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Swansea Bay and West Wales Metro
WelTAG Stage 2
Final Report

October 2021

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Swansea Bay and West Wales Metro - WelTAG Stage 2 Final Report

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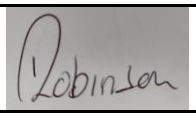
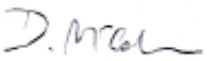
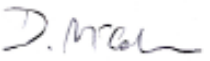
Author	Will Robinson		22/10/2021
Checker	David McCallum		22/10/2021
Approver	David McCallum		22/10/2021

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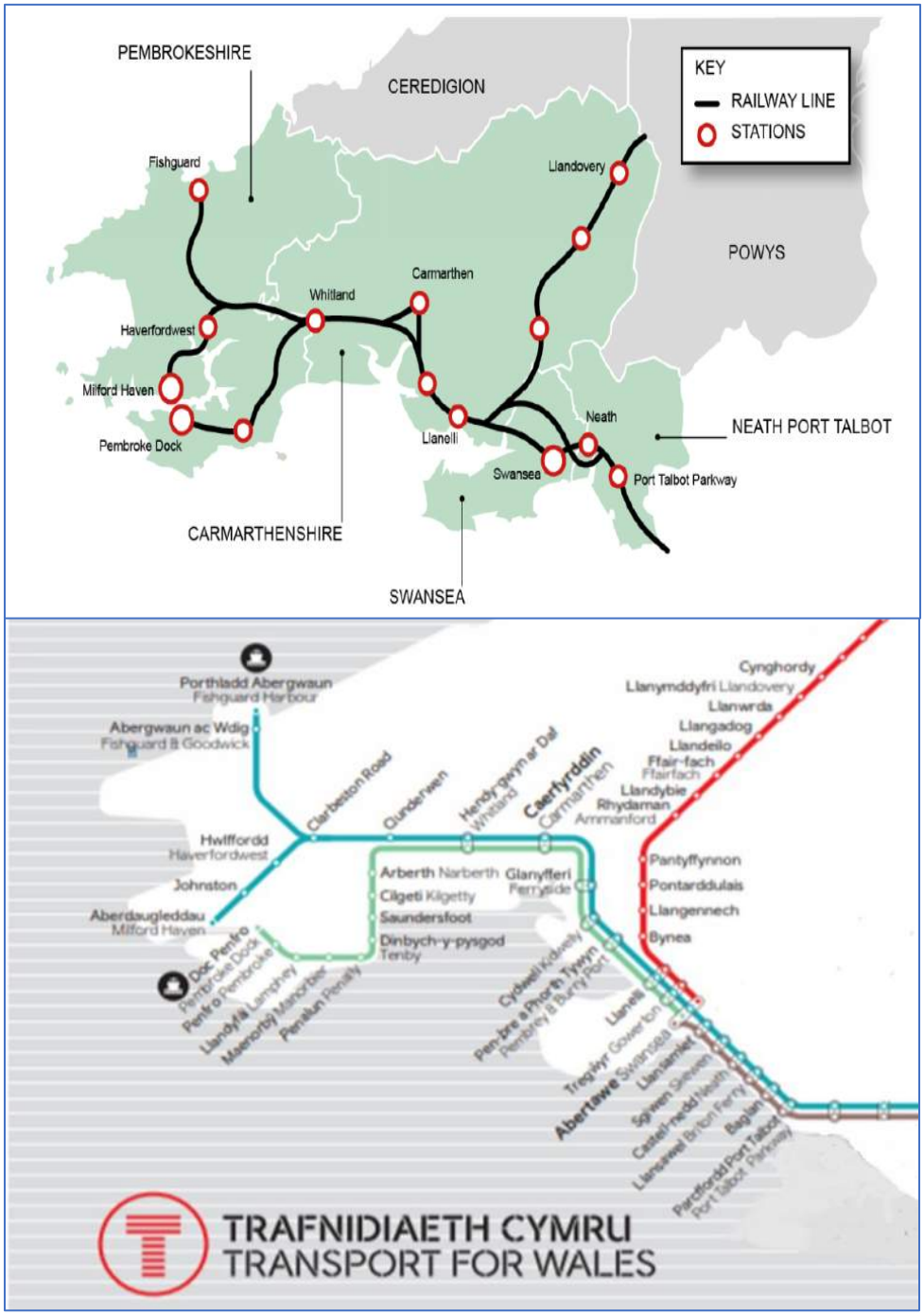
Appendix A - Option Appraisal Summaries

1. Executive Summary

1.1 Introduction

The study area is the South West Wales region including the counties of Pembrokeshire, Carmarthenshire, Swansea and Neath Port Talbot as illustrated in Figure 1.1.

Figure 1-1 Study Area



The WelTAG Stage 1 work was initially considered under five areas of intervention:

- Strategic services to West Wales & Swansea (Options 1, 2, 3, 4, 5, 6, 27)
- Swansea – West Wales frequency/connectivity (Options 7A, 7B, 8, 9A, 9B, 10, 11, 28).
- Swansea Bay Metro Services (Options 12, 13, 14, 15, 16, 17, 18, 19, 20, 26)
- New Stations (21, 22, 23, 24A, 24B, 24C, 24D1, 24D2); and
- Station improvements (Options 25A, 25B, 25C, 25D).

The proposed interventions at the end of WelTAG stage 1 were regrouped into 3 areas:

1. Strategic South Wales Mainline (SWML) Measures
2. Local Measures on existing rail network
3. New Urban Area Metro

Due to the interrelationship between the South Wales Mainline Services in South West Wales and the rest of South Wales the interventions in area 1 are now being looked at under a separate study. The options which fall into areas 2 and 3 are the subject of this WelTAG Stage 2 report.

1.2 Strategic Case

1.2.1 Policy Context

Three new national policies have been released since the original Stage 1 work (Llwybr Newydd: A New Wales Transport Strategy (2021), New Development Plan 2040 - Future Wales – the National Plan 2040, Planning Policy Wales, Edition 11, February 2021). These have been reviewed to confirm that options under consideration contribute to their strategic aims.

1.2.2 Objectives of the Study

The Swansea Bay Metro Region objectives from the stage 1 assessment will be carried forward to this stage 2 assessment and are as follows:

1. Reduce journey times between key population centres including Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke and Milford Haven.
2. Increase service frequencies
    a. For local stations on the main line between Carmarthen and Port Talbot, especially during peak periods
    b. On the Heart of Wales Line to serve commuters into Swansea and beyond
    c. Across South West Wales to improve suitably for daily commuting
3. Improve regional transport accessibility, including connectivity to Enterprise Zones, through widening the spatial reach of the rail network and services.
4. Improve Park and Ride provision for access to the Swansea Bay region.
5. Provide a viable public transport alternative to the congested M4/A48 corridor
6. Contribute to developing a Swansea Bay Urban Area Metro including improvements to multi-modal interchanges.
7. Maximise the potential for stations to accelerate urban regeneration and major development site delivery
8. Increase the number of trips made by public transport, focusing particularly on commuter trips.
9. Reduce the environmental impact of transport, especially carbon emission and air quality
10. Improve rail network efficient to allow a lower future subsidy requirement per passenger.

1.2.3 Option Development

Options 1 to 6 inclusive and Option 27 from the WelTAG stage 1 report will be considered as part of a separate workstream looking at the entire South Wales Main Line due to the interdependencies with other proposals on this section of the rail network. These options will therefore not be considered further in this report. These include study objectives such as improving access to enterprise zones located on the western side of the region.

At stage 1 Options 10 and 20 were identified to not progress to stage 2 assessment due to timetabling difficulties or infrastructure constraints and will not be considered further at present. St Clears station (Option 21) has now received New Station Funding and can therefore be considered as a committed scheme and is also not assessed further in this report.

At stage 1 the new stations were considered independently, however for this assessment they have been grouped with the appropriate service option as they are co-dependant. Most of the new stations are not on the existing passenger rail network so would require the new services to operate and provide connections. Option 25E and 25F (Neath and Milford Haven Station Improvements) are being progressed separately by third parties. To avoid duplication of the assessment process they are therefore not considered further in this report.

Option 7a and 7b

Services currently operate from Manchester hourly with the terminus alternating between Milford Haven and Carmarthen. The Option 7 proposal will add a 2-hourly infill service when the Manchester service terminates at Carmarthen to provide hourly service to Milford Haven starting from either Swansea (Option 7a) or Carmarthen (Option 7b). This option is an alternative to the Manchester service extension (Option 8). It should be noted that the timetabling analysis carried out for this study indicates that every 4 hours the train extent may need to be limited to Haverfordwest due to Milford Haven freight paths and Branch Line capacity. This option does not introduce any new stations (it is assumed that St Clears is a committed scheme) and there is no infrastructure required.

Option 8

This option involves extending the existing Manchester services that terminate at Carmarthen every 2-hours to Milford Haven to provide hourly service. This is an alternative option to Options 7a/7b, and the services will have a similar issue with capacity at Milford Haven, meaning every 4 hours, one service may have to terminate at Haverfordwest instead of continuing to Milford Haven. Again, no infrastructure is required and no new stations.

Option 9a and 9b

There is currently a two-hourly service between Swansea and Pembroke Dock. These options involve increasing service frequencies on the Pembroke Dock Branch Line, by operating an additional train every 2 hours, starting from either Swansea or Carmarthen. This additional train was assessed as a limited stop service on the Branch (Serving Pembroke Dock, Pembroke, Tenby and Whitland) in order to meet timetabling requirements. In combination with existing services this provides an hourly service to the stations with the most demand.

Option 11

Option 11 will provide additional services on the Fishguard Harbour Branch Line, to provide a 2-hourly interval service from Carmarthen, increasing from a 7 trains per day (tpd) service in

2019. This will require two additional return services per day. An option from Swansea was also assessed but was not operationally viable due to turnround time at Swansea

Option 12

This proposal is for a new metro service, which will operate a 2 trains per hour (tph) service between Pontarddulais and Swansea via Neath, using the Swansea District Line (SDL). Much of the route uses existing rail infrastructure. The route will require a new chord at Cwrt Sart, to connect the SDL to the current South Wales Mainline (SWML) south of Neath. Technical reviews (engineering and signalling) conclude that it is feasible to deliver this new infrastructure.

New signalling (turn back facility) will also be required at Pontarddulais, as the station will be the terminus station for the service. The proposal will serve new stations at Landore, Winch Wen, Llandarcy, Morriston, Felindre and Pontlliw. (based on a higher demand forecast and technical planning/engineering factors Pontlliw was considered a more viable location than Penllergaer). Initial feasibility design options have been produced for stations at Landore and Llandarcy plus feasibility design work for Cwrt Sart chord and feasibility studies of signalling capacity and turnback requirements.

Option 13

This option will provide a new Metro service between Pembrey and Burry Port and Swansea, providing 2 trains per hour (tph) at 5 stations: Pembrey and Burry Port, Llanelli, Gowerton, Cockett and Swansea. Cockett station will be a new station and a preferred location has been identified following an engineering review, however feasibility design will need to be undertaken.

Timetabling assessment concluded that the service was achievable, but would need to be reviewed in combination with additional service proposals to Carmarthen to ensure services were not duplicated. Extending the option west of Pembrey & Burry Port would be difficult to justify given the smaller population and higher operating costs. A new turnback facility will be required at Pembrey and Burry Port. Engineering studies for the turnback facility have not been undertaken at this stage.

Option 14

This option involves building a new North West to South East chord connecting the SWML to the Heart of Wales line at Llandeilo Junction. This will mean that Heart of Wales line services will not need to reverse at Llanelli, reducing journey times. This will result in Heart of Wales services no longer calling at Llanelli. For this option the new junction has been considered in the context of the existing Heart of Wales line services only, however it could be provided in conjunction with Option 28 or Option 15.

Option 15

Option 15 proposes a new Metro service between Pantyffynnon/ Ammanford and Gwaun Cae Gurwen. The route will use an existing freight route from the Heart of Wales line at Pantyffynnon, to a coal loading point at Gwaun Cae Gurwen.

To make the route suitable for passenger operations extensive route works would be necessary including to track, signalling, telecommunications and level crossing upgrades. The assessed option considered a 30-minute frequency requiring a passing loop and 3 new stations located at Ammanford (Town), Glanaman and Gwaun Cae Gurwen.

Option 16

Option 16 is a Metro service between Neath and Onllwyn, which would use an existing freight route which travels to an open cast colliery in Onllwyn. The option would involve new stations being built at Neath Riverside, Aberdulais, Cryant, Seven Sisters and Onllwyn.

To make the route suitable for passenger operations track upgrade works would be needed, including a passing loop and associated signalling and level crossings to accommodate a proposed 30-minute service. As the existing freight only route does not connect to the SWML at Neath, this option has potential to form an extension of the plans detailed in Option 18.

Option 17

Option 17 also involves a service from a new Neath Riverside station, and like Option 16, this new Metro route has potential to be an extension of the proposals detailed in Option 18. The route will connect Neath Riverside to Cwmgwrach using the existing freight line which serves a coal loading point at Cwmgwrach. The options will provide new stations at Neath Riverside, Aberdulais & Tonna, Resolven and Cwmgwrach. To make the route suitable for passenger operations track upgrade works would be needed, including a passing loop and associated signalling to accommodate a proposed 30-minute service.

Option 18

This option involves a new service between Neath Riverside and Swansea City Centre via Swansea Docks, at a proposed 30-minute frequency. The proposal will involve tram train operation, and a section of the route will involve street running. The route will make partial use of existing freight routes to Swansea Docks and will require a significant new on street alignment into the city centre. Double track, electrification, tram control system/signalling, level crossings will be needed as part of the infrastructure works.

Although similar alternative alignments may be possible at this stage a route has been identified with potential stations at Swansea High Street, College Street, Strand, Port Tennant, Langdon, University (Bay campus), Bay Studios Jersey Marine, Llandarcy, Neath Abbey, and Neath Riverside. These are closer together than the other routes, in line with light rail characteristics with quicker acceleration and deceleration and the route travelling through areas of dense land use.

Option 19

Like Option 18, Option 19 is a new Metro service which will use tram train running for a Clydach to Swansea City Centre route, also via Swansea Docks. The route will serve stations at Swansea High Street, College Street, Strand, Port Tennant, Langdon, University (Bay campus), Bay Studios Jersey Marine, Llandarcy and Clydach. It will share the same route as Option 18 between Swansea City Centre and Jersey Marine, before branching off via Llandarcy to Clydach and has a proposed frequency of 30 minutes.

As with Option 18 the route will be mostly new alignment from the city centre but will share section of docks freight route, Swansea District line and a restored railway to Clydach. Double track, electrification, tram control system/signalling, level crossings will be needed as part of the infrastructure upgrades.

Option 25

There are 6 (A-F) sub options associated with Option 25, but the option involves making interchange improvements to current stations at Carmarthen (A), Pembrey and Burry Port (B), Whitland (C), Llanelli (D), Neath (E) and Milford Haven (F). Proposals include various combinations of car parking, crossing upgrade, inter-platform access, drop-off /interchange (buses, taxis, cars).

Option 26

Option 26 involves electrifying the routes from Swansea to Pembrey and Burry Port and Pontarddulais. This option would be difficult to implement until the SWML electrification has been completed between Cardiff and Swansea as this would introduce a new grid feeder near Port Talbot. This will allow new electric train or tram-train stock to use the routes, reducing carbon emissions and improving performance.

Option 28

Option 28 will look to provide an additional Swansea to Llandovery train to increase the total trains per day along this section of the Heart of Wales Line to 7. This comprises the existing 4 trains a day which travel beyond Llandovery towards Shrewsbury, the planned 5th through service and the existing return Swansea to Llandovery return service. Timetabling work has been carried out and identified an opportunity to provide this service.

1.2.4 Summary of Strategic Case

The option summary tables favour the proactive options, with the 'Do Minimum' approach ranking poorly in comparison to the other options. All the proactive options score favourably against the new Welsh Transport Strategy's ambitions and priorities.

The West Wales frequency Options (7, 9a, 9b, 11) which involve new or reconfigured services score slightly better than those which extend existing services (8) as they have fewer timetabling interdependencies. However, Option 8 does score well in terms of employment access and connecting Wales and England through the extended Manchester service.

The Metro options (12-19) are slightly more complicated to deliver as they generally involve infrastructure works with a longer timeframe and use alignments which are currently disused or lightly trafficked, currently used by infrequent freight services which means service intensification may be less publicly acceptable. However, the Metro options do provide more social and cultural benefits. There are also more risks associated with developing the Metro options, with large infrastructure requirements. Options 14-19 are at an early stage of development. All Metro options will require further design to refine scheme costs and risks to complete Stage 2 if taken forward.

The station improvement options can generally be delivered in a short to medium timeframe and are likely to be acceptable to the public and relatively little risk which scores positively for deliverability. Risks to these include issues over third-party land ownership, which affects Options 25c and 25d. Station improvement options will also provide townscape and landscape improvements to the towns they are situated in.

Whilst electrification of Swansea Bay Metro (26) would have a positive impact on air pollution levels, carbon emissions and journey times, this option has a relatively negative overall deliverability score, due to its dependency on prior SWML electrification between Cardiff and

Swansea. This is to secure network continuity and the National Grid power requirements, making it a longer-term prospect.

Additional services on the Southern section of the Heart of Wales Line (28) have been subject to further timetabling assessment to confirm their technical viability, they have also been judged to have good public acceptability.

The Strategic Case was originally developed and presented at WelTAG Stage One. A review of the Strategic Case at WelTAG Stage Two has confirmed that the policy context, case for change, identified problems and study objectives remain current. The WelTAG Stage Two Strategic Case includes details of option development work and additional consultation activities that have been undertaken as part of WelTAG Stage Two to inform the appraisal process. The Strategic Case has considered the adverse impacts, dependencies, constraints and risks of each option.

The Strategic Case has appraised the short-listed options against national, regional and local policy objectives to assess their suitability and strategic fit as potential solutions. Each option has also been assessed against the study objectives and its ability to address the identified problems. This appraisal provides an update to the previous appraisal undertaken at WelTAG Stage One and reflects the additional option development work that has been undertaken.

Table 1-1 provides a summary of the results of the appraisal. Costs to Broad Transport Budget have been calculated through capital and revenue costs at 2010 prices and values, which is the accepted benchmark value.

Table 1.1: Appraisal Summary Table

Criteria	Qualitative Assessment (Options)																			
	7a	7b	8	9a	9b	11	12	13	14	15	16	17	18	19	25A	25B	25C	25D	26	28	29
Economic	Frequency Improvements - New service Swansea - Milford Haven	Frequency Improvements - New service Carmarthen - Milford Haven	Frequency Improvements - Extend Manchester (Carmarthen) - Milford Haven hourly	Frequency Improvements - New service Swansea - Pembroke Dock	Frequency Improvements - New service Carmarthen - Pembroke Dock	Frequency Improvements - Swansea - Fishguard (2 hourly)	Swansea Bay Metro (Services): Swansea to Pontarddulais viaNeath & SDL including: Option 22 - New Stations: Llandarcy, Option 23 - New Stations: Landore, Option 24A - New Metro station - Winch Wen, Option 24B - New Metro Station – Morriston, Option 24C - New Metro Station – Felindre, Option 24D1 - New Metro Station – Penllegaer, Option 24D2 - New Metro Station - Pontlliw	Swansea Bay Metro (Services): Swansea - Pembrey & Burry Port 2tph including: Option 24E - New Metro Station: Cockett	Additional cord to connect SWML to Swansea District line at Llandeilo junction (more direct link between Swansea and HoW line).	Swansea Bay Metro: Pantyffynnon (Ammanford) to Gwaun Cae Gurwen	Swansea Bay Metro: Neath to Onllwyn	Swansea Bay Metro: Neath to Cwmgwrach	Swansea Bay Metro: Neath - Llandarcy - Swansea City Centre via Swansea Docks (as Tram-Train Operation as a section off current rail alignment) including Option 22 - New Stations: Llandarcy	Swansea Bay Metro: Link from Swansea District Line to Clydach	Station Improvements: Carmarthen	Stattion Improvements: Bury Port	Station Improvements: Whitland	Station Improvements: Llanelli	Electrification of Swansea Bay Metro to allow Tram-Train operation	Frequency Improvements - Heart of Wales (southern section) additional tpd (7)	Do Minimum
Business Users & Reliability Impact	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
Regeneration	0	0	0	0	0	0	+	+	0	0	0	0	+	0	+ +	+	+	+ +	+	+	0
Wider Impacts	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0
Environment																					
Noise	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Air Quality	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+ +	+	-
Greenhouse Gases	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+ + +	+	-
Landscape	0	0	0	0	0	0	+	+	-	0	0	0	+	-	+	0	0	+	0	-	0
Townscape	0	0	0	0	0	0	+ +	+ +	0	0	+	+	+ +	0	+ +	+ +	+ +	+ +	0	0	0
Historic Landscape	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cultural Heritage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0
Biodiversity	0	0	0	0	0	0	0	0	-	0	0	0	0	-	0	0	0	0	+	0	0
Water Environment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Social and Cultural																					
Commuting and Other Users	+ +	+ +	+ +	+ +	+ +	+ +	+	+	+ +	+ +	+ +	+ +	+ +	+	+ +	+ +	+ +	+ +	+ +	+	-
Reliability Impact on Commuting and Other Users	+ +	+ +	+ +	+ +	+ +	+ +	0	0	+ +	+ +	+ +	+ +	+ +	+	+ +	+ +	+ +	+ +	+ +	+	-
Physical Activity	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	+	-
Journey Quality	+ +	+	+	+	+	+	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	- -
Accidents	0	0	0	0	0	0	0	0	0	0	0	0	0	0	+	0	0	0	0	0	0
Security	0	0	0	0	0	0	+	+	0	0	0	0	+	0	+	+	+	+	0	0	0
Access to Services	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+	0	- -
Welsh Language	0	0	0	0	0	0	0	0	0	0	0	0	+	0	+	+	+	+	0	0	0
Tourism	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	0	0	0	0	0
Affordability	+	+	+	+	+	+	0	0	-	-	-	-	0	-	-	0	-	0	- -	-	+ +
Severance	+	+	+	+	+	+	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	0	+ +	0
Option Values	+	+	+	+	+	+	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+	+	+	+	+ +	+ +	-
Public Accounts																					
Cost to Broad Transport Budget	£127,986,678	£79,616,155	£53,173,780	£101,669,563	£80,451,538	£11,069,357	£255,060,090	£170,086,129	£23,093,525	£117,890,376	£146,362,053	£129,291,294	£432,043,881	£364,244,545	£4,879,354	£2,144,280	£2,967,885	£1,275,764	£161,400,119	£5,122,759	NYA
Indirect Tax Revenues	-	-	-	-	-	-	- -	-	0	-	-	-	- -	- -	-	-	-	-	-	-	-

Key

- Large positive (+ + +)
- Moderate positive (+ +)
- Slight positive (+)
- Neutral (0)
- Slight negative (-)
- Moderate negative (- -)
- Large Negative (- - -)
- Not Yet Assessed (NYA)

1.3 Transport Case

1.3.1 Capital Costs

The WelTAG Stage Two process has involved the development of preliminary capital cost estimates for each of the options under consideration. Values used for the BCR calculation include Risk and Optimism Bias in line with Transport Appraisal Guidance.

1.3.2 Operational Costs

Operational costs have been calculated based on the mileage of the service and includes train crew, track access charges, rolling stock lease costs, maintenance cost allowances.

1.3.3 Monetised Benefits

The benefits of each scheme include:

- Revenue (based on Demand Forecasts)
- Journey Time Savings and User Cost Savings
- Marginal External Costs
- Physical Activity Benefits

1.3.4 Non - Monetarised Benefits – Assessment of Impacts

This qualitative appraisal has been reviewed and updated for WelTAG Stage Two, to reflect the additional option development work, the environmental and ecological reviews and economic assessment that has been undertaken.

Table 1.2 - Summary of Appraisal Worksheets

Option Ref	Option	Wales Transport Strategy Outcomes		WBOFGA Goals & Local Well-being Objectives	Welsh Government Well-being Objectives				Local Transport Plan Objectives	Swansea Bay City Region Objectives	Scheme Objectives										Tackling Problems	Appraisal Summary Table				Delivery
											Swansea Bay Objectives						Combined									
		Ambitions	Priorities		Prosperous and Secure	Healthy and Active	Ambitious and Learning	United and Connected			1	2	3	4	5	6	7	8	9	10		Econ.	Env.	Soc. & Cul	Pub. Acc.	
7a	Frequency Improvements - New service Swansea - Milford Haven	+	+ +	+	+ +	0	0	+	+	0	+ +	+ + +	+ +	0	0	0	+	+	+	+	+ +	+	+	+ +	NYA	-
7b	Frequency Improvements - New service Carmarthen - Milford Haven	+	+ +	+ +	+ +	0	0	+	+	0	+ +	+ + +	+ +	0	0	0	+	+	+	+	+ +	+	+	+ +	NYA	-
8	Frequency Improvements - Extend Manchester (Carmarthen) - Milford Haven hourly	+	+ +	+ +	+ +	0	0	+	+	0	+ +	+ +	+ +	0	0	0	+	+	+	+	+ +	+	+	+ +	NYA	-
9a	Frequency Improvements - New service Swansea - Pembroke Dock	+	+	+	+ +	0	0	+	+	0	+ +	+ + +	+ +	0	0	0	+	+	+	+	+ +	+	+	+ +	NYA	-
9b	Frequency Improvements - New service Carmarthen - Pembroke Dock	+	+	+	+ +	0	0	+	+	0	+ +	+ + +	+ +	0	0	0	+	+	+	+	+ +	+	+	+ +	NYA	-
11	Frequency Improvements - Swansea - Fishguard (2 hourly)	+	+	+	+ +	0	0	+	+	0	+ +	+ + +	+ +	0	0	0	+	+	+	+	+ +	+	+	+ +	NYA	-
12	Swansea Bay Metro (Services): Swansea to Pontarddulais viaNeath & SDL including: Option 22 - New Stations: Llandarcy, Option 23 - New Stations: Landore, Option 24A - New Metro station - Winch Wen, Option 24B - New Metro Station – Morriston, Option 24C - New Metro Station – Felindre, Option 24D1 - New Metro Station – Penllegaer, Option 24D2 - New Metro Station - Pontlliw	+	+	+	+	0	0	+	+ +	0	+ +	+ +	+ +	0	0	+	+ +	+	+	+	+	+	+	+ +	NYA	-
13	Swansea Bay Metro (Services): Swansea - Pembrey & Burry Port 2tph including: Option 24E - New Metro Station: Cockett	+	+	+	+	0	0	+	+ +	0	+ +	+ +	+ +	0	0	+	+ +	+	+	+	+	+	+	+ +	NYA	-
14	Additional cord to connect SWML to Swansea District line at Llandeilo junction (more direct link between Swansea and HoW line).	+	+	+ +	+	0	0	+	+ +	0	+ +	+ + +	+ +	0	0	+	+	+	+	+	+	+	+	+ +	NYA	- -
15	Swansea Bay Metro: Pantyffynnon (Ammanford) to Gwaun Cae Gurwen	+	+	+ +	+	0	0	+	+ +	0	+	+	+ +	0	0	0	+	+	+	+	+	+	+	+ +	NYA	- -
16	Swansea Bay Metro: Neath to Onllwyn	+	+	+	+	0	0	+	+ +	0	+	+	+ +	0	0	0	+	+	+	+	+	+	+	+ +	NYA	- -
17	Swansea Bay Metro: Neath to Cwmgwrach	+	+	+	+	0	0	+	+ +	0	+	+	+ +	0	0	0	+	+	+	+	+	+	+	+ +	NYA	- -
18	Swansea Bay Metro: Neath - Llandarcy - Swansea City Centre via Swansea Docks (as Tram-Train Operation as a section off current rail alignment) including Option 22 - New Stations: Llandarcy	+	+	+	+	0	0	+	+ +	0	+ +	+	+ +	0	0	0	+	+	+	+	+	+	+	+ +	NYA	- -
19	Swansea Bay Metro: Link from Swansea District Line to Clydach	+	+	+	+	0	0	+	+ +	0	+	+	+	0	0	0	+	+	+	+	+	+	+	+ +	NYA	- -
25A	Station Improvements: Carmarthen	+	+	+	+	0	0	+ +	+	0	+	0	+ +	0	+	0	+ +	+	+	+	+ +	+	+	+ +	NYA	-
25B	Stattion Improvements: Bury Port	+	+	+	+	0	0	+ +	+	0	+	0	+ +	0	0	0	+ +	+	+	+	+	+	+	+ +	NYA	-
25C	Station Improvements: Whitland	+	+	+	+	0	0	+ +	+	0	+	0	+ +	0	+	0	+ +	+	+	+	+	+	+	+ +	NYA	-
25D	Station Improvements: Llanelli	+	+	+	+	0	0	+ +	+	0	+	0	+ +	0	+	0	+ +	+	+	+	+	+	+	+ +	NYA	-
26	Electrification of Swansea Bay Metro to allow Tram-Train operation	+	+ +	+ +	+ +	+	0	+	+ +	0	+	+	+	0	+	0	+	+	+ + +	+	+ +	+	+	+ +	NYA	-
28	Frequency Improvements - Heart of Wales (southern section) additional tpd (7)	+	+	+ +	+ +	0	0	+	+	0	+ +	+ + +	+ +	0	0	0	+	+	+	+	+	+	+	+ +	NYA	-
29	Do Minimum	-	0	0	-	0	0	- -	0	0	-	-	-	0	0	0	-	-	-	-	0	0	0	0	NYA	- -

Key

Large positive (+ + +)
Moderate positive (+ +)
Slight positive (+)
Neutral (0)
Slight negative (-)
Moderate negative (- -)
Large negative (- - -)
Not Yet Assessed (NYA)

Key:
Scheme Objectives
(1) Reduce journey times between key population centres including Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke and Milford Haven.
(2) Increase service frequencies: for local stations on the main line between Carmarthen and Port Talbot, especially during peak periods, on the Heart of Wales line to serve commuters into Swansea and beyond, across South West Wales to improve suitability for daily commuting
(3) Improve regional transport accessibility through widening the spatial reach of the rail network and services.
(4) Improve Park and Ride provision for access to the Swansea Bay region.
(5) Provide a viable public transport alternative to the congested M4/A48 corridor.
(6) Contribute to developing a Swansea Bay Urban Area Metro including improvements to multi-modal interchanges.
(7) Maximise the potential for stations to accelerate urban regeneration and major development site delivery.
(8) Increase the number of trips made by public transport, focusing particularly on commuter trips.
(9) Reduce the environmental impact of transport, especially carbon emissions and air quality.
(10) Improve rail network efficiency to allow a lower future subsidy requirement per passenger.

1.3.5 Transport Case Summary

The Transport Case has considered the social, cultural, environmental and economic impacts of each of the shortlisted options. This has included a quantitative economic assessment of the costs and benefits of each option and a qualitative appraisal that has considered wider social, cultural and environmental impacts.

Based on the BCR values the options which delivery best value for money (high or medium VfM classifications) are Option 12, Option 13, Option 25B, 25C, 25D, Option 18, and Option 19. Options which still have a positive business case but low value for money classification are Option 7a, Option 9a, Option 15, Option 25A and Option 28. The remaining options (7b, 8, 9b, 11, 14,16,17, 26) have a poor value for money classification, however if they have a significant non-monetised impact some may still be worth pursuing to meet strategic aims as part of a comprehensive transport offer or form part of a longer term strategy.

In relation to the qualitative Transport Case appraisal, all options scored positively overall against the economic, environmental, social and cultural criteria indicating that they have benefits beyond those which are readily quantifiable. The West Wales frequency options and some of the Metro lines score slightly higher (moderate beneficial + +) as they increase accessibility in areas which currently have restricted public transport options.

A summary of the transport case is included as Table 1-3.

It should be noted that all cost estimates on which the economic assessment is based are preliminary in nature, which reflects the current stage of development of each of the options. Any changes to cost estimates should options be further developed will impact on the economic assessment, which will need to be revisited and refined to reflect any further development work.

It should also be noted that this current assessment is based on usage data from before the Covid-19 pandemic which has had a significant impact on transport demand and capacity. Some assumptions about transport recovery have been made (i.e. that public transport demand returns to 2019 levels by 2025) however to what extent and how quickly transport usage returns to this level will have to be monitored.

Table 1-3 Summary of the Transport Case

Option	Net Present value	Initial BCR	Qualitative assessment	Key risks and uncertainties	VfM category
Option 7a - New service Swansea to Milford Haven	£ 29,698,469	1.2	+ +	Duplicates existing Manchester service between Swansea and Carmarthen. Would need to be reviewed if progressed with other options increasing frequency between Carmarthen and Swansea to ensure timetable capacity with other services	low
Option 7b - New service Carmarthen to Milford Haven	-£30,931,519	0.6	+ +		poor
Option 8 - Extend Manchester (Carmarthen) - Milford Haven hourly	-£3,667,647	0.9	+ +	Reliant on long distance services and wider timetabling constraints, however this means a good fit with current operations to Milford Haven.	poor
Option 9a - New service Swansea – Pembroke Dock	£54,883,798	1.5	+ +	Would need to be reviewed if progressed with other options increasing frequency between Carmarthen and Swansea to ensure timetable capacity with other services	low
Option 9b - New service Carmarthen - Pembroke Dock	-£25,655,929	0.7	+ +		poor
Option 11 - Carmarthen - Fishguard (2 hourly)	-£2,641,365	0.8	+ +	Recast timetable would need to be considered with ferry times to ensure service still provides connections	poor
Option 12 - Swansea to Pontarddulais via Neath & SDL	£496,232,701	2.9	+ +		high
Option 13 - Swansea to Burry Port Metro Service	£113,886,194	1.7	+ +		medium
Option 14 - Additional chord to connect SWML to Swansea District Line at Llandeilo junction	-£22,498,837	0.03	+ +		poor
Option 15 - Swansea Bay Metro: Pantyffynnon (Ammanford) to Gwaun Cae Gurwen	£2,352,054	1.0	+	Most demand from Ammanford	low

Option	Net Present value	Initial BCR	Qualitative assessment	Key risks and uncertainties	VfM category
Option 16 - Swansea Bay Metro: Neath to Onllwyn	-£80,413,874	0.5	+		poor
Option 17 - Swansea Bay Metro: Neath to Cwmgwrach	-£64,318,846	0.5	+		poor
Option 18 - Swansea Bay Metro: Neath - Llandarcy - Swansea City Centre via Swansea Docks	£401,231,271	1.9	+		medium
Option 19 - Swansea Bay Metro: Link from Swansea District Line to Clydach	£326,499,167	1.9	+		medium
Option 25A - Station Improvements: Carmarthen	£9,267,913	2.9	+		high
Option 25B - Station Improvements: Pembrey & Burry Port	£557,180	1.26	+		low
Option 25C - Station Improvements: Whitland	£3,111,941	2.05	+		high
Option 25D - Station Improvements: Llanelli	£19,989,098	2.35	+	NR depot would require relocating to provide parking all in one location to meet demand. Some potential road safety issues to address.	high
Option 26 - Electrification of Swansea Bay Metro to allow Tram -Train	-£62,812,304	0.6	+ +	Likely to need mainline electrification to precede Metro electrification to be cost effective.	poor
Option 28 - Heart of Wales (southern section) additional train per day	£671,667	1.1	+ +		low
Option 29 - Do Minimum	N/A	N/A	- -	No transport improvements, Air quality and greenhouse gas emissions will not be reduced. Net Zero targets unlikely to be met.	N/A

1.4 Financial Case

The Financial Case has identified the capital costs and ongoing revenue costs anticipated for each option assessed. The Financial Case has considered factors affecting the lifetime costs of each option, potential sources of funding and accounting implications to public sector organisations.

The options assessed vary in the scale of the capital investment required at the start of the project but also in the ongoing costs of each option.

The frequency enhancements between Swansea or Carmarthen and Milford Haven, Pembroke Dock or Fishguard Harbour have no capital cost requirements only operational costs as they can be provided without the need for additional infrastructure. The services are likely to require subsidy support as revenues do not exceed operational costs.

The station enhancements require an initial capital investment but have only a small increase in operational costs. Provided a source of funding for the relatively modest capital investment can be secured the ongoing financial requirements are minimal.

The Metro options require the most substantial capital cost investment and have significant operational costs which will be a recurring financial commitment. Most of these services will require a subsidy to part fund their operating costs.

The package of options taken forwards will require a substantial capital investment from Welsh Government but has the potential to offer a step-change in the provision of public transport in Swansea Bay and West Wales. There will also be ongoing operational costs which will also require funding. The proposed public transport options also make a wider contribution towards reducing carbon emissions and achieving the legally binding targets that have been set by government.

In all cases, further development and design work is needed to establish more robust cost estimates. The preliminary cost estimates, both capital and revenue, will be further developed and refined as any recommended options are progressed in greater detail during WelTAG Stage Three (Full Business Case).

1.5 Commercial Case

Each option under consideration (other than the do minimum) will require the procurement of capital works to deliver new infrastructure and/or procurement of a new service. At this stage of option development, the infrastructure procurement method and associated matters such as contract length, payment mechanism and pricing framework, have not been determined for the options. The service procurement are likely to be an extension of the existing arrangements with Transport for Wales Rail Services which has now been brought into Government ownership.

The WelTAG Stage Two Commercial Case has highlighted a range of issues that will need consideration when determining the most appropriate method of procurement. Issues identified include determining the lead body in the procurement process and whether an option is delivered as a single contract or would need to be procured as discreet elements,

this may be influenced by delivery timescales and funding availability especially where there are significant capital requirements.

Issues relating to the level of private and public sector involvement and on-going viability have also been identified for each option. Further information on all elements within the Commercial Case will be contained in the Full Business Case (WelTAG Stage Three).

1.6 Management Case

1.6.1 Summary of Management Case

The WelTAG Stage Two Management Case has provided an overview of the key development stages required for each option and the statutory procedures that may need to be undertaken. This has considered the development of each option in relation to:

- Additional evidence that may need to be obtained to assist scheme development;
- Feasibility and design work required;
- Environmental and ecological requirements;
- Statutory procedures/ legal requirements; and
- Land matters.

It is evident from the Management Case that each option under consideration requires further development work prior to scheme delivery.

The Management Case has also included an assessment of risks and deliverability issues affecting each option, which will need to be further developed and quantified as any recommended options are progressed to WelTAG Stage Three. Other aspects considered by the management case are the governance structure, project management processes and the role of the WelTAG Review Group.

1.6.2 Deliverability and Risk

The key risks and deliverability of the options are summarised in table 1-4.

Table 1-4 Deliverability and risk

Option No.	Option	Feasibility (Technical)	Acceptability	Timescale	Risks
7a/b	Frequency/Connectivity: new services from Swansea/Carmarthen to fill frequency gaps for Milford Haven	**0**	**+**	**2-3 yrs**	**0**
8	Frequency/Connectivity: extension of Manchester - Carmarthen, hourly service to Milford Haven	**-**	**+**	**2-3 yrs**	**-**
9a/b	Frequency/Connectivity: new services from Swansea/Carmarthen to fill frequency gaps for Pembroke Dock	**0**	**+**	**2-3 yrs**	**0**
11	Frequency/Connectivity: reconfigure TfW Fishguard Harbour services to provide 2 hourly timetable	**0**	**+**	**2-3 yrs**	**0**

Option No.	Option	Feasibility (Technical)	Acceptability	Timescale	Risks
12	Swansea Bay Metro (Services): Swansea to Pontarddulais via Neath and Swansea District Line 2tph Infrastructure: Cwrt Sart Junction, Pontarddulais Turnback signalling & 6 new stations	-	0	5-7 yrs	-
13	Swansea Bay Metro (Services): Swansea to Pembrey & Burry Port 2tph Infrastructure: Signalling, Pembrey turnback and Cockett station	-	0	5-7 yrs	-
14	Additional cord to connect SWML to Swansea District Line at Llandeilo junction (more direct link between Swansea and HoW Line).	- - -	- -	7-10 yrs	- -
15	Swansea Bay Metro: Ammanford to Gwaun Cae Gurwen	- -	0	7-10 yrs	- -
16	Swansea Bay Metro: Neath to Onllwyn	- -	0	7-10 yrs	- -
17	Swansea Bay Metro: Neath to Cwmgwrach	- -	0	7-10 yrs	- -
18	Swansea Bay Metro: Neath - Llandarcy - Swansea City Centre via Swansea Docks	- -	-	7-10 yrs	- -
19	Swansea Bay Metro: Link from Swansea District Line to Clydach	- -	-	7-10 yrs	- -
25A	Station Improvements: Carmarthen	-	+	3-5 yrs	-
25B	Station Improvements: Pembrey & Burry Port	0	+	3-5 yrs	0
25C	Station Improvements: Whitland	-	+	3-5 yrs	-
25D	Station Improvements: Llanelli	-	+	3-5 yrs	- -
26	Electrification/Decarbonisation: Possible electrification of Swansea Bay Metro/wider services	- -	0	7-10 yrs	- -
28	Additional Services on southern section of HoW Line.	0	+	2-3 yrs	0
29	Do Minimum	0	0	0	0

1.7 Conclusion and Recommendations

At the end of WelTAG 2 only a single option should be taken forward to Stage 3 where more than one option exists. The proposals have different delivery timescales and will also need to advance at their own pace. Additionally, in terms of moving towards funding and delivery, focus is required on a limited number of schemes to take forward to full business case and secure funding alongside further development work for longer term prospects.

Options have been assessed individually to date, therefore when moving to a final package of measures consideration has been given to their strategic fit, and the potential implications of removing duplication in costs or benefits at Final Business Case.

1.7.1 West Wales Services

It is recommended that Option 8 (extending the Manchester service to Milford Haven) becomes the preferred option for this route, due to the fit with existing services and avoids duplication between Swansea and Carmarthen. However, this will need to be reviewed in the context of long-distance proposals being considered by the parallel work on the South Wales Main Line. Should this not be proceedable then Option 7b would remain viable.

Option 9a (Swansea to Pembroke Dock) is the recommended option to service Pembroke Dock Branch and would enable improvements to frequency to Pembroke Dock and between Swansea and Carmarthen.

Assuming it can be resourced from the existing fleet then Option 28 (additional service on the southern part of Heart of Wales Line) is also recommended.

Option 11 Carmarthen – Fishguard has good non-monetised benefits and fulfils a strategic role for this Branch but has a poor value for money, a more detailed rolling stock review (in conjunction with the operator) should be carried out to assess if this can be delivered with less rolling stock and therefore reduce the additional operating cost to improve the business case.

Table 1-5 summarises the options and recommendations for West Wales.

Table 1-5 Summary of options and recommendations (West Wales)

Route (additional frequency)	Capex (Opex)	Additional Demand	BCR	Delivery timescale	Recommendation
7a. Swansea – Milford Haven (2-hourly)	(3.5m)	224k	1.2	2-3 years	Not recommended. 7b or 8 preferred. Part duplicates existing services.
7b. Carmarthen – Milford Haven (2-hourly)	(2.2m)	58k	0.6	2-3 years	Not recommended. 8 preferred. Alt to 8, runs in same path. Saving of 0.5 unit + 9b
8. Carmarthen – M. Haven (MCR service, 2-hourly)	(1.5m)	58k	0.9	2-3 years	Preferred option, subject to strategic proposals
9a. Swansea – Pembroke Dock (2 hourly, limited stop)	(2.8m)	246k	1.5	2-3 years	Preferred option, subject to strategic proposals

9b. Carmarthen – Pembroke Dock (2 hourly, limited stop)	(2.2m)	81k	0.7	2-3 years	Not recommended. Saving of 0.5 unit + 7b. Alternate to 9a
11. Carmarthen – Fishguard 2-hourly	(306k)	8.6k	0.8	2-3 years	Rolling stock requirement needs detailed review.
28. 1 add tpd. Swansea – Llandovery return	(141k)	9.4k	1.1	2-3 years	Assumes resourced from current fleet

1.7.2 Station Improvements

The station improvements all have a reasonable business case and require a modest level of investment therefore are recommended for progression to further design development and stage 3 assessment TfW Rail are currently reviewing fifteen locations within south wales for improved parking provision and these proposals should be cross referenced against their scope to avoid duplication of design work. The option at Llanelli requires further investigation in regard to relocating the depot to accommodate a strategic level of parking provision in one location.

Table 1-6 Summary of options and recommendations (West Wales Station Improvements). The options listed in brackets are the localised options drawn up for each station, and the costs of these options are taken forward for the Capex and BCRs.

Route	Capex (Opex)	Additional Demand	BCR	Delivery timescale	Recommendation
Option 25A Carmarthen (Option 2)	£1.8m	55k	2.9	3-5 years	Progress subject to TFW rail services proposals
Option 25B Pembrey & Burry Port (Option 1)	£1.8m	5.7k	1.26	3-5 years	
Option 25C Whitland (Option 1 and 5 (With Bridge))	£2m	13k	2.05	3-5 years	Progress subject to TFW rail services proposals
Option 25D Llanelli (Option 2, 6 and 9)	£1.6m	156k	2.35	3-5 years	Strategic option requires depot relocation

1.7.3 Swansea Bay Metro

The Metro options recommended for initial progression to further design development and WelTAG 3 and full business case assessment are Option 12 (Swansea to Pontarddulais) and, subject to review with West Wales service options and line capacity, Option 13 (Swansea to Pembrey and Burry Port). In both cases these will require work to confirm cost and risks to complete all engineering deliverables in TfW Plan of works stage A & B before progressing design to Stage C and Full Business Case.

Options 18 and 19 are also recommended to progress but are subject to a longer timeframe for delivery and have some prerequisites to delivery. Due to the overlap of part of the route they should be considered as a package. A development package to undertake feasibility design work to allow protection of a preferred route alignment from development would be beneficial.

The chord at Llandeilo (Option 14) is not viable without further, more frequent Metro services to benefit from the time saving. The loss of serving Llanelli on the Heart of Wales services has a detrimental impact on the option.

Despite a BCR of 1.0 for Option 15 Pantyffynnon - Gwaun Cae Gurwen the non-monetised benefits are more limited due to the catchment size of the valley with the majority of demand at Ammanford. Without significant development, to generate more demand, the cost of providing the link all the way to Gwaun Cae Gurwen is unlikely to be justified. A more fundamental issue is the need for more frequent services beyond Ammanford which is not considered in the costing. There would be potential to extend Option 12 Pontarddulais Metro services to Ammanford which would serve a significant proportion of the demand of Option 15 and could act a hub to serve the rest of the valley via a bus-based option. This should be investigated as part of the design work for Option 12 but may have capacity considerations between Pontarddulais and Ammanford. A longer-term option may be a more direct route to Swansea in combination with Option 14.

Option 16 and 17 (Onllwyn and Cwmgwrach) experience a similar issue with low population levels and therefore demand. They are not recommended to be progressed at present as a rail-based Metro route. It is recommended that the development of Option 18 looks at extending to Aberdulais /Tonna as this would serve a large proportion of the demand from Options 16 and 17 without the full cost. There would then be potential for a hub and alternative provision for the northern part of the routes.

Table 1-7 Summary of options and recommendations (Swansea Bay)

Route	Capex (Opex)	Additional Demand	BCR	Deliverability	Recommendation
12. Swansea – Pontarddulais 2tph	£131m (4.5m pa)	1,730k	2.9	5 – 7 years	Progress as 1st Phase. Consider extension to Ammanford.
13. Swansea - Pembrey & Burry Port 2tph	£34m (4m pa)	630k	1.7	5 – 7 years	Needs review with WW service options.

14. Llandeilo Chord	£35.2m (-71k pa)	-	0.03	7-10 years	Not recommended unless part of Metro route
15. Pantyffynnon – Gwaun Cae Gurwen 2tph	£58m** (2.1m pa)	282k	1.0	7-10 years	Most demand from Ammanford.
16. Neath Riverside - Onllwyn 2tph	97.9m (2.1m pa)	159k	0.5	7-10 years	V. Low demand north of Aberdulais.
17. Neath Riverside – Cwmgwrach 2tph	81.3m (2m pa)	162k	0.5	7-10 years	Low demand north of Aberdulais
18. Swansea – Docks – Neath Riverside 2tph	£507m (2.2m)	2,225k	1.9	7-10 years	Potentially extend to Aberdulais /Tonna.
19. Swansea – Llandarcy-Clydach 2tph	£400m (2.4m)	1,893k	1.9	7-10 years	18/19 as a package.

Tph = Trains per hour

1.7.4 Summary of recommended options

Schemes need to be packaged into deliverable components which will then move forward at their own pace. Some development will also be required for longer term proposals so that they are ready for delivery in the future and to protect opportunities in terms of development (and also align development and planning policy to them).

Based on current assessment this initial package (See also figures 1-2 to 1-4) could comprise:

- Interchanges (Option 25)
- West Wales frequency
  - Option 8 Milford Haven (subject to outcome of strategic service SWML work).
  - Option 9a (Swansea - Pembroke Dock frequency),
  - Option 11 Carmarthen – Fishguard, subject to operator review)
  - Option 28 (7th Train for southern section of Heart of Wales Line).
- Swansea Bay Metro
  - Option 12 (Swansea – Pontarddulais, consider extension to Ammanford)
  - Option 13 (Swansea - Pembrey & Bury Port)

- Development package to confirm (and secure) route alignment
    - Option 18 Swansea – Neath (and extension to Aberdulais /Tonna)
    - Option 19 Swansea – Clydach

The total capital investment cost for the preferred package is £1.1billion (2021 costs). However the combined public transport improvements generate significant benefits with a resultant BCR value of 3.6.

Some mainline stations may be capable of standalone delivery, for example under New Station Funding (NSF), this should be investigated further. There should also be a review of extending Pontarddulais services (Option 12) to Ammanford, there will be an interface with Heart of Wales Line services and track capacity considerations but an Ammanford – Swansea service may be an option in the longer term. Option 11 (Fishguard services) should be reviewed with the operator to identify if a more efficient use of rolling stock could improve the business case. Electrification for Metro Phase 1 (Option 26) should be reviewed further to scheme development of Cardiff – Swansea mainline electrification.

Figure 1-2
Recommended West Wales service options

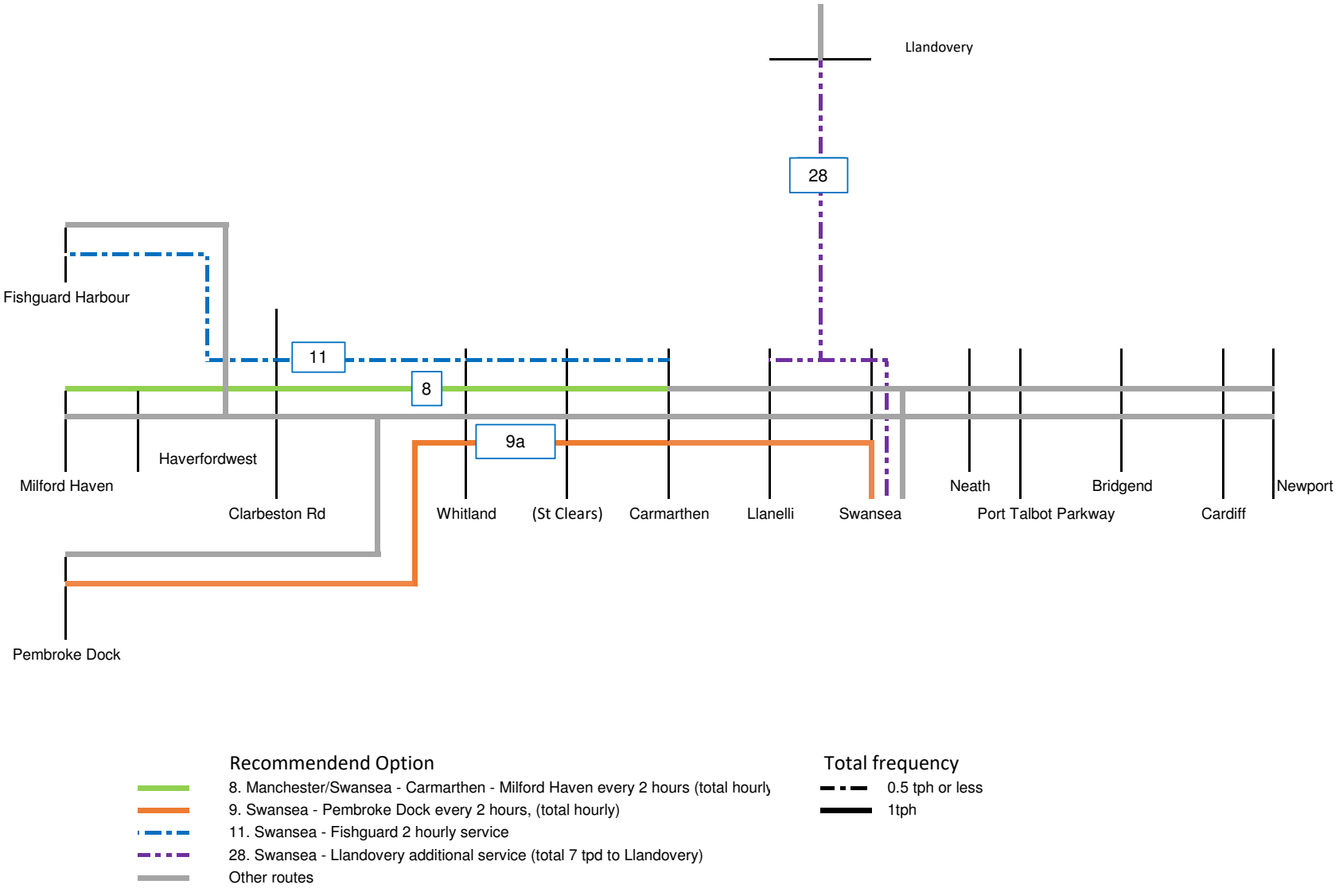
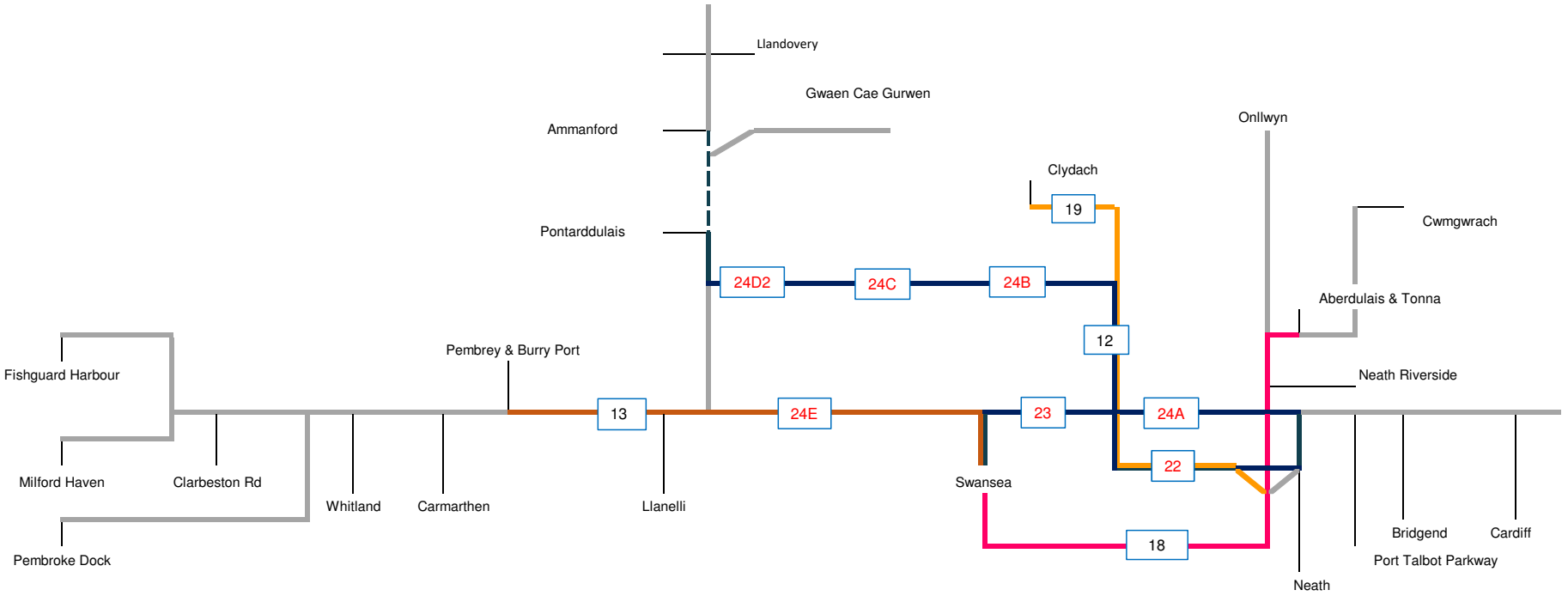


Figure 1-3
Recommended Metro Interventions



Recommended route options

- 12. Swansea - Neath - Pontarddulais
- 12. Potential extension to Ammanford
- 13. Swansea - Llanelli - Pembrey & Bury Port

Development package

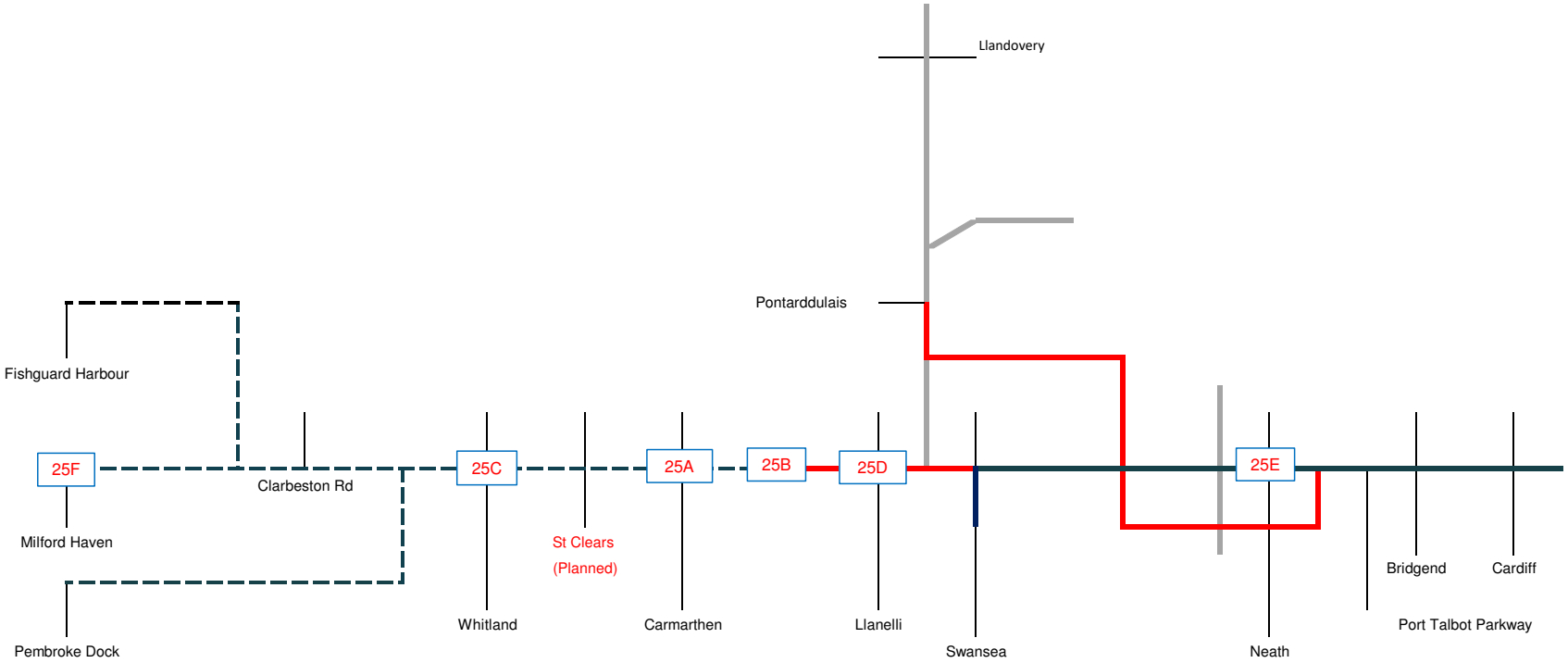
- 18. Swansea - Jersey Marine - Neath Riverside - Aberdulais
- 19. Swansea - Jersey Marine - Clydach

Existing lines

New stations (options 12/13)

22	Llandarcy Station
23	Landore Station
24A	Winch Wen Station
24B	Morriston Station
24C	Felindre Station
24D2	Pontillw Station
24E	Cockett Station

Figure 1-4
Recommended Station Interchange & Infrastructure Interventions



Recommended options

25A	Carmarthen Station improvements
25B	Pembrey & Burry Port Station improvements
25C	Whitland Station improvements
25D	Llanelli Station improvements
25E	Neath Station improvements
25F	Milford Haven Station improvements
	Cardiff - Swansea mainline electrification (Prerequisite)
	26. Phase 1 Metro Electrification (To review)
	Later Phase 1 Electrification

2. Introduction

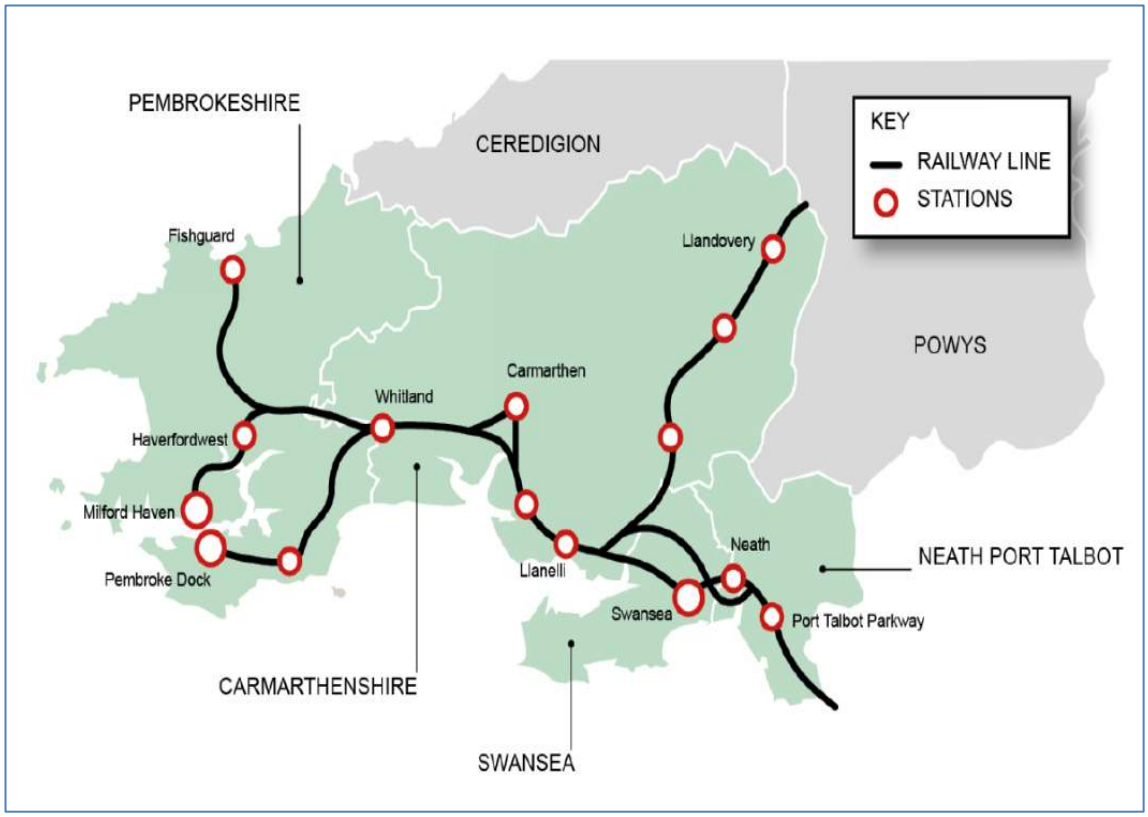
2.1 Swansea Bay and West Wales Metro Concept

Transport for Wales is developing Metro concepts for a number of areas across Wales. The concepts are to provide an accessible, integrated and comprehensive network using a variety of modes such as heavy rail, tram-train, light rail and bus as appropriate to individual routes. Integrated ticketing and active travel (walking and cycling) links into the transport network are also important components.

2.2 Study Area

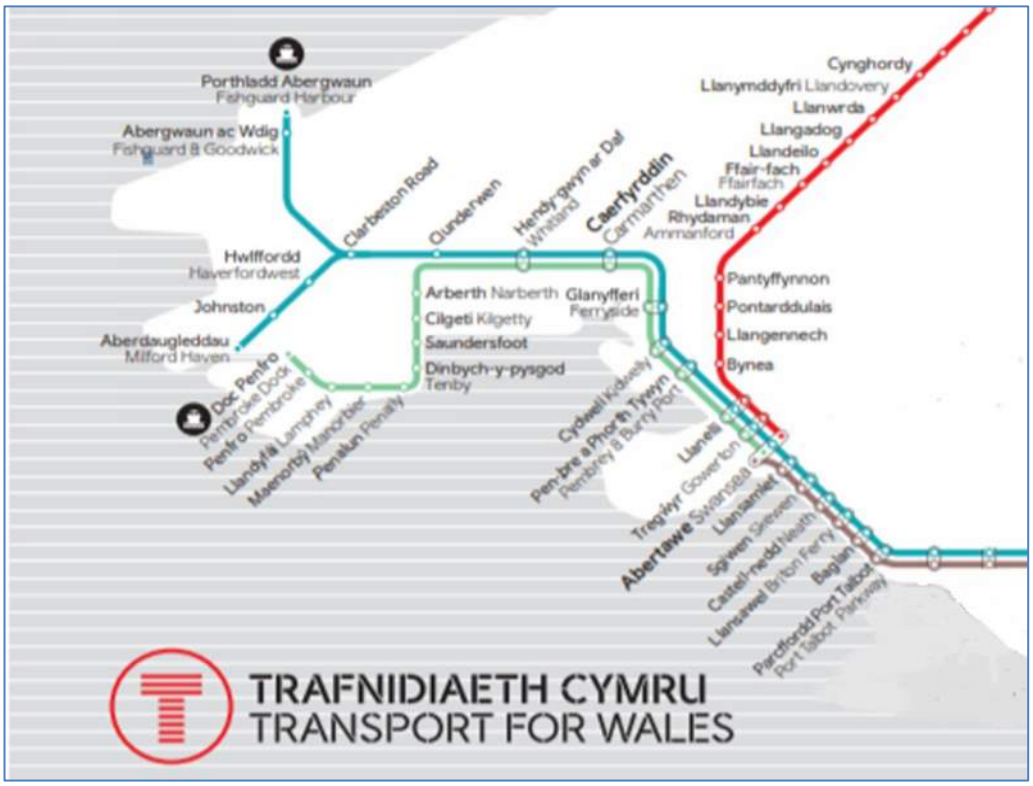
The study area is the Swansea Bay and West Wales region including the counties of Pembrokeshire, Carmarthenshire, Swansea and Neath Port Talbot as illustrated in Figure2-1. The area has wide ranging characteristics including the city of Swansea through to smaller towns and large rural areas. The existing railway stations in the area are shown in Figure 2-2. Existing service provision is detailed further in Appendix A of the IAR.

Figure 2-1 Study Area Map



The main rail routes are the South Wales Mainline (SWM2) with branches to Fishguard Harbour (NPF), Milford Haven (MIL) and Pembroke Docks (PEM) with some services (including the Fishguard 'boat train' which provides a connection with the ferry to Ireland) running via the Swansea District Line (SDI). The southern end of the Heart of Wales Line (CWL) is also within the region. (Network Rail Engineering Line References in Brackets)

Figure 2-2 Existing Railway Stations (Study Area)



2.3 Project Scope

The purpose of the commission is to undertake feasibility design and operational assessment and WelTAG appraisal of various proposals to improve rail services and facilities in South West Wales building on work that has already been undertaken. The full brief for the WelTAG stage 1 and 2 work is provided in Appendix B in the Impact Assessment Report (IAR) with the main points summarised below:

The WelTAG work was initially considered under five areas of intervention:

- Strategic services to West Wales & Swansea.
- Swansea – West Wales frequency/connectivity (Options 7A, 7B, 8, 9A, 9B, 11).
- Swansea Bay Metro Services (Options 12, 13, 14, 15, 16, 17, 18, 19)
- New Stations (21, 22, 23, 24A, 24B, 24C, 24D1, 24D2); and
- Station improvements (Options 25A, 25B, 25C, 25D, 25E, 25F).(Please note that Options 25E and Option 25F have been omitted as they are being taken forward under separate WelTAG 2 studies.

The proposed interventions at the end of WelTAG stage 1 were regrouped into 3 areas:

1. Strategic SWML Measures
2. Local Measures on existing rail network
3. New Urban Area Metro

Due to the interrelationship between the South Wales Mainline Services in South West Wales and the rest of Wales the interventions in area 1 are now being looked at under a separate study. The options which fall into areas 2 and 3 are reviewed further in this report.

Supporting information that was produced at stage 1 included:

- SWW timetabling assessment.
- SWW Metro Swansea Station Additional Platform - Engineering feasibility.
- Landore Station Engineering assessment
- Llandarcy Station Engineering assessment
- Cwrt Sart Junction Engineering assessment
- Signalling Route Capacity
- Signalling Technical Report - St Clears New Station
- Signalling Technical Report – Cwrt Sart Junction New Chord.
- Signalling Technical Report – Landore New Station.
- Signalling Technical Report – Llandarcy New Station.
- Signalling Technical Report – Pontarddulais Signalling Alteration Assessment
- Signalling Technical Report – Swansea Station (additional platform).

The following additional supporting information has been produced at Stage 2:

- Spatial Model
- Engineering Feasibility of Station Improvements
- Engineering review of new stations and routes (Deliverability Report)
- Swansea Bay & West Wales Metro Interchange and Intermodal Analysis
- Swansea Bay & West Wales Metro Travel Corridors Mode Suitability
- Swansea Bay Metro Fleet Requirement Review

Spatial Model

A spatial model was constructed to map the relationship between the proposed metro improvements and tertiary education, strategic healthcare, major employment sites and proposed development sites. This was used to assess their accessibility to the existing rail network and impact of the metro proposals. The report in included in Appendix E of the IAR.

Engineering Feasibility of Station Improvements

The feasibility and costs of providing station improvements including parking, intraplatform access and interchange at Carmarthen, Whitland, Pembrey and Burry Port and Llanelli have been considered in this report. The report in included in Appendix J of the IAR.

Engineering review of new stations and routes (Deliverability Report)

An engineering review was undertaken of all proposals not subject of technical studies above to identify all new station locations were feasible options and ascertain the high level scope of infrastructure works required for each route. This has been used to update the deliverability report in Appendix K of the IAR.

Swansea Bay & West Wales Metro Interchange and Intermodal Analysis

An analysis of connectivity between bus and rail networks at key stations on the network was undertaken as part of this commission. The report examines which railway stations provide offer strategic potential for intermodal connectivity, based on geographical position and current or potential service coverage and patterns. The report also examines how complementary current bus and train timetables are to allow for viable intermodal changes. The report is included as Appendix I of the IAR.

Swansea Bay & West Wales Metro Travel Corridors Mode Suitability

A review of the current modes of transport along the key travel corridors in South West Wales was undertaken. This was done to assess which modes of transport were the most strategic before and after each option was implemented. Currently, where the train is available, journey times are shorter to that of the bus along the same corridor. However, the bus network has a higher level of coverage overall, and a higher average frequency, particularly west of Swansea. The options which involved increasing train frequencies west of Swansea and Option 18 had the largest effect on shifting the strategic method of travel from bus to train along the key corridors in the region. The report is included as Appendix L of the IAR.

Swansea Bay Metro Fleet Requirement Review

An analysis of the suitability of different rolling stock for use on the Swansea Bay Metro was undertaken. Capacity, speed, power source and route suitability were assessed for each of the proposed units which could operate each route or provide the extra units required to operate an increased frequency timetable. The report found that the Tram-train stock was the only suitable unit to operate Options 18 & 19, but it is likely that conventional Diesel Multiple Units (DMU) or new diesel hybrid 'FLIRT (Fast Light Intercity and Regional Train)' type vehicles will be required to operate the initial Pontarddulais and Pembrey & Burry Port Metro services, until electrification of the SWML has reached Swansea. Electric/Hybrid units either Tram-Train or 'FLIRT' type hybrid units can then take over from the 'stop-gap' DMU stock. The report is included as Appendix M of the IAR.

2.4 Previous Studies

Several previous studies have looked at options for improving rail services in the south west Wales region. These are listed below and were summarised in the WelTAG 1 report, which was issued in 2020 and supports the deliverability assessment. The most recent studies have been the Programme Strategic Outline Case and Addendum for strategic services and Swansea Metro proposals respectively. This study will bring the assessment of the proposals into compliance with WelTAG and the Well-being of the Future Generations (Wales) Act 2012. It will also assess alternative proposals identified by the four authorities, those identified during the development of the brief or in the course of the stakeholder consultation, undertake a number of engineering and operations technical studies to develop these proposals and consolidate these findings into a single WelTAG (Welsh Transport Appraisal) framed assessment. This will be reported at Stage 1 and Stage 2 as described above.

Previous studies include:

- South West Wales Metro WelTAG 1, October 2020
- The Case for Rail Investment PSOC Addendum: South West Wales Rail Rev A, November 2019
- West Wales Parkway Feasibility Study Key Findings, December 2018
- The Case for Rail Investment South Wales Programme Strategic Outline Case, September 2018
- The Case for Change SWML and Swansea Bay, April 2018
- West Wales Parkway Station Scoping Study, February 2018
- St Clears Station Feasibility Study Updated Business Case, Rev A, November 2015
- St Clears Feasibility Study, January 2014
- SWWITCH Rail Strategy, 2013

2.5 Current Covid-19 Impact

At the time of the report there were significant restrictions on movement and social distancing measures that are impacting on travel patterns, service frequency and capacity. We are in an unusual situation where public transport use is not being encouraged, indeed for a time was being actively discouraged. At present it is not known when public transport use may return to a pre-Covid 19 level, and further review of this situation will be needed. Most of the interventions being considered in this study have timeframes of 3 years or longer so this allows the situation to settle and the impact to be minimised. It is still recommended that the proposals proceed 'as normal' in the meantime.

2.6 WelTAG 2017 (Stage Two: Outline Business Case)

In 2017, the Welsh Government issued updated Welsh Transport Appraisal Guidance[1], which is used to appraise all transport schemes in Wales. The original guidance was issued in 2008.

The Guidance has been used to appraise options developed as part of this South West Wales Metro Study to ensure that:

- As part of the Strategic Outline Case (WelTAG Stage One), the appraisal process used to produce a long list of options is compliant within current guidance; and
- An 'evidence' led approach has been adopted in selecting a short-list of options for consideration at the Outline Business Case (WelTAG Stage Two).

Throughout the WelTAG process, appraisal is based on the Five Case approach, which is used by the Welsh Government and HM Treasury in business cases for projects requiring public sector funding.

The Five Cases are as follows:

- The Strategic Case;
- The Transport/ Economic Case;
- The Financial Case;
- The Commercial Case and
- The Management Case.

At Outline Business Case (WelTAG Stage Two), which is the subject of this Report, the purpose is to examine in greater detail the short list of options for tackling the problems under consideration.

The Stage Two report should set out how each of the proposed options will meet the stated objectives, the anticipated impacts of each option and the ways in which the context of the scheme will affect the achievement of the objectives. It should also consider the robustness of the proposed options to meet its objectives using sensitivity testing and scenario analysis including consideration of future scenarios. Key risks and dependencies should be presented.

Stage Two provides the evidence required for the WelTAG's Review Group to select a preferred option to take forward Stage Three (Full Business Case).

[1] https://gov.wales/sites/default/files/publications/2017-12/welsh-transport-appraisal-guidance.pdf

An appraisal methodology note is included in the IAR as Appendix C, which details the approach taken to appraise the short list of options.

2.7 Well-being of Future Generations (Wales) Act 2015

The principles behind the Well-being of Future Generations (Wales) Act 2015 are embedded within the WelTAG process and have been an integral part of the development of the WelTAG Stage One and Stage Two reports.

The Act identifies seven well-being goals that public bodies must work to achieve and five ways of working that public bodies need to apply when making their decisions. A summary has been produced of how the five ways of working have been considered and applied throughout WelTAG Stages One and Two and is included within Appendix D of the IAR. This outlines the well-being considerations in undertaking the WelTAG process to date, but also recognises the ongoing importance of the five ways of working in the further development of options and the later WelTAG stages.

The well-being goals of the Well-being of Future Generations (Wales) Act 2015 have been central to the WelTAG process. For example, in WelTAG Stage One, the well-being goals and five ways of working were integral to the identification of problems, the development of study-specific objectives and the assessment of potential options. Each were assessed in terms of their potential to impact on or contribute to each of the national well-being goals. The WelTAG Stage Two option appraisal process has involved a more detailed assessment of the impacts of each option in relation to national well-being goals and the well-being objectives of relevant national and local public bodies, including the Welsh Government, Public Services Boards, Swansea Council Pembrokeshire Council, Neath Port Talbot Council and Carmarthenshire Council.

The study approach and how it fits with the five ways of working is illustrated in figure 2.3.

Figure 2-3 Study Approach

2.8 Report Structure

This Report is structured as follows:

- Chapter 3 – This chapter provides the Strategic Case. It outlines any changes in the study area since the WelTAG Stage One report was undertaken, along with information on the development of the short list options and the stakeholder and public engagement activities. It provides a summary appraisal of the short list of options in terms of their ability to address problems and meet objectives, as well as outlining the potential adverse impacts and dependencies, constraints and risks of each option.

- Chapter 4 – This chapter provides the Transport Case. It outlines the results of the assessment undertaken into the economic, environmental, social and cultural impacts of the short list of options appraised. It also provides a value for money assessment.
- Chapter 5 – This chapter provides the Financial Case. This chapter discusses some of the capital and revenue costs that may be associated with the short list options, as well as highlighting the potential funding sources that may be available to undertake development work and implement a final preferred option.
- Chapter 6 – This chapter provides the Commercial Case. This provides a summary of the aspects that will need to be considered in procuring any future options for implementation. It considers potential private sector involvement and ongoing viability of each option.
- Chapter 7 – This chapter provides the Management Case. Details are provided of the development work required for each option, governance arrangements and potential statutory procedures that may be involved in scheme delivery. An assessment of the deliverability of each of the short list of options is provided.
- Chapter 8 – This chapter provides a summary and conclusion to the Report, recommending which options should be taken forward for further WelTAG assessment. It highlights the future work that may be required to undertake further assessment.

3. Strategic Case

3.1 Overview

As detailed in WelTAG 2017 the strategic case:

- Presents an evidence-based description of the current situation and the issue that needs addressing, describes the likely future situation if no action is taken and presents the reasons why an intervention is required.
- Involves an analysis of the factors that are contributing to the identified problem, as this will assist in the development of possible solutions;
- Establishes objectives against which the proposed solutions will be judged and
- Sets out a narrative as to how each of the proposed solutions is intended to change the situation.

In line with WelTAG 2017, a detailed Strategic Case was presented within the WelTAG Stage One report. This chapter provides an update to the information provided in the WelTAG Stage One Strategic Case, including details of option development work and additional consultation activities that have been undertaken as part of WelTAG Stage Two.

3.2 Policy Context

A policy review was undertaken to inform the development of the WelTAG Stage One report. This was included in the WelTAG Stage One IAR. The national, regional and local policy documents reviewed were as follows:

National Policy:

- Prosperity for All: The National Strategy (2017);
- Prosperity for All: Economic Action Plan (2018);
- One Wales: Connecting the Nation (Wales Transport Strategy, 2008) and the Wales Transport Strategy: Scoping Report (2020)
- National Development Framework (anticipated publication – 2020);
- Wales Spatial Plan (2008);
- National Transport Plan (2010, updated 2011);
- National Transport Finance Plan (updated 2017);
- Planning Policy Wales (Edition 10, 2018);
- Well-being of Future Generations (Wales) Act 2015;
- Prosperity for All: A Low Carbon Wales (2019);
- Welsh Route Study (2016);
- The Rail Network in Wales – The Case for Investment (2018);
- A Railway for Wales – The Case for Devolution; and
- UK Rail Policy (National Infrastructure Delivery Plan (2016 – 2021), Transport Investment Strategy – Moving Britain Ahead (July 2017), Connecting People – A Strategic Vision for Rail).
- Written Statement: Principles for Public Transport Connectivity Ken Skates AM Minister for Economy & Transport 24th September 2019

Regional Policy:

- Joint Local Transport Plan for South West Wales 2015-2020;

- Swansea Bay City Region City Deal; and
- Swansea Bay City Region Economic Regeneration Strategy (2013-2030);

Local Policy:

- Swansea Public Services Board Well-being Plan (2018 -2023);
- The City and County of Swansea's Corporate Plan 2018/22;
- The City and County of Swansea Council Adopted Local Development Plan (2010 – 2025);
- Neath Port Talbot Public Service Board Well-Being Plan 2018-2023;
- Neath Port Talbot Council Corporate Plan 2018-2022;
- Neath Port Talbot Council Adopted Local Development Plan (2011-2026);
- Carmarthenshire Well-being Plan: The Carmarthenshire We Want 2018 – 2023;
- Carmarthenshire County Council Corporate Strategy 2018 – 2023;
- Carmarthenshire Local Development Plan – 2018-2023;
- Pembrokeshire Public Service Board Well-being Plan 2018;
- Pembrokeshire County Council Corporate Plan 2019/20;
- Pembrokeshire County Council Local Development Plan: Planning Pembrokeshire's Future (up to 2021);
- Ceredigion Public Service Board Well-being Plan (2016);
- Ceredigion County Council Revised Well-being Objectives 2019-2020; and
- Ceredigion County Council Local Development Plan 2007-2022.

The policy review that was undertaken at WelTAG Stage One remains current for this WelTAG Stage Two Report. Although the Welsh Government has since published Llwybr Newydd: A New Wales Transport Strategy (2021) (replacing One Wales: Connecting the Nation (Wales Transport Strategy, 2008)), New Development Plan 2040 - Future Wales (replacing National Development Framework (anticipated publication – 2020 and Wales Spatial Plan (2008) and a new Planning Policy Wales (Ed 11) replacing edition 10. These additional pieces of national policy and this study's compliance with them is summarised below:

- Llwybr Newydd: A New Wales Transport Strategy (2021), - Llwybr Newydd (new path) is a new Wales Transport Strategy that sets out Welsh Government's vision and long term 20-year ambitions for transport and how it contributes to well-being in Wales. The vision of the strategy is for "An accessible, sustainable and efficient transport system". It places walking and cycling at the top of the sustainable travel hierarchy. The four long term ambitions in the plan are:
    - Good for people and communities;
    - Good for the environment;
    - Good for places and the economy; and
    - Good for culture and the Welsh Language.

Delivering modern and connected infrastructure to South West Wales will help move people sustainably across the region. This will be good for people and communities as it will help to make sustainable travel more attractive for people travelling across the South West Wales region, encouraging them to make more sustainable travel choices.

Improvements along the rail network will also help to make the movement of people and goods more accessible, sustainable, and efficient. This will be good for the regional economy and the national economy of Wales.

- New Development Plan 2040 - Future Wales – the National Plan 2040 is the national development framework, setting the direction for development in Wales to 2040. It is a development plan with a strategy for addressing key national priorities through the planning system, including sustaining, and developing a vibrant economy, achieving decarbonisation and climate-resilience, developing strong ecosystems and improving the health and well-being of communities.

The improvements to the rail network will contribute to improving regional connectivity by supporting the South West Wales Metro and will help to create new integrated transport systems that provide faster, more frequent and joined-up services using trains, buses and light rail.

- Planning Policy Wales, Edition 11, February 2021 - Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. The document outlines that the Welsh Government is committed to reducing reliance on the private car and supporting a modal shift to walking, cycling and public transport. Delivering this objective will make an important contribution to decarbonisation, improving air quality, increasing physical activity, improving the health of the nation and realising the goals of the Well-being of Future Generations Act.

In accordance with Planning Policy Wales, this WelTAG Stage 2 reflects that improvements to the rail network in South West Wales will aid the delivery of both the strategic and spatial and sustainable placemaking outcomes listed in the PPW Edition 11. The improvements will help achieve the national sustainable placemaking outcome by promoting a modal shift towards sustainable transport modes, making communities more sustainable and grow the local economy sustainably.

3.3 The Case for Change

The case for change was set out in detail in the WelTAG Stage One report and remains current for this WelTAG Stage Two assessment. A summary is provided below of the key factors identified in the case for change, study specific and wider contextual issues.

Wider Contextual Issues

Decarbonisation - Promoting the greater use of and improvements to the public transport system (rail network) is therefore supportive of and instrumental in helping to achieve the decarbonisation agenda at a national and local level.

Economic Prosperity - A West Wales Metro would deliver modern and connected infrastructure to help support prosperity and deliver jobs into the region.

Western Gateway - Greater links onward to Swansea and West could facilitate higher levels of economic interaction and trade between these town and city-region economies (Swansea, Cardiff, Newport, Bristol, Bath, Gloucester, Cheltenham, Swindon and Salisbury).

Study Area Specific (South West Wales)

Future Growth - Enabling and facilitating growth in rail demand would help to achieve climate change objectives set by local authorities, enable economic growth within the region, attract

inward investment and help improve the health and well-being of communities through increasing accessibility to services, leisure, education and employment opportunities.

Economic Performance - Carmarthenshire and Pembrokeshire and to a lesser extent Swansea & Neath-Port Talbot underperform in terms of GVA per capita. Investing in a coherent and efficient public transport network within the Swansea Bay area would support more sustainable local commuting journeys, reduced highway congestion, and increased access to health facilities, employment and education and training opportunities.

Deprivation and Rates of Employment – a number of indices such as number of Employment Support Allowance claimants, Welsh Index of Multiple Deprivation, number of workless households and households in poverty indicate that the region experiences deprivation which improved public transport would help alleviate.

Swansea Bay City Deal - Over the next 15 years, the City Deal will boost the regional economy by £1.8bn and generate almost 10,000 new, high-quality jobs. Improvements in accessibility, efficient movement of people and goods, new stations and technological improvements provided by a South West Wales Metro will support the City Deal projects.

Rail Network Accessibility & Public Transport Integration - Network coverage is less comprehensive than in South East Wales. For large parts of the urbanised area in and around Swansea, residents do not have access to a rail station within a 20-minute walk time. This acts to limit rail demand which the Metro seeks to address.

Rail Infrastructure – the current rail infrastructure which is largely single track with passing loops and significant freight timetable paths, puts a constraint on the services that can be provided, key improvements would unlock additional capacity on the network.

Journey times and Line Speeds - Investment in the rail infrastructure within the South West Wales Study area could see line speed improvements and a reduction in journey times for the rail services.

Rail Service Frequency & Capacity – most long-distance journeys from West Wales require interchange at Cardiff, some journeys will require interchange at both Swansea and Cardiff. Trains are required to reverse at Carmarthen and Swansea adding to journeys time further. Similarly, Heart of Wales services must reverse at Llanelli.

Trends in Rail usage – There are a total of 42 stations in the area with Swansea station accounting for 40% of demand and the top 10 stations 90% of demand. Demand for rail travel in Swansea Bay and West Wales was fairly static over the three years to 2018/19 growing 2% overall with demand in West Wales declining in several locations, one exception being Gowerton where track redoubling of the Loughor Viaduct enabled increased train frequency and patronage growth. Low service frequencies are a constraint to use on many routes and it is unlikely this trend will therefore reverse without investment to increase service frequencies and improve the passenger experience.

'Principles for Public Transport Connectivity' – set out in September 2019 these principles are to be considered when infrastructure schemes are being planned and services procured. It outlined recommended service frequency and journey times for strategic, regional and urban services. The proposed Metro and west wales services will contribute towards these targets.

'Enterprise Zones' – There are existing enterprise zones in Swansea Bay and West Wales at 'Haven Waterway', centred on Milford Haven and Pembroke Dock, (with further sites around

Fishguard) and 'Port Talbot Waterfront', focussed on Baglan and Porth Talbot Dock. The Metro proposals will improve connectivity to these sites through increased train service frequency to Pembroke Dock, Milford Haven and Fishguard. The related rail proposals under the South Wales Mainline and Cardiff Capital Region metro programmes will also improve linkages to Port Talbot Waterfront and to the other enterprise zones in South Wales at Cardiff Airport, Central Cardiff and Ebbw Vale.

The need for change

Improvements to public transport provision in the region is key to providing viable options for residents and visitors to allow them to reduce their use of private cars. Without intervention existing problems of difficult access to employment, education and services along with problems associated with car use such as congestion and poor air quality are unlikely to improve.

3.4 Identification of Problems

The problems in the study area were identified at WelTAG Stage One. Problems for the study area had been defined in previous studies (Transport for Wales, The Case for Rail Investment, South Wales Programme Strategic Outline Case, September 2018). This was used as a base, with the WelTAG stakeholder workshop providing an update on any additional problems affecting the study area.

A summary of the problems identified is as follows:

1 Journey Times in Pembrokeshire are not competitive with the car due to the number of stations, interchange, line speeds and infrastructure restrictions.
2 Indirect alignment of the railway east of Swansea increases rail journey times.
3 Current timetable is designed to fit the Manchester/Crewe services
4 Infrastructure challenge in Pembrokeshire – single track restricts frequency.
5 Wider issues of track capacity across South Wales e.g. Cardiff to Severn Tunnel
6 Strategic links to ports – added capabilities and potential of air traffic.
7 Stabling – additional stabling required South/West Wales
8 South Wales Main Line- available capacity or services may be acting to limit demand.
9 Swansea Bay Region - mix of short and long-distance services on the same lines results in irregular stopping patterns which are not conducive to commuting.
10 Passenger volumes are modest from many stations reflecting existing services, constructing a financial and economic case for upgrades may be challenging.
11 The Gross Value Added (GVA) per capita is lower than other Welsh (and English) regions.
12 Resilience – particularly between Carmarthen and Cardiff as a coastal route
13 Unregulated, faster and cheaper bus services will undermine some of the solutions proposed – e.g. Swansea to Pontarddulais via SDL will be much quicker by bus
14 Journey times and speeds achieved by rail services are relatively poor, particularly on inter-city services west of Bristol, on local services between Swansea and Cardiff and on services between Cardiff and Bristol
15 Existing times of Pembrokeshire to Swansea services don't match key work times
16 Facilities at Stations e.g. Neath – improve environment, integrated ticketing needed.
17 Potential disbenefit of HS2 – leaves the region further behind
18 Services in West Wales are infrequent and often fail to provide morning and evening arrivals and departures that make it possible to commute by rail.

19 Swansea Bay region - Smaller stations, (not served by GWR services), have long journey times or infrequent/irregular service timings.
20 Neath Port Talbot – travel to Cardiff marginal by car – cost is the challenge
21 Heart of Wales Line has long running time and infrequent services which is a problem for commuters, potential of the line is not realised
22 The Heart of Wales highway corridor has a lot of traffic; rail needs to be more desirable with improved interchange facilities
23 Access from Valleys to stations is tricky, bus and rail timetables/frequencies do not align, car share is cheaper than by rail
24 It is considered quicker and more convenient to drive to Neath or Port Talbot Parkway and join services there than to travel by rail from Pembrokeshire
25 Car park at Carmarthen is not big enough to serve people from Ceredigion
26 Reliability for train users: missing a train leads to long waiting times
27 Swansea Bay network - Train frequencies in this area are generally modest.
28 Tourist element and rural communities along the Heart of Wales Line need to be considered
29 Of 4.5m visitors to Pembrokeshire per year (2m day trippers) – only 3% use trains
30 Problems for attracting people to rail including inadequate parking, poor frequency, long journey times, car being/seen as cheaper
31 Swansea Bay Region has an under-provision of rail park and ride facilities and poor integration with other transport modes.
32 Quality of rolling stock and stations is poor- affects patronage and passenger experience

3.5 Objectives of Study

As discussed in the stage 1 report the objectives used in the previous work on the 'The Case for Rail Investment, South Wales Programme Strategic Outline Case', September 2018' were taken forward for this assessment. As part of this WelTAG Stage 1 study process, opinion was sought on objectives during a stakeholder workshop on the 29th and 30th April 2020 and the use of the previously defined objectives was agreed with the local authorities. Originally two sets of objectives were presented: South Wales Main Line and Swansea Bay Metro; however, as the South Wales Main Line measures are being taken forward separately these are no longer required in this assessment.

The objectives that will form the basis for this WelTAG are as follows:

Swansea Bay Metro Region:

1. Reduce journey times between key population centres including Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke and Milford Haven.
2. Increase service frequencies
a. For local stations on the main line between Carmarthen and Port Talbot, especially during peak periods
b. On the Heart of Wales Line to serve commuters into Swansea and beyond
c. Across South West Wales to improve suitably for daily commuting
3. Improve regional transport accessibility through widening the spatial reach of the rail network and services
4. Improve Park and Ride provision for access to the Swansea Bay region.
5. Provide a viable public transport alternative to the congested M4/A48 corridor
6. Contribute to developing a Swansea Bay Urban Area Metro including improvements to multi-modal interchanges.
7. Maximise the potential for stations to accelerate urban regeneration and major development site delivery

8. Increase the number of trips made by public transport, focusing particularly on commuter trips.
9. Reduce the environmental impact of transport, especially carbon emission and air quality
10. Improve rail network efficient to allow a lower future subsidy requirement per passenger.

3.6 Option Development

Options 1 to 6 inclusive and Option 27 from the WelTAG stage 1 report will be considered as part of a separate workstream looking at the entire South Wales Main Line due to the interdependencies with other proposals on this section of the rail network. These options will therefore not be considered further in this report.

At stage 1 Options 10 and 20 were identified to not progress to stage 2 assessment due to timetabling difficulties or infrastructure constraints and will not be considered further at present. St Clears station (Option 21) has now received New Station Funding and can therefore be considered as a committed scheme and is also not assessment further in this report.

At stage 1 the new stations were considered independently, however for this assessment they have been grouped with the appropriate service option as they are co-dependant. Most of the new stations are not on the existing operational rail network so would require the new services to operate and provide connections.

To support the WelTAG stage 2 development analysis has been undertaken using GIS. The full details are included in Appendix E IAR with key points summarised as follows.

Figure 3-1 and 3-2 - Station usage and passenger destinations

Figure 3.1 – Station usage and passenger destinations – Swansea Bay Area

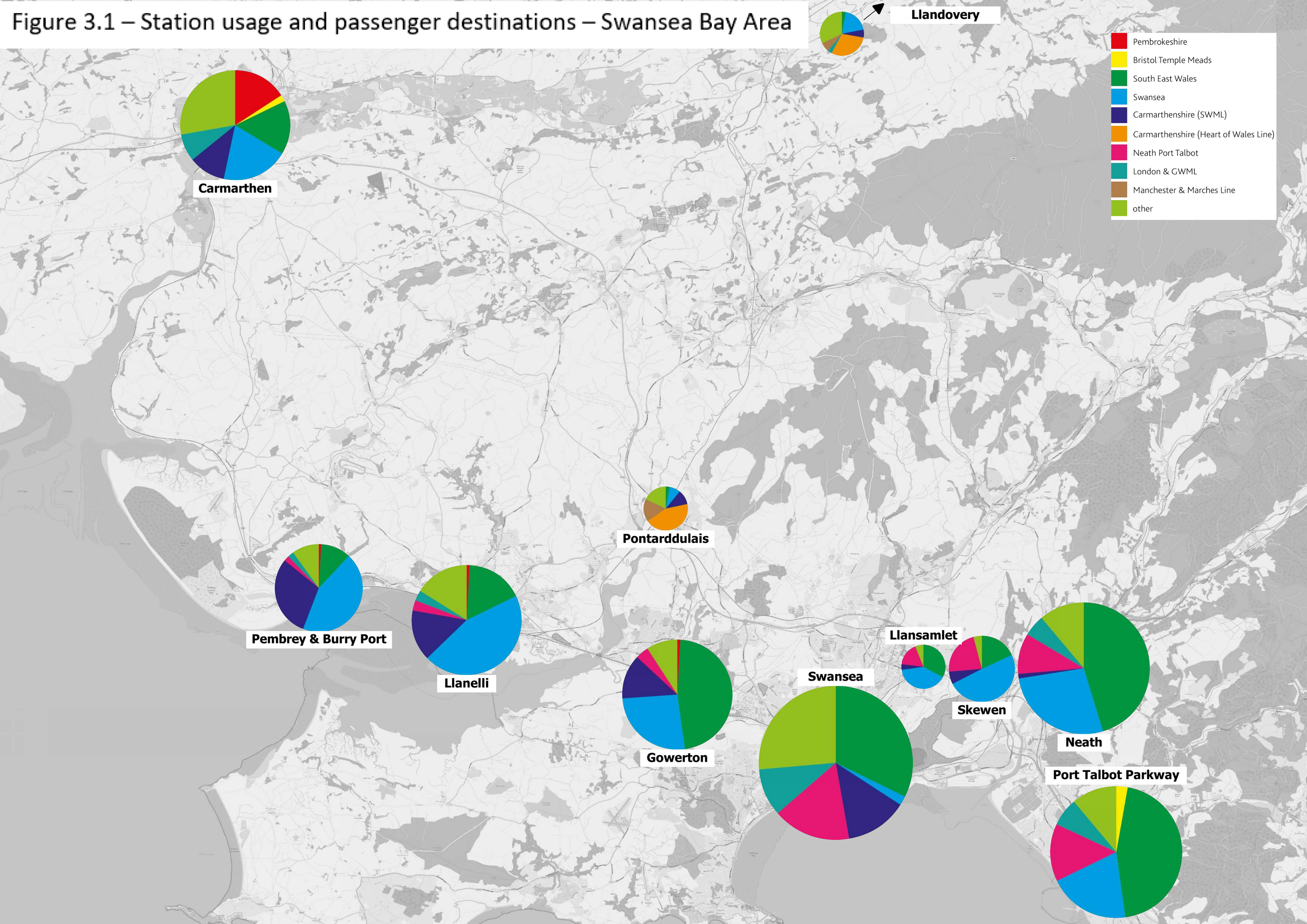
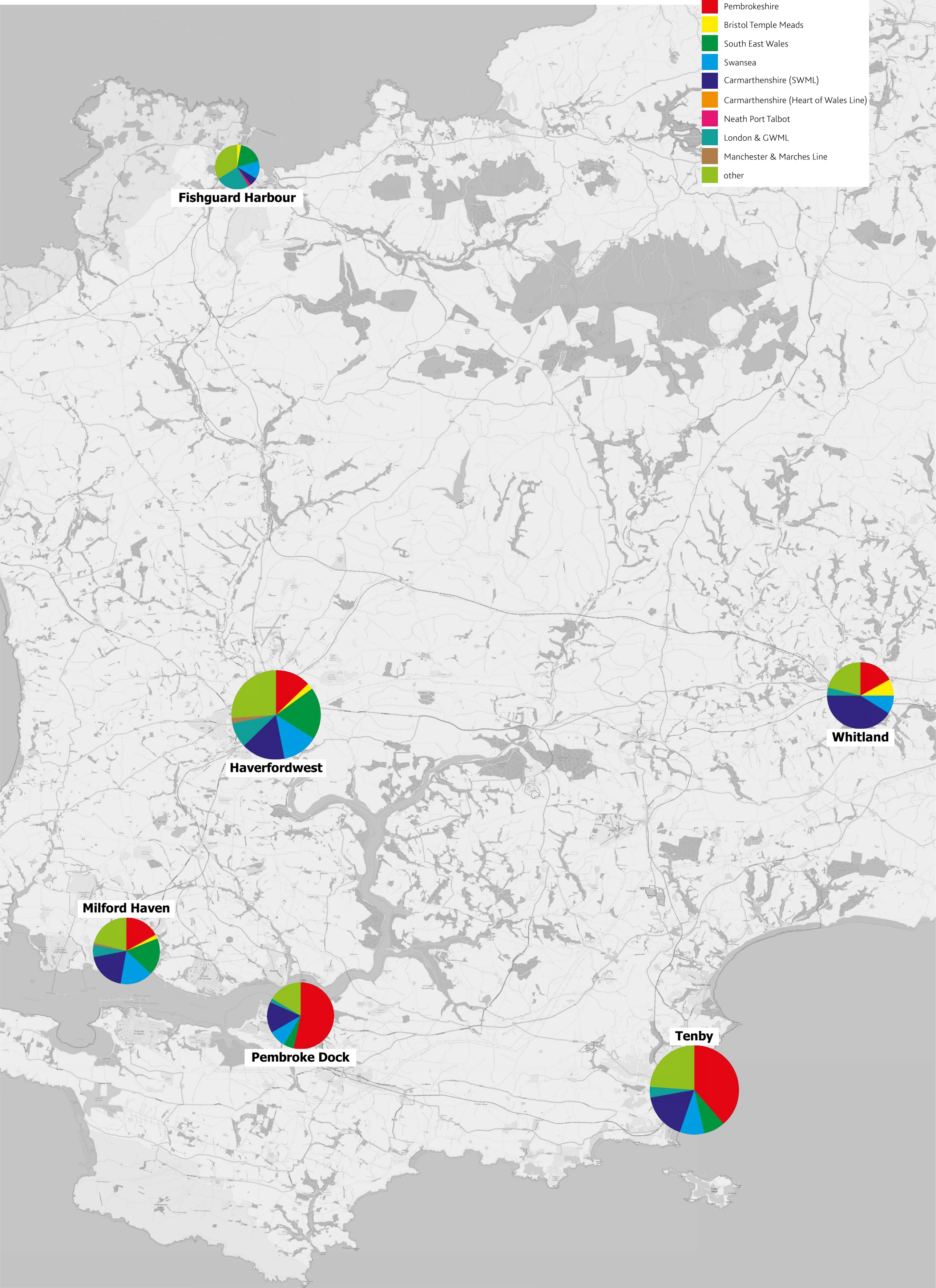


Figure 3.2 - Station usage and passenger destinations – West Wales Area



The GIS output seen in figures 3-1 and 3-2 represents the passenger destinations from each station based on 2019 ticket sales. The size of the pie charts in the figure represent the total passenger footfall, and the destinations are displayed on the charts. The destinations are grouped into areas, for example, Pembrokeshire, for viewing ease.

The GIS suggests that many journeys for passengers travelling from stations on the Pembroke Dock Branch Line were travelling to other destinations in Pembrokeshire. Stations on the other two Pembrokeshire Branch Lines (Fishguard Harbour and Milford Haven) have a larger variety of destination stations. East of Carmarthen, the main destinations are South East Wales and Swansea itself.

A RAG (Red, Amber, Green) analysis was also conducted on key healthcare, tertiary employment, employment, and proposed development sites to assess their accessibility to the existing and proposed rail network. The analysis shows the current proximity of these sites to existing stations, and proximity to stations if all the options were to be successfully carried out. The full RAG analysis breakdown can be found in the Appendix E of the IAR, which details which sites were examined, and how the Metro proposals improve accessibility to tertiary education, health and key employment and development sites by increasing the number of these locations accessible by rail. Overall there is a 22% increase of existing sites located within 800m of a rail station. A summary can be seen in table 3-1 and 3-2.

Table 3-1 RAG analysis criteria

G	≤ 800m from an existing train station
A	Between 800m and 1.2km from an existing train station
R	≤1.2km from an existing train station

Table 3-2 RAG analysis summary

	Current	With Metro proposals	Difference
Green	17 (15%)	39 (34%)	+22 (19%)
Amber	9 (8%)	11 (10%)	+2 (2%)
Red	87 (77%)	63 (56%)	-24 (-21%)

Option 7a and 7b

Services currently operate from Manchester hourly with the terminus alternating between Milford Haven and Carmarthen. The Option 7 proposal will add a 2-hourly infill service when the Manchester service terminates at Carmarthen to provide hourly service to Milford Haven, albeit potentially requiring an interchange between services. This service was considered starting from either Swansea (Option 7a) or Carmarthen (Option 7b). This option is an alternative to the Manchester service extension (Option 8). Service 7a from Swansea would largely duplicate the existing Manchester services to Carmarthen. It should be noted that the timetabling analysis carried out for this study indicates that every 4hours the train extent may need to be limited to Haverfordwest due to Milford Haven freight paths and Branch Line capacity. This option does not introduce any new stations (it is assumed that St Clears is a committed scheme) and there is no infrastructure required. The route has been assessed as being operated by DMUs.

Option 8

This option involves extending the existing Manchester services that terminate at Carmarthen every 2-hours to Milford Haven to provide hourly service to all stations without needing to interchange at Carmarthen. This is an alternative option to Options 7a/7b, and the services will have a similar issue with freight capacity on the line, meaning every 4 hours, one service may have to terminate at Haverfordwest instead of continuing to Milford Haven. Again, no infrastructure is required and no new stations. The route has been assessed as being operated by DMUs.

Option 9a and 9b

There is currently a two-hourly service between Swansea and Pembroke Dock. These options involve increasing service frequencies on the Pembroke Dock Branch Line, by operating an additional limited stop service every 2 hours to give an hourly frequency to the busiest stations on the Branch (Pembroke Dock, Pembroke, Tenby, Whitland), starting from either Swansea (Option 9a) or Carmarthen (Option 9b). There are no additional stations and infrastructure required. The route has been assessed as being operated by DMUs.

Option 11

Option 11 will provide additional services on the Fishguard Harbour Branch Line, to provide a 2-hourly service to Carmarthen or Swansea, increasing from a 7 trains per day (tpd) service in 2019. This will require two additional return services per day from Carmarthen or Swansea. The timetabling assessment indicated that the service from Swansea had poor operational viability. Therefore focus was on a Carmarthen option. The route has been assessed as being operated by DMUs.

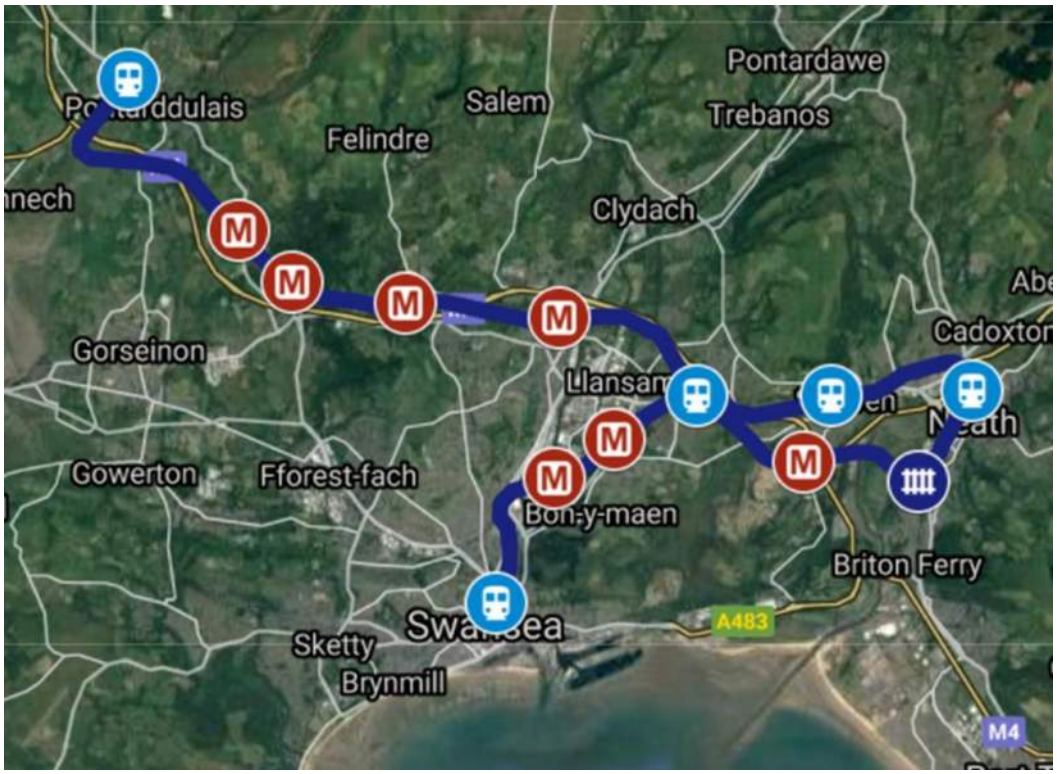
Option 12

This proposal is for a new Metro service, which will operate a 2 trains per hour service between Pontarddulais and Swansea via Neath, using the Swansea District Line (SDL). The proposed route is illustrated in figure 3-3. The service specification was built on a 2 tph initial service, which is underpinned by timetabling work completed at WelTAG stage 1 (SWW timetabling assessment) in combination with other service options. Previous studies had already considered a 3 tph service.

Key for Option geographic maps

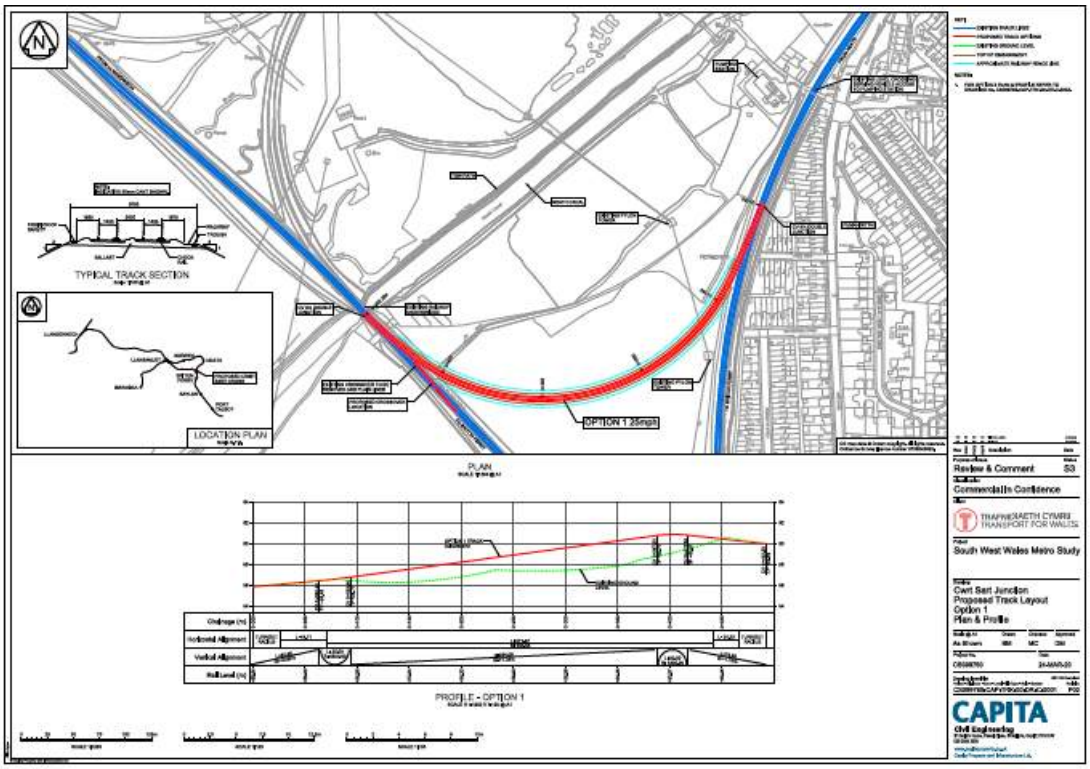
	Existing Station
	Proposed Station
	Chord (new connecting line)

Figure 3-4 Proposed Metro route (Option 12)



Most of the route uses existing rail infrastructure. The route will require a new chord at Cwrt Sart, to connect the Swansea District Line (SDL) to the current South Wales Mainline south of Neath, for trains to travel between Swansea and the SDL. The requirements of the new junction are considered in separate reports: South West Wales Metro - “Cwrt Sart Junction” Engineering Feasibility and Signalling Technical Report Cwrt Sart Junction (New Chord). These conclude that it is feasible to deliver this new infrastructure, one of the design options is illustrated in figure 3-4.

Figure 3-5 Cwrt Sart junction feasibility design. Please note: Larger versions of the feasibility technical drawings can be found in the IAR of this report.



The Cwrt Sart curve enables services to complete the route without needing to travel a further 2km and reverse at Britton Ferry, which would add significantly to journey times.

New signalling (turn back facility) will also be required at Pontarddulais, as the station will be the terminus station for the service. The details of these are provided in a separate report: Signalling Route Capacity – Pontarddulais Signalling Alteration Assessment.

The route will initially be served by Diesel Multiple Units (DMU), but once the electrification of the SWML reaches Swansea, the Metro route could be electrified, allowing for hybrid or tram-train operation (this is considered under Option 26). The proposal will serve new stations at Landore, Winch Wen, Llandarcy, Morriston, Felindre, and Pontlliw as well as existing stations (Llansamlet, Skewen, Neath) on the route. Initial assessment was carried out to decide whether Pontlliw or Penllergaer were better locations – based on catchment size (existing and potential with development) and location engineering and planning factors. Pontlliw was considered the more viable location and was included in the option in preference to Penllergaer.

Initial feasibility design options have been produced for stations at Landore and Llandarcy (South West Wales Metro - Llandarcy Station Engineering Feasibility and South West Wales Rail - “Landore Station” Engineering Feasibility). One of the options consider for each station is illustrated in figures 3-5 and 3-6. In the case of Llandarcy further discussion have subsequently been held with the local planning authority. The station would be located west of Jersey Marine Junction (North) thus would also serve any service to Clydach developed under option 18

Figure 3-6 One of the feasibility options for Llandarcy Station

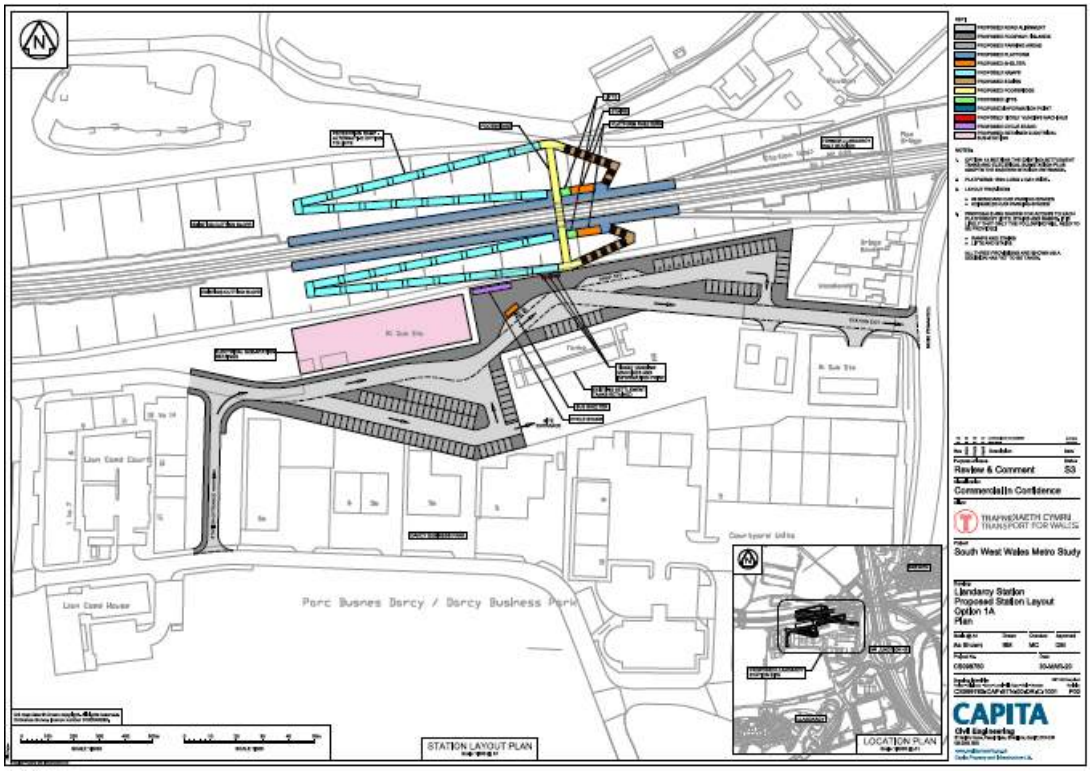
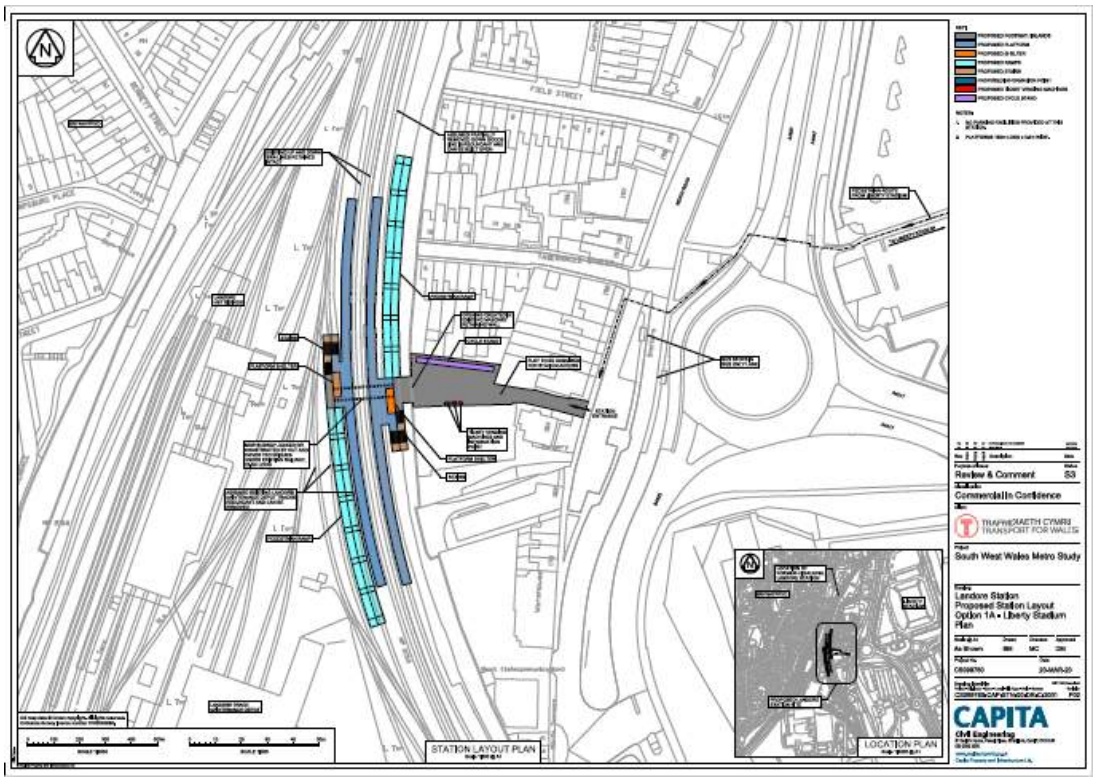


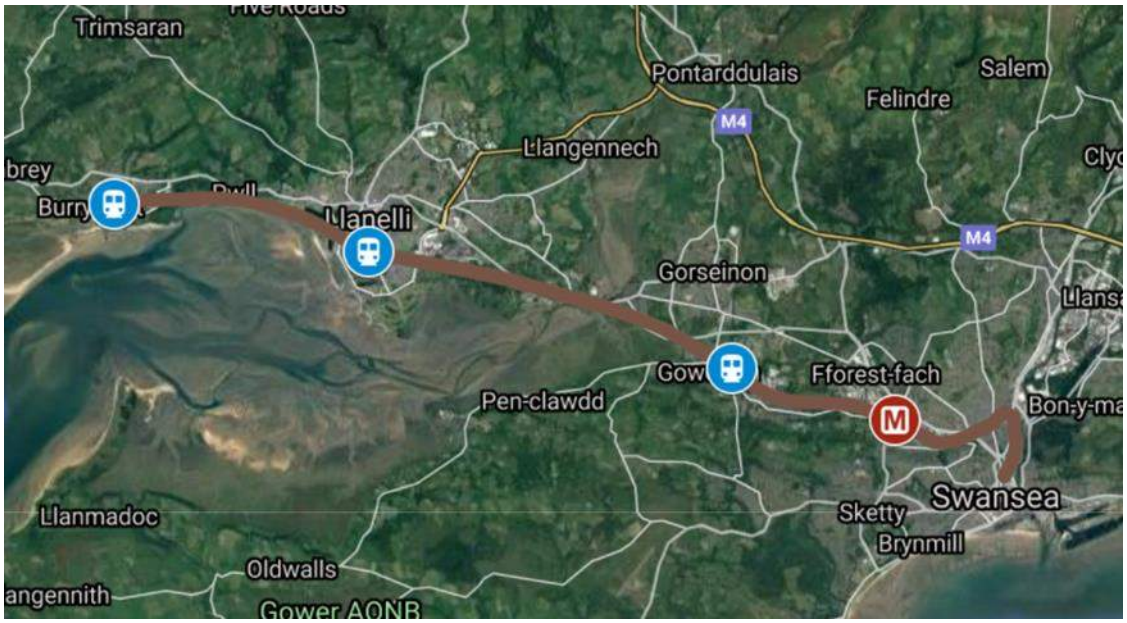
Figure 3-7 One of the feasibility options at Landore



Option 13

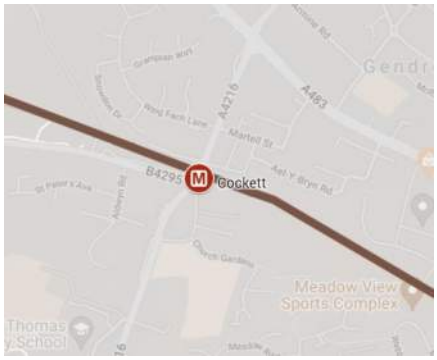
This option will provide a new Metro service between Pembrey and Burry Port and Swansea, providing 2-trains per hour at 5 stations: Pembrey and Burry Port, Llanelli, Gowerton, Cockett and Swansea as illustrated in figure 3-7.

Figure 3-8 Proposed Metro route (Option 13)



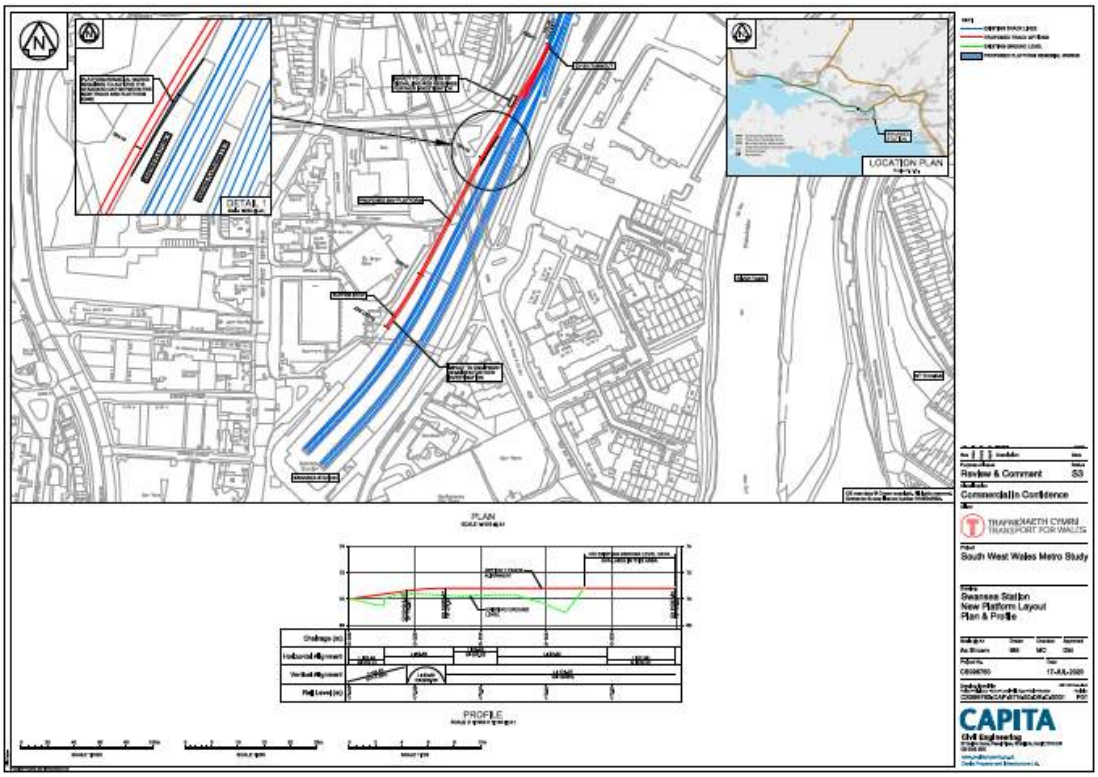
Cockett station will be a new station and the other stations are existing. There has not been the same level of engineering development for this station as Landore and Llandarcy however the location is shown in figure 3-8.

Figure 3-9 Cockett Station Location



A new turnback will be required at Pembrey and Burry Port however this has not been considered in detail at this stage. The overall signalling route capacity is considered in the report: Signalling Route Capacity – Swansea to Pontarddulais (via Court Sart), Swansea to Pembrey & Burry Port Routes. The feasibility of providing a new platform at Swansea is considered in two separate reports: South West Wales Metro - Swansea Station additional platform - Engineering Feasibility and Signalling Technical Report Swansea Station (Additional Platform). The proposed engineering solution is illustrated in figure 3-9.

Figure 3-10 Swansea Station additional platform proposal



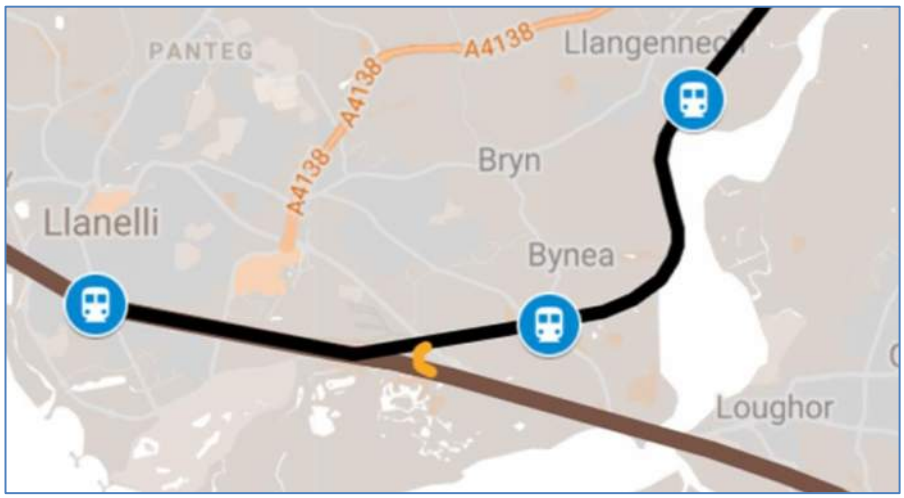
The timetabling work concluded this was not required for metro services up to 2 tph to Pontarddulais and Pembrey & Burry Port but would be needed for service levels at 3 tph or above. It is likely that DMUs will initially operate the additional services but once the SWML

electrification reaches Swansea, the route to Pembrey could be electrified, allowing for hybrid or electric stock to operate (this is further considered in Option 26).

Option 14

This option involves building a new North West to South East chord connecting the SWML to the Heart of Wales Line at Llandeilo Junction (shown as orange C in figure 3-10). This will mean that Heart of Wales Line services will not need to reverse at Llanelli, reducing journey times. This will result in Heart of Wales services no longer calling at Llanelli. For this option the new junction has been considered in the context of the existing Heart of Wales Line services only, however it could be provided in conjunction with Option 28 or Option 15 (direct service to Swansea).

Figure 3-11 Llandeilo Junction new chord



Option 15

Option 15 proposes a new Metro service serving 4 stations between Ammanford and Gwaun Cae Gurwen. The route will use an existing branch of track which joins the Heart of Wales Line at Pantyffynnon, which is currently a freight only route to an coal loading site at Gwaun Cae Gurwen. The route is illustrated in figure 3-11.

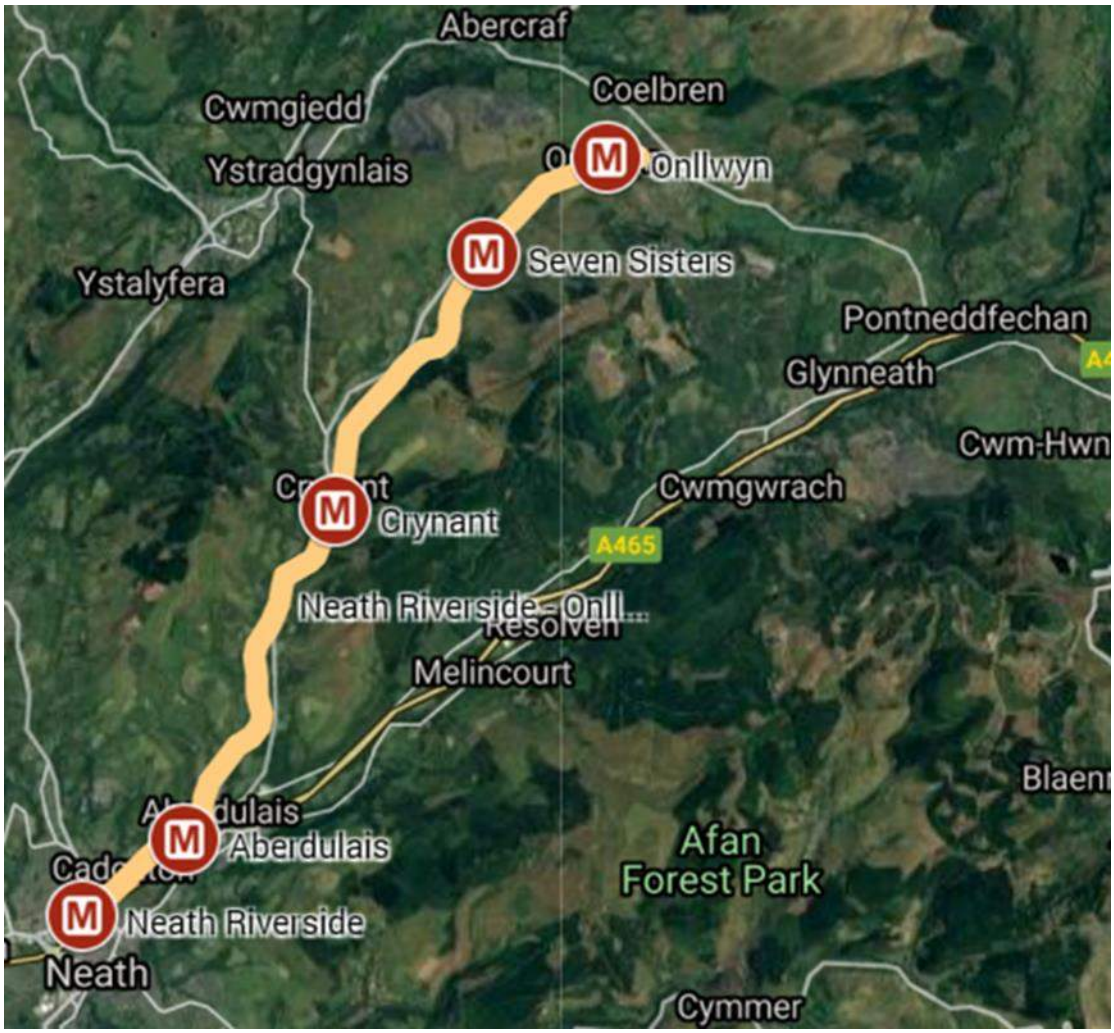
Figure 3-12 Metro Route Option 15

To make the route suitable for passenger services, track upgrades would be necessary, along with a passing loop for a 30 minute interval service, associated signalling, telecommunications and level crossing upgrades. The option will involve 3 new stations at Ammanford (Town), Glanaman and Gwaun Cae Gurwen. It should be noted that as the existing frequency of HoWL services is low, to be attractive to passengers' services would need to be extended from Pontarddulais Metro or a new direct service to Swansea via new chord at Llandeilo junction. The capacity of the Heart of Wales Line to accommodate this frequency uplift has not been assessed at this stage. The route has been assessed as being operated by DMUs.

Option 16

Option 16 is a proposed Metro service between Neath Riverside and Onllwyn, which would use an existing freight route which travels to an open cast colliery in Onllwyn. The option would involve new stations being built at Neath Riverside, Aberdulais, Crynant, Seven Sisters and Onllwyn. The route will also serve the proposed 'Global Centre of Rail Excellence (GCRE), which would be a new rail testing facility located at Onllwyn. The route and stations are illustrated in figure 3-12.

Figure 3-13 Metro route Option 16



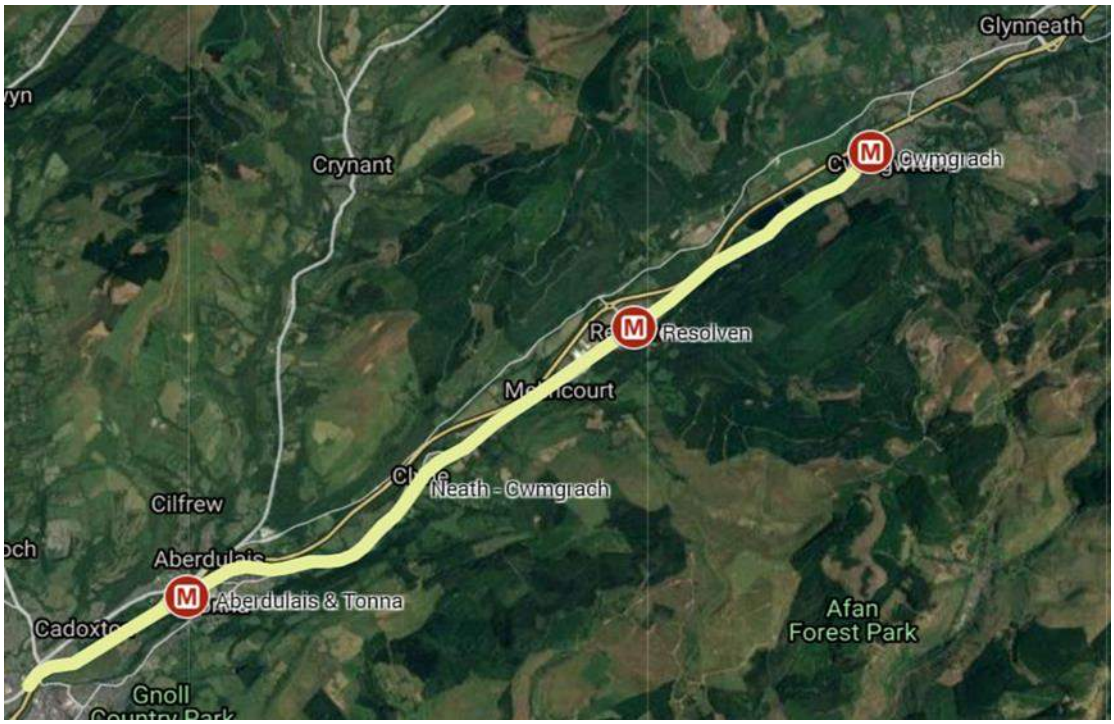
To make the route suitable for passenger services track upgrade works would be needed, including a passing loop and associated signalling to accommodate a proposed 30-minute service. The route has been assessed as being operated by DMUs.

As the existing freight only route does not connect directly to the SML at Neath, this option has more potential of forming an extension of the plans detailed in Option 18.

Option 17

Option 17 also involves a service from a new Neath Riverside station, and like Option 16, this new Metro route has potential to be an additional branch of the proposals detailed in Option 18. The route will connect Neath Riverside to Cwmgwrach using an existing freight route which serves a colliery in Cwmgwrach. The options will provide new stations at Neath Riverside, Aberdulais & Tonna, Resolven and Cwmgwrach. The route and stations are shown on figure 3-13.

Figure 3-14 Metro route Option 17



To make the route suitable for passenger services track upgrade works would be needed, including a passing loop and signalling upgrades to accommodate a proposed 30-minute service. The route has been assessed as being operated by DMUs.

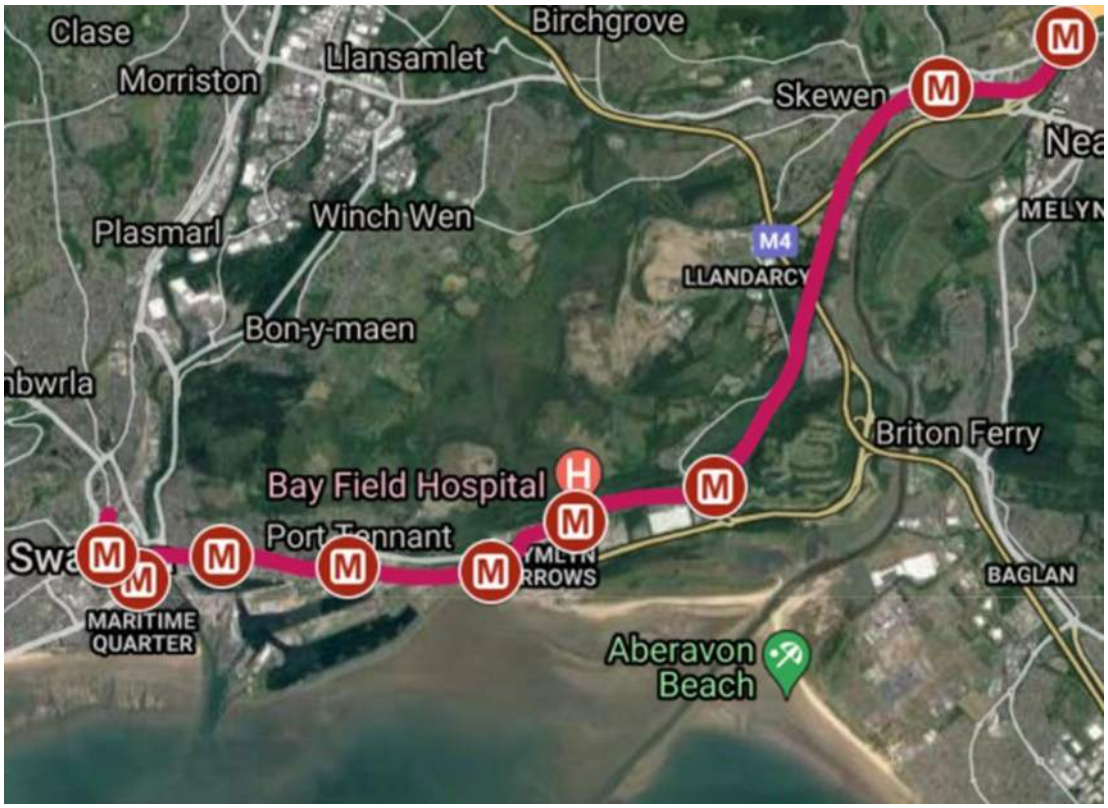
As the existing freight only route does not connect directly to the SML at Neath, this option again has potential of forming an extension of the plans detailed in Option 18

Option 18

This option involves a new railway between Neath Riverside and Swansea City Centre (to Swansea High Street Station) via Swansea Docks, serving 10 stations, 9 of which will be new, and was assessed for a proposed 30-minute frequency. The proposal will involve tram train operation as a significant section of the route will involve street running and new alignment. The route will make partial use of existing freight routes in the Swansea Docks area and will require a significant new alignment part on street alignment into the city centre. Double track, electrification, tram control system/signalling, level crossings and tram street running controls will be needed as part of the infrastructure upgrades. Presently one alignment has been identified for assessment purposes but going forward variations to this will need to be considered to select the optimal route following further design and costing.

Potential stations have been identified at Swansea High Street, College Street, Strand, Port Tennant, Langdon, University (Bay campus), Bay Studios Jersey Marine, Llandarcy, Neath Abbey, and Neath Riverside. These are closer together than the other routes as light rail tram-train operation has better performance and the route travelling through areas of dense land use, without constraints of other services. The route and new stations are illustrated on figure 3-14.

Figure 3-15 Metro route Option 18

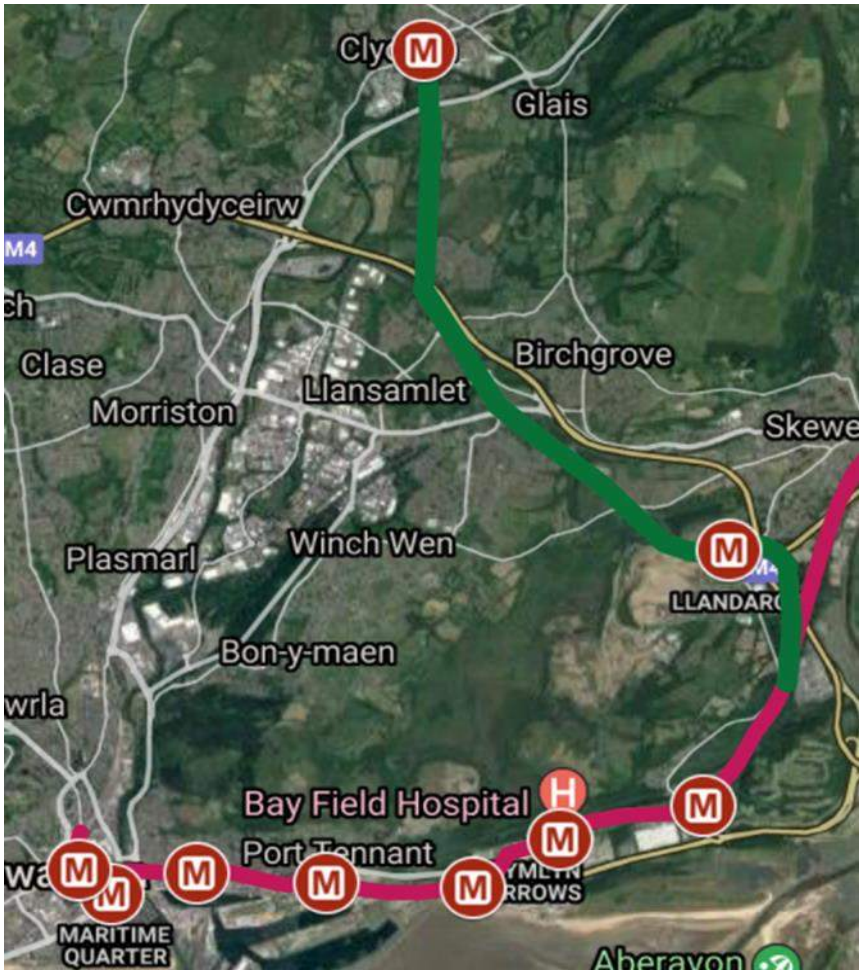


Option 19

Like Option 18, Option 19 is a new Metro service which will use tram train running for a Clydach to Swansea City Centre route, via Swansea Docks. The route will serve stations at Swansea High Street, College Street, Strand, Port Tennant, Langdon, University (Bay campus), Bay Studios Jersey Marine, Llandarcy and Clydach and is illustrated in figure 3-15. It will share the same route as Option 18 between Swansea City Centre and Jersey Marine (shown in red), before branching off to Llandarcy and Clydach (shown in green) and has a proposed initial frequency of 30 minutes.

Beyond Jersey Marine the route would operate via LLandarcy and Swansea District Line and restored railway to Clydach. Due to street running Tram-trains would be required. Infrastructure includes; Double track, electrification, tram control system/signalling, level crossings and street running tram controls.

Figure 3-16 Metro route Option 19



Option 25

There are 6 (A-F) sub options associated with Option 25, but the option involves making improvements to current stations. The stations in question are Carmarthen (A), Pembrey and Burry Port (B), Whitland (C), Llanelli (D), Neath (E) and Milford Haven (F).

Neath Port Talbot Council are working with TfW and Network Rail to develop a transport hub at Neath station and upgrade the station, while Pembrokeshire Council have also taken forward plans for an interchange at Milford Haven. so There has been no further feasibility or design work carried out in these two locations by this study which are also subject to separate WelTAG assessments, which are reported on separately. The remaining four locations considered in this report; Carmarthen, Pembrey and Burry Port, Whitland and Llanelli have been to subject of an engineering feasibility assessment. This is provided as Appendix J of the IAR.

Work at Carmarthen includes Car Parking and Barrow Crossing upgrade; at Pembrey and Burry Port the focus is improving inter-platform access (bridge), at Whitland the proposal include inter-platform access (bridge), drop-off /interchange (buses, taxis, cars) and reuse of station building, Llanelli upgrades in car parking proposals, interchange and placemaking. Figures 3-16 to 3-19 outline the options considered.

Figure 3-17 Carmarthen options considered

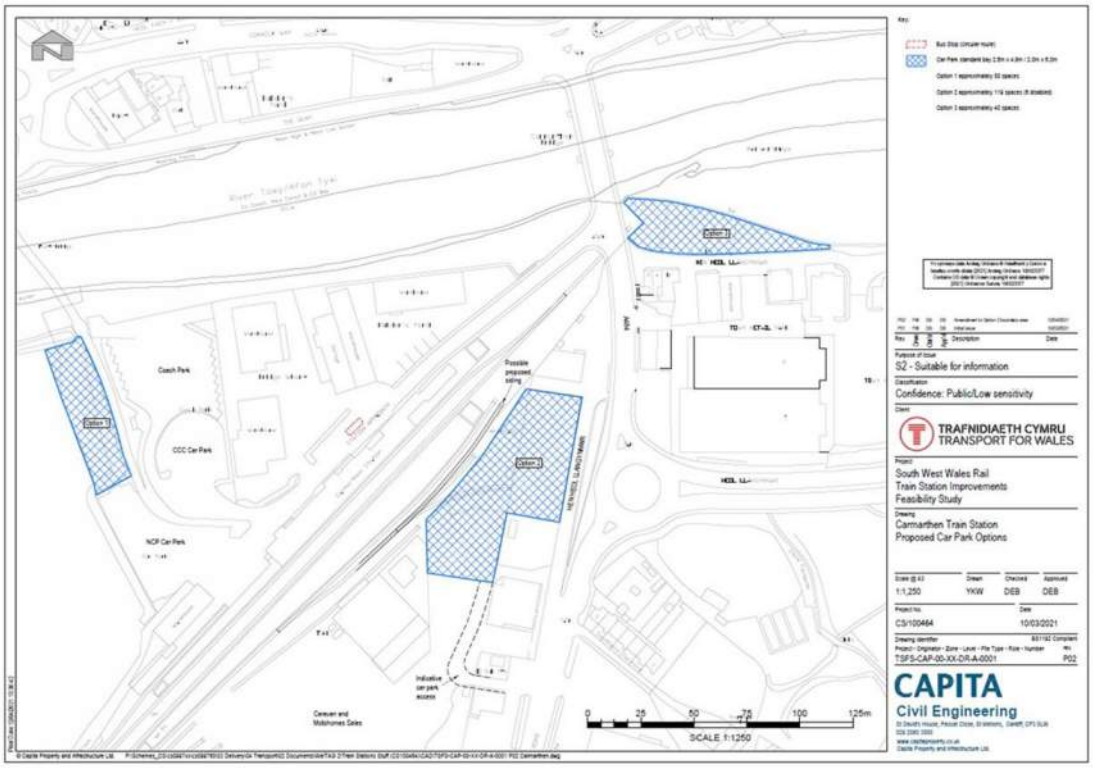


Figure 3-18 Pembrey and Burry Port bridge proposal

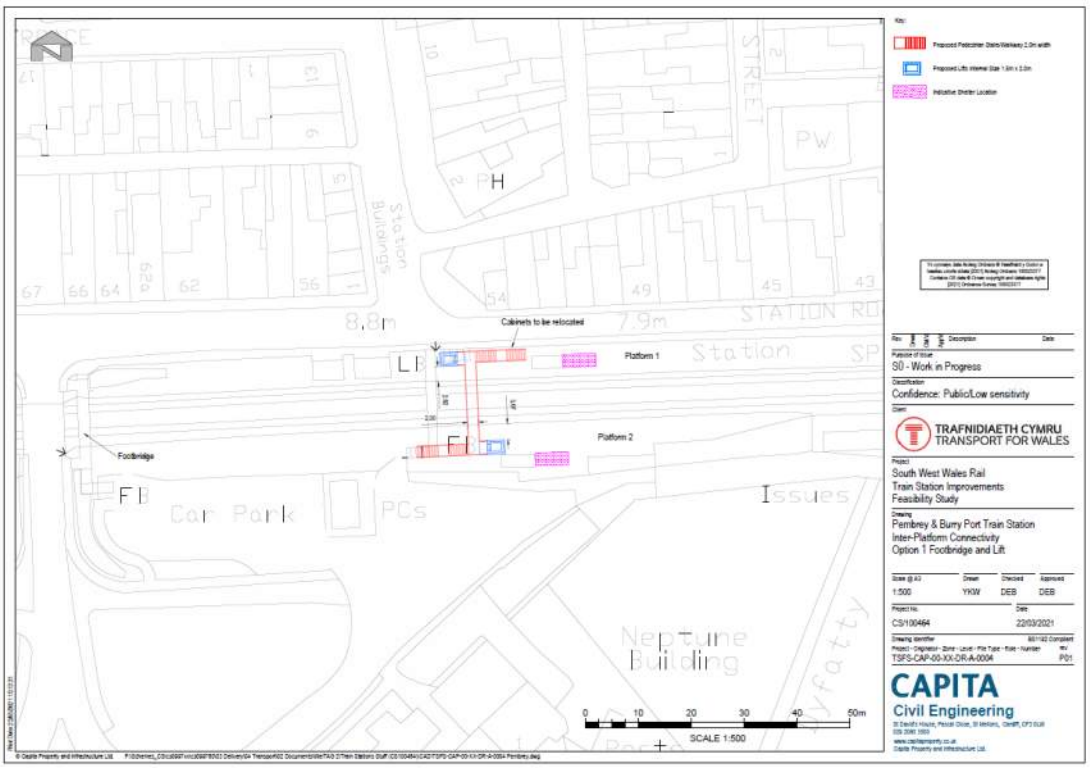


Figure 3-19 Whitland parking options considered

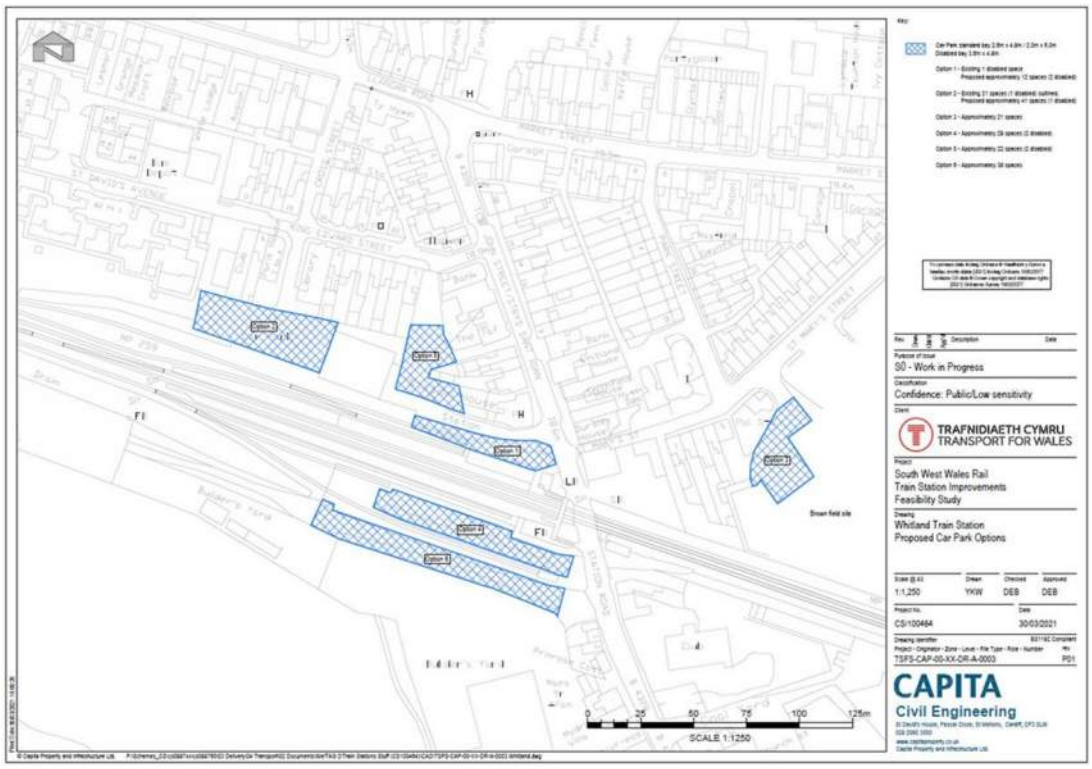
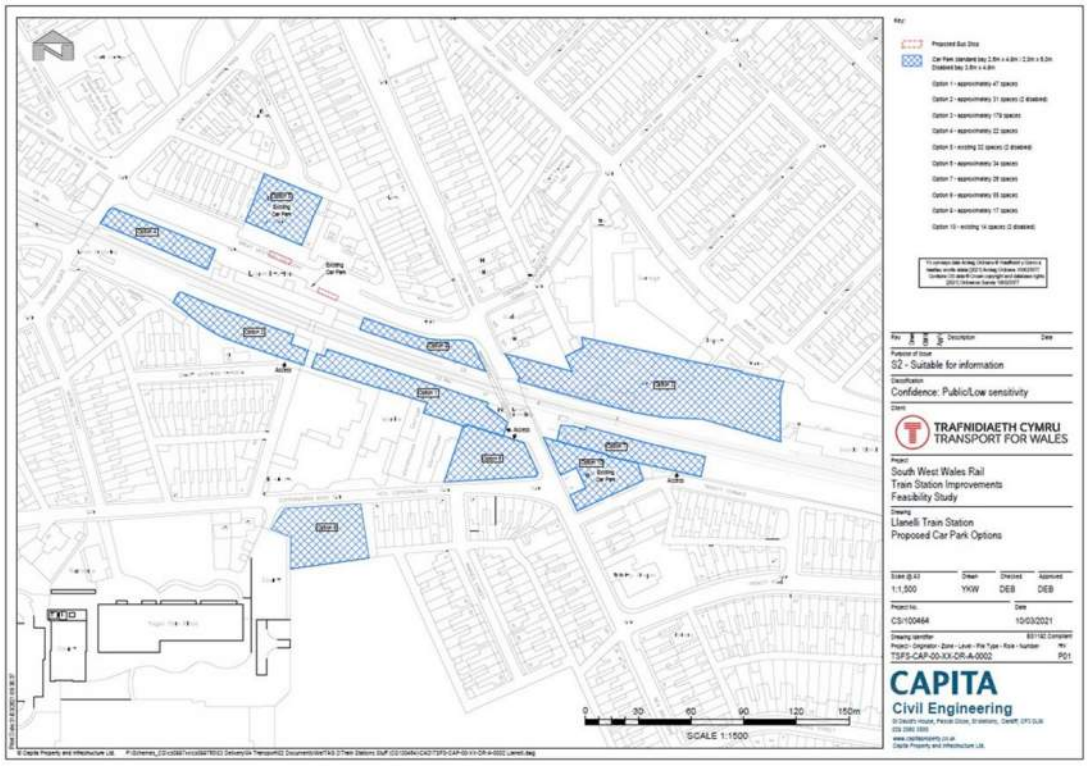


Figure 3-20 Llanelli parking options considered



Option 26

Option 26 involves electrifying the routes from Swansea to Pembrey and Burry Port and Pontarddulais. This option would be difficult to implement until the SWML electrification has been completed between Cardiff and Swansea as this would introduce a new grid feeder near Port Talbot. This will allow new electric train or tram-train stock to use the routes, reducing carbon emissions and improving performance. Assessment used high level costs based on Rail Industry Association analysis of recent projects and best practise.

Option 28

Option 28 will look to provide an additional Swansea to Llandovery train to increase the total trains per day along this section of the Heart of Wales Line to 7. This comprise the existing 4 trains a day which travel beyond Llandovery towards Shrewsbury, the planned 5th through service and the existing return Swansea to Llandovery return service. Timetabling work has been carried out and identified an opportunity to provide this service.

3.7 Consultation

Stakeholder Consultation
Stakeholders have been kept up to date on the stage 2 work with a fortnightly progress meeting with the representative for Regional Local Government. Interim results were presented to the May 2021 Regional Transport Director's Meeting. The full report was presented at a review group meeting on 19th May 2021. The draft report was issued in June 2021 and stakeholder comments were incorporated into this final report.

Public Consultation
The public consultation took place between 16th March 2021 and 8th June 2021. Due to the COVID-19 restrictions, the meeting was conducted online and hosted on the Welsh Government website. The public consultation consisted of a written/graphic outline of the proposed options, a recorded PowerPoint with commentary and an online questionnaire for participants to complete. There was also a printable version of the questionnaire to return by post for those who did not wish to complete online. A dedicated project email address was set up to allow members of the public to raise any queries on the consultation. The consultation report with the material made available and a summary of responses can be found in Appendix F of the IAR.

3.8 Option Appraisal

The WelTAG Stage One report included a Strategic Case appraisal of each option against a range of factors using the WelTAG seven-point assessment scale.

The appraisal process included each option being assessed against:

- The objectives of the Wales Transport Strategy, the Local Transport Plan and the Cardiff Capital Region;
- The goals of the Well-being of Future Generations (Wales) Act 2015 and the objectives of local well-being plans; and
- The identified problems and agreed objectives of the WelTAG study.

The WelTAG Stage One report also included an early stage appraisal of the deliverability of each option, which considered potential technical constraints and risks to delivery.

The Strategic Case appraisal of the short-listed options has been reviewed for this WelTAG Stage Two Report to reflect the additional development work that has been undertaken on each option, as described in Section 3.6. The appraisal has been undertaken using the WelTAG seven-point assessment scale, as detailed in Section 3.4. A full record of the WelTAG Stage Two Strategic Case appraisal is included in Appendix G (Worksheets 6-16) of the IAR.

The WelTAG Stage Two Strategic Case appraisal has been completed using information that is currently available about each option. It should be noted that although additional development work has been undertaken since the WelTAG Stage One appraisal, the options under consideration continue to be at a relatively early stage of development.

The tables in Appendix A of this report provide a summary of the Strategic Case appraisal of each of the options and supports the detailed assessment that is recorded in Appendix G (Worksheets 6-16) of the IAR.

3.9 Summary of Strategic Case

The option summary tables favour the proactive options, with the 'Do Minimum' approach ranking poorly in comparison to the other options. All the proactive options score favourably against the new Welsh Transport Strategy's ambitions and priorities.

The West Wales frequency options (7, 9a, 9b, 11) which involve new or reconfigured services score slightly better than those which extend existing services (8) as they have fewer timetabling interdependencies. However, Option 8 does score well in terms of employment access and connecting Wales and England through the extended Manchester service.

The Metro options (12-19) are slightly more complicated to deliver as they generally involve infrastructure works with a longer timeframe and use alignments which are currently disused or lightly trafficked, currently used by infrequent freight services which means service intensification may be less publicly acceptable. However, the Metro options do provide more social and cultural benefits. There are also more risks associated with developing the Metro options, with large infrastructure requirements. Options 14-19 are at an early stage of development. All Metro options will require further design to refine scheme costs and risks to complete Stage 2 if taken forward.

The station improvement options can generally be delivered in a short to medium timeframe and are likely to be acceptable to the public and relatively little risk which scores positively for deliverability. Risks to these include issues over third-party land ownership, which affects Options 25c and 25d. Station improvement options will also provide townscape and landscape improvements to the towns they are situated in.

Whilst electrification of Swansea Bay Metro (26) would have a positive impact on air pollution levels, carbon emissions and journey times, this option has a relatively negative overall deliverability score, due to its dependency on prior SWML electrification between Cardiff and Swansea. This is to secure network continuity and the National Grid power requirements, making it a longer-term prospect.

Additional services on the Southern section of the Heart of Wales Line (28) have been subject to further timetabling assessment to confirm their technical viability, they have also been judged to have good public acceptability.

The Strategic Case was originally developed and presented at WelTAG Stage One. A review of the Strategic Case at WelTAG Stage Two has confirmed that the policy context, case for change, identified problems and study objectives remain current. The WelTAG Stage Two Strategic Case includes details of option development work and additional consultation activities that have been undertaken as part of WelTAG Stage Two to inform the appraisal process. The Strategic Case has considered the adverse impacts, dependencies, constraints and risks of each option, which are considered further in Chapter 4: Transport Case and Chapter 7: Management Case.

The Strategic Case has appraised the short-listed options against national, regional and local policy objectives to assess their suitability and strategic fit as potential solutions. Each option has also been assessed against the study objectives and its ability to address the identified problems. This appraisal provides an update to the previous appraisal undertaken at WelTAG Stage One and reflects the additional option development work that has been undertaken

Table 3-2 provides a summary of the results of the appraisal. A detailed record of the assessment is provided in Appendix G (Tables 6-16) of the IAR.

Table 3.2: Appraisal Summary Table

Criteria	Qualitative Assessment (Options)																			
	7a	7b	8	9a	9b	11	12	13	14	15	16	17	18	19	25A	25B	25C	25D	26	28	29
Economic	Frequency Improvements - New service Swansea - Milford Haven	Frequency Improvements - New service Carmarthen - Milford Haven	Frequency Improvements - Extend Manchester (Carmarthen) - Milford Haven hourly	Frequency Improvements - New service Swansea - Pembroke Dock	Frequency Improvements - New service Carmarthen - Pembroke Dock	Frequency Improvements - Swansea - Fishguard (2 hourly)	Swansea Bay Metro (Services): Swansea to Pontarddulais viaNeath & SDL including: Option 22 - New Stations: Llandarcy, Option 23 - New Stations: Landore, Option 24A - New Metro station - Winch Wen, Option 24B - New Metro Station – Morriston, Option 24C - New Metro Station – Felindre, Option 24D1 - New Metro Station – Penllegaer, Option 24D2 - New Metro Station - Pontliw	Swansea Bay Metro (Services): Swansea - Pembrey & Burry Port 2tph including: Option 24E - New Metro Station: Cockett	Additional cord to connect SWML to Swansea District line at Llandeilo junction (more direct link between Swansea and HoW line).	Swansea Bay Metro: Pantyffynnon (Ammanford) to Gwaun Cae Gurwen	Swansea Bay Metro: Neath to Onllwyn	Swansea Bay Metro: Neath to Cwmgwrach	Swansea Bay Metro: Neath - Llandarcy - Swansea City Centre via Swansea Docks (as Tram-Train Operation as a section off current rail alignment) including Option 22 - New Stations: Llandarcy	Swansea Bay Metro: Link from Swansea District Line to Clydach	Station Improvements: Carmarthen	Stattion Improvements: Bury Port	Station Improvements: Whitland	Station Improvements: Llanelli	Electrification of Swansea Bay Metro to allow Tram-Train operation	Frequency Improvements - Heart of Wales (southern section) additional tpd (7)	Do Minimum
Business Users & Reliability Impact	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
Regeneration	0	0	0	0	0	0	+	+	0	0	0	0	+	0	+ +	+	+	+ +	+	+	0
Wider Impacts	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0
Environment																					
Noise	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Air Quality	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+ +	+	-
Greenhouse Gases	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+ + +	+	-
Landscape	0	0	0	0	0	0	+	+	-	0	0	0	+	-	+	0	0	+	0	-	0
Townscape	0	0	0	0	0	0	+ +	+ +	0	0	+	+	+ +	0	+ +	+ +	+ +	+ +	0	0	0
Historic Landscape	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cultural Heritage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0
Biodiversity	0	0	0	0	0	0	0	0	-	0	0	0	0	-	0	0	0	0	+	0	0
Water Environment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Social and Cultural																					
Commuting and Other Users	+ +	+ +	+ +	+ +	+ +	+ +	+	+	+ +	+ +	+ +	+ +	+ +	+	+ +	+ +	+ +	+ +	+ +	+	-
Reliability Impact on Commuting and Other Users	+ +	+ +	+ +	+ +	+ +	+ +	0	0	+ +	+ +	+ +	+ +	+ +	+	+ +	+ +	+ +	+ +	+ +	+	-
Physical Activity	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	+	-
Journey Quality	+ +	+	+	+	+	+	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	- -
Accidents	0	0	0	0	0	0	0	0	0	0	0	0	0	0	+	0	0	0	0	0	0
Security	0	0	0	0	0	0	+	+	0	0	0	0	+	0	+	+	+	+	0	0	0
Access to Services	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+	0	- -
Welsh Language	0	0	0	0	0	0	0	0	0	0	0	0	+	0	+	+	+	+	0	0	0
Tourism	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	0	0	0	0	0
Affordability	+	+	+	+	+	+	0	0	-	-	-	-	0	-	-	0	-	0	- -	-	+ +
Severance	+	+	+	+	+	+	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	0	+ +	0
Option Values	+	+	+	+	+	+	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+	+	+	+	+ +	+ +	-
Public Accounts																					
Cost to Broad Transport Budget	£127,986,678	£79,616,155	£53,173,780	£101,669,563	£80,451,538	£11,069,357	£255,060,090	£170,086,129	£23,093,525	£117,890,376	£146,362,053	£129,291,294	£432,043,881	£364,244,545	£4,879,354	£2,144,280	£2,967,885	£1,275,764	£161,400,119	£5,122,759	NYA
Indirect Tax Revenues	-	-	-	-	-	-	- -	-	0	-	-	-	- -	- -	-	-	-	-	-	-	-

Key

- Large positive (+ + +)
- Moderate positive (+ +)
- Slight positive (+)
- Neutral (0)
- Slight negative (-)
- Moderate negative (- -)
- Large Negative (- - -)
- Not Yet Assessed (NYA)

4. Transport Case

4.1 Overview

As detailed in WelTAG 2017, 'the Transport Case tells you what the expected impacts of the project are, how the project will contribute to the well-being goals and whether a project will provide value for public money. This is calculated by thinking about social, cultural, environmental and economic costs and benefits of each option.'

The Transport Case is an evidence-based assessment of:

- What the impacts will be;
- The scale of those impacts;
- Where and when they will occur; and
- Who/what will experience them.

The Transport Case for the WelTAG Stage One report was a qualitative assessment. In relation to the Stage Two Transport Case, WelTAG 2017 states that 'During Stage Two, the level of quantification of the impacts should increase for those impacts which are relevant to the decisions that need to be made.'

This assessment is based on pre-Covid 19 transport information and the assumption that service provision and passenger numbers will return to this level in future. At present there are significant restrictions on movement and social distancing measures that are impacting on travel patterns, service frequency and capacity. At present it is not known when public transport use may return to a pre-Covid 19 level, and further review of this situation will be needed in order to validate the assumptions made in this Transport Case.

4.2 Capital Costs

The WelTAG Stage Two process has involved the development of preliminary capital cost estimates for each of the options under consideration. Table 4-1 provides a summary of the cost estimate for each option (including risk and optimism bias). At this stage all cost estimates are preliminary in nature, which reflects the current stage of development of each of the options. Values used for the BCR calculation include Risk and Optimism Bias in line with Transport Appraisal Guidance.

Table 4-1 Capital Cost Summary

Option	Description of elements costed	Source of cost estimate	Capital Cost Estimate (including optimism bias and risk)
Option 7a - New service Swansea to Milford Haven	No infrastructure required	N/A	£0
Option 7b - New service Carmarthen to Milford Haven	No infrastructure required	N/A	£0
Option 8 - Extend Manchester (Carmarthen) - Milford Haven hourly	No infrastructure required	N/A	£0
Option 9a - New service Swansea - Pembroke	No infrastructure required	N/A	£0
Option 9b - New service Carmarthen - Pembroke Dock	No infrastructure required	N/A	£0
Option 11 - Swansea - Fishguard (2 hourly)	No infrastructure required	N/A	£0
Option 12 - Swansea to Pontarddulais via Neath & SDL	New stations at Llandarcy, Landore, Winch Wen, Morriston, Felindre, and Pontlliw, Cwrt Sart junction (track and signalling), Pontarddulais turnback	Railway SPONS & Scheme rates	£131,223,000
Option 13 - Swansea to Burry Port Metro Service	New station at Cockett,	Scheme rate	£34,030,000
Option 14 - Additional chord to connect SWML to Swansea District Line at Llandeilo junction	Track and signalling for new connection.	Scheme rates based on Cwrt Sart	£35,243,000
Option 15 - Swansea Bay Metro: Ammanford to Gwaun Cae Gurwen	Track upgrade. New stations at Ammanford (Town), Glanaman and Gwaun Cae Gurwen	Scheme km rates	£58,082,000
Option 16 - Swansea Bay Metro: Neath to Onllwyn	Track upgrade. New stations at Neath Riverside, Aberdulais, Crynant, Seven Sisters and Onllwyn	Scheme km rates	£98,739,000
Option 17 - Swansea Bay Metro: Neath to Cwmgwrach	Track upgrade. New stations at Neath Riverside, Aberdulais & Tonna, Resolven and Cwmgwrach	Scheme km rates	£81,315,000
Option 18 - Swansea Bay Metro: Neath - Llandarcy - Swansea City Centre via Swansea Docks	New track, signalling (including on-street running section). New stations at College Street, Strand,	Scheme km rates	£507,304,000

	Port Tennant, Langdon, University (Bay campus), Bay Studios Jersey Marine, Llandarcy, Neath Abbey, and Neath Riverside		
Option 19 - Swansea Bay Metro: Link from Swansea District Line to Clydach	New track, signalling (including on-street running section). New stations at College Street, Strand, Port Tennant, Langdon, University (Bay campus), Bay Studios Jersey Marine, Llandarcy and Clydach	Scheme km rates	£400,399,000
Option 25A - Station Improvements: Carmarthen	Parking and access proposals	Railway and Highways SPONS	£1,827,984
Option 25B - Station Improvements: Pembrey & Burry Port	Access proposals	Railway and Highways SPONS	£1,782,433
Option 25C - Station Improvements: Whitland	Parking and interchange proposals	Railway and Highways SPONS	£1,977,281
Option 25D - Station Improvements: Llanelli	Parking and interchange proposals	Railway and Highways SPONS	£1,581,925
Option 26 - Electrification of Swansea Bay Metro to allow Tram -Train (Options 12 and 13)	Provision of overhead electrification equipment and related works	Reported costs from previous projects (RIA)	£183,000,000
Option 28 - Heart of Wales (southern section) additional train per day	No infrastructure required	N/A	£0
Option 29 - Do Minimum	No investment.	N/A	£0

-+

4.3 Operational Costs

Operational costs have been calculated based on the mileage of the service and includes track access charges, rolling stock, train crew and maintenance cost allowances. Table 4-2 provides a summary of the cost estimate for each option (optimism bias is currently excluded from the values but would be 1.6% for the current level of option development).

Table 4-2 Operational Cost Summary

Option	Description of elements costed	Information to support cost estimate	Operational Cost (p.a.) Estimate (excluding optimism bias)
Option 7a - New service Swansea to Milford Haven	Annual costing of running the new services including additional rolling stock.	Extra mileage per journey = 73 Total extra daily milage = 1311 Additional units required = 3	£3,536,326
Option 7b - New service Carmarthen to Milford Haven	Annual costing of running the new services including additional rolling stock.	Extra mileage per journey = 40 Total extra daily milage = 720 Additional units required = 2	£2,199,828
Option 8 - Extend Manchester (Carmarthen) - Milford Haven hourly	Annual costing of running the new services including additional rolling stock.	Extra mileage per journey = 40 Total extra daily milage = 720 Additional units required = 1	£1,469,214
Option 9a - New service Swansea - Pembroke	Annual costing of running the new services including additional rolling stock.	Extra mileage per journey = 73 Total extra daily milage = 1314 Additional units required = 2	£2,809,173
Option 9b - New service Carmarthen - Pembroke Dock	Annual costing of running the new services including additional rolling stock.	Extra mileage per journey = 42 Total extra daily milage = 743 Additional units required = 2	£2,222,910
Option 11 - Carmarthen - Fishguard (2 hourly)	Annual costing of running the new services including additional rolling stock.	Extra mileage per journey = 43 Total extra daily milage = 171 Additional units required = 0	£305,851
Option 12 - Swansea to Pontarddulais via Neath & SDL	Annual costing of running the new services including additional rolling stock.	Extra mileage per journey = 22 Total extra daily milage = 1575 Additional units required = 4	£4,538,145
Option 13 - Swansea to Burry Port Metro Service	Annual costing of running the new services including additional rolling stock.	Extra mileage per journey = 16 Total extra daily milage = 1148 Additional units required = 4	£4,048,823
Option 14 - Additional chord to connect SWML to Swansea District Line at Llandeilo junction	Slight cost saving reduced journey length	1.5 miles per journey saved by not going into Llanelli and reversing (HoW services).	-£71,680

Option 15 - Swansea Bay Metro: Ammanford to Gwaun Cae Gurwen	Annual costing of running the new services including additional rolling stock.	Extra mileage per journey = 11 Total extra daily milage =756 Additional units required = 2	£2,146,705
Option 16 - Swansea Bay Metro: Neath to Onllwyn	Annual costing of running the new services including additional rolling stock.	Extra mileage per journey = 11 Total extra daily milage = 765 Additional units required = 2	£2,155,938
Option 17 - Swansea Bay Metro: Neath to Cwmgwrach	Annual costing of running the new services including additional rolling stock.	Extra mileage per journey = 9 Total extra daily milage = 630 Additional units required = 2	£2,017,451
Option 18 - Swansea Bay Metro: Neath - Llandarcy - Swansea City Centre via Swansea Docks	Annual costing of running the new services including additional rolling stock.	Extra mileage per journey = 8 Total extra daily milage = 585 Additional units required = 2	£2,236,784
Option 19 - Swansea Bay Metro: Link from Swansea District Line to Clydach	Annual costing of running the new services including additional rolling stock.	Extra mileage per journey = 11 Total extra daily milage = 810 Additional units required = 2	£2,407,719
Option 25A - Station Improvements: Carmarthen	Existing station – assumed to have no significant operational costs above existing requirements. Allowance of £5k added.	N/A	£5000
Option 25B - Station Improvements: Pembrey & Burry Port	Existing station – assumed to have no significant operational costs above existing requirements. Allowance of £5k added.	N/A	£5000
Option 25C - Station Improvements: Whitland	Existing station – assumed to have no significant operational costs above existing requirements. Allowance of £5k added.	N/A	£5000
Option 25D - Station Improvements: Llanelli	Existing station – assumed to have no significant operational costs above existing requirements. Allowance of £7.5k added.	N/A	£7500
Option 26 - Electrification of Swansea Bay Metro to allow Tram -Train	Cost difference of electric operation compared to diesel	Whilst fuel cost is less the rolling stock leasing is more leading to a slight overall cost increase.	£ 960,190
Option 28 - Heart of Wales (southern section) additional train per day	Annual costing of running the new services including additional rolling stock.	Extra mileage per journey = 42 Total extra daily milage = 85 Additional units required = 0	£141,544

Option 29 - Do Minimum	No investment.	N/A	£0

4.4 Monetised Benefits

This section describes the methodology used to appraise each option in economic terms and presents the appraisal findings. The economic assessment has been undertaken in accordance with Welsh Government Transport Appraisal Guidance (WelTAG) and Department for Transport Appraisal Guidance (TAG).

Demand Forecast and Revenue

Demand forecasting has been carried out using Passenger Demand Forecasting Handbook (PDFH) methodology for existing stations and services. Services which are totally new routes, with new stations, have been forecast using a trip rate model. Known significant residential developments were included in the demand forecasts for Winch Wen, Llandarcy and Felindre. Employment at the proposed Onllwyn test track was also included in the Option 16 forecasts.

For Options 12 and 13 output was also obtained from the South West Wales Strategic Model as a comparator. For revenue purposes top ten destination data was obtained from Moira (rail industry database/model) and this was used to calculate an average fare for existing stations. For new Metro services it was assumed that a zonal approach would be employed with an average single fare of £1.50.

To allow for post-Covid recovery it has been assumed that 2019 passenger numbers will not be reached again until 2025, from this point growth of 1.05% per annum has been applied for the next 25 years. This figure is the lower estimate set out in Network Rail's Long-Term Planning Regional Urban Market Study to reflect uncertainty in the future market.

Journey Time Savings and User Cost Savings

Journey times for the top ten destinations from each station have been compared for rail, bus/coach and car and the journey time savings calculated, for new routes the same has been carried out for all origin-destination pairs along the route. In some instances where the car journeys are still quicker than the train these values are negative. Applying the TAG value of time (VoT) converts these savings into a monetary value.

Marginal External Costs

Marginal external cost savings are savings gained from car trips taken off the highway network and include congestion relief, accident reduction and greenhouse gas reduction. Indirect tax changes are also included in this category, although where car use reduces these will be negative values as the government receives less fuel duty and VAT. TAG provides values which have been applied to the anticipated reduction in car kilometres travelled.

Physical Activity Benefits
Increased physical activity due to people walking to the station has also been included in the assessment. Using the DfT's online Health Impact Assessment Tool (HEAT) the increase in walking translates to a reduction in loss of life due to inactivity related ill-health and an associated value.

4.5 Benefit Cost Ratios

The detailed benefit cost ratio results are included in Appendix H of the IAR (Transport Economic Efficiency - TEE, Public Accounts – PA and Analysis of Monetised Costs and Benefits – AMCB Tables). The key points for each option are discussed in the follow section.

4.5.1 Option 7a - New service Swansea to Milford Haven

The demand forecasting for this option indicates that the increase in passengers equates to 224,135 trips per annum. This is a result of uplifts in passengers due to increased frequency at the following stations: Milford Haven, Johnston, Haverfordwest, Clarbeston Rd, Clunderwen, Whitland, St Clears, Carmarthen, Ferryside, Kidwelly, Pembrey BP, Llanelli, Gowerton, and Swansea.

Over the 60-year appraisal period journey time savings and user cost savings equate to £66,092,226 with marginal external costs and physical activity benefits contributing £99,511,935. This gives a present value of benefits of £157,685,147, after indirect taxation revenues have been subtracted.

The present value of costs (in this option operational costs only as no additional infrastructure is required) over the 60-year period equate to £127,986,678. Revenue generated covers about four fifths of the operating costs on an annual basis suggesting that public subsidy will be required for the operation of additional trains.

Considering all the monetised benefits then the Benefit to Cost Ratio (BCR) is 1.2 for this option.

4.5.2 Option 7b - New service Carmarthen to Milford Haven

The demand forecast for this option equates to 57,956 additional passengers a year. This is due to an uplift in use at Milford Haven, Johnston, Haverfordwest, Clarbeston Rd, Clunderwen, Whitland, St Clears and Carmarthen stations.

The present value of costs (PVC) over the 60-year assessment period for this option is £79,616,155. Around three fifths of the annual operating costs of the service is covered by direct revenue so a subsidy would be required for the service.

The present value of benefits (PVB) is £48,684,635. This is made up of £24,801,042 of journey time and user savings and £26,784,443 of marginal external cost savings.

The overall Benefit Cost Ratio for this option is 0.6.

4.5.3 Option 8 - Extend Manchester (Carmarthen) - Milford Haven hourly

This option is an alternative way of providing the same service level as Option 7b therefore the passenger demand estimate is the same at 57,956 per annum.

The operating costs of this option are less than Option 7b and therefore almost 90% are covered by the direct revenue from the increased demand, a smaller subsidy would be required for delivering the frequency this way due to reduction in operating costs

Overall, the 60-year present value of benefits (PVB) is calculated to be £49,496,133 (£25,033,522 of journey time and user savings and £27,097,672 of marginal external cost savings).

The 60-year present value of costs (PVC) is £53,173,780. This gives a BCR of 0.9.

4.5.4 Option 9a - New service Swansea – Pembroke

Demand estimates for this option is an additional annual number of 246,835 trips. This option is a limited stop services so includes a frequency uplift for the following stations: Pembroke Dock, Pembroke, Tenby, Whitland, St Clears, Carmarthen, Ferryside, Kidwelly, Pembrey and Burry Port, Llanelli, Gowerton and Swansea.

If this level of demand is realised and current journey destination pattern and average fare is maintained, then the annual operating cost of the services is covered by direct revenue. The present value of costs (PVC) for the 60-year assessment is £101,669,563.

The benefits of this option include £106,370,257 of marginal external cost savings and £58,423,342 of user cost and journey time savings. This results in an overall present value of benefits of £156,553,361.

The benefit cost ratio calculated is 1.5 for this option.

4.5.5 Option 9b - New service Carmarthen - Pembroke Dock

This option is again a limited stop service and demand is generated due to increased frequency at Pembroke Dock, Pembroke, Tenby, Whitland, St Clears, and Carmarthen. The total annual demand associated with this service is estimated at 80,655.

Revenue from the ticket sales associated with these trips is estimated to cover just over half of the operating costs therefore a subsidy would be required to operate the service. The 60-year present value of costs is £80,451,538.

The 60-year present value of benefits is £54,795,610 of which, £34,310,215is marginal external cost savings and £23,028,512 is direct cost saving to users and journey time savings.

Overall the BCR of this option is 0.7.

4.5.6 Option 11 - Carmarthen - Fishguard (2 hourly)

Demand for this service enhancement is estimated to be an additional 8,561 passengers per year, made up of users from Fishguard Harbour, Fishguard & Goodwick, Clarbeston Rd, Clunderwen, Whitland, St Clears and Carmarthen.

Around two thirds of the operational cost of the two return trips per day are covered by the direct revenue of additional demand suggesting a subsidy will be required to operate the improved frequency service. Over the 60-year assessment the present value of costs equates to £11,069,357.

The present value of benefits is made up of £4,181,814 marginal external cost savings and £4,699,8803,362,890 user cost and journey time savings giving a total PVB of £8,427,992.

The BCR value for this option is 0.8.

4.5.7 Option 12 - Swansea to Pontarddulais via Neath & SDL

The demand for this new Metro option is estimated at 1,730,000. This include demand associated with new stations at Llandarcy, Landore, Winch Wen, Morriston, Felindre, and

Pontlliw and increase demand due to frequency uplifts at existing stations at Skewen, Llansamlet, Swansea, Neath and Pontarddulais. The forecast additional annual demand is shown in table 4.3.

Table 4-3 Option 12 Demand Forecasts

Station	Forecast additional annual demand	Comments
Swansea Station	173,800	
Landore	410,400	
Winch Wen	129,300	Development 1.3k dwellings
Skewen	37,500	
Llansamlet	27,000	
Neath	93,500	
Llandarcy	323,600	Development 4k dwellings
Morriston	339,800	
Felindre	48,900	Development 0.4k dwellings
Pontlliw	45,200	
Pontarddulais	101,000	
Total	**1,730,000**	

This demand compares with 4,256,130 forecast by the Multi Modal South West & Mid Wales Transport Model (SWMWTM). The most significant differences are at existing stations where the regional model predicts an average of 10 times more additional passengers. If you consider just the new stations the different methods of demand forecasting are very similar with 1,493,578 (SWW model) and 1,352,995 (trip rate). The lower values will be used for the base case with a sensitivity test of the higher value.

Annual operating costs for this option are expected to be covered by direct income from ticket sales. The 60-year present value of costs (capital and operating) is £255,060,090.

The 60-year present value of benefits is £751,292,791 (comprising £109,533,325 journey time/user cost savings and £661,146,976 of marginal external cost savings).

The BCR for this option is 2.9.

A sensitivity test was conducted for this option, using demand forecasts from the SWMWTM. If the demand forecast from the model is taken forward, the option would have a BCR value of 7.2, with a 60 year present value of benefits (PVB) of £1,847,743,102. The forecast PVB comprises of £269,479,791 of journey time/user cost savings and £1,625,961,509 of marginal external cost savings.

4.5.8 Option 13 - Swansea to Burry Port Metro Service

The demand estimate for this option is 632,100 made up of new station demand at Cockett and frequency uplifts at existing stations at Gowerton, Llanelli, Pembrey and Burry Port and Swansea. The forecast additional annual demand is shown in table 4.4.

Table 4-4 Option 13 Demand Forecasts

Station	Forecast additional annual demand
Swansea HS	173,700
Cockett	272,000
Gowerton	37,800

Llanelli	110,500
Pembrey & Burry Port	38,100
Total	**632,100**

This compares to a total of 851,230 forecast by the regional model. Again, the values for the new stations are very similar with both methods but the values for existing stations, especially Swansea are predicted to be higher by the regional model. The lower values will be used for the base case with a sensitivity test of the higher value.

Only around half of the operating costs of this option are expected to be covered by the ticket revenue so a subsidy would be required to support the option. The total assessment period present value of costs is £170,086,129.

The present value of benefits for the assessment period are £283,972,324 (comprising £59,653,054 journey time and user cost savings and £231,751,170 of marginal external cost savings).

The BCR for this option is 1.7.

A sensitivity test was conducted for this option, using demand forecasts from the SWMWTM. If the demand forecast from the model is taken forward, the option would have a BCR value of 2.2, with a 60 year present value of benefits (PVB) of £380,823,475. The forecast PVB comprises of £80,324,072 of journey time/user cost savings and £310,506,610 of marginal external cost savings.

4.5.9 Option 14 - Additional chord to connect SWML to Swansea District Line at Llandeilo junction

Analysis using Moira indicates that 43,712 passengers are on board per year when services travel between Bynea and Llanelli and these will therefore experience a journey time saving of around 6 minutes with the new chord.

If the existing services only are considered, then the present value of benefits is £549,688 over the 60-year appraisal period.

The present value of costs for the 60-year period are £23,093,525 (due to the significant capital costs as the reduced distance provides a slight operational cost saving). The resultant BCR is 0.03 indicating the chord is not cost effective, however, other options can potentially benefit from the chord so if they are taken forward the chord could from part of that package.

4.5.10 Option 15 - Swansea Bay Metro: Pantyffynnon (Ammanford) to Gwaun Cae Gurwen

The demand for this option is derived from new stations at Ammanford, Glanaman and Gwaun Cae Gurwen and a frequency uplift at the existing station of Pantyffynnon. The total demand for this route is 282,800. The forecast additional annual demand is shown in table 4.5.

Table 4-5

Station	Forecast additional annual demand	Comments
Pantyffynnon	52,600	Interchange with HoWL
Ammanford (Town)	141,600	
Glanaman	31,600	Very low demand
Gwaun Cae Gurwen	57,000	Low demand.
Total	**282,800**	

Around 60% of the annual operating costs are covered by the direct revenue so the service will require a subsidy. The present value of benefits (over 60-year appraisal period) is £120,242,430 comprising £23,823,487 of journey time savings and £97,667,909 of marginal external costs). It should be noted that trip rate demand forecasts, do not consider destination, and therefore improved frequency beyond Pantyffynnon is also required to realise the scale of demand.

The present value of costs is £117,890,376 (capital and operating costs over the 60-year assessment period).

The results in a BCR value of 1.0 for the branch only.

4.5.11 Option 16 - Swansea Bay Metro: Neath to Onllwyn

The demand for this option totals 159,700 passenger per year made up of new stations at Neath Riverside, Aberdulais, Crynant, Severn Sisters and Onllwyn. The forecast additional annual demand is shown in table 4.6.

Table 4-6

Station	Forecast additional annual demand	Comments
Neath Riverside	67,800	
Aberdulais	46,900	Low demand
Crynant	8,800	Very low demand
Seven Sisters	19,100	Very low demand
Onllwyn	17,100	Very low demand, assumes 300 jobs at GCRE
Total	**159,700**	

The annual operational cost of the service is approximately 10 times the direct revenue associated with the demand on the route so would require an operating subsidy. The present value of costs over 60-years is £146,362,053.

The 60-year present value of benefits is £65,948,179 with £7,816,508 of this being journey time and user cost savings and £59,307,418 being marginal external cost savings.

The overall BCR for this option is 0.5.

4.5.12 Option 17 - Swansea Bay Metro: Neath to Cwmgwrach

Demand for this route is generated from new stations at Neath Riverside, Aberdulais and Tonna, Resolven and Cwmgwrach with a total estimate of 162,200 per annum. The forecast additional annual demand is shown in table 4.7.

Table 4-7

Station	Forecast additional annual demand	Comments
Neath Riverside	67,800	
Aberdulais & Tonna	63,700	
Resolven	8,000	Very low demand

Cwmgwrach	22,700	Very low demand.
Total	**162,200**	

The annual operating cost of this option is approximately nine times the direct revenue from passenger use therefore a subsidy will be required to operate the service. The total present value of costs is £129,291,294 (capital and operation costs over the 60-year period).

The present value of benefits totals £64,972,448 which is £6,771,597 user cost and journey time savings and £59,036,227of marginal external costs).

The BCR value for this option is 0.5.

4.5.13 Option 18 - Swansea Bay Metro: Neath - Llandarcy - Swansea City Centre via Swansea Docks

Demand for this option is generated by new stations at Llandarcy, Neath Riverside, Neath Abbey, Port Tenant, Jersey Marine, Bay Studios, Langdon Road, College Street, Strand and University and a connects to Swansea Station. The total annual demand estimate is 2,225,600 passenger trips. The forecast additional annual demand is shown in table 4.8.

Table 4-8

Station	Forecast additional annual demand	Comments
Swansea HS	173,800	
College Street	478,300	
Strand	354,200	
Port Tennant	215,100	
Langdon	111,500	
University (Bay campus)	32,200	Mainly destination
Bay Studios	17,000	Mainly destination
Jersey Marine	13,300	Mainly destination (Amazon)
Llandarcy	323,600	
Neath Abbey	187,700	
Neath Riverside	312,900	
Total	**2,225,600**	

If this level of total demand is achieved, then the annual operational costs are likely to be covered by the revenue generated by passengers. The present value of costs is £401,231,271 (operational and capital costs considered over the 60-year appraisal period).

The present value of benefits is £833,275,151 (user cost and journey time savings of £123,964,329 and marginal external cost saving of £720,747,164 over the 60-year appraisal).

The overall BCR value is 1.9 for this option.

4.5.14 Option 19 - Swansea Bay Metro: Link from Swansea District Line to Clydach

Demand for the link to Clydach totals 1,893,400 made up of demand from new stations at Clydach, Llandarcy, Jersey Marine, Port Tenant, Bay Studios, Langdon Road, College Street, Strand, University connecting with Swansea Station. The forecast additional annual demand is shown in table 4.9.

Table 4-9

Station	Forecast additional annual demand	Comments
Swansea HS	173,800	
College Street	478,300	
Strand	354,200	
Port Tennant	215,100	
Langdon	111,500	
University (Bay campus)	32,200	Mainly destination
Bay Studios	17,000	Mainly destination
Jersey Marine	13,300	Mainly destination (Amazon)
LLandarcy	323,600	
Clydach	174,400	
Total	**1,893,400**	

The annual operating cost is again expected to be covered by the direct revenue if the passenger demand are fare assumptions are met. The present value of cost for this option (operational and capital cost over 60 years) is £364,244,545.

The present value of benefits is £690,743,711 (£120,899,449 of user cost/journey time savings and £581,333,039 of marginal external benefits over the 60 years).

The BCR for the route is 1.9.

4.5.15 Option 25A - Station Improvements: Carmarthen

The improvements at the station are estimated to increase passenger use by 55k per annum as passengers can park more easily and securely.

The 60-year present value of costs is £4,879,354.

Present value of benefits is £14,147,267, comprising £4,413,000 of journey time and user cost savings and £10,549,061 of marginal external benefits.

The BCR for this option is 2.9.

4.5.16 Option 25B - Station Improvements: Pembrey & Burry Port

The demand increase is estimated to be 6k passengers per year due to improved access to and between platforms.

The 60-year present value of costs is £2,144,280.

The present value of benefits is £2,701,460 (£858,024 form journey time/user cost savings and £1,929,365 from marginal external benefits).

The BCR value for this option is 1.26.

4.5.17 Option 25C - Station Improvements: Whitland

Additional demand at Whitland station is estimated at 13k per year as a result of improved parking (amount and security) and better access between platforms.

The present value of costs for the station improvements are £2,967,885

The present value of benefits is £6,079,826 (£1,627,121 of journey time and user cost savings and £4,757,566 of external marginal benefits).

The BCR value of 2.05.

4.5.18 Option 25D - Station Improvements: Llanelli

Increased demand at Llanelli station due to substantially increased and secure parking and better interchange could be in the region of 127k trips per year.

The present value of costs (60-year) is £10,212,454.

The present value of benefits (60-year) is £30,201,551 (£10,265,792 journey time/ user benefits and £21,053,391 marginal external benefits)

The BCR value is 2.35

4.5.19 Option 26 - Electrification of Swansea Bay Metro to allow Tram -Train

This considers the additional benefits of electrifying the Metro routes outlined in Options 12 and 13. The 'sparks effect' of increasing patronage is estimated at 10% of non-electrified demand resulting in 236,213 additional trips on these routes.

There are substantial capital costs to provide electrification of these routes and the present value of costs is £161,400,119.

The present value of benefits is £98,587,815 giving an overall BCR of 0.60. on a standalone basis.

Either passenger demand would have to be substantially above the 10% due to electrification (and/or in addition to increased demand due to changing travel patterns) or the costs would have to be substantially less. The prior electrification of the South Wales mainline between Cwrt Sart and Swansea under SWML electrification would reduce the overall add on cost, which can be assessed

4.5.20 Option 28 - Heart of Wales (southern section) additional train per day

Demand from an additional service on the Heart of Wales Line is estimated to generate an additional 9k passengers per year.

Based on mileage only increased operating costs (i.e. no additional rolling stock requirements) then the present value of costs is £5,122,759.

The present value of benefits is £5,794,426 (£2,244,534 from journey time savings/user cost savings and £3,770,805 from marginal external cost savings).

The benefit cost ration is therefore 1.1.

4.6 Sensitivity tests

Sensitivity tests were conducted for all the options discussed. These tests were conducted using the same methods to conduct the BCR calculations, with altered costings and demand. The tests analysed how the BCR values would be affected if the project costs rise by 20%, or demand falls by 20%. The results are shown in table ____ below.

Option	Base BCR	Costs +20%	Demand -20%
Option 7a - New service Swansea to Milford Haven	1.2	1.0	1.0
Option 7b - New service Carmarthen to Milford Haven	0.6	0.5	0.5
Option 8 - Extend Manchester (Carmarthen) - Milford Haven hourly	0.9	0.8	0.7
Option 9a - New service Swansea - Pembroke	1.5	1.3	1.2
Option 9b - New service Carmarthen - Pembroke Dock	0.7	0.6	0.5
Option 11 - Swansea - Fishguard (2 hourly)	0.8	0.6	0.6
Option 12 - Swansea to Pontarddulais via Neath & SDL	2.9	Different sensitivity test used Refer to text	
Option 13 - Swansea to Burry Port Metro Service	1.7	Different sensitivity test used Refer to text	
Option 14 - Additional chord to connect SWML to Swansea District Line at Llandeilo junction	0.03	0.02	0.02
Option 15 - Swansea Bay Metro: Ammanford to Gwaun Cae Gurwen	1.0	0.8	0.8
Option 16 - Swansea Bay Metro: Neath to Onllwyn	0.5	0.4	0.4
Option 17 - Swansea Bay Metro: Neath to Cwmgwrach	0.5	0.4	0.4
Option 18 - Swansea Bay Metro: Neath - Llandarcy - Swansea City Centre via Swansea Docks	1.9	1.6	1.5
Option 19 - Swansea Bay Metro: Link from Swansea District Line to Clydach	1.9	1.6	1.5
Option 25A - Station Improvements: Carmarthen	2.9	2.74	2.7
Option 25B - Station Improvements: Pembrey & Burry Port	1.26	1.12	1.09
Option 25C - Station Improvements: Whitland	2.05	1.87	1.82
Option 25D - Station Improvements: Llanelli	2.35	2.89	2.9
Option 26 - Electrification of Swansea Bay Metro to allow Tram -Train	0.6	0.5	0.5
Option 28 - Heart of Wales (southern section) additional train per day	1.1	0.9	0.9

4.7 Value for Money Assessment

The Benefit to Cost Ratio (BCR) calculated for each option corresponds to the value for money categories recognised by government and presented in Table 4-10. The respective classifications

for the options assessed are presented in table 4-11. These are the pure financial considerations and do not consider other wider benefits that are not readily quantifiable.

Table 4-10 ***Value for Money Classification***

BCR Value	Value for Money
Less than 1	Poor VfM
Between 1.0 and 1.5	Low VfM
Between 1.5 and 2.0	Medium VfM
Between 2.0 and 4.0	High VfM
Greater than 4.0	Very high VfM

The value for money for each option are presented in table 4-11.

Table 4-11 Option value for money classification

Option	Value for Money Classification
West Wales Frequency/ Connectivity	
Option 7a New service Swansea – Milford Haven	low
Option 7b New service Carmarthen – Milford Haven	poor
Option 8 Extend Manchester (Carmarthen) – Milford Haven hourly	poor
Option 9a New service Swansea – Pembroke Dock	Low/medium
Option 9b New service Carmarthen - Pembroke Dock	poor
Option 11 Cardiff - Fishguard 2 hourly	poor
Option 28 HoW (south) additional tpd (7)	low
Station Improvements	
Option 25A Carmarthen	high
Option 25B Pembrey & Burry Port	low
Option 25C Whitland	high
Option 25D Llanelli	high
Swansea Bay Metro	
Option 12 (inc. 22, 23, 24A/B/C/D2) Swansea - Pontardullais via Neath/SDL	high
Option 13 (inc. Opt. 24E) Swansea - Pembrey & BP 2tph	medium
Option 14 Additional Chord Llandeilo Jnct (existing services)	poor
Option 15 Pantyffynnon (Ammanford) to Gwaun Cae Gurwen	low
Option 16 Neath to Onllwyn	poor
Option 17 Neath to Cwmgwrach	poor
Option 18 Neath - Llandarcy - Swansea City Centre via Swansea Docks	medium
Option 19 (Opt. 22) Swansea District Line to Clydach	medium
Option 26 Electrification – Metro Phase 1 (Opt 12 and 13) as standalone	poor

4.8 Economic Impact Appraisal

A summary of the economic impact assessment undertaken for each option is presented in Table 4-12.

Table 4-12 Economic Impact Assessment Summary (60-year appraisal values at 2010 prices & values: 2010 is the current common base year for appraisal as adopted by DfT and HMT. Additional factors are used in the calculations to account for this.)

Option	Economic Benefits (PVB)	Economic Costs (PVC)	Net Present Value (NPV)	BCR
Option 7a - New service Swansea to Milford Haven	£157,685,147	£127,986,678	£29,698,469	1.2
Option 7b - New service Carmarthen to Milford Haven	£48,684,635	£79,616,155	-£30,931,519	0.6
Option 8 - Extend Manchester (Carmarthen) - Milford Haven hourly	£49,496,133	£53,173,780	-£3,677,647	0.9
Option 9a - New service Swansea - Pembroke	£156,553,361	£101,669,563	£54,883,798	1.5
Option 9b - New service Carmarthen - Pembroke Dock	£54,795,610	£80,451,538	-£25,655,929	0.7
Option 11 - Swansea - Fishguard (2 hourly)	£8,427,992	£11,069,357	-£2,641,365	0.8
Option 12 - Swansea to Pontarddulais via Neath & SDL	£751,292,791	£255,060,090	£496,232,701	2.9
Option 13 - Swansea to Burry Port Metro Service	£283,972,324	£170,086,129	£113,886,194	1.7
Option 14 - Additional chord to connect SWML to Swansea District Line at Llandeilo junction	£594,688	£23,093,525	-£22,498,873	0.03
Option 15 - Swansea Bay Metro: Ammanford to Gwaun Cae Gurwen	£120,242,430	£117,890,376	£2,352,054	1.0
Option 16 - Swansea Bay Metro: Neath to Onllwyn	£65,948,179	£146,362,053	-£80,413,874	0.5
Option 17 - Swansea Bay Metro: Neath to Cwmgwrach	£64,972,448	£129,291,294	-£64,318,846	0.5
Option 18 - Swansea Bay Metro: Neath - Llandarcy - Swansea City Centre via Swansea Docks	£833,275,151	£432,043,881	£401,231,271	1.9
Option 19 - Swansea Bay Metro: Link from Swansea District Line to Clydach	£690,743,711	£364,244,545	£326,499,167	1.9
Option 25A - Station Improvements: Carmarthen	£14,147,267	£4,879,354	£9,267,913	2.9
Option 25B - Station Improvements: Pembrey & Burry Port	£2,701,460	£2,144,280	£557,180	1.26
Option 25C - Station Improvements: Whitland	£6,079,826	£2,967,855	£3,111,941	2.05
Option 25D - Station Improvements: Llanelli	£30,201,552	£10,212,454	£19,989,098	2.35

Option	Economic Benefits (PVB)	Economic Costs (PVC)	Net Present Value (NPV)	BCR
Option 26 **-** Electrification of Swansea Bay Metro to allow Tram -Train	£98,587,815	£161,400,119	-£62,812,304	0.6
Option 28 - Heart of Wales (southern section) additional train per day	£5,794,426	£5,122,759	£671,667	1.1

4.9 Non - Monetarised Benefits – Assessment of Impacts

The WelTAG Stage One Transport Case assessment involved undertaking a qualitative appraisal of each option against Economic, Environmental, Social and Cultural criteria. This appraisal has been reviewed and updated for WelTAG Stage Two, to reflect the additional option development work, the environmental and ecological reviews and economic assessment that has been undertaken. The appraisal has involved each option being assessed using the WelTAG seven-point assessment scale, as set out in Section 1.4. The appraisal also considered when and where impacts will occur and who and/or what will experience the impacts. A summary of the results of this appraisal are presented in Table 4-11 and is also included within Appendix G (Worksheet 10) of the IAR.

Table 4.13 - Summary of Appraisal Worksheets

Option Ref	Option	Wales Transport Strategy Outcomes		WBOFGA Goals & Local Well-being Objectives	Welsh Government Well-being Objectives				Local Transport Plan Objectives	Swansea Bay City Region Objectives	Scheme Objectives										Tackling Problems	Appraisal Summary Table				Delivery
											Swansea Bay Objectives						Combined									
		Ambitions	Priorities		Prosperous and Secure	Healthy and Active	Ambitious and Learning	United and Connected			1	2	3	4	5	6	7	8	9	10		Econ.	Env.	Soc. & Cul	Pub. Acc.	
7a	Frequency Improvements - New service Swansea - Milford Haven	+	+ +	+	+ +	0	0	+	+	0	+ +	+ + +	+ +	0	0	0	+	+	+	+	+ +	+	+	+ +	NYA	-
7b	Frequency Improvements - New service Carmarthen - Milford Haven	+	+ +	+ +	+ +	0	0	+	+	0	+ +	+ + +	+ +	0	0	0	+	+	+	+	+ +	+	+	+ +	NYA	-
8	Frequency Improvements - Extend Manchester (Carmarthen) - Milford Haven hourly	+	+ +	+ +	+ +	0	0	+	+	0	+ +	+ +	+ +	0	0	0	+	+	+	+	+ +	+	+	+ +	NYA	-
9a	Frequency Improvements - New service Swansea - Pembroke Dock	+	+	+	+ +	0	0	+	+	0	+ +	+ + +	+ +	0	0	0	+	+	+	+	+ +	+	+	+ +	NYA	-
9b	Frequency Improvements - New service Carmarthen - Pembroke Dock	+	+	+	+ +	0	0	+	+	0	+ +	+ + +	+ +	0	0	0	+	+	+	+	+ +	+	+	+ +	NYA	-
11	Frequency Improvements - Swansea - Fishguard (2 hourly)	+	+	+	+ +	0	0	+	+	0	+ +	+ + +	+ +	0	0	0	+	+	+	+	+ +	+	+	+ +	NYA	-
12	Swansea Bay Metro (Services): Swansea to Pontarddulais viaNeath & SDL including: Option 22 - New Stations: Llandarcy, Option 23 - New Stations: Landore, Option 24A - New Metro station - Winch Wen, Option 24B - New Metro Station – Morriston, Option 24C - New Metro Station – Felindre, Option 24D1 - New Metro Station – Penllegaer, Option 24D2 - New Metro Station - Pontlliw	+	+	+	+	0	0	+	+ +	0	+ +	+ +	+ +	0	0	+	+ +	+	+	+	+	+	+	+ +	NYA	-
13	Swansea Bay Metro (Services): Swansea - Pembrey & Burry Port 2tph including: Option 24E - New Metro Station: Cockett	+	+	+	+	0	0	+	+ +	0	+ +	+ +	+ +	0	0	+	+ +	+	+	+	+	+	+	+ +	NYA	-
14	Additional cord to connect SWML to Swansea District line at Llandeilo junction (more direct link between Swansea and HoW line).	+	+	+ +	+	0	0	+	+ +	0	+ +	+ + +	+ +	0	0	+	+	+	+	+	+	+	+	+ +	NYA	- -
15	Swansea Bay Metro: Pantyffynnon (Ammanford) to Gwaun Cae Gurwen	+	+	+ +	+	0	0	+	+ +	0	+	+	+ +	0	0	0	+	+	+	+	+	+	+	+ +	NYA	- -
16	Swansea Bay Metro: Neath to Onllwyn	+	+	+	+	0	0	+	+ +	0	+	+	+ +	0	0	0	+	+	+	+	+	+	+	+ +	NYA	- -
17	Swansea Bay Metro: Neath to Cwmgwrach	+	+	+	+	0	0	+	+ +	0	+	+	+ +	0	0	0	+	+	+	+	+	+	+	+ +	NYA	- -
18	Swansea Bay Metro: Neath - Llandarcy - Swansea City Centre via Swansea Docks (as Tram-Train Operation as a section off current rail alignment) including Option 22 - New Stations: Llandarcy	+	+	+	+	0	0	+	+ +	0	+ +	+	+ +	0	0	0	+	+	+	+	+	+	+	+ +	NYA	- -
19	Swansea Bay Metro: Link from Swansea District Line to Clydach	+	+	+	+	0	0	+	+ +	0	+	+	+	0	0	0	+	+	+	+	+	+	+	+ +	NYA	- -
25A	Station Improvements: Carmarthen	+	+	+	+	0	0	+ +	+	0	+	0	+ +	0	+	0	+ +	+	+	+	+ +	+	+	+ +	NYA	-
25B	Stattion Improvements: Bury Port	+	+	+	+	0	0	+ +	+	0	+	0	+ +	0	0	0	+ +	+	+	+	+	+	+	+ +	NYA	-
25C	Station Improvements: Whitland	+	+	+	+	0	0	+ +	+	0	+	0	+ +	0	+	0	+ +	+	+	+	+	+	+	+ +	NYA	-
25D	Station Improvements: Llanelli	+	+	+	+	0	0	+ +	+	0	+	0	+ +	0	+	0	+ +	+	+	+	+	+	+	+ +	NYA	-
26	Electrification of Swansea Bay Metro to allow Tram-Train operation	+	+ +	+ +	+ +	+	0	+	+ +	0	+	+	+	0	+	0	+	+	+ + +	+	+ +	+	+	+ +	NYA	-
28	Frequency Improvements - Heart of Wales (southern section) additional tpd (7)	+	+	+ +	+ +	0	0	+	+	0	+ +	+ + +	+ +	0	0	0	+	+	+	+	+	+	+	+ +	NYA	-
29	Do Minimum	-	0	0	-	0	0	- -	0	0	-	-	-	0	0	0	-	-	-	-	0	0	0	0	NYA	- -

Key

Large positive (+ + +)
Moderate positive (+ +)
Slight positive (+)
Neutral (0)
Slight negative (-)
Moderate negative (- -)
Large negative (- - -)
Not Yet Assessed (NYA)

Key:
Scheme Objectives
(1) Reduce journey times between key population centres including Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke and Milford Haven.
(2) Increase service frequencies: for local stations on the main line between Carmarthen and Port Talbot, especially during peak periods, on the Heart of Wales line to serve commuters into Swansea and beyond, across South West Wales to improve suitability for daily commuting
(3) Improve regional transport accessibility through widening the spatial reach of the rail network and services.
(4) Improve Park and Ride provision for access to the Swansea Bay region.
(5) Provide a viable public transport alternative to the congested M4/A48 corridor.
(6) Contribute to developing a Swansea Bay Urban Area Metro including improvements to multi-modal interchanges.
(7) Maximise the potential for stations to accelerate urban regeneration and major development site delivery.
(8) Increase the number of trips made by public transport, focusing particularly on commuter trips.
(9) Reduce the environmental impact of transport, especially carbon emissions and air quality.
(10) Improve rail network efficiency to allow a lower future subsidy requirement per passenger.

4.10 Summary of Transport Case

The Transport Case has considered the social, cultural, environmental and economic impacts of each of the shortlisted options. This has included a quantitative economic assessment of the costs and benefits of each option and a qualitative appraisal that has considered wider social, cultural and environmental impacts.

Based on the BCR values the options which delivery best value for money (high or medium VfM classifications) are Option 12, Option 13, Option 25b,25c,25d, Option 18, and Option 19. Options which still have a positive business case but low value for money classification are Option 7a, Option 9a, Option 15, Option 25a and Option 28. The remaining Options (7b, 8, 9b, 11, 14,16,17, 26) have a poor value for money classification, however if they have a significant non-monetised impact some may still be worth pursuing to meet strategic aims as part of a comprehensive transport offer or form part of a longer term strategy.

In relation to the qualitative Transport Case appraisal, all options scored positively overall against the economic, environmental, social and cultural criteria indicating that they have benefits beyond those which are readily quantifiable. The West Wales frequency options and some of the Metro lines score slightly higher (moderate beneficial + +) as they increase accessibility in areas which currently have restricted public transport options.

A summary of the transport case is included as Table 4-12. Due to the separate schemes for Options 25E and 25F, these have been omitted.

It should be noted that all cost estimates on which the economic assessment is based are preliminary in nature, which reflects the current stage of development of each of the options. Any changes to cost estimates should options be further developed will impact on the economic assessment, which will need to be revisited and refined to reflect any further development work.

It should also be noted that this current assessment is based on usage data from before the Covid-19 pandemic which has had a significant impact on transport demand and capacity. Some assumptions about transport recovery have been made (i.e. that public transport demand returns to 2019 levels by 2025) however to what extent and how quickly transport usage returns to this level will have to be monitored.

Table 4-14 Summary of the Transport Case

Option	Net Present value	Initial BCR	Qualitative assessment	Key risks and uncertainties	VfM category
Option 7a - New service Swansea to Milford Haven	£ 29,698,469	1.2	+ +	Duplicates existing Manchester service between Swansea and Carmarthen. Would need to be reviewed if progressed with other options increasing frequency between Carmarthen and Swansea to ensure timetable capacity with other services	low
Option 7b - New service Carmarthen to Milford Haven	-£30,931,519	0.6	+ +		poor
Option 8 - Extend Manchester (Carmarthen) - Milford Haven hourly	-£3,667,647	0.9	+ +	Reliant on long distance services and wider timetabling constraints, however this means a good fit with current operations to Milford Haven.	poor
Option 9a - New service Swansea - Pembroke	£54,883,798	1.5	+ +	Would need to be reviewed if progressed with other options increasing frequency between Carmarthen and Swansea to ensure timetable capacity with other services	low
Option 9b - New service Carmarthen - Pembroke Dock	-£25,655,929	0.7	+ +		poor
Option 11 - Swansea - Fishguard (2 hourly)	-£2,641,365	0.8	+ +	Recast timetable would need to be considered with ferry times to ensure service still provides connections	poor
Option 12 - Swansea to Pontarddulais via Neath & SDL	£496,232,701	2.9	+ +		high
Option 13 - Swansea to Burry Port Metro Service	£113,886,194	1.7	+ +		medium
Option 14 - Additional chord to connect SWML to Swansea District Line at Llandeilo junction	-£22,498,837	0.03	+ +		poor

Option	Net Present value	Initial BCR	Qualitative assessment	Key risks and uncertainties	VfM category
Option 15 - Swansea Bay Metro: Pantyffynnon (Ammanford) to Gwaun Cae Gurwen	£2,352,054	1.0	+		low
Option 16 - Swansea Bay Metro: Neath to Onllwyn	-£80,413,874	0.5	+		poor
Option 17 - Swansea Bay Metro: Neath to Cwmgwrach	-£64,318,846	0.5	+		poor
Option 18 - Swansea Bay Metro: Neath - Llandarcy - Swansea City Centre via Swansea Docks	£401,231,271	1.9	+		medium
Option 19 - Swansea Bay Metro: Link from Swansea District Line to Clydach	£326,499,167	1.9	+		medium
Option 25A - Station Improvements: Carmarthen	£9,267,913	2.9	+		high
Option 25B - Station Improvements: Pembrey & Burry Port	£557,180	1.26	+		low
Option 25C - Station Improvements: Whitland	£3,111,941	2.05	+		high
Option 25D - Station Improvements: Llanelli	£19,989,098	2.35	+	NR depot would require relocating to provide parking all in one location to meet demand. Some potential road safety issues to address.	high
Option 26 - Electrification of Swansea Bay Metro to allow Tram -Train	-£62,812,304	0.6	+ +	Likely to need mainline electrification to precede Metro electrification to be cost effective.	poor
Option 28 - Heart of Wales (southern section) additional train per day	£671,667	1.1	+ +		low
Option 29 - Do Minimum	N/A	N/A	- -	No transport improvements, Air quality and greenhouse gas emissions will not be reduced. Net Zero targets unlikely to be met.	N/A

5. Financial Case

5.1 Overview

As detailed in WelTAG 2017, 'the Financial Case tells you whether an option is affordable in the first place and the long-term financial viability of a scheme. It covers both capital and revenue requirements over the lifetime of the project and the implications of these for the balance sheet, income and expenditure accounts for public sector organisations.'

The following considerations should be made in outline at Stage One and completed by Stage Two:

- Lifetime costs of the project,
- Sources of funding,
- Accounting implications.

At WelTAG Stage One, a qualitative assessment of the Financial Case was undertaken, due to the early stage of development of each of the options under consideration. The Financial Case has been developed in greater detail as part of the WelTAG Stage Two process, which reflects the option development work that has been undertaken and the preliminary cost estimates that are available for each of the options.

5.2 Capital and Ongoing Costs and Potential Funding Sources

Details of the capital cost of each option are included in Section 4.2 of the Transport Case, which includes details about the source of all cost estimates and assumptions made in the development of the costs. The economic assessment that has been undertaken as part of WelTAG Stage Two has involved a consideration of the potential ongoing revenue costs of each option. In all cases, further development and design work is needed to establish more robust cost estimates. The preliminary cost estimates, both capital and revenue, will be further developed and refined as any recommended options are progressed in greater detail during WelTAG Stage Three. This will enable the financial case to be further developed.

The Financial Case assessment is presented in Table 5-1 and considers factors affecting the lifetime costs of each option, potential sources of funding and accounting implications to public sector organisations. At this stage costs relating to monitoring and evaluation have not been included within the cost estimates and will be considered for any options taken forward to WelTAG Stage Three. Swansea Bay City Deal may be a further potential source of funding although presently transport does not form part of its current programme

Values quoted in the financial case are in 2020 prices and exclude optimism bias in line with Transport Appraisal Guidance.

Table 5-1 Financial Case Assessment

Financial Case				
Option (Capital/ Revenue)		*Lifetime Costs of the Project* ***(excluding optimism bias)***	*Potential Sources of Funding*	*Accounting Implications*
Option 7a **-** New service Swansea to Milford Haven	Capital	None (no infrastructure required)	N/A	None
	Revenue	£3,536,326 (p.a)	Transport for Wales Welsh Government	Operational and maintenance costs Subsidy requirement (estimated at £525k p.a.)
Option 7b **-** New service Carmarthen to Milford Haven	Capital	None (no infrastructure required)	N/A	None
	Revenue	£2,199,828 (p.a)	Transport for Wales Welsh Government	Operational and maintenance costs Subsidy requirement (estimated at £900k p.a.)
Option 8 **-** Extend Manchester (Carmarthen) - Milford Haven hourly Pembroke	Capital	None (no infrastructure required)	N/A	None
	Revenue	£1,469,214 (p.a.)	Transport for Wales Welsh Government	Operational and maintenance costs Subsidy requirement (estimated at £175k p.a.)
Option 9a **-** New service Swansea – Pembroke Dock	Capital	None (no infrastructure required)	N/A	None
	Revenue	£2,809,173 (p.a.)	Transport for Wales Welsh Government	Operational and maintenance costs Potential for revenue to cover operating cost due to high average fare, however, may require subsidy if trip profile changes.
Option 9b **-** New service Carmarthen - Pembroke Dock	Capital	None (no infrastructure required)	N/A	None
	Revenue	£2,222,910 (p.a.)	Transport for Wales Welsh Government	Operational and maintenance costs Subsidy requirement (estimated at £940k p.a.)
Option 11 **-** Swansea - Fishguard (2 hourly)	Capital	None (no infrastructure required)	N/A	None
	Revenue	£305,851 (p.a.)	Transport for Wales Welsh Government	Operational and maintenance costs Subsidy requirement (estimated at £83k p.a.)

Financial Case				
Option (Capital/ Revenue)		*Lifetime Costs of the Project* ***(excluding optimism bias)***	*Potential Sources of Funding*	*Accounting Implications*
Option 12 - Swansea to Pontarddulais via Neath & SDL	Capital	£84,175,000	Transport for Wales Welsh Government Network Rail	Capital budget allocation required
	Revenue	£4,538,145 (p.a.)	Transport for Wales	Operational and maintenance costs Potential for revenue to cover operating cost due to passenger numbers, however, may require subsidy if trip numbers fall.
Option 13 - Swansea to Burry Port Metro Service	Capital	£20,500,000	Transport for Wales Welsh Government Network Rail	Capital budget allocation required
	Revenue	£4,099,601 (p.a.)	Transport for Wales Welsh Government	Operational and maintenance costs Subsidy requirement (estimated at £1.93m p.a.)
Option 14 - Additional chord to connect SWML to Swansea District Line at Llandeilo junction Gurwen	Capital	£23,495,000	Transport for Wales Welsh Government Network Rail	Capital budget allocation required
	Revenue	-£71,680 (p.a.)	Transport for Wales	Operational and maintenance costs Journey distance shortened therefore no increase to existing subsidy expected.
Option 15 - Swansea Bay Metro: Ammanford to Gwaun Cae	Capital	£44,415,000	Transport for Wales Welsh Government Network Rail	Capital budget allocation required
	Revenue	£2,146,705 (p.a.)	Transport for Wales Welsh Government	Operational and maintenance costs Subsidy requirement (estimated at £875k p.a.)
Option 16 - Swansea Bay Metro: Neath to Onllwyn	Capital	£75,506,000	Transport for Wales Welsh Government Network Rail	Capital budget allocation required
	Revenue	£2,155,938 (p.a.)	Transport for Wales Welsh Government	Operational and maintenance costs Subsidy requirement (estimated at £1.92m p.a.)

Financial Case				
Option (Capital/ Revenue)		*Lifetime Costs of the Project* ***(excluding optimism bias)***	*Potential Sources of Funding*	*Accounting Implications*
Option 17 **-** Swansea Bay Metro: Neath to Cwmgwrach	Capital	£62,181,000	Transport for Wales Welsh Government Network Rail	Capital budget allocation required
	Revenue	£2,017,451 (p.a.)	Transport for Wales Welsh Government	Operational and maintenance costs Subsidy requirement (estimated at £1.78m p.a.)
Option 18 **-** Swansea Bay Metro: Neath - Llandarcy - Swansea City Centre via Swansea Docks	Capital	£360,241,000	Transport for Wales Welsh Government Network Rail	Capital budget allocation required
	Revenue	£2,236,784 (p.a.)	Transport for Wales	Operational and maintenance costs Potential for revenue to cover operating cost due to passenger numbers, however, may require subsidy if trip numbers fall.
Option 19 **-** Swansea Bay Metro: Link from Swansea District Line to Clydach	Capital	£235,542,000	Transport for Wales Welsh Government Network Rail	Capital budget allocation required
	Revenue	£2,407,719 (p.a.)	Transport for Wales	Operational and maintenance costs Potential for revenue to cover operating cost due to passenger numbers, however, may require subsidy if trip numbers fall.
Option 25A **-** Station Improvements: Carmarthen	Capital	£816,170	Transport for Wales Welsh Government Network Rail	Capital budget allocation required
	Revenue	£5,000 (p.a.)	Transport for Wales	Minor increase in maintenance costs
Option 25B **-** Station Improvements: Pembrey & Burry Port	Capital	£561,985	Transport for Wales Welsh Government Network Rail	Capital budget allocation required
	Revenue	£5,000 (p.a.)	Transport for Wales	Minor increase in maintenance costs

Financial Case				
Option (Capital/ Revenue)		*Lifetime Costs of the Project* ***(excluding optimism bias)***	*Potential Sources of Funding*	*Accounting Implications*
Option 25C **-** Station Improvements: Whitland	Capital	£654,326	Transport for Wales Welsh Government Network Rail	Capital budget allocation required
	Revenue	£5,000 (p.a.)	Transport for Wales	Minor increase in maintenance costs
Option 25D **-** Station Improvements: Llanelli	Capital	£829,645	Transport for Wales Welsh Government Network Rail	Capital budget allocation required
	Revenue	£7,500 (p.a.)	Transport for Wales	Minor increase in maintenance costs
Option 26 **-** Electrification of Swansea Bay Metro to allow Tram - Train	Capital		Department for Transport Network Rail Welsh Government Transport for Wales	Significant investment in electrification in short to medium term
	Revenue		Transport for Wales Welsh Government	Operating cost savings New rolling stock leases required Additional subsidy (estimated at £287k p.a.)
Option 28 - Heart of Wales (southern section) additional train per day	Capital	None (no infrastructure required)	N/A	None
	Revenue	£141,544 (p.a.)	Transport for Wales Welsh Government	Operational and maintenance costs Subsidy requirement (estimated at £71k p.a.)
Option 29 - Do Minimum	Capital	N/A	N/A	No capital investment
	Revenue	Existing	Network Rail Welsh Government Transport for Wales	Ongoing costs at existing levels.

5.3 Summary of Financial Case

The Financial Case has identified the capital costs and ongoing revenue costs anticipated for each option assessed. The Financial Case has considered factors affecting the lifetime costs of each option, potential sources of funding and accounting implications to public sector organisations.

The options assessed vary in the scale of the capital investment required at the start of the project but also in the ongoing costs of each option.

The frequency enhancements between Swansea or Carmarthen and Milford Haven, Pembroke Dock or Fishguard Harbour have no capital cost requirements only operational costs as they can be provided without the need for additional infrastructure. The services are likely to require subsidy support as revenues do not exceed operational costs.

The station enhancements require an initial capital investment but have only a small increase in operational costs. Provided a source of funding for the relatively modest capital investment can be secured the ongoing financial requirements are minimal.

The Metro options require the most substantial capital cost investment and have significant operational costs which will be a recurring financial commitment. Most of these services will require a subsidy to part fund their operating costs.

The package of options taken forwards will require a substantial capital investment from Welsh Government but has the potential to offer a step-change in the provision of public transport in Swansea Bay and West Wales. There will also be ongoing operational costs which will require funding. The proposed public transport options also make a wider contribution towards reducing carbon emissions and achieving the ambitious targets that have been set by government.

In all cases, further development and design work is needed to establish more robust cost estimates. The preliminary cost estimates, both capital and revenue, will be further developed and refined as any recommended options are progressed in greater detail during WelTAG Stage Three (Full Business Case).

6. Commercial Case

6.1 Overview

As detailed in WelTAG 2017, 'the Commercial Case tells you if a scheme will be commercially viable, whether it is going to be possible to procure the scheme and then to continue it into the future. It focuses on the level and type of involvement of the private sector in each option. This includes items that affect the delivery of the option and its on-going viability, for example, will there be an on-going need for revenue support, will there be any charges levied on users or non-users and the allocation of risk for the provision of the project and during its on-going operation.'

The WelTAG Stage One Commercial Case included a high-level consideration of procurement issues and options, contract length and potential human resource issues. The Commercial Case has been further developed for WelTAG Stage Two and includes wider considerations such potential private sector involvement and ongoing viability of each option.

6.2 Procurement Options, Private Sector Involvement and On-going Viability

The West Wales frequency options will not require the procurement of any infrastructure. The services all fall within Transport for Wales Rail services operating extents. The services are therefore expected to be delivered by Transport for Wales Rail services, as this TOC is publicly owned there is no private sector involvement with these options. There is only a minor interface with Great Western Railway services to Carmarthen (1 return train per day) although some of the long-distance options being considered elsewhere separately impact on Great Western Railway services east of Swansea.

Station enhancements will require procurement of infrastructure only as they do not result in additional services. These could be delivered by Network Rail as station asset owner. Equally the improvements could be delivered by Transport for Wales Rail Services as the station facilities operator (SFO) or Transport for Wales. Where the station improvements do not involve work on or near the line, and if they were to be owned and maintained by the local authority rather than TfW then the former may also be an option for lead body of the infrastructure delivery.

Metro options will require the procurement of new infrastructure and services. As this would involve procuring infrastructure on or near the line then the most appropriate lead authority is likely to be either Network Rail or Transport for Wales. The services, as with the West Wales options could be procured as part of the Transport for Wales Rail services agreement.

A present it is expected that Transport for Wales will lead on the delivery the options with support from Network Rail, Local Authorities and Welsh Government. Transport for Wales existing frameworks or partnership arrangements could be used to procure the design and construction work or those of other parties such as Network Rail.

As noted previously for options with new infrastructure further design development work is needed to be completed prior to Final Business Case stage. Procurement approaches may include traditional full detailed design and separate build contracts or combined design and build usually procured at the end of outline design. Therefore at this stage of option development, the exact procurement methodology and associated matters such as contract terms, have not been

determined for the options. Further information will be contained in the Full Business Case (WelTAG Stage 3) for any options that are recommended to be progressed.

Each recommended option will need to be procured in line with the lead body's financial regulations and standing orders for contracts to ensure best value. The method of procurement will also need to be in line with any grant funding requirements, depending on how the preferred option is financed. Passenger services will require ongoing operating support which will require long term funding Government commitment to the increased subsidy needed.

Table 6.1 identifies factors that will affect the procurement of each of the options and highlights issues affecting the level of private sector involvement and on-going viability of each option.

Table 6-1 Procurement considerations, public/private sector involvement and ongoing viability

Option	Procurement considerations	Public/private sector involvement and on-going viability
Option 7a - New service Swansea to Milford Haven	• Services only – single supplier situation	• No private sector involvement • Public subsidy required to support service
Option 7b - New service Carmarthen to Milford Haven	• Services only – single supplier situation	• No private sector involvement • Public subsidy required to support service
Option 8 - Extend Manchester (Carmarthen) - Milford Haven hourly	• Services only – single supplier situation	• No private sector involvement • Public subsidy required to support service
Option 9a - New service Swansea – Pembroke Dock	• Services only – single supplier situation	• No private sector involvement • Public subsidy required to support service
Option 9b - New service Carmarthen - Pembroke Dock	• Services only – single supplier situation	• No private sector involvement • Public subsidy required to support service
Option 11 - Carmarthen - Fishguard (2 hourly)	• Services only – single supplier situation	• No private sector involvement • Public subsidy required to support service
Option 12 - Swansea to Pontarddulais via Neath & SDL	• Infrastructure – rail industry lead required (TfW or NR) • Services – single supplier situation	• Potential for private sector contractor (framework or partner)
Option 13 - Swansea to Burry Port Metro Service	• Infrastructure – rail industry lead required (TfW or NR) • Services – single supplier situation	• Potential for private sector contractor (framework or partner) • Public subsidy required to support service
Option 14 - Additional chord to connect SWML to Swansea District Line at Llandeilo junction	• Infrastructure – rail industry lead required (TfW or NR) • No service procurement required	• Potential for private sector contractor (framework or partner)
Option 15 - Swansea Bay Metro: Ammanford to Gwaun Cae Gurwen	• Infrastructure – rail industry lead required (TfW or NR) • Services – single supplier situation	• Potential for private sector contractor (framework or partner) • Public subsidy required to support service

Option	Procurement considerations	Public/private sector involvement and on-going viability
Option 16 - Swansea Bay Metro: Neath to Onllwyn	• Infrastructure – rail industry lead required (TfW or NR) • Services – single supplier situation	• Potential for private sector contractor (framework or partner) • Public subsidy required to support service
Option 17 - Swansea Bay Metro: Neath to Cwmgwrach	• Infrastructure – rail industry lead required (TfW or NR) • Services – single supplier situation	• Potential for private sector contractor (framework or partner) • Public subsidy required to support service
Option 18 - Swansea Bay Metro: Neath - Llandarcy - Swansea City Centre via Swansea Docks	• Infrastructure – rail industry lead required (TfW) • Services – single supplier situation	• Potential for private sector contractor (framework or partner)
Option 19 - Swansea Bay Metro: Link from Swansea District Line to Clydach	• Infrastructure – rail industry lead required (TfW) • Services – single supplier situation	• Potential for private sector contractor (framework or partner)
Option 25 (A -F) Station Improvements:	• Infrastructure – lead body required (TfW/NR/LA) • No service required	• Potential for private sector contractor (framework or partner)
Option 26 - Electrification of Swansea Bay Metro to allow Tram -Train	• Infrastructure – rail industry lead required (TfW or Network Rail) • Services – single supplier situation	• Potential for private sector contractor (framework or partner) • Public subsidy required to support service
Option 28 - Heart of Wales (southern section) additional train per day	• Services – single supplier situation	• Public subsidy required to support service
Option 29 - Do Minimum	• No procurement required	• Ongoing public support as existing

6.3 Human Resources and TUPE Implications

It is unlikely that there will be any TUPE (Transfer of Undertakings [Protection of Employment] Regulations) issues relating to the implementation of any of the options as the options are all within the Transport for Wales Rail Services portfolio. There will be additional staff required to operate services. Several metro routes will require new route knowledge as these would be new to the passenger operational network.

The provision of electric trains will have training implications for the TOC's drivers and depot maintenance staff. Additional depot space will be required to house the additional rolling stock.

6.4 Summary of the Commercial Case

As noted previously for options with new infrastructure further design development work is needed to be completed prior to progressing Final Business Case stage. Procurement approaches may include traditional full detailed design and separate build contracts or combined design and build usually procured at the end of outline design. Therefore at this stage of option development, the exact procurement methodology and associated matters such as contract terms, have not been determined for the options. Further information will be contained in the Full Business Case (WelTAG Stage 3) for any options that are recommended to be progressed.

The WelTAG Stage Two Commercial Case has highlighted a range of issues that will need consideration when determining the most appropriate method of procurement. Issues identified include determining the lead body in the procurement process and whether an option is delivered as a single contract or would need to be procured as discreet elements, this may be influenced by delivery timescales and funding availability especially where there are significant capital requirements.

Issues relating to the level of private and public sector involvement and on-going viability have also been identified for each option. Further information on all elements within the Commercial Case will be contained in the Full Business Case (WelTAG Stage Three).

7. Management Case

7.1 Overview

As detailed in WelTAG 2017, 'The Management Case tells you if an option is achievable. This case covers the delivery arrangements for the project and then its management during its lifetime. The management case should embed the five ways of working.'

The management case should consider aspects such as:

- Governance structure,
- Project reporting arrangements,
- Project planning,
- Legal requirements,
- Communications and stakeholder management,
- Risk management,
- Monitoring and evaluation, and
- Benefits realisation.

The WelTAG Stage One Management Case involved a high-level assessment of factors that may impact on the delivery of each option. The Management Case has been developed in greater detail for WelTAG Stage Two to reflect the option development work that has been undertaken.

7.2 Governance, Project Management and Reporting

The governance structure of the WelTAG Stage One and Stage Two work has involved the establishment of a Review Group as required by WelTAG 2017. The review group comprises the representatives of Transport for Wales and the four Local Authorities. The guidance states that 'the purpose of the Review Group is to consider the contents of the WelTAG Stage Reports, assess each of the options presented and decide on the actions to be taken at the end of that WelTAG stage.'

The Review Group will review the contents of this WelTAG Stage Two Report and its recommendations to decide on the actions to be taken. Details of the outcomes of this review and the decisions made by the Review Group will be included in Chapter 8: Conclusions and Recommendations of the final report.

The WelTAG Stage One and Stage Two work has been managed by Transport for Wales (on behalf of the four South West Wales Authorities: Carmarthenshire Neath Port Talbot Pembrokeshire, and Swansea Councils), with funding administered by Swansea Council by means of grant funding provided by Welsh Government.

The Transport for Wales, Swansea Bay & West Wales Programme has established a senior Strategy Board and Steering Group which include representatives from Local Government, Welsh Government, Department for Transport and Network Rail. Additionally, there is a separate rail focused programme for the South Wales mainline strategic proposals. Future scheme development is anticipated to be led by Transport for Wales under that programme's

management arrangements. As individual projects are taken forward further project governance structures will be put in place as required. This will include working with Local Government on complementary proposals for example to support interchange opportunities with local bus services and active travel routes. TfW have taken the lead on the communication and stakeholder management aspects related to the WelTAG Stage Two study.

Whilst development work to date has considered the programme as a whole, taking the projects recommended in this report to the next stage of development and full business case will require them to move forward at their own pace, to reflect their different development stages, complexity, cost and delivery timescales. Each project will need its own Project Plan that will include a staged approach to scheme development that requires approval checks at various development stages/ milestones in line with the TfW plan of work stages, which will initiate a review of the project prior to the scheme being progressed further. This will be particularly important given the scale of some of the options being considered by this WelTAG Stage Two Report.

7.3 Scheme Development, Delivery Arrangements and Legal Powers

Each option being considered by this WelTAG Stage Two Report is at a preliminary stage of development. Initial technical work has been undertaken on most of the options, either in terms of formal reports and plans or engineering reviews to help identify the high-level scope for less advanced proposals. This is in line with the proportionate approach required by WelTAG, such that sufficient information is developed about the scheme proposals scope, costs and risks to and quantify their benefits in sufficient detail to enable choices to be made, but without incurring unnecessary expenditure designing projects that may not proceed.

All options require further development work prior to being in a position to progress scheme delivery. This includes design work (e.g. review of any existing feasibility design work, outline design and detailed design) and undertaking any associated requirements to inform development of the proposals (e.g. environmental and ecological requirements, geotechnical requirements, survey work etc.). This further work will enable more robust cost estimates to be developed, which will enable a more detailed economic assessment to be undertaken.

Tables 7-2 to 7-18 set out an overview of the key development stages required for each option and the statutory procedures that may need to be undertaken including the technical work completed to date, work required to complete TfW Plan of works Stages A and key risks and issues. Due to the current stage of development of each of the options, the tables do not currently identify steps beyond the scheme development stage e.g. steps relating to procurement, construction, monitoring and ongoing operational issues. In addition, the tables do not include reference to aspects of scheme development that are applicable to all options e.g.:

- Project management processes that will need to accompany the development of any of the options e.g. development of a project plan and delivery programme.
- Further stakeholder engagement and public consultation that will be required during the development of each of the options; and
- Business case development – Further work to develop the options and obtain more robust cost estimates will inform the business case for the proposals, which will be important for those options taken forward to WelTAG Stage Three. The ongoing development of the Five Cases (Strategic, Transport, Financial, Commercial and Management) will be an

important aspect of scheme development for any of the options that are progressed. Development of a funding package for scheme delivery will be an important consideration in the development of the business case.

Scheme Development

Table 7-1 sets out the relationship between the Project Development Stages (e.g. TfW Plan of Works and NR GRIP/PACE) which primarily concern development and implementation of new infrastructure and the WelTAG Business case stages

Table 7-1 Project Development and WelTAG Stages

WelTAG Stages	Stage 1 SOBC	Stage 2 OBC		Stage 3 FBC	Stage 4 Implementation		Stage 5 Post implementation	
TfW Plan of work stages	Stage A: Develop output requirements & Options		Stage B: Options Development & Selection	Stage C: Prelim Design, Stage D: Statutory Processes	Stage E: Det. Design	Stage F: Construct, Comm., handover	Stage G: Close out	
NR GRIP	1 Output Def.	2 Project Feasibility	3 Option Selection	4 Single Option Dev.	5 Det. Design	6 Construct, Test, Commission	7 Scheme Hand back	8 Close Out
NR PACE	Strategic Programme Definition		Development & Option Selection	Project Development & Design		Project Delivery	Project Close	

For the purposes of this report reference is made to the TfW Plan of Work stages and NR GRIP stages. These differ slightly but there is close alignment of the products and permissions needed at the end of each stage.

At WelTAG Stage 1/TfW Stage A: The strategic case is established, a long list of possible options is identified and at the end of stage 1 a shortlist of options which all contribute to the strategic case is confirmed together with an assessment of their deliverability. As this assessment was undertaken for a programme a large number of options were taken forward to stage 1, albeit on an individual basis no more that 2 or 3 for a specific proposal. As limited design development has been undertaken at this stage cost information and technical deliverability assessments are qualitative. WelTAG 1 is early stage A/ NR GRIP 1.

At WelTAG Stage 2/TfW Stage A: At Stage 2 feasibility design of options should be undertaken to identify with more accuracy, technical feasibility, costs and risks.

As noted above a large number of project options have been assessed at this stage. Whilst all projects in this report have been subject to Stage 2 economic assessment, the level of feasibility design development and associated cost and risk assessment for infrastructure projects is more variable with some projects having higher confidence than others.

This is a fairly common situation with programme level assessment, as there is a desire to confirm if options are fundamentally viable in terms of demand before incurring more design development

fees particularly for large and or long-term projects to improve cost certainty. Therefore for projects to be taken forward involving significant infrastructure works it will be necessary to complete the outstanding design development to confirm the individual Stage 2 business case (primarily to improve certainty on costs and risks), before proceeding to Stage 3/Final Business Case.

A key decision required at the end of Stage 2/Stage B/ GRIP 3 is the future management and organisation arrangements for the ownership and delivery of new assets. Without this confirmation it is not possible to complete the outline design, with the Technical Approval Authority for each asset being confirmed so that the design deliverables are aligned to the needs of its future owner.

At WelTAG Stage 3/Stage C: To complete this stage for infrastructure projects, the outline design needs to be complete. It should be noted that this is normally required in advance any application for powers (Planning, CPO etc) at the end of Stage C/GRIP 4, as the outline design confirms land requirements and the Full Business Case is a key component of the project evidence in support of powers such as planning or compulsory purchase.

New Services

There are a number of proposals for new services, either with or without new infrastructure.

To assist stakeholders in understanding the steps to reach the introduction of a new passenger service, including any associated infrastructure, these are set out in more detail in four flow diagrams (Figures 7-1 to 7-4) covering;

- New Services - SOBC and OBC
- New services - FBC
- New Services - Track Access
- New Services - Service Implementation

Key processes associated with implementing new services,

- FBC stage; finalising costs and revenue estimates and determining the level of revenue support to operate the service, including the assessment of impact on other service and operator revenue (where relevant) and confirming funder and operator support,
- Track Access; obtaining the rights to operate the service on the network
- Service Implementation; including sourcing rolling stock and associated maintenance and recruiting train crew to operate it as well as route clearance. It can be seen that this is quite a complex process in its own right with a number of stages to complete. The implementation of this will vary by projects depending on its requirements, for example an entirely new type of rolling stock would have different implications to additional units of similar specification.

Figure 7-1
Strategic & Outline Business Case
For New Rail Service

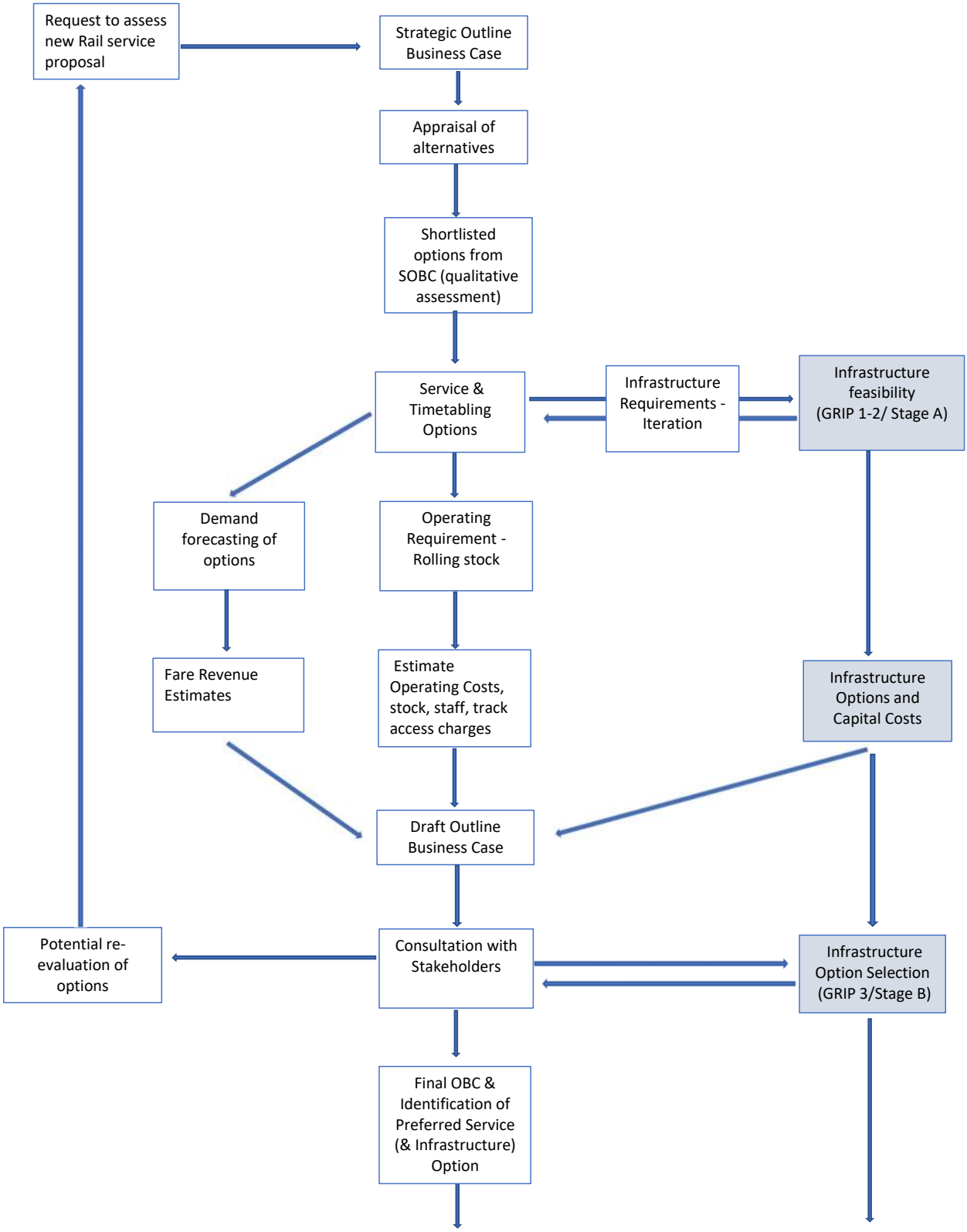


Figure 7-2
Full Business Case
For New Rail Service

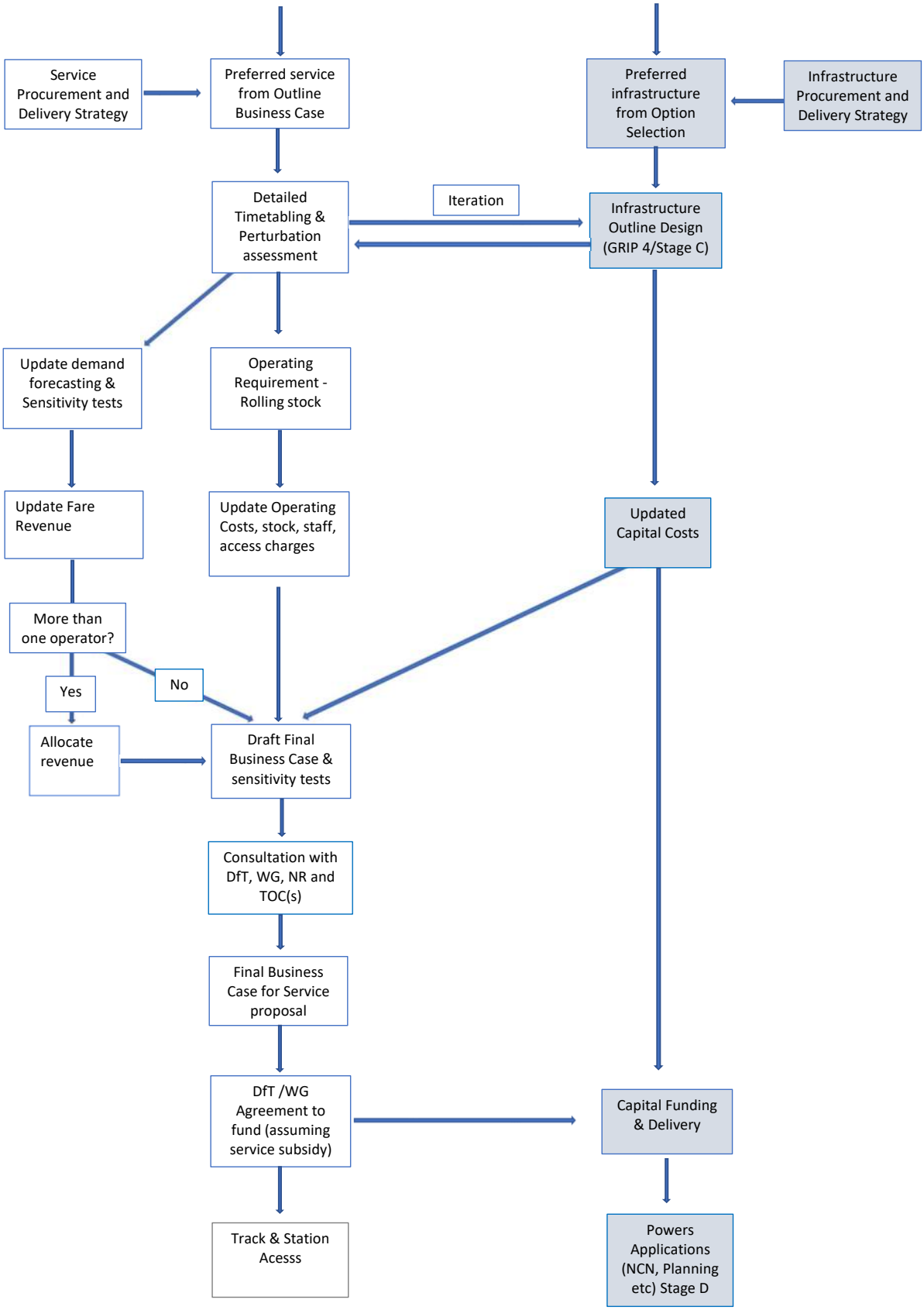


Figure 7-3
Track/Station Access Agreement
(Assuming Franchised Operator)
(Agreed applications Section 18/22)

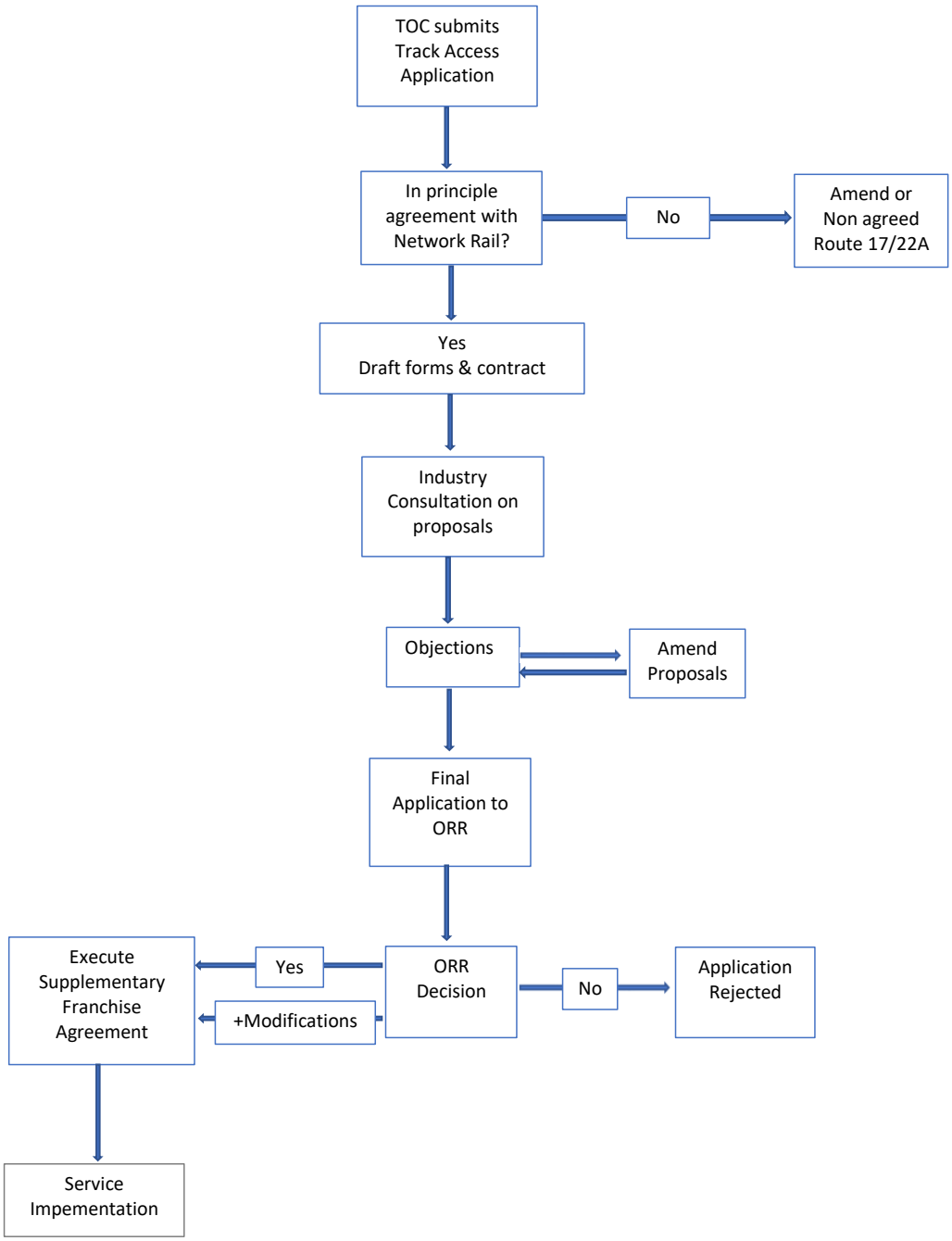
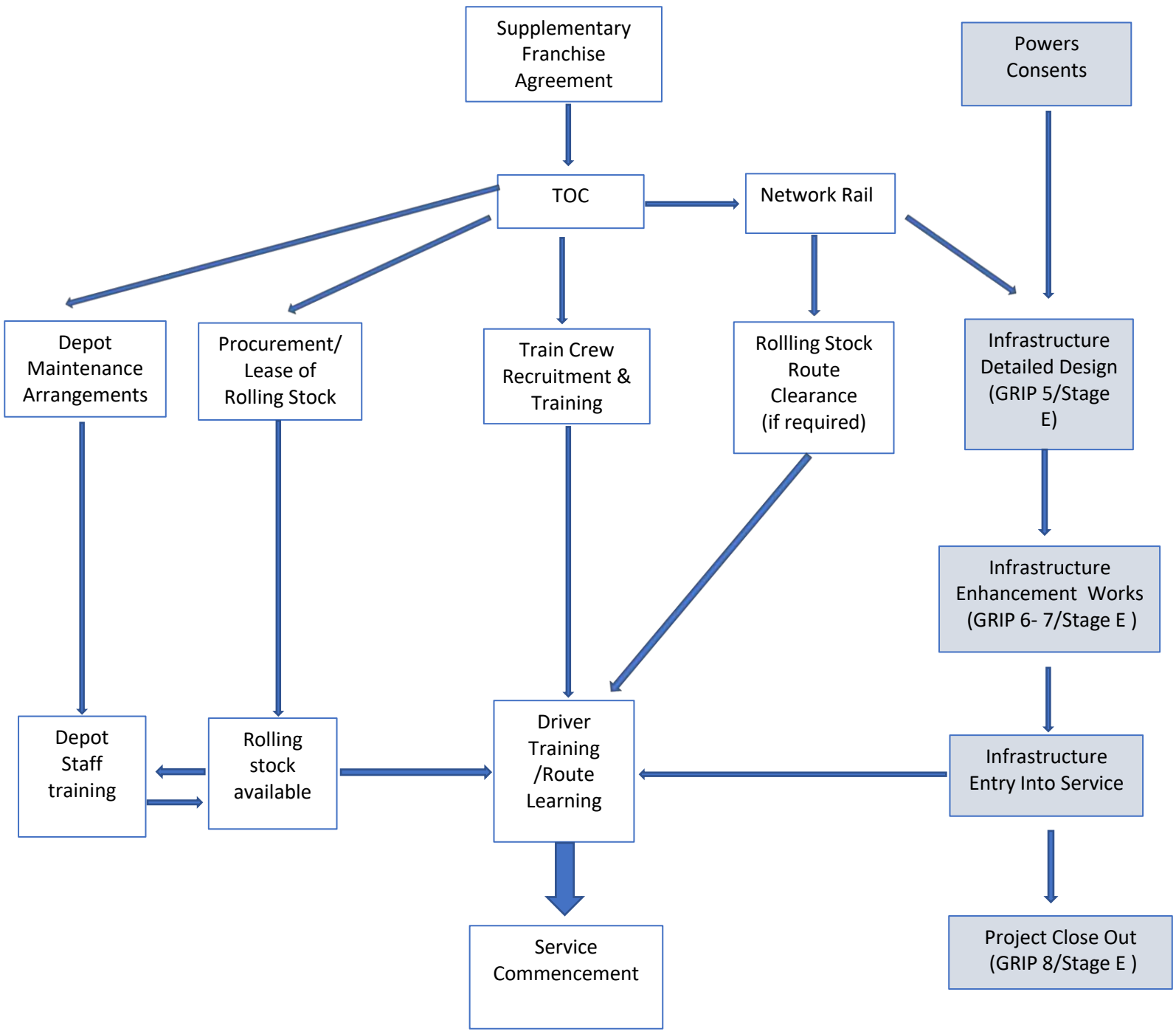


Figure 7-4
Implementation of New Service



Statutory Processes

At this stage it is difficult to determine the statutory procedures that would need to be followed in the delivery of the preferred option. Key requirements are in the tables 7-2 to 7-18 below albeit some may be subject to legal advice. However the full range of potential statutory procedures that might need to be completed in order to undertake rail infrastructure works and provide additional services includes:

- Planning permission and associated processes e.g. pre-application consultation, Environmental Impact Assessment/Statement; Flood impact assessment; Development of National Significance (new or improved routes over 2km)
- Environmental and ecological licences;
- Compulsory Purchase Orders may be needed to acquire any land or properties to enable a desired route alignment or delivery of infrastructure;
- Statutory Powers such as Transport and Work Act Order (e.g. Cwrt Sart Chord)
- Statutory Undertaker service diversions: liaison with utilities.
- Public transport service changes liaison with statutory bodies and service providers e.g. Network Rail, Train Operators, Bus operators etc ;
- Sustainable Drainage Approval Body (SAB) authorisation;
- Public highway changes and Traffic Orders, Highway authority design approval and orders processes
- Network Rail design approval (GRIP/PACE)
- Rail and Other Guided Systems (ROGS) classification particularly for new metro routes and safety requirements.
- Track Access (new services)
- The Construction (Design and Management) Regulations 2015 (CDM) and Common Safety Methodology (CSM)

This list is not exhaustive and will be developed further at future WelTAG stages as options are rationalised and a final preferred option chosen.

Delivery Arrangements

Which lead body that takes forward the final preferred option could impact on how scheme development progresses and the working arrangements that will be required to undertake the required statutory procedures and to deliver the preferred option on the ground, for example; due to use of permitted development rights. In addition, the ownership arrangements for the future infrastructure determine the Technical approval process (TAA) to be followed.

A key output by TfW Plan of Work Stage B is therefore confirmation of future ownership and maintenance arrangements for all proposed assets so that key design approval requirements in Stages C and E are clear. Additionally, all rail projects need to undertake screening for Common Safety Method (CSM) significance by the completion of Stage A to enable a appointment of the relevant review bodies if required at stage B.

There are various delivery models for implementation of the infrastructure works depending on the lead body. This includes delivery by a single organisation such as Network Rail or Transport for Wales or a hybrid arrangement with Transport for Wales contracting the station works directly and Network Rail undertaking route works as has been adopted in recent station re-openings.

The contracting strategy for works will also need to be developed with options including Traditional Full Design and separate build contracts, contracted at the end of GRIP 5 and Design & Build arrangements contracted at the end of GRIP 4. These may be different for different types of works. The key trade-off is between cost surety in terms of design stage the work is contracted on and ensuring design meet contractor preferences. Deliverability design reviews by a contractor are a means of addressing the latter with traditional arrangements.

Scheme Development summaries by Option

Table 7-2 Scheme development considerations for Option 7a

Option 7a: New service Swansea – Milford Haven	
Technical Development to date **Status - (Stage A, GRIP 2)**	• Operations assessment • Demand forecasting • Operational Costing for service and unit requirements • Up to 1 in 4 services would need to terminate at Haverfordwest when freight workings operate out of Milford Haven oil terminal.
Further technical development to Stage	• Consideration of alternative proposals for additional West Wales strategic services • Train operator discussion to agreed preferred rolling stock/operational arrangement to refine costs • Identify potential need for risk assessments associated with level crossings
Risks and Deliverability Issues	• Overlap with Swansea - Pembroke dock options and duplicates Manchester/Swansea – Carmarthen services. • Level crossing reviews have been identified as a risk on similar frequency projects. • Option 8, preferred to serve Milford Haven subject to outcome of strategic services considerations. • Rolling stock availability may affect delivery timescale

Table 7-3 Scheme development considerations for Option 7b

Option 7b: New service Carmarthen – Milford Haven	
Technical Development to date	• Timetabling assessment undertaken for separate 2-hourly, Carmarthen – Milford Haven to alternate with Manchester service to provide hourly service on branch) • Demand forecasting

Status - (Stage A, GRIP 2)	• Operational Costing for service and unit requirements. This option was associated with a Carmarthen operating hub concept with 9b. • Up to 1 in 4 Milford Haven services would need to terminate at Haverfordwest when freight workings operate out of Milford Haven oil terminal due to network capacity.
Further technical development FBC	• Assess interface with recommended service proposals package to assess preferred stopping patterns in overlapping areas. This would include alternative proposals for additional West Wales strategic services • Train operator discussion to agreed preferred rolling stock/operational arrangement to refine costs • Identify potential need for risk assessments associated with level crossings
Risks and Deliverability Issues	• Level crossing reviews have been identified as a risk on similar frequency projects. • Positive economic case, but will require additional operating subsidy (financial case) • Rolling stock availability may affect delivery timescale • Option 8 was preferred as having better stock utilisation/Business case

Table 7-4 Scheme development considerations for Option 8

Option 8: Extend Manchester - Carmarthen service to Milford Haven (hourly)	
Technical Development to date **Status - (Stage A, GRIP 2)**	• Timetabling assessment undertaken for extension of 2-hourly, Manchester - Carmarthen terminating service to provide hourly service on branch) • Demand forecasting • Operational Costing for service and unit requirements • Up to 1 in 4 services would need to terminate at Haverfordwest when freight workings operate out of Milford Haven oil terminal.
Further technical development FBC	• Assess interface with recommended service proposals package to assess preferred stopping patterns in overlapping areas. This would include alternative proposals for additional West Wales strategic services • Train operator discussion to agreed preferred rolling stock/operational arrangement to refine costs • Identify potential need for risk assessments associated with level crossings
Risks and Deliverability Issues	• Level crossing reviews have been identified as a risk on similar frequency projects. • Best overall option to service Milford Haven (economic BCR just under 1) in combination with 9a and will require additional operating subsidy (financial case). • Rolling stock availability may affect delivery timescale • There are proposals to operate some existing TfW services to Manchester using locomotive hauled 'Mk4' carriage stock in place of 'DMU's. The option will need to be reviewed when these proposals are finalised.

	• This is the preferred option to serve Milford Haven, subject to outcome of strategic service work.

Table 7-5 Scheme development considerations for Option 9a

Option 9a: New service Swansea – Pembroke Dock	
Technical Development to date **Status - (Stage A, GRIP 2)**	• Timetabling assessment undertaken for additional 2-hourly, limited stop service (hourly to main stations on branch) • Demand forecasting • Operational Costing for service and unit requirements • No additional operational infrastructure requirements identified
Further technical development FBC	• Assess interface with recommended service proposals package to assess preferred stopping patterns in overlapping areas. • Train operator discussion to agreed preferred rolling stock/operational arrangement to refine costs • Identify potential need for risk assessments associated with level crossings
Risks and Deliverability Issues	• Level crossing reviews have been identified as a risk on similar frequency projects. • Positive economic case, but will require additional operating subsidy (financial case) • Rolling stock availability may affect delivery timescale

Table 7-6 Scheme development considerations for Option 9b

Option 9b: New service Carmarthen - Pembroke dock	
Technical Development to date **Status - (Stage A, GRIP 2)**	• Timetabling assessment undertaken for additional 2-hourly, limited stop service (hourly to main stations on branch) • Demand forecasting • Operational Costing for service and unit requirements. This option was associated with a Carmarthen operating hub concept with 7b • No additional operational infrastructure requirements identified
Further technical development FBC	• Assess interface with recommended service proposals package to assess preferred stopping patterns in overlapping areas. • Train operator discussion to agreed preferred rolling stock/operational arrangement to refine costs • Identify potential need for risk assessments associated with level crossings
Risks and Deliverability Issues	• Level crossing reviews have been identified as a risk on similar frequency projects. • Poorer economic case than 9a and will require additional operating subsidy (financial case)

	• Rolling stock availability may affect delivery timescale. • Option 9a preferred.

Table 7-7 Scheme development considerations for Option 11

Option 11: Swansea/Carmarthen - Fishguard (2 hourly)	
Technical Development to date **Status - (Stage A, GRIP 2)**	• Timetabling assessment undertaken for a standard pattern 2-hourly service to Fishguard. Of these Carmarthen – Fishguard was preferred. • Demand forecasting • Operational Costing for service and unit requirements • No additional operational infrastructure requirements identified
Further technical development FBC	• Train operator discussion to agreed preferred rolling stock/operational arrangement to refine costs – potential to be cost neutral depending how resourced • Identify potential need for risk assessments associated with level crossings
Risks and Deliverability Issues	• Level crossing reviews have been identified as a risk on similar frequency projects. • Poor economic case, if additional resource. Will require additional operating subsidy (financial case) • Rolling stock availability may affect delivery timescale

Table 7-8 Scheme development considerations for Option 12

Option 12: Swansea – Pontarddulais via Neath & SDL	
Technical Development to date **Status - (Stage A, GRIP 1-2)**	• Timetabling assessment for 30 min interval service • Track and civil engineering assessment for Cwrt Sart Chord • Engineering review of station locations • Feasibility design for Landore and Llandarcy Stations options • Signalling technical assessments of route and Pontarddulais Turnback and stations above. • Demand forecasting • Capital costing (variable design level) • Operational Costing for service and unit requirements • Meeting with Swansea and Neath Port Talbot Councils Planning officers
Further technical development **(to complete Stage B/ GRIP 3)**	• Feasibility Design for remaining stations (Winch Wen, Morriston, Felindre, Pontlliw), plus associated signalling assessments • Option Selection for all stations and infrastructure • Initial environmental and ecological work (esp. Cwrt Sart Chord) & geotechnical appraisal • Consider extension of some/all services to Ammanford. • Identification of land requirements and all statutory procedures (Planning TWAO – Cwrt sart, Network Change) • Updated capital costs and detailed risk register • Technical design approval by Network Rail/LAs (TAAs)

	• Further Stakeholder engagement
Risks and Deliverability Issues	• NR Re-signalling proposals impact on station locations and capacity to Pontarddulais • Cwrt Sart chord will involve new route construction. Powers process needs to be confirmed • Network Rail will need to be engaged in the proposals to complete GRIP 3.

Table 7-9 Scheme development considerations for Option 13

Option 13: (inc. Opt. 24E Cockett Station) Swansea - Pembrey & BP	
Technical Development to date **Status - (Stage A, GRIP 1-2)**	• Timetabling assessment for 30 min interval service • Engineering review of Cockett station locations • Signalling technical assessments of route capability. • Demand forecasting • Capital costing (High level assessment, no feasibility design) • Operational Costing for service and unit requirements • Meeting with Swansea Council Planning officers (Cockett)
Further technical development **(to complete Stage B/ GRIP 3)**	• Feasibility Design/Option Selection for Cockett Station plus associated signalling assessments • Feasibility design/Option Selection for Pembrey & Burry Port turnback • Initial environmental and ecological work & geotechnical appraisal (Cockett) • Identification of land requirements and all statutory procedures (Planning, Network Change) • Updated capital costs and detailed risk register • Technical design approval by Network Rail/LAs (TAAs) • Further Stakeholder engagement
Risks and Deliverability Issues	• NR signalling proposals may impact on station locations. • Network Rail will need to be engaged in the proposals to complete GRIP 3.

Table 7-10 Scheme development considerations for Option 14

Option 14: Additional Chord Llandeilo Jcn. (existing HoWL services)	
Technical Development to date **Status - (Stage A, GRIP 1-2)**	• Engineering review only to identify option to test. • Demand forecasting • Capital costing (high level estimate based on Cwrt Sart) • Operational costing •
Further technical development **(to complete Stage B/ GRIP 3)**	• Feasibility design/ Option Selection for civils, track and signalling. • Initial environmental and ecological work and geotechnical appraisal • Identification of land requirements and all statutory procedures (Planning, Network Change) • Updated capital costs and detailed risk register • Technical design approval by Network Rail/LAs (TAAs) • Further Stakeholder engagement

Risks and Deliverability Issues	• Chord close to environmentally sensitive area • Poor business case for HoWL services only • Option not recommended.

Table 7-11 Scheme development considerations for Option 15

Option 15: Pantyffynnon to Gwaun Cae Gurwen	
Technical Development to date **Status - (Stage A, GRIP 1)**	• Operational calculation for 30 min interval service • Initial engineering review of potential station locations and infrastructure scope • Demand forecasting • Capital costing (High level assessment, no feasibility design) • Operational Costing for service and unit requirements
Further technical development **(to complete Stage B/ GRIP 3)**	• Feasibility Design/Option Selection for all engineering deliverables. • Initial environmental and ecological work & geotechnical appraisal • Identification of land requirements and all statutory procedures (Planning, Network Change) • Updated capital costs and detailed risk register • Technical design approval by Network Rail/LAs (TAAs) • Further Stakeholder engagement
Risks and Deliverability Issues	• Most route demand at Ammanford, low demand on branch. • Low level of service on HoWL means key issue is improved service to Ammanford which would capture most demand. • Ideally focussed on existing station, but new town centre station may also be an option. • Recommended to assess options for extension of Pontarddulais service or direct Swansea service, however HoWL capacity maybe a constraint

Table 7-12 Scheme development considerations for Option 16

Option 16: Neath to Onllwyn	
Technical Development to date **Status - (Stage A, GRIP 1-2)**	• Operational calculation for 30 min interval service • Initial engineering review of potential station locations and infrastructure scope • Demand forecasting • Capital costing (High level assessment, no feasibility design) • Operational Costing for service and unit requirements
Further technical development	• Feasibility Design/Option Selection for all engineering deliverables. • Initial environmental and ecological work & geotechnical appraisal • Identification of land requirements and all statutory procedures (Planning, Network Change)

(to complete Stage B/ GRIP 3)	• Updated capital costs and detailed risk register • Technical design approval by Network Rail/LAs (TAAs) • Further Stakeholder engagement
Risks and Deliverability Issues	• Very low level of demand • Poor business case • GCRE requirements may also impact on ability to operate service.

Table 7-13 Scheme development considerations for Option 17

Option 17: Neath to Cwmgwrach	
Technical Development to date **Status - (Stage A, GRIP 1-2)**	• Operational calculation for 30 min interval service • Initial engineering review of potential station locations and infrastructure scope • Demand forecasting • Capital costing (High level assessment, no feasibility design) • Operational Costing for service and unit requirements
Further technical development **(to complete Stage B/ GRIP 3)**	• Feasibility Design/Option Selection for all engineering deliverables. • Initial environmental and ecological work & geotechnical appraisal • Identification of land requirements and all statutory procedures (Planning, Network Change) • Updated capital costs and detailed risk register • Technical design approval by Network Rail/LAs (TAAs) Further Stakeholder
Risks and Deliverability Issues	• Low level of demand north of Aberdulais/Tonna • Poor business case • Recommended that, Aberdulais/Tonna combined with Option 18.

Table 7-14 Scheme development considerations for Option 18

Option 18: Neath - Llandarcy - Swansea City Centre via Swansea Docks	
Technical Development to date **Status - (Stage A GRIP 1-2)**	• Operational calculation for 30 min interval service • Initial engineering review of potential station locations and infrastructure scope • Demand forecasting • Capital costing (High level assessment, no feasibility design) • Operational Costing for service and unit requirements
Further technical development	• Feasibility Design/Option Selection for all engineering deliverables. • Initial environmental and ecological work & geotechnical appraisal • Identification of land requirements and all statutory procedures (Planning, TWAO/DNS, Network Change) • Updated capital costs and detailed risk register

(to complete Stage B/ GRIP 3)	• Technical design approval by Network Rail/LAs (TAAs) • Further Stakeholder/public engagement •
Risks and Deliverability Issues	• Affordability/High cost project • Low level of technical development - need to confirm route alignment into Swansea Centre • Compatibility with existing freight uses • Recommended that route is extended to Aberdulais/Tonna and development taken forward with Option 19 Clydach.

Table 7-15 Scheme development considerations for Option 19

Option 19: (Opt. 22) Swansea District Line to Clydach	
Technical Development to date **Status - (Stage A GRIP 1-2)**	• Operational calculation for 30 min interval service • Initial engineering review of potential station locations and infrastructure scope • Demand forecasting • Capital costing (High level assessment, no feasibility design) • Operational Costing for service and unit requirements
Further technical development **(to complete Stage B/ GRIP 3)**	• Feasibility Design/Option Selection for all engineering deliverables. • Initial environmental and ecological work & geotechnical appraisal • Identification of land requirements and all statutory procedures (Planning, TWAO/DNS, Network Change) • Updated capital costs and detailed risk register • Technical design approval by Network Rail/LAs (TAAs) • Further Stakeholder/public engagement
Risks and Deliverability Issues	• Affordability/High cost project • Low level of technical development - need to confirm route alignment into Swansea Centre • Compatibility with existing freight uses • Recommended that further route development is taken forward with Option 18 to Neath Riverside.

Table 7-16 Scheme development considerations for Option 25a Ca

Option 25 – Interchange improvements, (Carmarthen, Llanelli, Pembrey & Burry Port, Whitland)	
Technical Development to date **Status - (Stage A GRIP 1-2)**	• Feasibility design of options. • Demand forecasting • Capital costing • Workshop with Stakeholders

Further technical development **(to complete Stage B/ GRIP 3)**	• Option Selection design development for all engineering deliverables. • Initial environmental and ecological work & geotechnical appraisal • Identification of land requirements and all statutory procedures (Planning, Station change) • Updated capital costs and detailed risk register • Technical design approval by Network Rail/LAs (TAAs) inc. confirming ownership and maintenance arrangements • Further Stakeholder engagement
Risks and Deliverability Issues	• Some overlap with TfW rail services parking proposals • Parking options require existing NR owned land which may be leased • Strategic option at Llanelli requires local relocation of maintenance unit

Note Options 25 Interchange improvements at Milford Haven and Neath are being taken forward separately)

Table 7-17 Scheme development considerations for Option 26

Option 26 Electrification – Metro Phase 1 (Options 12 and 13)	
Technical Development to date **Status - (Stage A/ GRIP 1)**	• Initial cost assessment based on single track route km (stkm) and Rail Industry Association rates.
Further technical development **(to complete Stage B/ GRIP 3)**	• Feasibility design and option selection • Initial environmental and ecological work & geotechnical appraisal • Identification of land requirements and all statutory procedures (Planning, Network & Station change) • Rolling stock
Risks and Deliverability Issues	• Practically this will need to follow Cardiff - Swansea electrification due to power feed requirements. This would share costs over Swansea – Neath section of route. • Timings of this will need to be considered as part of South Wales Mainline programme. • Electrification will need to be aligned to rolling stock strategy

Table 7-18 Scheme development considerations for Option 28

Option 28: HoWL (Swansea - Llandovery) additional train per day (7)	
Technical Development to date	• Timetabling assessment undertaken to identify potential 6tph timetable with overlay for additional Swansea – Llandovery return working • Demand forecasting • Operational Costing for service requirements.

Status - (Stage A, GRIP 1-2)	• No additional operational infrastructure requirements identified
Further technical development **(to complete Stage B/ GRIP 3)**	• Confirm train could be provided within existing unit resources (current information is that this is correct) • Train operator discussion to agreed preferred rolling stock/operational arrangement to refine costs • Identify potential need for risk assessments associated with level crossings
Risks and Deliverability Issues	• Level crossing reviews have been identified as a risk on similar frequency projects. • Preferred option, positive business case.

7.4 Consultation Communications and stakeholder management,

As detailed in Section 3.2, the development of the WelTAG Stage One (Strategic Outline Case) has been informed by stakeholder engagement. The continued involvement of key stakeholders and interested parties and the involvement of the public will be important in taking forward the next stages of the WelTAG process and in the development of the preferred option (particularly statutory bodies).

A public consultation is currently ongoing for the WelTAG stage 1 study, and its findings will be incorporated in the Stage 2 final report. However as individual schemes are progressed particularly for infrastructure works in line with the five ways of working of the Well Being of Future Generations Act further public engagement exercises will be necessary including with local access groups, at option selection and outline design states, and in advance of statutory processes such as Planning Consent or Compulsory Purchase Orders for land acquisition Well-being of Future Generations (Wales) Act 2015. This will ensure that the preferred option is developed collaboratively and with the involvement of interested parties

Current Covid-19 restrictions limit the opportunity for traditional public exhibitions at present and ‘Online’ engagement has been used for the Stage 1 consultation. If restrictions continue or return online methods may again be used but will need to consider minimising the risk of excluding certain groups of the community e.g. those without internet access/unreliable internet connections.

Ongoing stakeholder engagement will be necessary to develop the proposals with Local Authorities, Welsh Government, Network Rail and Train Operators. This includes agreeing the detailed project requirements and scope of work to be delivered as well as who will manage and maintain new infrastructure. Other statutory bodies to be consulted during the course of the design development will include Local Planning Authorities, Natural Resources Wales, Utilities and Emergency services.

7.5 Project Risks, Constraints and Deliverability

The WelTAG Stage One report included a high-level consideration of deliverability of each option as part of the appraisal process. This included an assessment of constraints and key risks that could affect delivery of each option e.g. in terms of feasibility, acceptability and timescales for delivery. The further work that has been undertaken for WelTAG Stage Two has enabled a more detailed assessment of risks and deliverability issues affecting each option, which are summarised in Tables 7-2 to 7-18. The full deliverability assessment is included in Appendix K of the IAR.

In addition to the specific risks associated with each option, there will also be more general risks that will need consideration and will be applicable to all options, such as the reliance on external funding to enable delivery and engineering project risks. Some of the key risks to options are as follows:

- Funding availability;
- Increased capital costs;
- Public Acceptability;
- Potential loss of passenger revenue/increased subsidy due to ORCATS allocation method;
- Additional maintenance costs;
- Significant Capital Cost; and
- Uncertainty over associated demand (including post Covid-19 recovery).

Due to the relatively early stage of development of each of the options, all potential risks to delivery cannot be identified and quantified at this stage of the WelTAG process. As the development of recommended options is progressed, a Risk Management Strategy and a detailed Qualitative Cost Risk Assessment/Risk Register for each specific scheme to be progressed will be developed as part of the project management processes to complete TfW Stage B/GRIP stage 3.

Table 7-19 Deliverability Assessment Summary

Option No.	Option	Feasibility (Technical)	Acceptability	Timescale	Risks
7a/b	Frequency/Connectivity: new services from Swansea/Carmarthen to fill frequency gaps for Milford Haven	**0**	**+**	**2-3 yrs.**	**0**
8	Frequency/Connectivity: extension of Manchester - Carmarthen, hourly service to Milford Haven	**-**	**+**	**2-3 yrs.**	**-**
9a/b	Frequency/Connectivity: new services from Swansea/Carmarthen to fill frequency gaps for Pembroke Dock	**0**	**+**	**2-3 yrs.**	**0**
11	Frequency/Connectivity: reconfigure TfW Fishguard Harbour services to provide a 2 hourly interval service	**0**	**+**	**2-3 yrs.**	**0**

Option No.	Option	Feasibility (Technical)	Acceptability	Timescale	Risks
12	Swansea Bay Metro (Services): Swansea to Pontarddulais via Neath and Swansea District Line Infrastructure: Cwrt Sart Junction, Pontarddulais Turnback signalling & 6 new stations	-	0	5-7 yrs.	-
13	Swansea Bay Metro (Services): Swansea to Pembrey & Burry Port 2tph Infrastructure: Signalling, Pembrey turnback and Cockett station	-	0	5-7 yrs.	-
14	Additional chord to connect SWML to Swansea District Line at Llandeilo junction (more direct link between Swansea and HoW Line).	- - -	- -	7-10 yrs.	- -
15	Swansea Bay Metro: Ammanford to Gwaun Cae Gurwen	- -	0	7-10 yrs.	- -
16	Swansea Bay Metro: Neath to Onllwyn	- -	0	7-10 yrs.	- -
17	Swansea Bay Metro: Neath to Cwmgwrach	- -	0	7-10 yrs.	- -
18	Swansea Bay Metro: Neath - Llandarcy - Swansea City Centre via Swansea Docks	- -	-	7-10 yrs.	- -
19	Swansea Bay Metro: Link from Swansea District Line to Clydach	- -	-	7-10 yrs.	- -
25A	Station Improvements: Carmarthen	-	+	3-5 yrs.	-
25B	Station Improvements: Pembrey & Burry Port	0	+	3-5 yrs.	0
25C	Station Improvements: Whitland	-	+	3-5 yrs.	-
25D	Station Improvements: Llanelli	-	+	3-5 yrs.	- -
26	Electrification/Decarbonisation: Possible electrification of Swansea Bay Metro/wider services	- -	0	7-10 yrs.	- -
28	Additional Services on southern section of HoW Line.	0	+	2-3 yrs.	0
29	Do Minimum	0	0	0	0

7.6 Monitoring and evaluation, and Benefits realisation.

A Benefits Realisation and Monitoring and Evaluation Plan will be produced at WelTAG Stage Three (Final Business Case), which will set out the arrangements for monitoring and evaluation following scheme delivery. This will ensure the long-term impacts of the preferred option are monitored and evaluated to ensure objectives are being achieved and benefits realised.

7.7 Summary of Management Case

The WelTAG Stage Two Management Case has provided an overview of the key development stages required for each option and the statutory procedures that may need to be undertaken. This has considered the development of each option in relation to:

- Additional evidence that may need to be obtained to assist scheme development;
- Feasibility and design work required;
- Environmental and ecological requirements;
- Statutory procedures/ legal requirements; and
- Land matters.

It is evident from the Management Case that each option under consideration requires further development work prior to scheme delivery.

The Management Case has also included an assessment of risks and deliverability issues affecting each option, which will need to be further developed and quantified as any recommended options are progressed to WelTAG Stage Three. Other aspects considered by the management case are the governance structure, project management processes and the role of the WelTAG Review Group.

8. Conclusion & Recommendations

8.1 Summary

The shortlisted options have been further developed as part of the WelTAG Stage Two study to enable a more detailed appraisal of each option to be undertaken. The WelTAG Stage Two process has involved a Five Case assessment for each of the shortlisted options, which has considered the strategic, transport, financial, commercial and management cases for each option.

8.2 Recommendations

WelTAG 2017 states that the WelTAG Stage Two process should 'determine whether there are any transport options that can address the issues identified, contributes positively to the well-being goals and objectives and can be delivered within technical and financial constraints' and then 'select a preferred option to be taken forward to Stage Three'.

At the end of WelTAG 2 only a single option should be taken forward to Stage 3 where more than one option exists. The proposals have different delivery timescales and will also need to advance at their own pace. Additionally, in terms of moving towards funding and delivery, focus is required on a limited number of schemes to take forward to full business case and secure funding alongside further development work for longer term prospects.

Options have been assessed individually to date, therefore when moving to a final package of measures consideration has been given to their strategic fit, and the potential implications of removing duplication in costs or benefits.

8.2.1 West Wales Services

It is recommended that Option 8 (extending the Manchester service to Milford Haven) becomes the preferred option for this route, due to the fit with existing services and avoids duplication between Swansea and Carmarthen. However, this will need to be reviewed in the context of long-distance proposals being considered by the parallel work on the South Wales Main Line as well as proposals to operate some current Manchester services with locomotive hauled 'Mk4' coaching stock in place of DMUs. Should this not be proceedable then Option 7b would remain viable.

Option 9a (Swansea to Pembroke Dock) is the recommended option to service Pembroke Dock Branch and would enable improvements to frequency to Pembroke Dock and between Swansea and Carmarthen.

Assuming it can be resourced from the existing fleet then Option 28 (additional service on the southern part of Heart of Wales Line) is also recommended.

Option 11 Carmarthen – Fishguard has good non-monetised benefits and fulfils a strategic role for this Branch but has a poor value for money, a more detailed rolling stock review (in

conjunction with the operator) should be carried out to assess if this can be delivered with less rolling stock and therefore reduce the additional operating cost to improve the business case.

Implementing the four recommended options in West Wales would double existing service frequencies to/from Milford Haven/Haverfordwest and Pembroke Dock to hourly and provide a regular interval service every 2 hours to Fishguard. On the Heart of Wales line, services to Llandovery, (including existing franchise commitments), would increase from 5 to 7 trains per day, addressing some of the long gaps in the current timetable.

Table 8-1 summarises the options and recommendations for West Wales.

Table 8-1 Summary of options and recommendations (West Wales)

Route	Capex (Opex)	Additional Demand	BCR	Delivery timescale	Recommendation
7a. Swansea – Milford Haven (2-hourly)	(3.5m)	224k	1.2	2-3 years	Not recommended. 7b or 8 preferred. Duplicate ext.
7b. Carmarthen – Milford Haven (2-hourly)	(2.2m)	58k	0.6	2-3 years	Not recommended. 8 preferred. Alt to 8, runs in same path. Saving of 0.5 unit + 9b
8. Carmarthen – M. Haven (MCR service, 2-hourly)	(1.5m)	58k	0.9	2-3 years	Preferred option, subject to strategic proposals
9a. Swansea – Pembroke Dock (2 hourly, limited stop)	(2.8m)	246k	1.5	2-3 years	Preferred option, subject to strategic proposals
9b. Carmarthen – Pembroke Dock (2 hourly, limited stop)	(2.2m)	81k	0.7	2-3 years	Not recommended. Saving of 0.5 unit + 7b. Alternate to 9a
11. Carmarthen – Fishguard (2-hourly)	(306k)	8.6k	0.8	2-3 years	Rolling stock requirement needs detailed review.
28. 1 add tpd. Swansea – Llandovery return	(141k)	9.4k	1.1	2-3 years	Assumes resourced from current fleet

8.2.2 *Station Improvements*

The station improvements all have a reasonable business case and require a modest level of investment therefore are recommended for progression to further design development and stage 3 assessment TfW Rail are currently reviewing fifteen locations within south wales for improved parking provision and these proposals should be cross referenced against their scope to avoid duplication of design work. The option at Llanelli requires further investigation in regard to relocating the depot to accommodate a strategic level of parking provision in one location.

Table 8-2 Summary of options and recommendations (West Wales Station Improvements)

Route	Capex (Opex)	Additional Demand	BCR	Delivery timescale	Recommendation
Carmarthen	£1.8m	55k	2.9	3-5 years	Progress subject to TFW rail services proposals
Pembrey & Burry Port	£1.8m	5..7k			
Whitland	£2m	13k	2.05	3-5 years	Progress subject to TFW rail services proposals
Llanelli	£1.6m	156k	2.35	3-5 years	Strategic option requires depot relocation

8.2.3 *Swansea Bay Metro*

The Metro options recommended for initial progression to further design development and WelTAG 3 and full business case assessment are Option 12 (Swansea to Pontarddulais) and, subject to review with West Wales service options and line capacity, Option 13 (Swansea to Pembrey and Burry Port). In both cases these will require work to confirm cost and risks to complete all engineering deliverables in TfW Plan of works stage A & B before progressing design to Stage C and Full Business Case.

Options 18 and 19 are also recommended to progress but are subject to a longer timeframe for delivery and have some prerequisites to delivery. Due to the overlap of part of the route they should be considered as a package. A development package to undertaken feasibility design work to allow protection of a preferred route alignment from development would be beneficial.

The chord at Llandeilo (Option 14) is not viable without further, more frequent Metro services to benefit from the time saving. The loss of Llanelli on the Heart of Wales services has a detrimental impact on the option.

Despite a BCR of slightly over 1 for Option 15 (Pantyffynnon - Gwaun Cae Gurwen) the non-monetised benefits are more limited due to the catchment size of the valley with the majority of demand at Ammanford. Without significant development the cost of providing the link all the way to Gwaun Cae Gurwen is unlikely to be justified. A more fundamental issue is the need for more frequent services beyond Ammanford which is not considered in the costing. There would be potential to extend Option 12 Pontarddulais Metro services to Ammanford which would serve a significant proportion of the demand of route 15 and could act a hub to serve the rest of the valley via a bus-based option. This should be investigated as part of the design work for Option 12 but may have capacity considerations between Pontarddulais and Ammanford. A longer-term option may be a more direct route to Swansea in combination with Option 14.

Option 16 and 17 (Onllwyn and Cwmgwrach) experience a similar issue with low population levels and therefore demand. They are not recommended to be progressed at present as a rail-based Metro route. It is recommended that the development of Option 18 looks at extending to Aberdulais /Tonna as this would serve a large proportion of the demand from Options 16 and 17 without the full cost. There would then be potential for a hub and alternative provision for the northern part of the routes.

Table 8-3 Summary of options and recommendations (Swansea Bay)

Route	Capex	Additional Demand	BCR	Deliverability	Recommendation
12. Swansea – Pontarddulais 2tph	£131m (4.5m pa)	1,730k	2.9	5 – 7 years	Progress as 1st Phase
13. Swansea - Pembrey & Burry Port 2tph	£34m (4m pa)	630k	1.77	5 – 7 years	Needs review with WW service options.
14. Llandeilo Chord	£35.2m (-71k pa)	-	0.03	7-10 years	Not recommended unless part of Metro route
15. Pantyffynnon – Gwaun Cae Gurwen 2tph	£58m** (2.1m pa)	282k	1.0	7-10 years	Most demand from Ammanford.
16. Neath Riverside - Onllwyn 2tph	97.9m (2.1m pa)	159k	0.5	7-10 years	V. Low demand north of Aberdulais.
17. Neath Riverside – Cwmgwrach 2tph	81.3m (2m pa)	162k	0.5	7-10 years	Low demand north of Aberdulais

18. Swansea – Docks – Neath Riverside 2tph	£507m (2.2m)	2,225k	1.9	7-10 years	Potentially extend to Aberdulais /Tonna.
19. Swansea – Llandarcy-Clydach 2tph	£400m (2.4m)	1,893k	1.9	7-10 years	18/19 as a package.

8.2.4 Summary of recommended options

Schemes need to be packaged into deliverable components which will then move forward at their own pace. Some development will also be required for longer term proposals so that they are ready for delivery in the future and to protect opportunities in terms of development (and also align development and planning policy to them).

Based on current assessment this initial package could comprise (See also Figures 8.1 – 8.3) :

- Interchanges (option 25)
- West Wales frequency
  - Option 8 Milford Haven (subject to outcome of strategic service SWML work).
  - Option 9a (Swansea - Pembroke Dock frequency),
  - Option 11 Carmarthen – Fishguard - subject to operator review)
  - Option 28 (7th Train for southern section of Heart of Wales Line).
- Swansea Bay Metro
  - Option 12 (Swansea – Pontarddulais, consider extension to Ammanford)
  - Option 13 (Swansea - Pembrey & Bury Port)
- Development package to confirm (and secure) route alignment
  - Option 18 Swansea – Neath (and extension to Aberdulais /Tonna)
  - Option 19 Swansea – Clydach

The total capital investment cost for the preferred package is £1.1billion (2021 costs). However the combined public transport improvements generate significant benefits with a resultant BCR value of 3.6.

Some mainline stations may be capable of standalone delivery, for example under New Station Funding (NSF), this should be investigated further. There should also be a review of extending Pontarddulais services (Option 12) to Ammanford, there will be an interface with Heart of Wales Line services and track capacity considerations but an Ammanford – Swansea service may be an option in the longer term. Option 11 (Fishguard services) should be reviewed with the operator to identify if a more efficient use of rolling stock could improve the business case. Electrification for Metro Phase 1 (Option 26) should be reviewed further to scheme development of Cardiff – Swansea mainline electrification.

8.3 Further Work

This section sets out the further potential work that is required for each of those options that are recommended to be progressed to WelTAG Stage Three. The WelTAG stages 1 and 2 have considered a strategy for the public transport in Swansea Bay and West Wales. Individual WelTAG stage 3 assessments will now be required for the individual projects.

8.4 Review Group

In line with WelTAG 2017, an independent Review Group will need to oversee and review the WelTAG Stage Two appraisal output.

Figure 8-1
Recommended West Wales service options

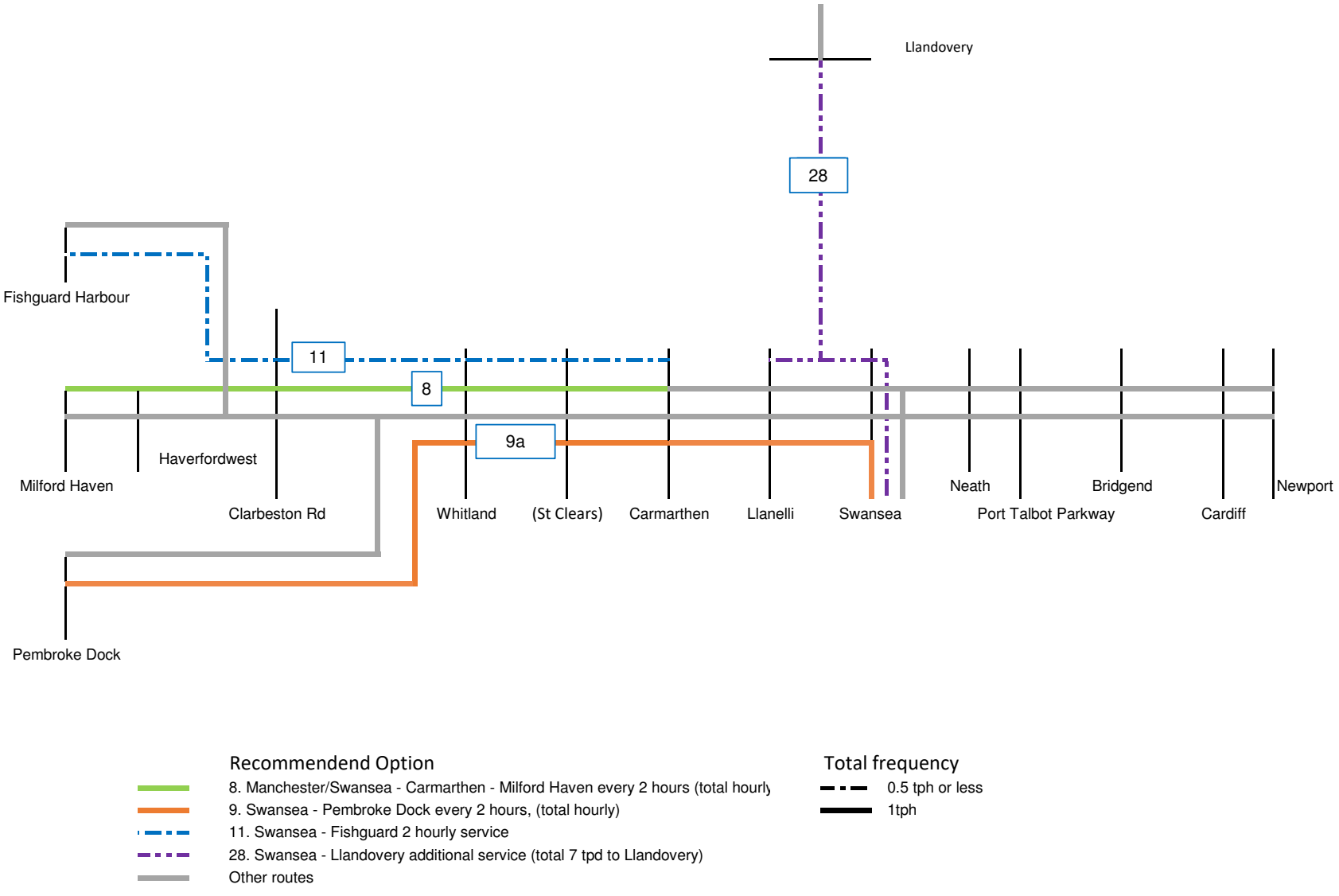
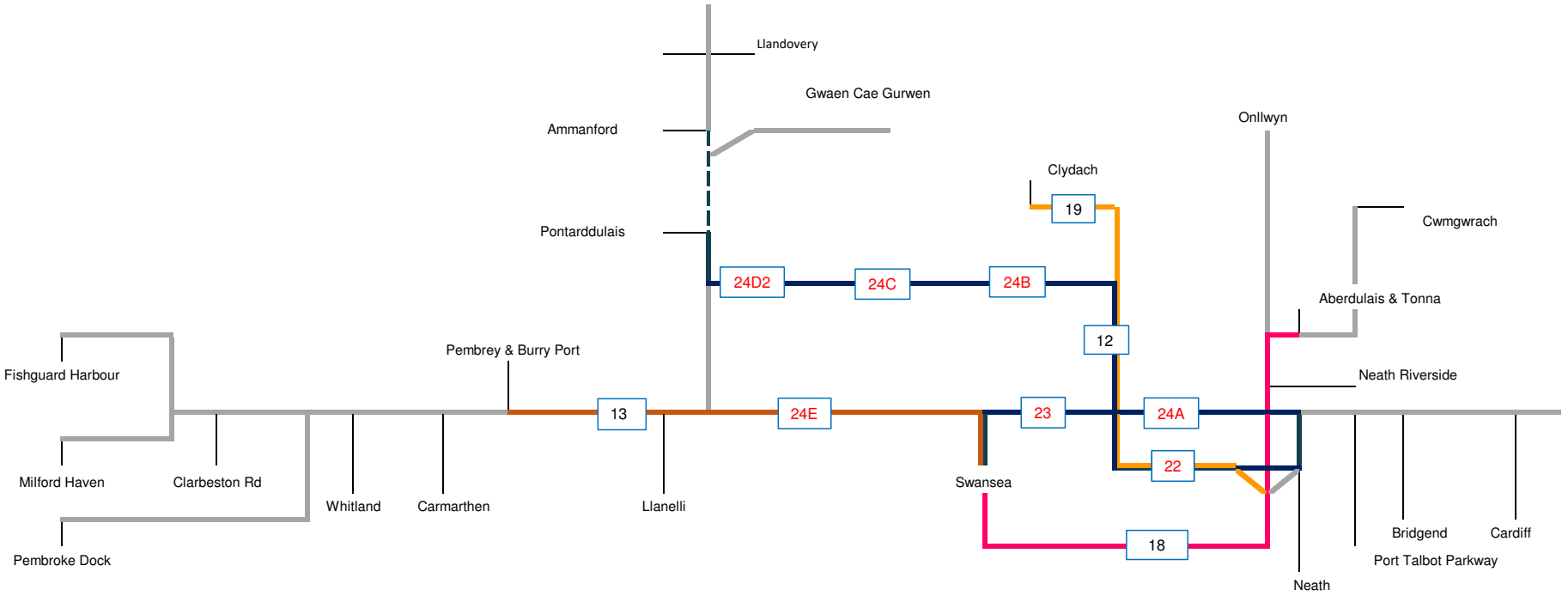


Figure 8-2
Recommended Metro Interventions



Recommended route options

- 12. Swansea - Neath - Pontarddulais
- 12. Potential extension to Ammanford
- 13. Swansea - Llanelli - Pembrey & Bury Port

Development package

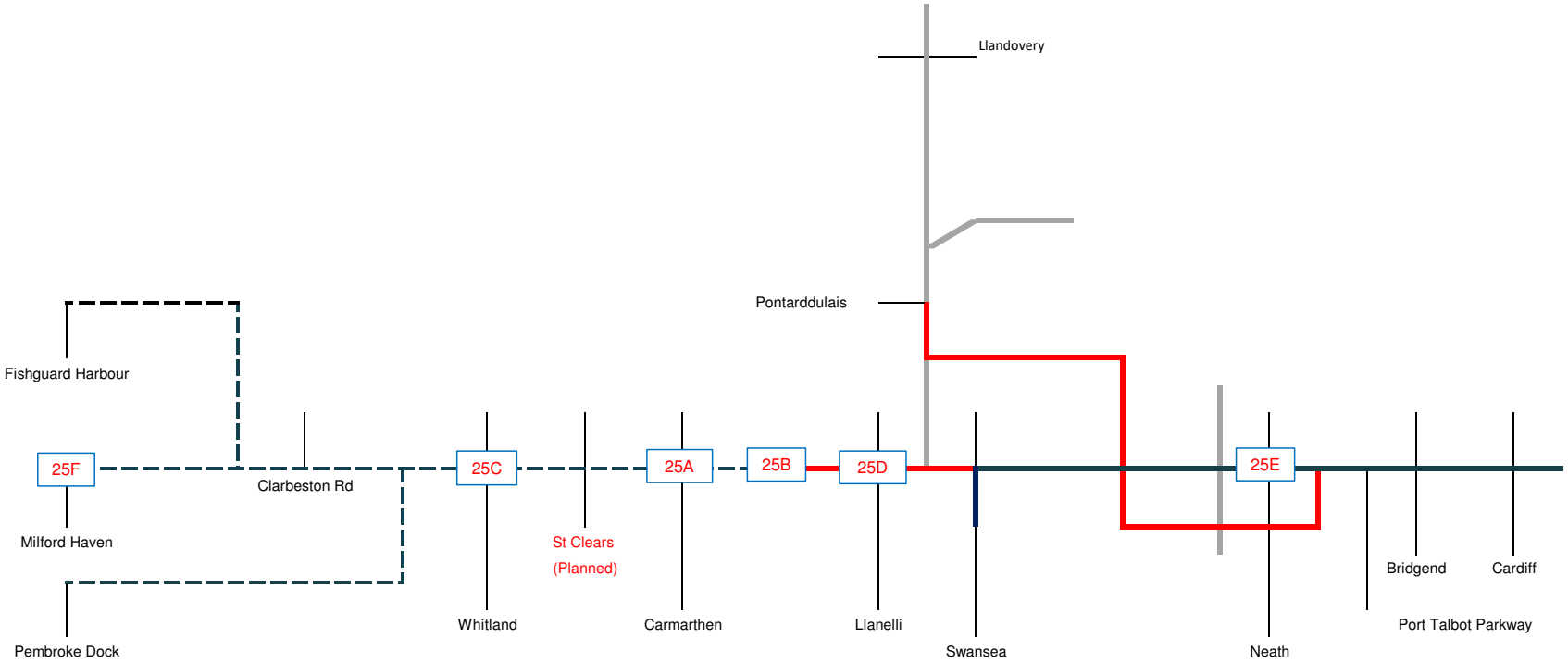
- 18. Swansea - Jersey Marine - Neath Riverside - Aberdulais
- 19. Swansea - Jersey Marine - Clydach

Existing lines

New stations (options 12/13)

22	Llandarcy Station
23	Landore Station
24A	Winch Wen Station
24B	Morriston Station
24C	Felindre Station
24D2	Pontillw Station
24E	Cockett Station

Figure 8-3
Recommended Station Interchange & Infrastructure Interventions



Recommended options

25A	Carmarthen Station improvements
25B	Pembrey & Burry Port Station improvements
25C	Whitland Station improvements
25D	Llanelli Station improvements
25E	Neath Station improvements
25F	Milford Haven Station improvements
	Cardiff - Swansea mainline electrification (Prerequisite)
	26. Phase 1 Metro Electrification (To review)
	Later Phase 1 Electrification

Appendix A

Option Appraisal Summaries

A.1 Option 7a New service Swansea to Milford Haven - Strategic Case Summary Table

Option 7a – Frequency Improvements - New service Swansea - Milford Haven		
Description	Introduction of additional services between Swansea and Milford Haven to add to the current two-hourly (0.5tph) service resulting in an hourly (1tph) service throughout the day.	
How does it tackle the problem?	This option addresses the existing poor timings of Pembrokeshire to Swansea Services, which currently are infrequent and often fail to provide reliable morning and evening services for commuters. Train frequencies in this area are generally modest, with only 3% of the 4.5m visitors to Pembrokeshire annually travelling by train.	
Objectives	(1) Reduce journey times between key population centres including Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke and Milford Haven.	**+ +**
	(2) Increase service frequencies: for local stations on the main line between Carmarthen and Port Talbot, especially during peak periods, on the Heart of Wales Line to serve commuters into Swansea and beyond, across South West Wales to improve suitability for daily commuting	**+++**
	(3) Improve regional transport accessibility through widening the spatial reach of the rail network and services.	**++**
	(4) Improve Park and Ride provision for access to the Swansea Bay region.	**0**
	(5) Provide a viable public transport alternative to the congested M4/A48 corridor.	**0**
	(6) Contribute to developing a Swansea Bay Urban Area Metro including improvements to multi-modal interchanges.	**0**
	(7) Maximise the potential for stations to accelerate urban regeneration and major development site delivery.	**+**
	(8) Increase the number of trips made by public transport, focusing particularly on commuter trips.	**+**
	(9) Reduce the environmental impact of transport, especially carbon emissions and air quality.	**+**
	(10) Improve rail network efficiency to allow a lower future subsidy requirement per passenger.	**+**

Adverse Impacts and Dependencies	Rail infrastructure and facilities will need to be upgraded where necessary to support the additional services into Pembrokeshire. New services must comply with current timetables. Station improvements to Milford Haven will also be required to accommodate additional services. Requires additional rolling stock (any suitable DMU)	
Constraints	This option can be timetabled in terms of a direct replacement for a Manchester services extension from Carmarthen however capacity at Carmarthen needs to be confirmed	
Key Risks	Feasibility (Technical)	**0**
	Acceptability	**+**
	Timescale	**+**
	Risks	**0**
	Main delivery risks: • Capacity at Carmarthen. • Rolling stock availability; and • Commercial/ economic viability. • Deliverable within 3 years – providing no new infrastructure is require and subject to funding agreements and provision of rolling stock.	

A.2 Option 7b New service Carmarthen to Milford Haven - Strategic Case Summary Table

Option 7b – Frequency Improvements - New service Carmarthen - Milford Haven		
Description	Introduction of additional services between Carmarthen and Milford Haven to add to the current two-hourly (0.5tph) service resulting in an hourly (1tph) service throughout the day.	
How does it tackle the problem?	This option addresses the existing poor timings of Pembrokeshire to Swansea Services, which currently are infrequent and often fail to provide reliable morning and evening services for commuters. Train frequencies in this area are generally modest, with only 3% of the 4.5m visitors to Pembrokeshire annually travelling by train.	
Objectives	(1) Reduce journey times between key population centres including Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke and Milford Haven.	**+ +**
	(2) Increase service frequencies: for local stations on the main line between Carmarthen and Port Talbot, especially during peak periods, on the Heart of Wales Line to serve commuters into Swansea and beyond, across South West Wales to improve suitability for daily commuting	**+++**
	(3) Improve regional transport accessibility through widening the spatial reach of the rail network and services.	**++**
	(4) Improve Park and Ride provision for access to the Swansea Bay region.	**0**
	(5) Provide a viable public transport alternative to the congested M4/A48 corridor.	**0**
	(6) Contribute to developing a Swansea Bay Urban Area Metro including improvements to multi-modal interchanges.	**0**
	(7) Maximise the potential for stations to accelerate urban regeneration and major development site delivery.	**+**
	(8) Increase the number of trips made by public transport, focusing particularly on commuter trips.	**+**
	(9) Reduce the environmental impact of transport, especially carbon emissions and air quality.	**+**
	(10) Improve rail network efficiency to allow a lower future subsidy requirement per passenger.	**+**

Adverse Impacts and Dependencies	Rail infrastructure and facilities will need to be upgraded where necessary to support the additional services into Pembrokeshire. New services must comply with current timetables. Station improvements to Milford Haven will also be required to accommodate additional services. Requires additional rolling stock (any suitable DMU)	
Constraints	This option can be timetabled in terms of a direct replacement for a Manchester services extension from Carmarthen however capacity at Carmarthen needs to be confirmed	
Key Risks	Feasibility (Technical)	**0**
	Acceptability	**+**
	Timescale	**+**
	Risks	**0**
	Main delivery risks: • Capacity at Carmarthen. • Rolling stock availability; and • Commercial/ economic viability. Deliverable within 3 years – providing no new infrastructure is require and subject to funding agreements and provision of rolling stock.	

A.3 Option 8 Extend Manchester (Carmarthen) - Milford Haven hourly - Strategic Case Summary Table

Option 8 - Frequency Improvements - Extend Manchester (Carmarthen) - Milford Haven hourly		
Description	This is an extension to Milford Haven of the TfW Rail service between Manchester and Carmarthen, every hour rather than every 2 hours. The resultant being an hourly service to Milford Haven.	
How does it tackle the problem?	The current timetable is designed to fit the Manchester/Crewe services. This option addresses the existing poor timings of Pembrokeshire to Swansea Services, which currently are infrequent and often fail to provide reliable morning and evening services for commuters. Train frequencies in this area are generally modest, with only 3% of the 4.5m visitors to Pembrokeshire annually travelling by train.	
Objectives	(1) Reduce journey times between key population centres including Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke and Milford Haven.	**+ +**
	(2) Increase service frequencies: for local stations on the main line between Carmarthen and Port Talbot, especially during peak periods, on the Heart of Wales Line to serve commuters into Swansea and beyond, across South West Wales to improve suitability for daily commuting	**++**
	(3) Improve regional transport accessibility through widening the spatial reach of the rail network and services.	**++**
	(4) Improve Park and Ride provision for access to the Swansea Bay region.	**0**
	(5) Provide a viable public transport alternative to the congested M4/A48 corridor.	**0**
	(6) Contribute to developing a Swansea Bay Urban Area Metro including improvements to multi-modal interchanges.	**0**
	(7) Maximise the potential for stations to accelerate urban regeneration and major development site delivery.	**+**
	(8) Increase the number of trips made by public transport, focusing particularly on commuter trips.	**+**
	(9) Reduce the environmental impact of transport, especially carbon emissions and air quality.	**+**
	(10) Improve rail network efficiency to allow a lower future subsidy requirement per passenger.	**+**

Adverse Impacts and Dependencies	With respect to an hourly frequency to Milford Haven it would be an alternative to options 4 & 8. With respect to extending the Manchester services it would be an alternative to Option 10. Require additional rolling stock to operate Rolling stock would need to be compatible with the new class 197 trains currently being ordered for these services from 2023 onwards.	
Constraints	Upgrade works required at Milford Haven station required Main constraint is the path every 4 hours for Milford Haven oil trains. In these hours the service could operate to Haverfordwest only. National/wider links to Manchester and Crewe Many services which connect South West Wales also serve a much larger part of the network. Therefore, changes to frequencies or the running schedules of services within the study area will have to interface with a number of wider network considerations	
Key Risks	Feasibility (Technical)	-
	Acceptability	+
	Timescale	+
	Risks	-
	Risk Descriptions Main delivery risks are commercial/ economic viability and rolling stock provision. Deliverable within 3 years (subject to funding agreements and provision of suitable rolling stock)	

A.4 Option 9a New service Swansea - Pembroke Dock Strategic Case Summary Table

Option 9a – Frequency Improvements - New service Swansea - Pembroke Dock		
Description	Introduction of a new Swansea to Pembroke Dock service every two hours (0.5tph) to add to the current 0.5pth service resulting in an hourly service (1tph).	
How does it tackle the problem?	This option addresses the existing poor timings of Pembrokeshire to Swansea Services, which currently are infrequent and often fail to provide reliable morning and evening services for commuters. Train frequencies in this area are generally modest, with only 3% of the 4.5m visitors to Pembrokeshire annually travelling by train.	
Objectives	(1) Reduce journey times between key population centres including Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke and Milford Haven.	**+ +**
	(2) Increase service frequencies: for local stations on the main line between Carmarthen and Port Talbot, especially during peak periods, on the Heart of Wales Line to serve commuters into Swansea and beyond, across South West Wales to improve suitability for daily commuting	**+++**
	(3) Improve regional transport accessibility through widening the spatial reach of the rail network and services.	**++**
	(4) Improve Park and Ride provision for access to the Swansea Bay region.	**0**
	(5) Provide a viable public transport alternative to the congested M4/A48 corridor.	**0**
	(6) Contribute to developing a Swansea Bay Urban Area Metro including improvements to multi-modal interchanges.	**0**
	(7) Maximise the potential for stations to accelerate urban regeneration and major development site delivery.	**+**
	(8) Increase the number of trips made by public transport, focusing particularly on commuter trips.	**+**
	(9) Reduce the environmental impact of transport, especially carbon emissions and air quality.	**+**
	(10) Improve rail network efficiency to allow a lower future subsidy requirement per passenger.	**+**

Adverse Impacts and Dependencies	Rail infrastructure and facilities will need to be upgraded where necessary to support the additional services into Pembrokeshire Require additional rolling stock to operate – any suitable diesel multiple unit	
Constraints	Additional service would need to be a limited stopping service at the busiest stations only	
Key Risks	Feasibility (Technical)	**0**
	Acceptability	**+**
	Timescale	**+**
	Risks	**0**
	Risk Descriptions Main delivery risks: • Whether the services can be timetabled (under assessment); • Rolling stock availability; and • Commercial/ economic viability. • Deliverable within 3 years – providing no new infrastructure is require and subject to funding agreements and provision of rolling stock	

A.5 Option 9b New service Carmarthen - Pembroke Dock - Strategic Case Summary Table

Option 9b – Frequency **Improvements - New service Carmarthen - Pembroke Dock**		
Description	Introduction of a new Carmarthen to Pembroke Dock service every two hours)0.5tph) to add to the current 0.5pth service resulting in an hourly service.	
How does it tackle the problem?	This option addresses the existing poor timings of Pembrokeshire to Swansea Services, which currently are infrequent and often fail to provide reliable morning and evening services for commuters. Train frequencies in this area are generally modest, with only 3% of the 4.5m visitors to Pembrokeshire annually travelling by train.	
Objectives	(1) Reduce journey times between key population centres including Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke and Milford Haven.	**+ +**
	(2) Increase service frequencies: for local stations on the main line between Carmarthen and Port Talbot, especially during peak periods, on the Heart of Wales Line to serve commuters into Swansea and beyond, across South West Wales to improve suitability for daily commuting	**+++**
	(3) Improve regional transport accessibility through widening the spatial reach of the rail network and services.	**++**
	(4) Improve Park and Ride provision for access to the Swansea Bay region.	**0**
	(5) Provide a viable public transport alternative to the congested M4/A48 corridor.	**0**
	(6) Contribute to developing a Swansea Bay Urban Area Metro including improvements to multi-modal interchanges.	**0**
	(7) Maximise the potential for stations to accelerate urban regeneration and major development site delivery.	**+**
	(8) Increase the number of trips made by public transport, focusing particularly on commuter trips.	**+**
	(9) Reduce the environmental impact of transport, especially carbon emissions and air quality.	**+**
	(10) Improve rail network efficiency to allow a lower future subsidy requirement per passenger.	**+**

Adverse Impacts and Dependencies	Rail infrastructure and facilities will need to be upgraded where necessary to support the additional services into Pembrokeshire Require additional rolling stock to operate – any suitable diesel multiple unit	
Constraints	Additional service would need to be a limited stopping service at the busiest stations only	
Key Risks	Feasibility (Technical)	**0**
	Acceptability	**+**
	Timescale	**+**
	Risks	**0**
	Main delivery risks: • Whether the services can be timetabled (under assessment); • Rolling stock availability; and • Commercial/ economic viability. Deliverable within 3 years – providing no new infrastructure is require and subject to funding agreements and provision of rolling stock	

A.6 Option 11 Carmarthen - Fishguard (2 hourly) - Strategic Case Summary Table

Option 11 – Frequency Improvements - Swansea - Fishguard (2 hourly)		
Description	Provide an additional two return services between Swansea and Fishguard Harbour and recast timetable to provide a regular two-hourly service (0.5 tph) throughout the day.	
How does it tackle the problem?	This option addresses the existing poor timings of Pembrokeshire to Swansea Services, which currently are infrequent and often fail to provide reliable morning and evening services for commuters. Train frequencies in this area are generally modest, with only 3% of the 4.5m visitors to Pembrokeshire annually travelling by train.	
Objectives	(1) Reduce journey times between key population centres including Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke and Milford Haven.	**+ +**
	(2) Increase service frequencies: for local stations on the main line between Carmarthen and Port Talbot, especially during peak periods, on the Heart of Wales Line to serve commuters into Swansea and beyond, across South West Wales to improve suitability for daily commuting	**+++**
	(3) Improve regional transport accessibility through widening the spatial reach of the rail network and services.	**++**
	(4) Improve Park and Ride provision for access to the Swansea Bay region.	**0**
	(5) Provide a viable public transport alternative to the congested M4/A48 corridor.	**0**
	(6) Contribute to developing a Swansea Bay Urban Area Metro including improvements to multi-modal interchanges.	**0**
	(7) Maximise the potential for stations to accelerate urban regeneration and major development site delivery.	**+**
	(8) Increase the number of trips made by public transport, focusing particularly on commuter trips.	**+**
	(9) Reduce the environmental impact of transport, especially carbon emissions and air quality.	**+**
	(10) Improve rail network efficiency to allow a lower future subsidy requirement per passenger.	**+**
Adverse Impacts and Dependencies	Require additional rolling stock to operate (any suitable DMU's) There may be potential to interwork this service with a Pembroke Dock service.	

Constraints	This service can be timetabled without any additional infrastructure being required although turnaround times at Fishguard are 5 min to maximise stock utilisation if originating from Swansea.	
Key Risks	Feasibility (Technical)	**0**
	Acceptability	**+**
	Timescale	**+**
	Risks	**0**
	Main delivery risks: o Whether the turnaround times are acceptable (Swansea service); o Rolling stock availability; and o Commercial / economic viability • Deliverable within 3 years – providing no new infrastructure is required and subject to funding agreements and provision of rolling stock	

A.7 Option 12 Swansea to Pontarddulais via Neath & SDL - Strategic Case Summary Table

Option 12 – Swansea Bay Metro (Services)		
Description	Introduction of Swansea to Pontarddulais via Neath & SDL including: Option 22 - New Stations: Llandarcy, Option 23 - New Stations: Landore, Option 24A - New Metro station – Winch Wen, Option 24B - New Metro Station – Morriston, Option 24C - New Metro Station – Felindre, Option 24D1 - New Metro Station – Penllergaer, Option 24D2 - New Metro Station - Pontlliw New stations will be built in the listed locations to aid the introductions of the Swansea Bay Metro Services	
How does it tackle the problem?	This option will improve service frequency and coverage in the Swansea Bay region, particularly improving reliability at stations not served by GWR services.	
Objectives	(1) Reduce journey times between key population centres including Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke and Milford Haven.	**+ +**
	(2) Increase service frequencies: for local stations on the main line between Carmarthen and Port Talbot, especially during peak periods, on the Heart of Wales Line to serve commuters into Swansea and beyond, across South West Wales to improve suitability for daily commuting	**++**
	(3) Improve regional transport accessibility through widening the spatial reach of the rail network and services.	**++**
	(4) Improve Park and Ride provision for access to the Swansea Bay region.	**0**
	(5) Provide a viable public transport alternative to the congested M4/A48 corridor.	**0**
	(6) Contribute to developing a Swansea Bay Urban Area Metro including improvements to multi-modal interchanges.	**+**
	(7) Maximise the potential for stations to accelerate urban regeneration and major development site delivery.	**++**
	(8) Increase the number of trips made by public transport, focusing particularly on commuter trips.	**+**
	(9) Reduce the environmental impact of transport, especially carbon emissions and air quality.	**+**
	(10) Improve rail network efficiency to allow a lower future subsidy requirement per passenger.	**+**

Adverse Impacts and Dependencies	Previous study work has already undertaken a timetable assessment for 3tph, which concluded that this was technically viable, albeit did not have a strong business cases. The option for 2tph (30-minute interval) is being assessed with additional engineering feasibility work and a revised frequency which will provide a comparator. (The new infrastructure would also provide for higher service frequencies) New infrastructure is required at Cwrt Sart Junction (civils, track and signalling), Pontarddulais Turnback (signalling only), Swansea Platform (track and signalling) together with new stations (assessed individually below). The service can be timetabled. The timetabling identifies that train planning rules at Swansea are a more significant constraint than platforms for a 30min service The service would require additional rolling stock to operate Class 230 'D - Trains' were previously assumed, but another Diesel Multiple Unit stock would be suitable for the service. Use of tram-train vehicles would require an electrified route. (see Option 26) which would be a complementary investment Economic development projects and growth zones across Swansea bay Region Initial civils & permanent way feasibility work has identified two options for Cwrt Sart Junction and that Swansea Platform 4 can be reinstated. Signalling assessment confirms a turnback solution at Pontarddulais	
Constraints	Environmental issues to address at Cwrt Sart Junction which is in the flood plain in TAN Zone C2 – therefore a flood risk assessment would be required. Transport & Works Act order powers are likely to be required Main programmed constraint is the time taken to deliver the Cwrt Sart chord and Swansea Platform Train planning rules at Swansea	
Key Risks	Feasibility (Technical)	**-**
	Acceptability	**0**
	Timescale	**0**
	Risks	**-**

	Risk Descriptions Previously assessed as 3tph, BCR indicated poor value for money. Therefore, being assessed for 2tph as a starting point. Main delivery risks: • Commercial/ economic viability are associated with the new infrastructure. • Environmental risks – flood plain assessment • Deliverable within 3-5 years – subject to funding agreements.	

A.8 Option 13 Swansea to Burry Port Metro Service - Strategic Case Summary Table

Option 13 - Swansea Bay Metro (Services)		
Description	This option is for a half hourly (2tph) service between Swansea & Burry Port including: Option 24E - New Metro Station: Cockett	
How does it tackle the problem?	This will improve frequency and reliability for smaller stations, particularly those not served by GWR services to the west of Swansea, in the Swansea Bay area.	
Objectives	(1) Reduce journey times between key population centres including Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke and Milford Haven.	**+ +**
	(2) Increase service frequencies: for local stations on the main line between Carmarthen and Port Talbot, especially during peak periods, on the Heart of Wales Line to serve commuters into Swansea and beyond, across South West Wales to improve suitability for daily commuting	**++**
	(3) Improve regional transport accessibility through widening the spatial reach of the rail network and services.	**++**
	(4) Improve Park and Ride provision for access to the Swansea Bay region.	**0**
	(5) Provide a viable public transport alternative to the congested M4/A48 corridor.	**0**
	(6) Contribute to developing a Swansea Bay Urban Area Metro including improvements to multi-modal interchanges.	**+**
	(7) Maximise the potential for stations to accelerate urban regeneration and major development site delivery.	**++**
	(8) Increase the number of trips made by public transport, focusing particularly on commuter trips.	**+**
	(9) Reduce the environmental impact of transport, especially carbon emissions and air quality.	**+**
	(10) Improve rail network efficiency to allow a lower future subsidy requirement per passenger.	**+**
Adverse Impacts and Dependencies	Previous study work has already undertaken a timetable assessment for 3tph, which concluded that this was technically viable, required additional infrastructure albeit did not have a strong business case. The option for 2tph (30-minute interval) service is being assessed with a revised frequency which will provide a comparator	

	New infrastructure is required at Pembrey & Burry Port Station (turnback facility - track and signalling) and Swansea Platform (track and signalling). Economic development projects and growth zones across Swansea bay Region A new station is proposed at Cockett (assessed individually see Option 24 E). To avoid service duplication stopping patterns of existing local services should be reviewed. The service would require additional rolling stock to operate. Class 230 DTrains were previously assumed, but other DMU stock would be suitable for the service (The proposals do not include electrification of the route).	
Constraints	The main programme constraint is the time taken to deliver the Pembrey and Burry Port turnback facility and Swansea Platform.	
Key Risks	Feasibility (Technical)	-
	Acceptability	0
	Timescale	0
	Risks	-
	Previously assessed as 3tph, BCR indicated poor value for money Therefore being assessed for 2tph as a starting point. The main delivery risks are the new infrastructure (turnback facility, Swansea platform) and the commercial/ economic viability. Estimated to take 3-5 years to deliver – subject to funding agreements.	

A.9 Option 14 Additional chord to connect SWML to Swansea District Line at Llandeilo junction - Strategic Case Summary Table

Option 14 – Additional chord to connect SWML to Swansea District Line at Llandeilo junction		
Description	This is the provision of a new Chord at Llandeilo junction to permit trains a direct connection from the South Wales Mainline to the Swansea District Line and onto the Heart of Wales Line. The principal benefit of this proposal is that it would enable trains from the Heart of Wales Line a direct route to Swansea without having to reverse at Llanelli resulting in a time saving for passengers to Swansea and increased resilience or improved rolling stock utilisation albeit at a cost of no longer serving Llanelli.	
How does it tackle the problem?	Swansea Bay Region - The need to provide for a mix of short and long-distance services on the same lines results in irregular stopping patterns which are not conducive to commuting. Access from Valleys to stations is tricky The Heart of Wales highway corridor has a lot of traffic, need to make rail more desirable for road users	
Objectives	(1) Reduce journey times between key population centres including Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke and Milford Haven.	**+ +**
	(2) Increase service frequencies: for local stations on the main line between Carmarthen and Port Talbot, especially during peak periods, on the Heart of Wales Line to serve commuters into Swansea and beyond, across South West Wales to improve suitability for daily commuting	**+++**
	(3) Improve regional transport accessibility through widening the spatial reach of the rail network and services.	**++**
	(4) Improve Park and Ride provision for access to the Swansea Bay region.	**0**
	(5) Provide a viable public transport alternative to the congested M4/A48 corridor.	**0**
	(6) Contribute to developing a Swansea Bay Urban Area Metro including improvements to multi-modal interchanges.	**+**
	(7) Maximise the potential for stations to accelerate urban regeneration and major development site delivery.	**+**
	(8) Increase the number of trips made by public transport, focusing particularly on commuter trips.	**+**
	(9) Reduce the environmental impact of transport, especially carbon emissions and air quality.	**+**
	(10) Improve rail network efficiency to allow a lower future subsidy requirement per passenger.	**+**

Adverse Impacts and Dependencies	This proposal would also be relevant to proposals to increase frequency on the Heart of Wales Line (item 29) and to Gwaun Cae Gurwen (item 15) A feasibility study would need to be undertaken to confirm the technical issues associated with this proposal Economic development projects and growth zones across Swansea bay region	
Constraints	Alignment close to local nature reserves A Transport & Works Act order is likely to be required to construct the alignment	
Key Risks	Feasibility (Technical)	**0**
	Acceptability	**-**
	Timescale	**-**
	Risks	**-**
	The main risks are associated with this will be technical and environmental in addition to economic viability. Estimated to take 5-10 years to deliver - subject to funding agreements	

A.10 Option 15 Swansea Bay Metro: Ammanford to Gwaun Cae Gurwen - Strategic Case Summary Table

Option 15 - Swansea Bay Metro: Ammanford to Gwaun Cae Gurwen		
Description	This is a proposal to re-instate passenger services on the freight line from Ammanford to Gwaun Cae Gurwen. The 5-mile single track railway diverges from the Hearth of Wales Line at Pantyffynnon to Gwaun Cae Gurwen, terminating at a loading pad just beyond the settlement itself. Passenger services ceased in 1958. The line is used for coal traffic. The line would serve Ammanford (passing much closer to the commercial centre) Glanaman and Garnant and Gwaun Cae Gurwen. Ammanford is the largest settlement.	
How does it tackle the problem?	This option serves the Swansea Bay region, particularly serving smaller stations not served by GWR services, improving reliability and frequency	
Objectives	(1) Reduce journey times between key population centres including Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke and Milford Haven.	**+**
	(2) Increase service frequencies: for local stations on the main line between Carmarthen and Port Talbot, especially during peak periods, on the Heart of Wales Line to serve commuters into Swansea and beyond, across South West Wales to improve suitability for daily commuting	**+**
	(3) Improve regional transport accessibility through widening the spatial reach of the rail network and services.	**++**
	(4) Improve Park and Ride provision for access to the Swansea Bay region.	**0**
	(5) Provide a viable public transport alternative to the congested M4/A48 corridor.	**0**
	(6) Contribute to developing a Swansea Bay Urban Area Metro including improvements to multi-modal interchanges.	**+**
	(7) Maximise the potential for stations to accelerate urban regeneration and major development site delivery.	**+**
	(8) Increase the number of trips made by public transport, focusing particularly on commuter trips.	**+**
	(9) Reduce the environmental impact of transport, especially carbon emissions and air quality.	**+**
	(10) Improve rail network efficiency to allow a lower future subsidy requirement per passenger.	**+**

Adverse Impacts and Dependencies	Route capacity over the Heart of Wales single track railway. Rolling stock could be DMU or tram train subject to electrification Economic development projects and growth zones across Swansea bay region	
Constraints	Feasibility study would need to be undertaken to confirm the detailed technical issues associated with this proposal. (The line has been maintained for freight purposes, and therefore re-instatement of passenger service would require infrastructure enhancements)	
Key Risks	Feasibility (Technical)	--
	Acceptability	0
	Timescale	-
	Risks	--
	Main delivery risks: o Service capacity on Heart of Wales Line o Public acceptability would depend on the impact on existing roads and properties. o Existing infrastructure condition and suitability for passenger operation and associated costs. o Need to accommodate freight use; and o Economic viability Estimated to take 7 – 10 years to deliver – subject to funding	

A.11 Option 16 Swansea Bay Metro: Neath to Onllwyn - Strategic Case Summary Table

Option 16 – Swansea Bay Metro: Neath to Onllwyn		
Description	This would involve re-instating passenger services from Neath to Onllwyn on the 'Neath and Brecon Line' either in whole or part. The route currently services the Onllwyn open cast site and washery and is the location of the proposed 'Global Centre of Rail Excellence'	
How does it tackle the problem?	This option will provide greater rail coverage of the Swansea Bay Metro area. It will connect passengers into Neath from smaller stations not served by GWR and challenge the time by car.	
Objectives	(1) Reduce journey times between key population centres including Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke and Milford Haven.	**+**
	(2) Increase service frequencies: for local stations on the main line between Carmarthen and Port Talbot, especially during peak periods, on the Heart of Wales Line to serve commuters into Swansea and beyond, across South West Wales to improve suitability for daily commuting	**+**
	(3) Improve regional transport accessibility through widening the spatial reach of the rail network and services.	**++**
	(4) Improve Park and Ride provision for access to the Swansea Bay region.	**0**
	(5) Provide a viable public transport alternative to the congested M4/A48 corridor.	**0**
	(6) Contribute to developing a Swansea Bay Urban Area Metro including improvements to multi-modal interchanges.	**+**
	(7) Maximise the potential for stations to accelerate urban regeneration and major development site delivery.	**+**
	(8) Increase the number of trips made by public transport, focusing particularly on commuter trips.	**+**
	(9) Reduce the environmental impact of transport, especially carbon emissions and air quality.	**+**
	(10) Improve rail network efficiency to allow a lower future subsidy requirement per passenger.	**+**

Adverse Impacts and Dependencies	New rolling stock would be required depending on option, either suitable diesel multiple units such as class 230 D-train stock for heavy rail options or tram-trains assuming a light rail solution. • Economic development projects and growth zones across Swansea bay region • The proposed Global Centre of rail excellence may generate demand	
Constraints	The existing connections with this route and the Swansea District Line face south. Therefore, even with the proposed chord at Cwrt Sart Junction there is no direct access to Neath station. Operationally therefore any passenger service would have three basic options. o A standalone service from a new station at Neath (new station west of centre) to Onllwyn o A light rail service from Swansea via the Docks Branch and continuing onto Onllwyn, with a new station for Neath west of the river (see item 18). o A service from Neath requiring a new S-E and W-N connection with the Swansea District Line in addition to the proposed Chord a Cwrt Sart Junction. However, this would be a very indirect route with poor journey times. • Options to re-stablish a direct link to Neath station even for light rail are likely to be precluded by cost • The Neath and Brecon Line to Onllwyn is a 10-mile single track line. The line has been maintained for freight purposes, and therefore re-instatement of passenger service would require infrastructure enhancements. A feasibility study would need to be undertaken to confirm the detailed technical issues associated with this proposal • Onllwyn is the location of the proposed Global Centre of Rail excellence and the line may also be used by trains accessing this site.	
Key Risks	Feasibility (Technical)	--
	Acceptability	0
	Timescale	-
	Risks	--
	Main risks: o The condition and suitability of the existing infrastructure and associated costs, o The need to accommodate any freight use, including as part of the proposed rail test facility o Potential demand due to the off centre station location at Neath, o Lack of interchange with mainline services and the relatively low population in the upper part of the route; and o Overall economic viability.	

	Estimated to take 7- 10 years to deliver - subject to funding agreements.

A.12 Option 17 Swansea Bay Metro: Neath to Cwmgwrach - Strategic Case Summary Table

Option 17 – Swansea Bay Metro: Neath to Cwmgwrach		
Description	This would involve re-instating passenger services from Neath to Cwmgwrach either in whole or part. The route currently services the Cwmgwrach coal loading/disposal point. The route would predominantly serve the settlements of Tonna, Resolven, Cwmgwrach & Glynneath.	
How does it tackle the problem?	Swansea Bay Region - The need to provide for a mix of short and long-distance services on the same lines results in irregular stopping patterns which are not conducive to commuting. Services in West Wales are infrequent and often fail to provide morning and evening arrivals and departures that make it possible to commute by rail. Access from Valleys to stations is tricky	
Objectives	(1) Reduce journey times between key population centres including Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke and Milford Haven.	**+**
	(2) Increase service frequencies: for local stations on the main line between Carmarthen and Port Talbot, especially during peak periods, on the Heart of Wales Line to serve commuters into Swansea and beyond, across South West Wales to improve suitability for daily commuting	**+**
	(3) Improve regional transport accessibility through widening the spatial reach of the rail network and services.	**++**
	(4) Improve Park and Ride provision for access to the Swansea Bay region.	**0**
	(5) Provide a viable public transport alternative to the congested M4/A48 corridor.	**0**
	(6) Contribute to developing a Swansea Bay Urban Area Metro including improvements to multi-modal interchanges.	**+**
	(7) Maximise the potential for stations to accelerate urban regeneration and major development site delivery.	**+**
	(8) Increase the number of trips made by public transport, focusing particularly on commuter trips.	**+**
	(9) Reduce the environmental impact of transport, especially carbon emissions and air quality.	**+**
	(10) Improve rail network efficiency to allow a lower future subsidy requirement per passenger.	**+**

Adverse Impacts and Dependencies	New rolling stock would be required depending on option, either suitable diesel multiple units such as class 230 D-train stock for heavy rail options or tram-trains assuming a light rail solution. Economic development projects and growth zones across Swansea bay region	
Constraints	The line has no direct access from Neath Station. Most viable option would probably be as an extension of a potential metro route from Swansea • Re-instatement of passenger service would require infrastructure enhancements. A feasibility study would need to be undertaken to confirm the detailed technical issues associated with this proposal.	
Key Risks	Feasibility (Technical)	+ +
	Acceptability	-
	Timescale	+ +
	Risks	+
	Main risks: o The condition and suitability of the existing infrastructure and associated costs, o The need to accommodate any freight use, o Potential demand due to the off centre station location at Neath, o Lack of interchange with mainline services and the relatively low population in the upper part of the route; and o Overall economic viability • The main public acceptability issues would relate to the impacts of the upgrading works • Estimated to take 7- 10 years to deliver - subject to funding agreements.	

A.13 Option 18 Swansea Bay Metro: Neath - Llandarcy - Swansea City Centre via Swansea Docks - Strategic Case Summary Table

Option 18 – Swansea Bay Metro: Neath - Llandarcy - Swansea City Centre via Swansea Docks		
Description	This is the provision of a Swansea Bay Metro service between Neath and Swansea City Centre via the Swansea Docks Branch which also extends up the Neath Valley to Cwmgwrach. The route could either connect to Neath Station via the proposed Cwrt Sart junction Chord or continue up the Vale of Neath Line. Alternatively, it could connect to the proposed LLandarcy station to the west.	
How does it tackle the problem?	Swansea Bay Region - The need to provide for a mix of short and long-distance services on the same lines results in irregular stopping patterns which are not conducive to commuting. Services in West Wales are infrequent and often fail to provide morning and evening arrivals and departures that make it possible to commute by rail. Access from Valleys to stations is tricky	
Objectives	(1) Reduce journey times between key population centres including Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke and Milford Haven.	**+ +**
	(2) Increase service frequencies: for local stations on the main line between Carmarthen and Port Talbot, especially during peak periods, on the Heart of Wales Line to serve commuters into Swansea and beyond, across South West Wales to improve suitability for daily commuting	**+**
	(3) Improve regional transport accessibility through widening the spatial reach of the rail network and services.	**++**
	(4) Improve Park and Ride provision for access to the Swansea Bay region.	**0**
	(5) Provide a viable public transport alternative to the congested M4/A48 corridor.	**0**
	(6) Contribute to developing a Swansea Bay Urban Area Metro including improvements to multi-modal interchanges.	**+**
	(7) Maximise the potential for stations to accelerate urban regeneration and major development site delivery.	**+**
	(8) Increase the number of trips made by public transport, focusing particularly on commuter trips.	**+**
	(9) Reduce the environmental impact of transport, especially carbon emissions and air quality.	**+**
	(10) Improve rail network efficiency to allow a lower future subsidy requirement per passenger.	**+**

Adverse Impacts and Dependencies	New rolling stock would be required depending on option, either suitable diesel multiple units such as class 230 D-train stock for heavy rail options or tram-trains assuming a light rail solution. Economic development projects and growth zones across Swansea bay region	
Constraints	The line has no direct access from Neath Station. Most viable option would probably be as an extension of a potential Metro route from Swansea • Re-instatement of passenger service would require infrastructure enhancements. A feasibility study would need to be undertaken to confirm the detailed technical issues associated with this proposal.	
Key Risks	Feasibility (Technical)	--
	Acceptability	0
	Timescale	-
	Risks	--
	Main risks: o The condition and suitability of the existing infrastructure and associated costs, o The need to accommodate any freight use, o Potential demand due to the off centre station location at Neath, o Lack of interchange with mainline services and the relatively low population in the upper part of the route; and o Overall economic viability • The main public acceptability issues would relate to the impacts of the upgrading works • Estimated to take 7- 10 years to deliver - subject to funding agreements.	

A.14 Option 19 Swansea Bay Metro: Link from Swansea District Line to Clydach - Strategic Case Summary Table

Option 19 – Swansea Bay Metro: Link from Swansea District Line to Clydach		
Description	New railway between the Swansea District Line and Clydach	
How does it tackle the problem?	Swansea Bay Region - The need to provide for a mix of short and long-distance services on the same lines results in irregular stopping patterns which are not conducive to commuting. Services in West Wales are infrequent and often fail to provide morning and evening arrivals and departures that make it possible to commute by rail. Access from Valleys to stations is tricky	
Objectives	(1) Reduce journey times between key population centres including Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke and Milford Haven.	+
	(2) Increase service frequencies: for local stations on the main line between Carmarthen and Port Talbot, especially during peak periods, on the Heart of Wales Line to serve commuters into Swansea and beyond, across South West Wales to improve suitability for daily commuting	+
	(3) Improve regional transport accessibility through widening the spatial reach of the rail network and services.	+
	(4) Improve Park and Ride provision for access to the Swansea Bay region.	0
	(5) Provide a viable public transport alternative to the congested M4/A48 corridor.	0
	(6) Contribute to developing a Swansea Bay Urban Area Metro including improvements to multi-modal interchanges.	0
	(7) Maximise the potential for stations to accelerate urban regeneration and major development site delivery.	+
	(8) Increase the number of trips made by public transport, focusing particularly on commuter trips.	+
	(9) Reduce the environmental impact of transport, especially carbon emissions and air quality.	+
	(10) Improve rail network efficiency to allow a lower future subsidy requirement per passenger.	+

Adverse Impacts and Dependencies	Economic development projects and growth zones across Swansea bay region • Part of the line is currently used as a cycle route • Operationally the route could work as a terminus of a Metro service from Swansea City Centre via the Docks Branch and LLandarcy or alternatively as shuttle service from Neath. Rolling stock is therefore likely to be tram-train but DMU operation would be possible for a shuttle service	
Constraints	A Transport & Works Act order is also likely to be required to construct the city centre connection. A feasibility study would need to be undertaken to confirm the detailed technical issues associated with this proposal. A key piece of infrastructure the bridge over the M4 still exists however the route is heavily wooded in parts Public acceptability would depend on the impact on existing, cycleway, roads and properties	
Key Risks	Feasibility (Technical)	--
	Acceptability	--
	Timescale	-
	Risks	--
	Risk Descriptions	

A.15 Option 25A Station Improvements: Carmarthen - Strategic Case Summary Table

Option 25A – Station Improvements: Carmarthen		
Description	There is a franchise commitment to invest in Carmarthen station in 2021. The main gaps currently identified are limited station parking given the large predominantly rural catchment (particularly if more direct services are provided) and accessible for all inter-platform access via a barrow crossing.	
How does it tackle the problem?	This option improves passenger experience and passenger patronage. It is likely to improve Carmarthen – Cardiff resilience	
Objectives	(1) Reduce journey times between key population centres including Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke and Milford Haven.	+
	(2) Increase service frequencies: for local stations on the main line between Carmarthen and Port Talbot, especially during peak periods, on the Heart of Wales Line to serve commuters into Swansea and beyond, across South West Wales to improve suitability for daily commuting	++
	(3) Improve regional transport accessibility through widening the spatial reach of the rail network and services.	++
	(4) Improve Park and Ride provision for access to the Swansea Bay region.	0
	(5) Provide a viable public transport alternative to the congested M4/A48 corridor.	+
	(6) Contribute to developing a Swansea Bay Urban Area Metro including improvements to multi-modal interchanges.	0
	(7) Maximise the potential for stations to accelerate urban regeneration and major development site delivery.	++
	(8) Increase the number of trips made by public transport, focusing particularly on commuter trips.	+
	(9) Reduce the environmental impact of transport, especially carbon emissions and air quality.	+
	(10) Improve rail network efficiency to allow a lower future subsidy requirement per passenger.	+
Adverse Impacts and Dependencies	The proposals are likely to have a positive public response, subject to local impacts. Dependencies: Aberystwyth – Carmarthen feasibility work	

Constraints	Land and property lease amendments. Access for All compliant inter-platform access may require a relatively expensive solution for the scale of the issue.	
Key Risks	Feasibility (Technical)	-
	Acceptability	+
	Timescale	0
	Risks	-
	The main risks for the parking are likely to be land acquisition or property lease amendments and access for improved parking and planning and environmental considerations. Deliverable within 3-5 years – subject to funding	

A.16 Option 25B Station Improvements: Pembrey & Burry Port - Strategic Case Summary Table

Option 25B – Station Improvements: Pembrey & Burry Port		
Description	The main gap identified at Pembrey and Burry Port station is the lack accessible for all access between platforms.	
How does it tackle the problem?	This option improves passenger experience and passenger patronage	
Objectives	(1) Reduce journey times between key population centres including Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke and Milford Haven.	+
	(2) Increase service frequencies: for local stations on the main line between Carmarthen and Port Talbot, especially during peak periods, on the Heart of Wales Line to serve commuters into Swansea and beyond, across South West Wales to improve suitability for daily commuting	++
	(3) Improve regional transport accessibility through widening the spatial reach of the rail network and services.	++
	(4) Improve Park and Ride provision for access to the Swansea Bay region.	0
	(5) Provide a viable public transport alternative to the congested M4/A48 corridor.	0
	(6) Contribute to developing a Swansea Bay Urban Area Metro including improvements to multi-modal interchanges.	0
	(7) Maximise the potential for stations to accelerate urban regeneration and major development site delivery.	++
	(8) Increase the number of trips made by public transport, focusing particularly on commuter trips.	+
	(9) Reduce the environmental impact of transport, especially carbon emissions and air quality.	+
	(10) Improve rail network efficiency to allow a lower future subsidy requirement per passenger.	+
Adverse Impacts and Dependencies	The proposals are likely to have a positive public response, subject to local impacts.	

Constraints	Space required for 'Access for All' compliant access bridge.	
Key Risks	Feasibility (Technical)	-
	Acceptability	+
	Timescale	0
	Risks	-
	This main risks for the DDA compliant access bridge are likely to be due to the space required and visual impact and also any potential impact of the turnback facility for the Metro services. Deliverable within 1-3 years subject to funding	

A.17 Option 25C Station Improvements: Whitland - Strategic Case Summary Table

Option 25C – Station Improvements: Whitland		
Description	The main gaps identified at Whitland Station is the lack of DDA compliant access between platforms, poorly defined interchange facilities and station parking and existing disused buildings.	
How does it tackle the problem?	This option improves passenger experience and passenger patronage	
Objectives	(1) Reduce journey times between key population centres including Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke and Milford Haven.	+
	(2) Increase service frequencies: for local stations on the main line between Carmarthen and Port Talbot, especially during peak periods, on the Heart of Wales Line to serve commuters into Swansea and beyond, across South West Wales to improve suitability for daily commuting	++
	(3) Improve regional transport accessibility through widening the spatial reach of the rail network and services.	++
	(4) Improve Park and Ride provision for access to the Swansea Bay region.	0
	(5) Provide a viable public transport alternative to the congested M4/A48 corridor.	+
	(6) Contribute to developing a Swansea Bay Urban Area Metro including improvements to multi-modal interchanges.	0
	(7) Maximise the potential for stations to accelerate urban regeneration and major development site delivery.	++
	(8) Increase the number of trips made by public transport, focusing particularly on commuter trips.	+
	(9) Reduce the environmental impact of transport, especially carbon emissions and air quality.	+
	(10) Improve rail network efficiency to allow a lower future subsidy requirement per passenger.	+
Adverse Impacts and Dependencies	The proposals are likely to have a positive public response, subject to local impacts	

Constraints	These proposals will be subject to initial feasibility design	
Key Risks	Feasibility (Technical)	-
	Acceptability	+
	Timescale	0
	Risks	-
	The main risks are likely to be the space required for a DDA compliant bridge and visual impact, commercial viability of repurposing the buildings and potential lease issues. Deliverable within 3-5 years subject to funding	

A.18 Option 25D Station Improvements: Llanelli - Strategic Case Summary Table

Option 25D – Station Improvements: Llanelli		
Description	The main gaps identified at Llanelli station is the lack of 'Access for All' compliant access between platforms, lack of station parking and lack of interchange facilities. Additionally, there is an opportunity to improve place making. There is a franchise commitment to invest in Llanelli station in 2025.	
How does it tackle the problem?	This option improves passenger experience and passenger patronage	
Objectives	(1) Reduce journey times between key population centres including Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke and Milford Haven.	+
	(2) Increase service frequencies: for local stations on the main line between Carmarthen and Port Talbot, especially during peak periods, on the Heart of Wales Line to serve commuters into Swansea and beyond, across South West Wales to improve suitability for daily commuting	++
	(3) Improve regional transport accessibility through widening the spatial reach of the rail network and services.	++
	(4) Improve Park and Ride provision for access to the Swansea Bay region.	0
	(5) Provide a viable public transport alternative to the congested M4/A48 corridor.	+
	(6) Contribute to developing a Swansea Bay Urban Area Metro including improvements to multi-modal interchanges.	0
	(7) Maximise the potential for stations to accelerate urban regeneration and major development site delivery.	++
	(8) Increase the number of trips made by public transport, focusing particularly on commuter trips.	+
	(9) Reduce the environmental impact of transport, especially carbon emissions and air quality.	+
	(10) Improve rail network efficiency to allow a lower future subsidy requirement per passenger.	+
Adverse Impacts and Dependencies	Some stations are in receipt of Access for All funding which could see station improvements e.g. Tenby and Llanelli; Economic development projects and growth zones across Swansea bay region.	

	The proposals are likely to have a positive public response, subject to local impacts	
Constraints	These proposals will be subject to initial feasibility design	
Key Risks	Feasibility (Technical)	-
	Acceptability	+
	Timescale	0
	Risks	-
	The main risks are likely to be the space required for a 'Access for All' compliant bridge and visual impact, commercial viability of repurposing the buildings and potential lease issues. Deliverable within 3-5 years subject to funding	

A.19 Option 26 Electrification of Swansea Bay Metro to allow Tram-Train operation - Strategic Case Summary Table

Option 26 – Electrification of Swansea Bay Metro to allow Tram-Train operation		
Description	The proposal is to seek to decarbonise new and existing rail services. All existing rail services west of Cardiff are operated by Diesel trains and there are no electrified lines. Proposals to electrify between Cardiff and Swansea were cancelled by the UK transport minister due to overspend on the Great Western Electrification Project in favour of Bi-mode trains. However, there is a renewed impetus to decarbonisation including forthcoming 2020 paper from NR on electrification priorities.	
How does it tackle the problem?	Wider issues of the general track capacity across South Wales Journey times and speeds achieved by rail services are relatively poor Potential disbenefit of HS2 – leaves the region further behind Reliability as a train user Swansea Bay network - Train frequencies in this area are generally modest. Quality of rolling stock is “shocking”- effects patronage and passenger experience	
Objectives	(1) Reduce journey times between key population centres including Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke and Milford Haven.	**+**
	(2) Increase service frequencies: for local stations on the main line between Carmarthen and Port Talbot, especially during peak periods, on the Heart of Wales Line to serve commuters into Swansea and beyond, across South West Wales to improve suitability for daily commuting	**+**
	(3) Improve regional transport accessibility through widening the spatial reach of the rail network and services.	**+**
	(4) Improve Park and Ride provision for access to the Swansea Bay region.	**0**
	(5) Provide a viable public transport alternative to the congested M4/A48 corridor.	**+**
	(6) Contribute to developing a Swansea Bay Urban Area Metro including improvements to multi-modal interchanges.	**0**
	(7) Maximise the potential for stations to accelerate urban regeneration and major development site delivery.	**+**
	(8) Increase the number of trips made by public transport, focusing particularly on commuter trips.	**+**
	(9) Reduce the environmental impact of transport, especially carbon emissions and air quality.	**+++**
	(10) Improve rail network efficiency to allow a lower future subsidy requirement per passenger.	**+**

Adverse Impacts and Dependencies	There are three potential low carbon options, electrification, battery operated or hydrogen powered strains. Additionally, hybrid bi-mode trains e.g. diesel electric, may provide an interim solution making best use of electrification where it has been installed and in environmentally sensitive areas. • Electrification of Cardiff – Swansea is likely to be a pre-requisite to further electrification • Electrification is currently technically feasible. Hydrogen powered trains are a relatively new technology, but early production variants are in use in Germany. A trial train is being developed by a UK train leasing company. Battery technology is already being used for trams/tram trains to enable discontinuous electrification, but full battery is in its infancy	
Constraints	The main issue for hydrogen trains will be fuelling locations, where hydrogen storage will be required and the visual impact of overhead electrification equipment and associated requirements. Due to the costs of making changes, electrification tends to 'lock in' existing route capability hence any significant infrastructure capability changes may need to be addressed first.	
Key Risks	Feasibility (Technical)	--
	Acceptability	0
	Timescale	--
	Risks	--
	Main risks associated with these options are the high infrastructure costs electrification, particularly for routes with lower service frequency and relatively limited existing UK experience with Hydrogen and Battery powered trains. Delivery programme for a decarbonisation project for local rail services is likely to be in the order of 5-10 years to implementation. In the case of electrification this would dependent on the scope and timing for mainline electrification from Cardiff to Swansea.	

A.20 Option 28 Frequency Improvements: Heart of Wales Line - Strategic Case Summary Table

Option 28 – Frequency Improvements: Heart of Wales Line		
Description	This proposal is additional services from Llandovery to Swansea/Llanelli. There are presently 5 trains per day each way, 1 of which is to Llandovery only. There is a franchise commitment to a 6th service from 2022.	
How does it tackle the problem?	Services in West Wales are infrequent and often fail to provide morning and evening arrivals and departures that make it possible to commute by rail. The Heart of Wales highway corridor has a lot of traffic, need to make rail more desirable for road users Access from Valleys to stations is tricky Tourist element and rural communities along the Heart of Wales Line need to be considered	
Objectives	(1) Reduce journey times between key population centres including Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke and Milford Haven.	**+ +**
	(2) Increase service frequencies: for local stations on the main line between Carmarthen and Port Talbot, especially during peak periods, on the Heart of Wales Line to serve commuters into Swansea and beyond, across South West Wales to improve suitability for daily commuting	**+++**
	(3) Improve regional transport accessibility through widening the spatial reach of the rail network and services.	**++**
	(4) Improve Park and Ride provision for access to the Swansea Bay region.	**0**
	(5) Provide a viable public transport alternative to the congested M4/A48 corridor.	**0**
	(6) Contribute to developing a Swansea Bay Urban Area Metro including improvements to multi-modal interchanges.	**0**
	(7) Maximise the potential for stations to accelerate urban regeneration and major development site delivery.	**+**
	(8) Increase the number of trips made by public transport, focusing particularly on commuter trips.	**+**
	(9) Reduce the environmental impact of transport, especially carbon emissions and air quality.	**+**
	(10) Improve rail network efficiency to allow a lower future subsidy requirement per passenger.	**+**

Adverse Impacts and Dependencies	Related proposals include Llandeilo junction chord which would avoid the need for Swansea services to HoW Line to reverse at Llanelli and services from Ammanford to Gwaun Cae Gurwen which could involve through running and thus an increase in frequency to stations south of Ammanford. Additionally, the proposed Swansea Metro service to Pontarddulais consumes capacity on the lower part of the route as it is on a single-track section.	
Constraints	The technical feasibility of any additional services would need to be assessed, however a key issue is the limited infrastructure on the route which limits capacity, specifically from Morlais Junction on the Swansea District Line to Llandovery (26 miles) the line is single track with passing loops only at Llandeilo and Llandovery. Service would also require additional rolling stock to operate (any suitable DMU's) Due to the existing levels of patronage, short/medium terms options are likely to be infrastructure constrained The service would be publicly acceptable providing it has no impact on other services. However additional infrastructure may raise concerns.	
Key Risks	Feasibility (Technical)	**0**
	Acceptability	**+**
	Timescale	**+**
	Risks	**0**
	The main delivery risks are whether additional services can be timetabled (this would need to be assessed), rolling stock availability as well as the commercial/ economic viability. Estimated to be achievable within 3 years – providing no new infrastructure is required subject to funding agreements and provision of rolling stock. If new infrastructure is required depending on the extent then 5-10 years would be more realistic timescale.	

A.21 Option 29 - Do Minimum - Strategic Case Summary Table

Option 29 - Do Minimum		
Description	No further changes to the rail network in terms of frequency of existing services, new services or infrastructure only continuation of routine maintenance and other small projects to keep the network operational.	
How does it tackle the problem?	Undertaking no improvements to the rail network within the study area apart from those which are required to keep the network operational, could lead to all the problems listed for the study area becoming worse.	
Objectives	(1) Reduce journey times between key population centres including Swansea, Neath, Port Talbot, Llanelli, Carmarthen, Pembroke and Milford Haven.	**-**
	(2) Increase service frequencies: for local stations on the main line between Carmarthen and Port Talbot, especially during peak periods, on the Heart of Wales Line to serve commuters into Swansea and beyond, across South West Wales to improve suitability for daily commuting	**-**
	(3) Improve regional transport accessibility through widening the spatial reach of the rail network and services.	**-**
	(4) Improve Park and Ride provision for access to the Swansea Bay region.	**0**
	(5) Provide a viable public transport alternative to the congested M4/A48 corridor.	**0**
	(6) Contribute to developing a Swansea Bay Urban Area Metro including improvements to multi-modal interchanges.	**0**
	(7) Maximise the potential for stations to accelerate urban regeneration and major development site delivery.	**-**
	(8) Increase the number of trips made by public transport, focusing particularly on commuter trips.	**-**
	(9) Reduce the environmental impact of transport, especially carbon emissions and air quality.	**-**
	(10) Improve rail network efficiency to allow a lower future subsidy requirement per passenger.	**-**
Adverse Impacts and Dependencies	Wider issues of the general track capacity across South Wales Potential disbenefit of HS2 – leaves the region further behind	
Constraints	Long term impacts from not addressing identified problems within the	

	study area.	
Key Risks	Feasibility (Technical)	**0**
	Acceptability	**0**
	Timescale	**0**
	Risks	**0**
	Risks: NA	

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