MetroWest

METROWEST PHASE 1

OUTLINE BUSINESS CASE

Chapter 5 Financial Case

travelwest

Bath & North East Somerset, Bristol, North Somerset and South Gloucestershire councils working together to improve your local transport

December 2017

Chapter 5: Financial Case

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Financial Case

5.1 Introduction

The estimated scheme capital out-turn cost is £106,071,658 excluding preparation costs to date (technical work and engineering design prior to the submission of this Outline Business Case), excluding provision for potential Part 1 claims and excluding scheme monitoring and evaluation costs. These three cost areas in total amount to £10,391,057, in addition to these costs are operational costs which are to be dealt with separately. Therefore the total estimated scheme delivery cost (excluding operational costs) to be borne by the Authorities including cost of work to date, Part 1 claims and monitoring and evaluations is £116,462,715.

In respect of scheme operational costs negotiations between the Authorities and the DfT Rail Executive are on-going and there are both operational options being considered by DfT and commercial /contractual options. The base position is that the DfT's three year rule would apply whereby the Authorities would have to fund all the operational costs during the first years of operation. However, the proposed train services are forecast to generate a revenue surplus by the end of year six and that by year 10 the surplus is approx £1M per annum, consequently the three year rule may not be the most appropriate option.

5.2 Scheme Costs

The delivery and operation of the scheme entails a four stage cost lifecycle, as follows:

1. Preparation costs up to submission of Outline Business Case (Sunken Costs)
2. Preparation costs from Outline Business Case to Full Business Case Approval and Construction Costs (Scheme Out-turn Cost)
3. Operational costs (train service, railway and highway maintenance costs)
4. Long term asset renewal costs eg track renewal costs, train replacement costs

Item 1 - Preparation costs up to submission of Outline Business Case are sunken costs and have been met by the Authorities.

Items 2 - Preparation Costs and Construction Costs are capital costs (except costs for Part 1 claims and monitoring and evaluation costs) and will be met by a combination of funding budgeted by the Authorities and funding to be secured through the DfT Large Local Major Scheme Fund or other funding mechanism. For further details see section 5.3 and Table 5.1.

Item 3 - Operational costs include train service costs, railway and highway maintenance costs. These costs are examined in detail in section 5.4 and Table 5.2.

Item 4 - Long term asset renewal costs includes long term industry costs of renewing track and infrastructure (in year 20, 30 & 40) and train replacement costs (year 30). Both of these costs will fall upon the public sector, via Network Rail in respect of track renewal and DfT (directly or indirectly) in respect of train replacement costs. These costs have been estimated for the economic appraisal and included in calculating the net present costs.

5.3 Capital Costs

The scheme estimated capital out-turn cost is £106,071,658 excluding preparation costs to date (technical work and engineering design prior to the submission of this Outline Business Case), excluding provision for potential Part 1 claims and excluding scheme monitoring and evaluation costs. These three cost areas in total amount to £10,391,057, in addition to these costs are operational costs which are to be dealt with separately. Therefore the total estimated scheme out-turn cost to be borne by the Authorities including cost of work to date, Part 1 claims and monitoring and evaluations is £116,462,715.

Table 5.1 and Figure 5.1 shows the capital out-turn cost by cost heading. The cost estimate is based on GRIP stage 3 Option Selection Approval in Principle (AIP) design. The GRIP 3 AIP deign is built around a 3d model and includes the Network Rail engineering disciplines: Track formation, Geo-technical & drainage, Structures, Signalling and Electrical & Plant, Communications (GSMR), Overhead Line Equipment (for Bathampton Turnback only), Buildings & Property and Maintenance.

The GRIP 3 AIP deliverables are extensive and comprise of over 300 reports and drawings. All the mandatory deliverables required at GRIP Stage 3 have been undertaken and have achieved Route Asset Manager (RAM) technical approval. Above and beyond this additional deliverables that are normally undertaken GRIP 5 were undertaken during GRIP3, including extensive ground investigation works and track telemetry modelling, to reduce risks particularly in respect of informing the scheme red line boundary and construction strategy. Further information about the scheme engineering design and technical work is set out in chapter 3, the Management Case.

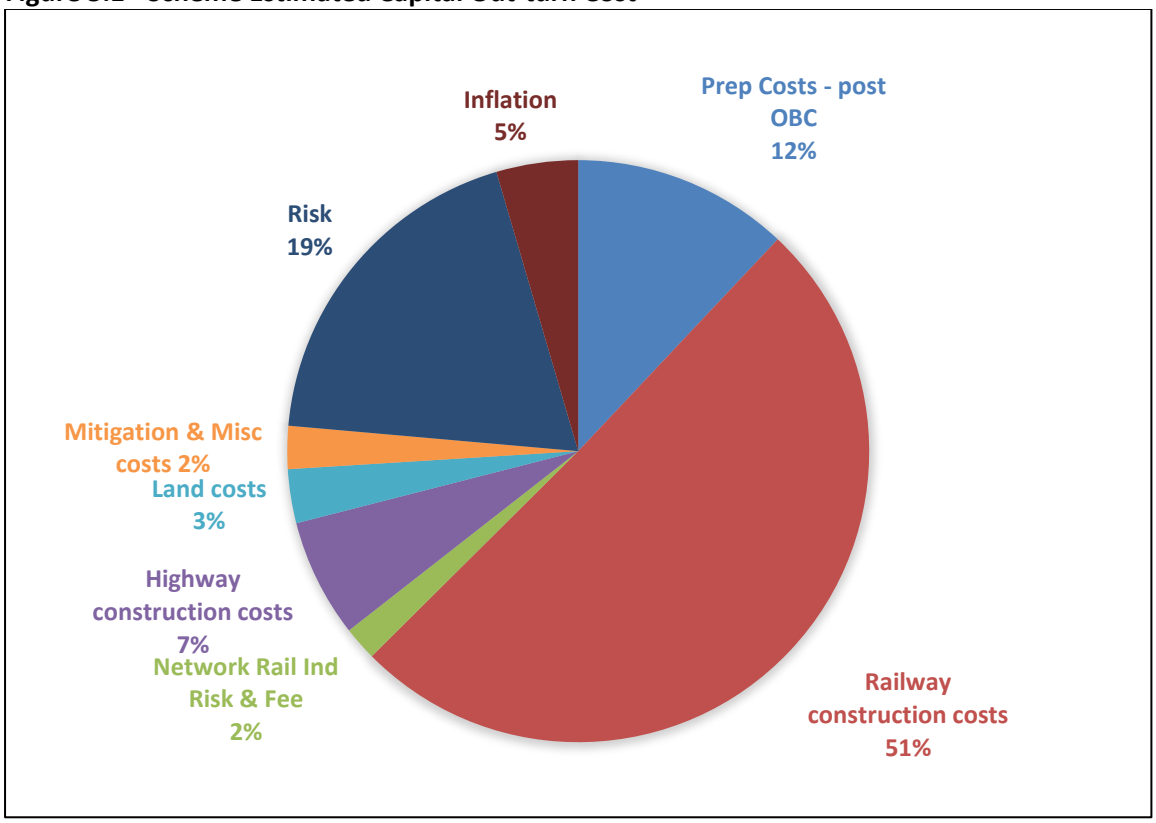
Table 5.1 – Scheme Estimated Capital Out-turn Cost by Cost Heading

Cost Heading	Scheme Delivery Costs*
Preparation Costs - Outline Business Case to Full Business Case	£12,751,887
Railway construction costs (2017 prices excl risk & inf)	£53,600,000
Network Rail Ind Risk & Fee Fund for railway construction	£2,000,000
Highway construction costs (2017 prices excl risk & Inf)	£6,975,497
Land costs	£3,179,054
Mitigation works & Misc costs	£2,529,525
Sub-total	**£81,035,963**
Risk	£20,221,425
Inflation	£4,814,271
Total including all Costs	**£106,071,658**

* excluding preparation costs to date, provision for potential Part1 claims and scheme monitoring and evaluation costs.

The estimate has been informed by both internal processes within Network Rail including inter-disciplinary reviews (across eight engineering disciplines) and also has been subject to independent review via Mott MacDonald appointed by the Authorities as its Independent Cost Estimation Reviewer. Mott MacDonald have been appointed based on their considerable experience undertaking similar work in the rail industry including major projects with Transport for London and Cambridgeshire County Council. Their work has included examining scheme costs including engineering design, construction methodology, project management, industry fees and approaches to risk and inflation.

Figure 5.1 - Scheme Estimated Capital Out-turn Cost



Risk

A full Quantified Cost Risk Assessment (QCRA) was undertaken in March 2017 to assess risk exposure and inform the cost estimate and is attached to chapter 3 Management Case as appendix 3.6. As a third party scheme, the risks modelled were divided into the following categories:

1. NR Project Risks – risks associated with Network Rail's execution of the project
2. NR Integration Risks – risks on the integration (and timely completion) of other NR programmes
3. Client Risks – risks owned by the promoting authorities

The majority of risks that are programme level in nature, excluding the integration risks are held by the Authorities. The GRIP3 cost estimate was completed in March 2017 (based on the 2 trains per hour option) and this included the QCRA modelling with a P80 output of £24.8M combined total. The GRIP3 cost estimate including all client costs totalled £160M, which was considerably higher than the previous GRIP2 cost estimate. This presented major affordability issues for the Authorities and in discussion with the rail industry, the Authorities decided in March 2017 to proceed with a lower cost option for the Portishead Line (one train per hour instead of two trains per hour).

This resulted in a considerable amount of railway infrastructure being removed from the scheme, through value engineering informed by further train pathing modelling (Railsys), refer to the strategic Case chapter 1 for further details. The value engineering exercise was completed in June 2017 and included revisions to the QCRA, see appendix 5.1. Between June and December 17 revisions to the GRIP3 AIP design were undertaken based on the revised value engineering scope. The QCRA was further updated in December 2017 and resulted in a P80 output of £20.2M. The £20.2M risk provision equates to 28% of the total preparation and construction costs.

Inflation

The Building Cost Information Service (BCIS) central forecast to 2021 Q2 has been used for inflation estimation. The forecast is based on the BCIS Price Adjustment Formulae Indices, developed and managed by the Royal Institute of Chartered Surveyors (RICS). This indices has been used in preference to Retail Prices Index (RPI) because using RPI would result in a risk of insufficient provision for inflation. The BCIS Price Adjustment Formulae Indices is based on a data set of underlying construction and materials costs which are regularly updated inline which fluctuations in markets, industry practises and industry buoyancy. The total provision for risk is £4,814,271, which equates to a total uplift of 8% on 2017 Q3 estimated construction costs.

Commenting on BCIS Price Adjustment Formulae Indices, Robert Stockwell Crossrail Ltd (CRL) said *"At Crossrail we have administered NEC3 Contracts with Secondary Option X1 clauses using the BCIS Price Adjustment Formulae Indices (PAFI). By using the BCIS Indices we have been able to procure contracts where inflation is identified as an Employers' risk which could otherwise have been priced by our Tier 1 Contractors at a potentially high risk premium. The biggest benefit of using the BCIS Price Adjustment Formulae Indices is that it promotes a collaborative commercial arrangement between the project manager and contractor by setting out in the contract tender process exactly how the impact of inflation will be measured and how the Contractor will recover costs through the administration of a periodic Price Adjustment".* Source: BCIS Inflation Adjustment Clauses - May 2016.

5.4 Operational Costs

The scheme operational costs comprise of four main elements:

I. Train operator costs (pre-opening mobilisation costs) leading up to the start of the train services

II. Train operator costs (post opening train service) during the first three years of operation

III. Network Rail infrastructure maintenance costs, from opening to the start of the next control period

IV. Highway maintenance and car park operating costs

Train Operator Costs - pre-opening mobilisation Costs

Prior to scheme opening there will be some train operator costs (pre-opening mobilisation costs) comprising of recruitment and training of train drivers and train managers, training of additional staff (depot pool) operational commissioning and testing cost (new rail infrastructure, stations, ticketing etc). A total of 18 addition train drivers will be required and 13.5 train conductors to operate the MetroWest Phase 1 train services (further information on this is set out in the following paragraphs). The initial estimate for these mobilisation costs is £1.74M, with costs commencing T-18 months to T-0 scheme opening.

Although the Authorities do not take issue that these costs will need to be borne, the largest proportion of these costs relate to the cost of recruiting and training new train drivers and conductors. Training a new train driver takes 18 months and the investment produces a medium to long term asset for the rail industry. While MetroWest Phase 1 should pay its fair share of operational costs it should not be expected to meet what are essentially medium to long term rail industry costs.

Train Operator Costs - post opening train service costs

The scheme will augment the existing Severn Beach Line service, which is currently operated using two train sets and augment the existing Bath Spa to Bristol local train service, which is operated as part of a regional route. The enhancement of the Severn Beach Line service and the Bath Spa to Bristol service requires two additional train sets (based on Railsys modelling to date). The reopening of the Portishead Line with an hourly service requires one train set. For the hourly plus option (hourly with peak enhancement) an additional train set is required for the peak. Each train set will operate in a three car formation, therefore a total of nine train units will be required to operate the base MetroWest Phase 1 service (with an hourly service for the Portishead Line).

Table 5.2 sets out a summary of the composition of train operator costs, provided by Great Western Railway.

There are number of constraints in resourcing additional train crew:

- Shifts for members of train crew including rest periods and booking on and off may only last eight hours. Therefore, to cover an eighteen hour service, three shifts are typically required.
- Opportunities may present themselves to create efficient diagrams by integrating with existing diagrams. However these may already be as efficient as possible and additional interworking creates inherent performance risks (train and crew not necessarily being in the same place at the same time).

- Each member of train crew only works four days in seven. So allowing for leave and sickness two heads are required to cover each driver turn and 1.5 to cover each conductor turn. Across a large train crew pool there may be minor efficiencies available but these will be limited.
- Therefore it can be assumed that the likely net additional train crew requirement is effectively 18 train drivers (3 trains x 3 shifts x 2 heads) and 13.5 conductors (3 trains x 3 shifts x 1.5 heads).

There are also constraints in respect of rolling stock:

- The train path modelling (Railsys) indicates that MetroWest Phase 1 requires three additional train sets in three car formations (nine train units in total), however the large number of enhancement and renewal schemes currently being delivered in a relatively short period in late control period 5 and early control period 6, is causing a degree of uncertainty in the modelling undertaken to date. This will be clarified by further Railsys modelling based on the final December 2018 timetable, which is expected to be available around Easter 2018.
- The commercial rolling stock market via the rolling stock operating companies (ROSCOs) can fluctuate in accordance with demand, therefore the costs set out in Table 5.2 are indicative.

Table 5.2 also shows the costs estimated for the 2014 Preliminary Business Case option 5B (previous central case), for comparative purposes.

Table 5.2 - Indicative Train Operator Costs (Post Opening Train Service Costs)

Operational Cost	**Operational Cost Detail**	**OBC Central Case** **Severn Beach and Bath corridors 2 TPH, Portishead corridor 1TPH** **9 x Class 165/6**	***PBC 2014 (Option 5B)*** ***All three corridors 2TPH*** ***12 x Class 165/6***
Base Estimate	Mileage Costs	£1.129	*£1.218*
	Lease Costs	£1.482	*£1.976*
	Staff Costs	£1.548	*£2.064*
	Station Costs	£0.271	*£0.271*
Base Estimate Total		**£4.430**	***£5.529***
Operational Risk	Fuel price +50%	£0.319	*£0.427*
	Spare Train Unit (Maintenance)	- - - -	*£0.494*
	More Train Managers per turn	£0.162	*£0.216*
	Station Staff at Portishead	- - - -	*£0.241*
	Depot Staff	£0.379	- - - -
	Sub-total	**£0.860**	***£1.378***
Risk Adjusted Total	**(all numbers £M)**	**£5.290**	***£6.907***

Network Rail Infrastructure Maintenance Costs

The maintenance costs incurred by Network Rail in the early years after scheme opening are likely to be very modest, because the key railway assets will either be new or in a renewed condition.

Network Rail have informed the Authorities informally that it is unlikely that it would levy any maintenance costs onto the Authorities to cover any maintenance costs from midpoint in the control period to the end of the control period, subject to internal approval. Towards the end of control period 6, post scheme opening Network Rail will seek to include the new MetroWest Phase 1 assets into the regulatory asset base (RAB) in negotiation with the Office of Rail & Road leading into the next control period. For the economic appraisal undertaken to the Economic Case chapter 2, theoretical maintenance costs were included in the detailed appraisal calculations.

Highway Maintenance Cost

Most of the highway works are to be delivered within North Somerset Council's area, with the remainder of works delivered in Bristol City Council's area. A section 278 agreement (under the Highways Act 1980) will be entered into with each of the highway authorities. Furthermore each Council has agreed to own and maintain the new highway assets delivered in its area. The scheme highway works are of a relatively minor nature, the biggest item entails the re-alignment of the northern end of Quays Avenue, Portishead. Quays Avenue is already maintained by North Somerset Council as part of the adopted highway and the realignment of the northern end of the road will not result in any additional highway maintenance costs. The four road over bridges on the dis-used section of railway between Portishead and Pill are already maintained by North Somerset Council as part of the adopted highway. While some defect rectification works will be undertaken to the bridges as part of the scheme works, the scheme will not result in any additional ongoing maintenance requirements for the bridges.

Other highway maintenance costs include maintenance costs of new toucan crossing at Quays Avenue, various other informal pedestrian crossing points, a 150m extension of a bridleway east of the M5, a new 300 metre pedestrian & cycle boulevard on Harbour Road, a new footbridge next to Trinity Primary school and landscaping / ecology maintenance costs. These maintenance costs will be borne by North Somerset Council's Highways & Transport Service and total approximately £0.08M per annum. At Ashton Gate, Bristol a new pedestrian and cycle ramp is to be delivered along with a 100 m extension to a left turn only lane and an upgrade to a set of high traffic signals. The maintenance costs of these assets are very modest. Note the sections of National Cycle Route 26 that run under three highway bridges are already maintained by Sustrans and will continue to be maintained by them.

Car Park Operating Costs

The scheme entails delivery of three new car parks, two for Portishead station and one for Pill station. The operating costs of the car parks include rates, electricity, operational staffing and asset maintenance. The total estimated operating cost of the two Portishead station car parks is £0.03M per annum and £0.008M per annum for Pill station car park. All three car parks will be operated by North Somerset Council's Highway & Transport Service with a charging tariff. The exact tariff is yet to be decided however the working assumption is a charge of £2 to £3 per day for Portishead and slightly lower for Pill. Using the forecast passenger demand profiled by mode of transport arrivals at the stations (see Forecasting Report appended to the Economic Case chapter 2), the forecast total revenue for all three car parks is £0.145M in the opening year, giving a forecast revenue surplus of £0.107M.

Given, the forecast revenue surplus from the car parks is substantially greater than the highway maintenance costs, these costs are being treated as cost neutral by North Somerset Council's Highway & Transport Service. In other words the Council will offset the highway maintenance costs from the car parking revenue surplus.

5.5 Budgets & Funding Position

As set out in section 5.2 the delivery and operation of the scheme entails a four stage cost lifecycle, as follows:

1. Preparation costs up to submission of Outline Business Case
2. Preparation costs from Outline Business Case to Full Business Case Approval and Construction Costs (Scheme Out-turn Cost)
3. Operational costs (train service, railway and highway maintenance costs)
4. Long term asset renewal costs eg track renewal costs, train replacement costs

5.5.1 Funding of Preparation Costs up to the submission of the OBC

The MetroWest Phase 1 scheme was launched in 2013. The total of preparation costs from May 2013 up to the submission of this Outline Business Case in December 2017 is £10,116,057. The costs have been met by the Authorities and are treated as sunken costs. Table 5.3 sets out the funding sources for the sunken costs.

Table 5.3 - Scheme Sunken Costs

Funding Source		**Sub-total**
Local Contribution - Prior to OBC up to December 17	Cash contributions by the Councils	£2,214,921
	Local Growth Funding by WoE LEP	£7,901,136
	Sub-total	**£10,116,057**

5.5.2 Funding of Preparation Costs (OBC to FBC) and Construction Costs

The estimated preparation cost from the Outline Business Case to the Full Business Case is £12,751,887. In order to achieve the Full Business Case the scheme must meet rail industry GRIP costs (GRIP 4 & 5) and also substantial costs to achieve powers to build and operate the scheme, including Development Consent Order costs and Habitat Regulations Assessment costs. The preparation cost to Full Business Case are to be met by the Authorities (using combination of cash resources and Local Growth Funding).

The estimated scheme capital out-turn cost is £106,071,658 excluding preparation costs up to the submission of this Outline Business Case, (which are set out in Table 5.3), excluding provision for potential Part1 claims and excluding scheme monitoring and evaluation costs. These three cost areas in total amount to £10,391,057. Therefore the total estimated scheme delivery cost (excluding operational costs) to be borne by the Authorities including cost of work to date, Part 1 claims and monitoring and evaluations is £116,462,715.

With a scheme budget of £57,813,000 this left a total funding gap of £58,649,715 leading up to the submission of this Outline Business Case. The initial task for the Authorities was to examine all possible sources of local funding within the West of England including Local Growth Funding (LGF) and Economic Development Funding (EDF), West of England Combined Authority Funding and Council reserves. The outcome of the examination was that all LGF and EDF was already fully committed to high priority schemes. While an allocation of West of England Combined Authority Funding was identified as a potential option, there are issues and constraints with this funding

source. The lead Authority for MetroWest Phase 1 North Somerset Council (within which most of the scheme infrastructure is to be delivered) is not part of the West of England Combined Authority (WECA). WECA comprises of the Bath & North East Somerset, Bristol City and South Gloucestershire Council areas. MetroWest Phase 1 is a cross boundary scheme, and the proportion of the scheme (on a mileage basis) within WECA is relatively modest.

In respect of Council reserves these are very limited due in part to the sustained period of reduction in central Government revenue funding for local Government since 2010. Given the outlook of further reduction in local Government revenue support, no funds are available from Council reserves. Another possible funding source identified was borrowing on the back of Portishead station car park and this could contribute circa £1M. Note this has subsequently been built into North Somerset Councils additional contribution of £5.86M, as set out below.

Having established at an early stage (summer 2017) that it would not be feasible for the Authorities to meet the total funding gap, the Authorities engaged in discussions with the DfT on how the scheme could be funded. The DfT advised that one potential funding mechanism is the Large Local Major Scheme Fund. This fund requires the promoter to provide a local contribution, although the amount is not prescribed, the fund entails a competitive bidding process with a strong focus of decision making on value for money in terms of both the BCR and the limiting the net amount of funding sought from the DfT by the promoters.

In early December 2017 the Authorities increased the local contribution by a further £11,720,000 to £69,533,000 to support a Large Local Major Scheme Fund bid to the DfT. £10,116,057 of the Authorities £69,533,000 budget has been spent on preparation costs prior to the submission of this Outline Business Case, leaving £59,141,943. With the additional £11,720,000 allocated by the Authorities this leaves a net funding gap of £46,929,715 which is being sought from the DfT through a Large Local Major Scheme bid.

This equates to a local contribution of 56% with the remaining 44% being sought from the DfT. Both the scheme cost and indeed the total local contribution is above the DfT's threshold of £59M minimum scheme cost for the WoE (as set out in DfT Guidance) for consideration of Large Local Major Scheme Funding, for schemes which otherwise are too large to be funded locally. The funding sources for the scheme estimated out-turn are shown in Table 5.4. The spend profile for the scheme estimated out-turn is shown in Table 5.5.

Table 5.4 - Scheme Funding Sources

Funding Source		**Sub-total**	**%**
Local Contribution - Post OBC	Cash contributions by the Councils [1]	£1,923,079	-
	Local Growth Funding by WoE LEP	£45,498,864	-
	North Somerset Council - further cash [2]	£5,860,000	-
	West of England Combined Authority - cash [2]	£5,860,000	-
	Sub-total	**£59,141,943**	**56%**
Large Local Major Funding Sought		**£46,929,715**	**44%**
Total Scheme Budget		**£106,071,658**	**100%**

[1] a further sum has been allocated by the Councils for Part 1 Claims and Evaluation & Monitoring Costs
[2] this funding has been allocated to support the Large Local Majors Funding Bid

Table 5.5 - Scheme Spend Profile

Funding Source	2017/18 Q4 Estimated Spend	2018/19 Estimated Spend	2019/20 Estimated Spend	2020/21 Estimated Spend	2021/22 Estimated Spend	Total
Prep Costs - LGF funding	£ 945,434	£ 4,019,034	£ 5,864,340	£ -	£ -	**£ 10,828,808**
Prep Costs - Authority funding:						
Bath & North East Somerset	£ -	£ 120,450	£ 168,012	£ -	£ -	**£ 288,462**
Bristol City	£ -	£ 240,900	£ 336,024	£ -	£ -	**£ 576,924**
North Somerset	£ -	£ 401,500	£ 560,040	£ -	£ -	**£ 961,540**
South Gloucestershire	£ -	£ 40,150	£ 56,004	£ -	£ -	**£ 96,154**
Sub-total Prep Costs - Authority funding	**£ -**	**£ 803,000**	**£ 1,120,079**	**£ -**	**£ -**	**£ 1,923,079**
Construction Costs - LGF funding	£ -	£ -	£ 6,453,695	£ 28,216,361	£ -	**£ 34,670,056**
Construction Costs - Authority funding:						
North Somerset	£ -	£ -	£ -	£ -	£ 5,860,000	£ 5,860,000
West of England Combined Authority	£ -	£ -	£ -	£ -	£ 5,860,000	£ 5,860,000
Sub-total Construction Costs - Authority funding	**£ -**	**£ -**	**£ -**	**£ -**	**£ 11,720,000**	**£ 11,720,000**
Construction Costs - DfT Large Local Major	£ -	£ -	£ -	£ 20,043,239	£ 26,886,476	**£ 46,929,715**
Total	**£ 945,434**	**£ 4,822,034**	**£ 13,438,114**	**£ 48,259,600**	**£ 38,606,476**	**£ 106,071,658**

Note the above spend profile is subject to agreement by the WoE LEP (through approval by the West of England Joint Committee) to amend the profile of LGF funding between years, from the current approved profile. The revised spend profile includes moving of £9.883M of LGF funding from construction to preparation costs, in light of the revised scheme programme. This re-profiling of LGF funding does not change the total spend of £53.4M of LGF by March 2021.

5.5.3 Funding of Operational Costs

The estimated operating costs in the opening year of the scheme total £5,372,299 (see section 5.4 for the detail cost breakdown). The opening year operating costs includes a 19% risk uplift on the base cost estimate provided by Great Western Railways, based on a P50 risk output (see table 5.2). These operating costs in the opening year are largely off-set by forecast farebox revenue of £4,385,000, leaving a net subsidy requirement of £987,099. After the opening year the forecast revenue increases each year such that the train service breaks even in year six. By the end of year 10 the train service is forecast to generate a net surplus of just under £1M per annum, see table 5.6.

Table 5.6 - Estimated Operating Costs and Forecast Revenue

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Scheme Estimated Operating Costs	5,372,299	5,521,040	5,681,070	5,853,201	6,038,333	6,229,970	6,428,363	6,633,772	6,846,466	7,066,728
Scheme Forecast Revenue	£4,385,200	£4,830,408	£5,289,775	£5,627,691	£5,981,376	£6,354,164	£6,746,866	£7,160,311	£7,595,351	£8,052,854
Scheme Net Revenue Position	-£987,099	-£690,632	-£391,295	-£225,510	-£56,956	£124,194	£318,503	£526,540	£748,885	£986,126

The forecast revenue growth arises from growth in forecast passenger demand during the first ten years and into the medium term. This growth in passenger demand is driven by three main factors:

- Ramp up - the forecast passenger trips produced by the Rail Demand Model, refer to the Economic Case chapter 2 for more details, have been manually adjusted (reduced) to take account of the fact that demand for a new train service does not switch on 100% from day one. There is an initial period of typically two or three months for people to adjust to the new service. The financial profiling shown in Table 5.6 has included a ramp up factor based on 90% of the forecast demand in year 1 increasing to 95% in year 2, with year 3 based on 100% of demand.
- Latent demand and personal strategic decision making - the absence of a rail offer on the Portishead corridor has the effect of suppressing total travel on the corridor for all modes,

because of the inherent unreliable journey times by car and by bus into and out of Bristol, this results in latent demand (demand above what would normally be expected from modelling existing trip flows/patterns). This effect can be augmented further by personal strategic decision making after an initial period of operation. For example, a commuter who tries out the new train service in the first few months, switching between a few days a week traveling by train and a few days a week by car, may decide after a few months to sell a car (typically second household car) thereby limiting his/her access to a car and opt for the train every day of the week.

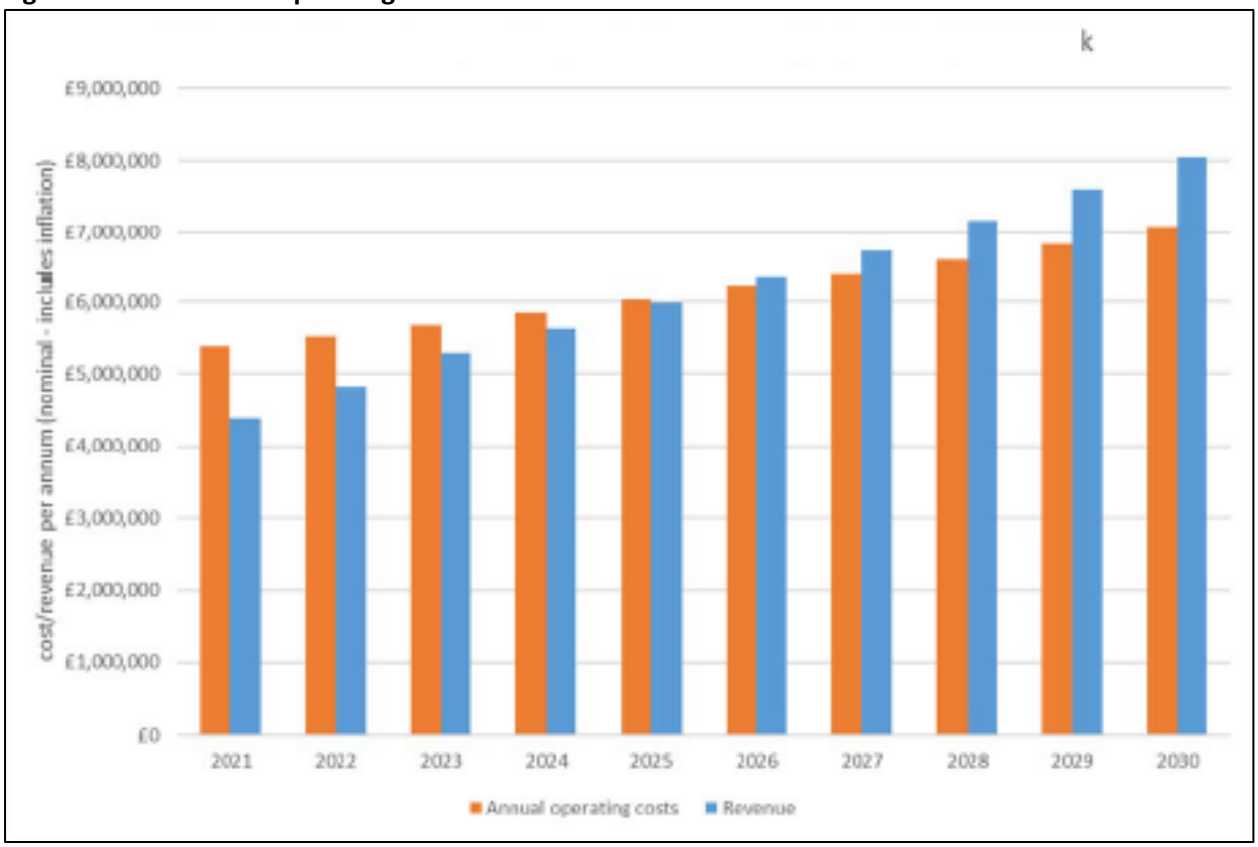
- Underlying growth in rail passenger demand - as set out in the Strategic Case Chapter 1, ORR data shows the ten year growth from 2006/7 to 2015/16 was 63%, averaging 5.6% per annum for all stations in the West of England. This is the main driver of the increase in forecast farebox revenue during the first ten years and into the medium term. Note inflation has been assumed to apply to both fares and operating costs in future years in the financial profile.

Detailed information about the assumptions used for calculation of farebox revenue is set out in the Forecasting Report which is appended to chapter 2 the Economic Case. The fare tariff has been calculated based on a basket of fares which takes into account purchase of season tickets, use of rail cards etc to produce a rate of 26½ pence per mile. Furthermore a number of sensitivity tests have also been undertaken on the scheme revenue profile.

Figure 5.2 illustrates how forecast growth in passenger demand out strips estimated operating costs during the first ten years. The forecast revenue surplus generated by the scheme's train service demonstrates that should the service be included in the Great Western Franchise it would result in a substantial positive financial impact for the franchise. However, this net positive financial impact only arises from the delivery of the scheme infrastructure which is being delivered by the Authorities who are taking all the delivery risk as a third party promoter. Therefore the authorities wish to explore further with the DfT Rail Executive the most appropriate delivery arrangement for the procurement and contractualisation of the train service.

To illustrate this point under the DfT three year rule the Authorities would have to meet the train subsidy costs for the first three years which amounts to an estimated £2.069M. The DfT would then meet the subsidy costs there on. However, this is only needed for two further years and amounts to an estimated £0.282M, after which the scheme generates an annual surplus. By year 10 the revenue surplus amounts to an estimated £1M per annum, rising to £3.9M per annum by year 20 and £7.7M per annum by year 30. Clearly it would not be equitable for the Authorities to have to meet the £2.069M subsidy for the first three years and then forgo a stake in the long term revenue surpluses generated by the scheme.

Figure 5.2 - Estimated Operating Costs and Forecast Revenue



Service Capacity

The operating cost estimate provided by Great Western Railway is based on Class 165/6 trains operating in three car formations. Each three car train has approximately 270 seats and standing capacity for approximately a further 130 people. Figure 5.3 and 5.4 below shows that full standing capacity is not reached within the first ten years of service, however taking account of passenger comfort, an upgrade to 5 car train formations would be likely around year 10.

Note both new stations at Portishead and Pill are to be delivered with 5 car length platforms from the outset, furthermore all the existing station on the Portishead line (Parson Street, Bedminster and Bristol Temple Meads) have 5 car length platforms. The local stations on the Bath Spa to Bristol Line (Keynsham and Oldfield Park) also already have 5 car length platforms. The stations on the Severn Beach Line has a mixture of platform lengths.

Figure 5.3 - Portishead to Bristol TM – Maximum Passengers Per Train 08:00-09:00

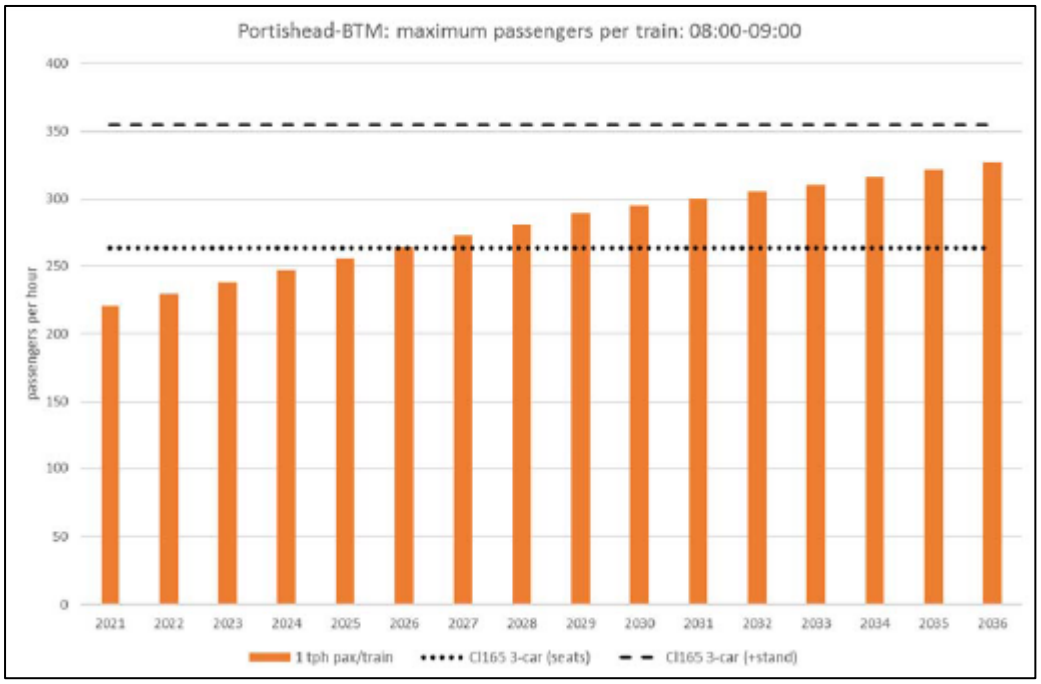
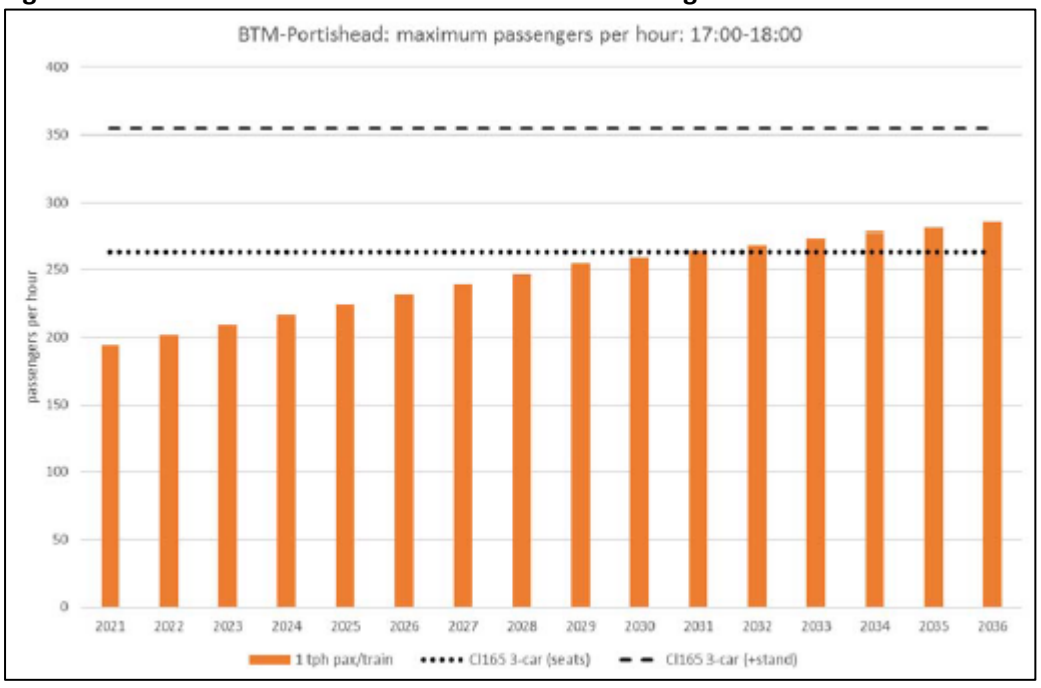


Figure 5.4 - Bristol TM to Portishead – Maximum Passengers Per Train 17:00-18:00

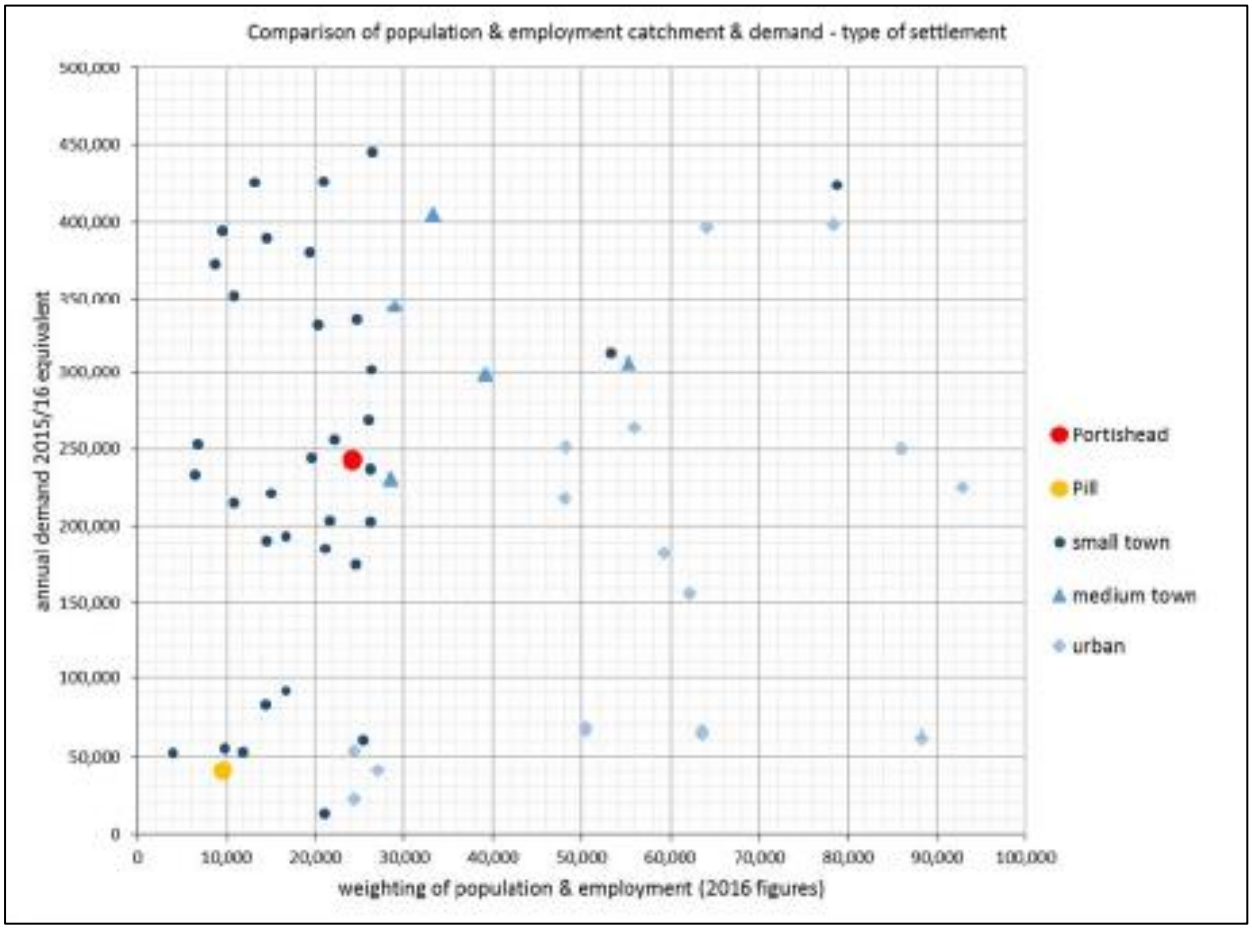


Robustness of the Passenger Demand Forecast

The passenger demand forecast is based on a Rail Demand Model which encompasses three main elements; the Network Rail MORIA model to changes in demand to existing stations, a CH2M gravity demand model for the two new stations and the sub-regional GBATS4 multi-modal model which is being used as a cross check for Network Rail and CH2M model and used to calculate the scheme non-user benefits. Further detail about the Rail Demand Model is set out in the Economic Case chapter 2.

Having built, validated and operated the Rail Demand Model, the model output has been put through a further check to benchmark the results against similar existing stations and their respective passenger volumes. This additional benchmarking provides an extra level of assurance for the Authorities in the robustness of the passenger demand forecasting. The results of the benchmarking illustrated in Figure 5.5 show that the forecast demand for each of the new stations is very comparable with existing peer group stations.

Figure 5.5 - One Train Per Hour Comparator Stations by Location Type



5.5.4 Funding of Long Term Asset Renewal Costs

The scheme infrastructure assets will be transferred to Network Rail at GRIP stage 7. As set out in section 5.4 Network Rail will seek to include the assets within its Regulatory Asset Base (RAB) as part of its periodic (Control Period 7) funding settlement. Aside from on-going maintenance operating costs, there will be a need to renew key assets approximately every 30 years, which typically include track formation and signalling. At part of the RAB these renewal costs will be met by Network Rail.

In respect of the train service, there will be a need for heavy maintenance work to rolling stock every 10-15 years and major rebuild or renew every 30 years. These costs are built into the rolling stock leasing costs which contains both a 'Base Capital' element and a 'Non Base Capital Reserve' element.

5.5.5 Alternative Scheme Funding Approach

Section 5.1.3 demonstrates the MetroWest Phase 1 train service yields a strong financial performance, generating a revenue surplus from year 6 onwards, based on a conservative

operational cost and forecast revenue methodology. Table 5.6 shows that by year 10 the train service is forecast to generate a net surplus of just under £1M per annum. The paragraphs following Table 5.6 explains the context of how forecast growth in passenger demand out strips estimated operating costs during the first ten years.

Financial profiles have been undertaken over a 30 and 60 year period, using a range of assumptions and sensitivity tests. The profiles in Table 5.7 are based on a more conservative approach to operating costs that assumes all the quantified operational cost risks arise all together. In other words the combined total of the operational cost risks (which is £1.72M) has been applied to the base operational cost estimated provided by GWR (of £4.430M), giving a total (risk adjusted) estimated operating cost in the opening year of £5.290M. This more cautious approach has be taken to provide a higher level of certainty for decision makers. It can be seen from Table 5.7 that the trend of growth in passenger demand outstripping operating costs, continues into the medium to long term. By year 20 the revenue surplus is £3.9M per annum and by year 30 the revenue surplus is £7.7M per annum.

Given the considerable revenue generated by the scheme, it may be feasible to establish a funding mechanism where the Authorities borrow against these future revenues to fund the cost of delivering the scheme. This approach was used to fund Worcester Parkway station and was deemed a successful approach for potential replication for other third party rail schemes. The approach is however dependent upon the borrower having certainty over the whole borrowing period of a dependable income stream. For Worcester Parkway station scheme the approach used by the DfT Rail Executive entailed setting up a station access payment to Worcestershire County Council (the promoter) that guaranteed an annual payment in return for delivering the new station and operating the new station over a 30 year period. The farebox revenue collected for trips to and from the station was then fed back to the DfT Rail Executive.

Such an arrangement needs to be commercially attractive to the promoter who is taking all the risk for delivering the scheme, while also giving value for money to the DfT Rail Executive. Our initial calculations indicate that the scheme revenue surpluses could make a contribution towards the scheme capital funding gap, via a borrowing arrangement.

Table 5.7 - Scheme Indicative Revenue Profile Over 60 Years (based on Full Operating Cost Risks)

		INITIAL PROFILE			NO real terms increases in fares			NO real terms increases in wages		
60 min PHD		Demand growth:	main profile		Demand growth:	main profile		Demand growth:	main profile	
100% RISK		Ticket price policy:	real terms incr.		Ticket price policy:	NO increases		Ticket price policy:	real terms incr.	
		Inflation assumption:	WebTAG		Inflation assumption:	WebTAG		Inflation assumption:	WebTAG	
		Real earnings:	real terms incr.		Real earnings:	real terms incr.		Real earnings:	NO increases	
		Revenue	Operating costs	NET (rev - op)	Revenue	Operating costs	NET (rev - op)	Revenue	Operating costs	NET (rev - op)
	TOTAL	£1,645,541,018	£1,037,485,429	£608,055,589	£1,118,997,661	£1,037,485,429	£81,512,232	£1,645,541,018	£710,033,672	£935,507,346
	total inc. mobilisation	£1,645,541,018	£1,039,828,661	£605,712,357	£1,118,997,661	£1,039,828,661	£79,169,000	£1,645,541,018	£712,329,802	£933,211,216
	Year	Revenue	Operating costs	NET (rev - op)	Revenue	Operating costs	NET (rev - op)	Revenue	Operating costs	NET (rev - op)
mobilisation	2017	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -
mobilisation	2018	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -
mobilisation	2019	£ -	£440,383	-£440,383	£ -	£440,383	-£440,383	£ -	£431,244	-£431,244
mobilisation	2020	£ -	£1,902,849	-£1,902,849	£ -	£1,902,849	-£1,902,849	£ -	£1,864,886	-£1,864,886
1	2021	£4,447,009	£5,770,907	-£1,323,898	£4,447,009	£5,770,907	-£1,323,898	£4,447,009	£5,657,526	-£1,210,517
2	2022	£4,900,844	£5,921,763	-£1,020,919	£4,853,811	£5,921,763	-£1,067,952	£4,900,844	£5,766,018	-£865,174
3	2023	£5,369,486	£6,084,110	-£714,623	£5,266,895	£6,084,110	-£817,214	£5,369,486	£5,882,102	-£512,616
4	2024	£5,715,240	£6,258,704	-£543,464	£5,552,191	£6,258,704	-£706,513	£5,715,240	£6,006,145	-£290,905
5	2025	£6,077,348	£6,446,376	-£369,028	£5,847,226	£6,446,376	-£599,150	£6,077,348	£6,138,546	-£61,198
6	2026	£6,456,117	£6,648,035	-£191,917	£6,151,926	£6,648,035	-£496,109	£6,456,117	£6,279,732	£176,385
7	2027	£6,855,120	£6,856,603	-£1,484	£6,469,320	£6,856,603	-£387,284	£6,855,120	£6,424,166	£430,954
8	2028	£7,275,199	£7,072,338	£202,862	£6,799,740	£7,072,338	-£272,597	£7,275,199	£6,571,922	£703,277
9	2029	£7,717,219	£7,295,503	£421,716	£7,143,518	£7,295,503	-£151,985	£7,717,219	£6,723,076	£994,143
10	2030	£8,182,063	£7,526,376	£655,687	£7,500,980	£7,526,376	-£25,396	£8,182,063	£6,877,707	£1,304,356
11	2031	£8,670,630	£7,765,242	£905,388	£7,872,447	£7,765,242	£107,205	£8,670,630	£7,035,894	£1,634,736
12	2032	£9,183,840	£8,012,401	£1,171,439	£8,258,236	£8,012,401	£245,835	£9,183,840	£7,197,720	£1,986,120
13	2033	£9,722,628	£8,268,161	£1,454,466	£8,658,657	£8,268,161	£390,495	£9,722,628	£7,363,267	£2,359,360
14	2034	£10,287,944	£8,532,846	£1,755,098	£9,074,012	£8,532,846	£541,166	£10,287,944	£7,532,623	£2,755,321
15	2035	£10,880,754	£8,806,788	£2,073,965	£9,504,595	£8,806,788	£697,807	£10,880,754	£7,705,873	£3,174,881
16	2036	£11,502,037	£9,090,337	£2,411,699	£9,950,692	£9,090,337	£860,354	£11,502,037	£7,883,108	£3,618,929
17	2037	£12,152,784	£9,383,854	£2,768,930	£10,412,576	£9,383,854	£1,028,722	£12,152,784	£8,064,419	£4,088,365
18	2038	£12,833,998	£9,687,715	£3,146,283	£10,890,511	£9,687,715	£1,202,797	£12,833,998	£8,249,901	£4,584,097
19	2039	£13,546,691	£10,002,310	£3,544,381	£11,384,747	£10,002,310	£1,382,437	£13,546,691	£8,439,649	£5,107,042
20	2040	£14,291,882	£10,328,046	£3,963,835	£11,895,521	£10,328,046	£1,567,475	£14,291,882	£8,633,761	£5,658,121
21	2041	£15,070,596	£10,665,346	£4,405,251	£12,423,055	£10,665,346	£1,757,709	£15,070,596	£8,832,337	£6,238,259
22	2042	£15,883,866	£11,014,647	£4,869,218	£12,967,553	£11,014,647	£1,952,906	£15,883,866	£9,035,481	£6,848,385
23	2043	£16,732,722	£11,376,408	£5,356,313	£13,529,206	£11,376,408	£2,152,798	£16,732,722	£9,243,297	£7,489,425
24	2044	£17,402,031	£11,751,103	£5,650,927	£13,935,082	£11,751,103	£2,183,979	£17,402,031	£9,455,893	£7,946,138
25	2045	£18,098,112	£12,139,226	£5,958,886	£14,353,135	£12,139,226	£2,213,909	£18,098,112	£9,673,378	£8,424,734
26	2046	£18,822,036	£12,541,290	£6,280,746	£14,783,729	£12,541,290	£2,242,439	£18,822,036	£9,895,866	£8,926,170
27	2047	£19,574,918	£12,957,830	£6,617,088	£15,227,241	£12,957,830	£2,269,411	£19,574,918	£10,123,471	£9,451,447
28	2048	£20,357,915	£13,389,400	£6,968,515	£15,684,058	£13,389,400	£2,294,658	£20,357,915	£10,356,311	£10,001,604
29	2049	£21,172,231	£13,836,578	£7,335,653	£16,154,580	£13,836,578	£2,318,002	£21,172,231	£10,594,506	£10,577,725
30	2050	£22,019,120	£14,299,965	£7,719,155	£16,639,217	£14,299,965	£2,339,252	£22,019,120	£10,838,180	£11,180,941
31	2051	£22,899,885	£14,780,186	£8,119,699	£17,138,394	£14,780,186	£2,358,207	£22,899,885	£11,087,458	£11,812,427
32	2052	£23,815,881	£15,277,891	£8,537,989	£17,652,545	£15,277,891	£2,374,654	£23,815,881	£11,342,469	£12,473,411
33	2053	£24,768,516	£15,793,757	£8,974,759	£18,182,122	£15,793,757	£2,388,365	£24,768,516	£11,603,346	£13,165,170
34	2054	£25,759,257	£16,328,485	£9,430,772	£18,727,585	£16,328,485	£2,399,100	£25,759,257	£11,870,223	£13,889,033
35	2055	£26,789,627	£16,882,808	£9,906,818	£19,289,413	£16,882,808	£2,406,605	£26,789,627	£12,143,238	£14,646,389
36	2056	£27,861,212	£17,457,488	£10,403,724	£19,868,095	£17,457,488	£2,410,607	£27,861,212	£12,422,533	£15,438,679
37	2057	£28,975,660	£18,053,315	£10,922,345	£20,464,138	£18,053,315	£2,410,823	£28,975,660	£12,708,251	£16,267,409
38	2058	£30,134,687	£18,671,114	£11,463,572	£21,078,062	£18,671,114	£2,406,948	£30,134,687	£13,000,541	£17,134,146
39	2059	£31,340,074	£19,311,743	£12,028,332	£21,710,404	£19,311,743	£2,398,662	£31,340,074	£13,299,553	£18,040,521
40	2060	£32,593,677	£19,976,091	£12,617,586	£22,361,716	£19,976,091	£2,385,625	£32,593,677	£13,605,443	£18,988,234
41	2061	£33,897,424	£20,665,089	£13,232,335	£23,032,568	£20,665,089	£2,367,479	£33,897,424	£13,918,368	£19,979,056
42	2062	£35,253,321	£21,379,701	£13,873,620	£23,723,545	£21,379,701	£2,343,844	£35,253,321	£14,238,491	£21,014,831
43	2063	£36,663,454	£22,120,932	£14,542,522	£24,435,251	£22,120,932	£2,314,319	£36,663,454	£14,565,976	£22,097,478
44	2064	£38,129,992	£22,889,827	£15,240,165	£25,168,309	£22,889,827	£2,278,482	£38,129,992	£14,900,993	£23,228,999
45	2065	£39,655,192	£23,687,475	£15,967,717	£25,923,358	£23,687,475	£2,235,883	£39,655,192	£15,243,716	£24,411,476
46	2066	£41,241,400	£24,515,008	£16,726,392	£26,701,059	£24,515,008	£2,186,051	£41,241,400	£15,594,322	£25,647,078
47	2067	£42,891,056	£25,373,603	£17,517,452	£27,502,090	£25,373,603	£2,128,487	£42,891,056	£15,952,991	£26,938,065
48	2068	£44,606,698	£26,264,489	£18,342,209	£28,327,153	£26,264,489	£2,062,664	£44,606,698	£16,319,910	£28,286,788
49	2069	£46,390,966	£27,188,940	£19,202,026	£29,176,968	£27,188,940	£1,988,028	£46,390,966	£16,695,268	£29,695,698
50	2070	£48,246,604	£28,148,285	£20,098,320	£30,052,277	£28,148,285	£1,903,992	£48,246,604	£17,079,259	£31,167,346
51	2071	£50,176,469	£29,143,907	£21,032,562	£30,953,845	£29,143,907	£1,809,938	£50,176,469	£17,472,082	£32,704,387
52	2072	£52,183,527	£30,177,244	£22,006,283	£31,882,460	£30,177,244	£1,705,216	£52,183,527	£17,873,940	£34,309,588
53	2073	£54,270,868	£31,249,796	£23,021,073	£32,838,934	£31,249,796	£1,589,139	£54,270,868	£18,285,040	£35,985,828
54	2074	£56,441,703	£32,363,120	£24,078,583	£33,824,102	£32,363,120	£1,460,982	£56,441,703	£18,705,596	£37,736,107
55	2075	£58,699,371	£33,518,840	£25,180,531	£34,838,825	£33,518,840	£1,319,985	£58,699,371	£19,135,825	£39,563,546
56	2076	£61,047,346	£34,718,646	£26,328,700	£35,883,990	£34,718,646	£1,165,344	£61,047,346	£19,575,949	£41,471,397
57	2077	£63,489,240	£35,964,296	£27,524,944	£36,960,510	£35,964,296	£996,214	£63,489,240	£20,026,196	£43,463,044
58	2078	£66,028,810	£37,257,621	£28,771,189	£38,069,325	£37,257,621	£811,704	£66,028,810	£20,486,798	£45,542,011
59	2079	£68,669,962	£38,600,527	£30,069,435	£39,211,405	£38,600,527	£610,878	£68,669,962	£20,957,995	£47,711,967
60	2080	£71,416,760	£39,994,999	£31,421,762	£40,387,747	£39,994,999	£392,748	£71,416,760	£21,440,028	£49,976,732

5.6 Summary of Financial Case

In summary:

- a robust approach has been taken to understanding and estimating the costs of the scheme
- a QCRA has been undertaken based on the GRIP3 AIP design with a P80 output which has informed the GRIP 3 estimated capital out-turn cost
- the estimated capital out-turn cost has been subject to an independent cost estimation review
- the scheme operating costs have been informed by input from Great Western Railways and Network Rail
- the Authorities have already increased their contribution to the scheme delivery costs to £69.5M, including the cost of work to date of £10.1M, leaving a net capital funding gap of £46.9M
- the MetroWest Phase 1 train service yields a strong financial performance, generating a revenue surplus from year 6 onwards, based on a conservative operational cost and forecast revenue methodology.
- by year 10 the train service is forecast to generate a net surplus of just under £1M per annum.
- a robust approach has been taken to forecast passenger demand including bench marking to check how the forecast output compares against similar existing peer group stations
- the forecast scheme revenue profile shows the scheme would result in a substantial positive financial impact for the Great Western franchise and this would continue into the long term over a 60 year period.
- there are options for the DfT Rail Executive to consider in respect of the contractualisation of the MetroWest Phase 1 train service, taking into account that the forecast scheme revenue only arises from the delivery of the scheme infrastructure for which the Authorities are taking all the delivery risk.