



MetroWest

Phase 2 Preliminary Business Case

July 2015

travelwest 

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

Document History

MetroWest Phase 2

Preliminary (Strategic Outline) Business Case

West of England Authorities

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- Appendix C – Socio-economic Appraisal Report, Network Rail
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Supporting Documentation

- Supporting Document 1 – South Bristol Link Data Collection Report, April 2013
- Supporting Document 2 – South Bristol Link HAM Validation Report, April 2013
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Acronyms and Abbreviations

AQMAs	Air quality monitoring and air quality management areas
B&NES	Bath & North East Somerset Council
BCC	Bristol City Council
BCR	Benefit to Cost Ratio
CCTV	Closed-circuit television
CP5	Control period 5 – 2014 -2019
CO2	Carbon dioxide
DCO	Development Consent Order
DDA	Disability Discrimination Act
DFT	Department for Transport
DMRB	Design Manual for Roads and Bridges
EIA	Environmental Impact Assessment
EU	European Union
FGW	First Great Western
GBATS3	Greater Bristol Area Transport Study Model
GRIP	Governance for Railway Infrastructure Projects
GVA	Gross Value Added
IDB	Internal Drainage Board
IMD	Indices of Multiple Deprivation
JLTP	Joint Local Transport Plan
JSA	Job-seekers allowance
LDF	Local Development Framework
LEP	Local Enterprise Partnership
NMU	Non-motorised users
NO ₂	Nitrogen dioxide
NPV	Net Present Value
NR	Network Rail
NSC	North Somerset Council
OBC	Outline Business Case
OHLE	Overhead line electrification
ORR	Office of Rail and Road
OS	Ordnance Survey
PM10	Particulate matter
SEP	Strategic Economic Plan
SGC	South Gloucestershire Council
SSSI	Site of Special Scientific Interest
TAG	Transport Appraisal Guidance
TOC	Train operating company
TQEZ	Temple Quarter Enterprise Zone
WOE	West of England

Executive Summary

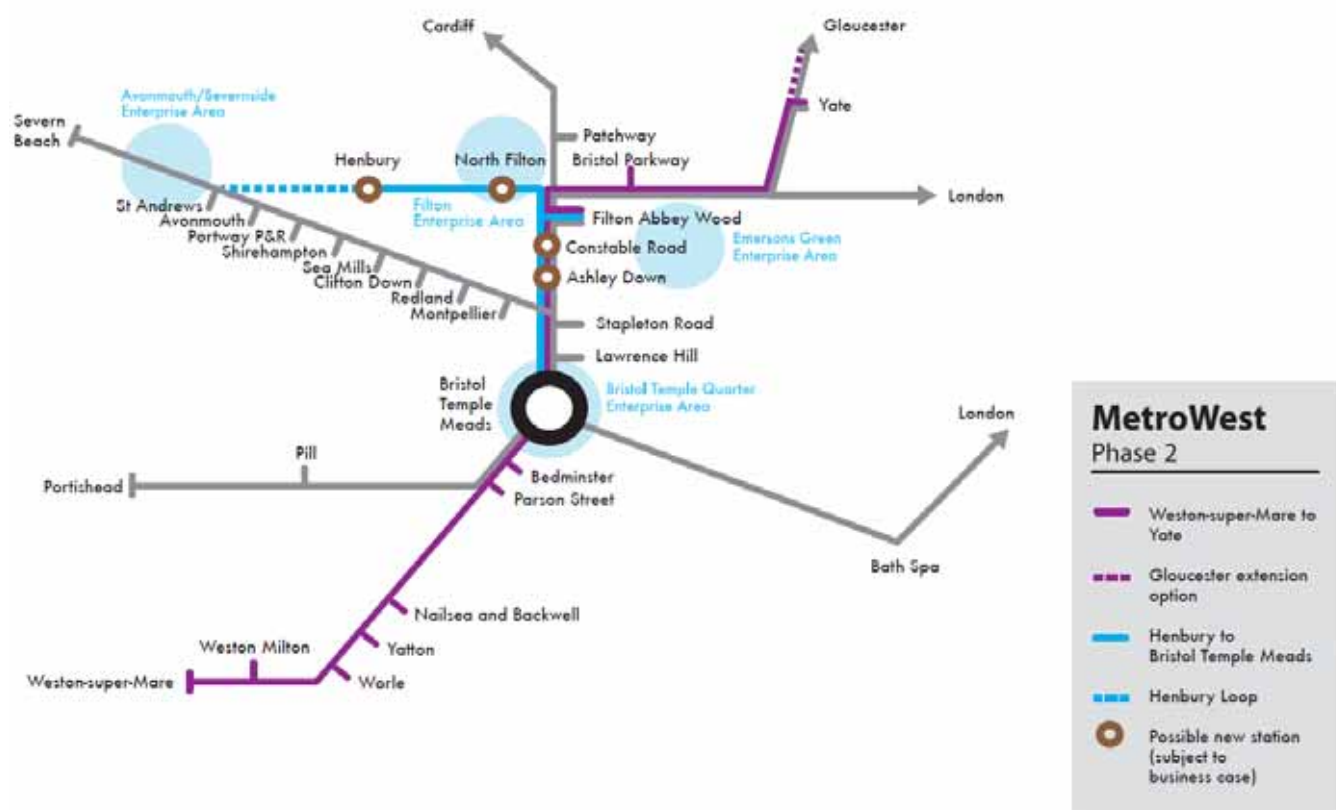
What is MetroWest Phase 2?

MetroWest Phase 2 is an ambitious programme to improve local rail services across the West of England. MetroWest includes relatively major schemes (entailing both infrastructure and service enhancement) to smaller scale schemes. MetroWest is being jointly promoted and developed by the four West of England councils (Bath & North East Somerset, Bristol City, North Somerset and South Gloucestershire Councils).

The MetroWest programme will help address the core issue of transport network resilience, through targeted investment to increase both the capacity and accessibility of the local rail network. The MetroWest concept is to deliver an enhanced local rail offer for the City Region comprising:

- Existing and disused rail corridors feeding into Bristol
- Broadly half-hourly service frequency (with some variations possible)
- Cross-Bristol service patterns (i.e. Bath to Severn Beach)
- A Metro-type service appropriate for a city region of 1 million population

MetroWest is being delivered in phases; MetroWest Phase 2 offers an hourly service for the re-opened Henbury line with stations at Henbury and North Filton and along the Filton Bank coupled with a half-hourly service for the Yate to Bristol line, as illustrated below:



Phase 2 does not include the reopening of the Portishead Line and half hourly services on the Severn Beach Line and local stations to Bath Spa which are all part of Phase 1. Neither does it include the New Stations Package for Ashton Gate, Salford and Corsham, Portway Platform and long term aspirations for a park and ride station at Bathampton.

The City Region's population is expected to exceed 1.1 million by 2026. Planning for this growth means the City Region needs to make sure that its transport infrastructure is not only fit for purpose, but has the ability to respond to increasing demand and therefore maximise potential for economic growth.

MetroWest Phase 2 will play a key role in supporting economic and housing growth including the new Cribbs Patchway New Neighbourhood, enterprise areas and the Temple Quarter Enterprise Zone.

The Preliminary Business Case

The Department for Transport has set out guidance on developing a transport business case. The recommended approach shows whether a scheme:

- Is supported by a robust case for change that fits with wider policy objectives – the ‘strategic case’
- Demonstrates value for money – the ‘economic case’
- Is commercially viable – the ‘commercial case’
- Is financially affordable – the ‘financial case’
- Is achievable – the ‘management case’

This Preliminary Business Case, is the first of three business cases that consider the elements above. Subsequent Outline and Full Business Cases, will update the information presented within this document with more refined assessment based on a more detailed scheme.

MetroWest Phase 2 Option development

As part of the development of this Preliminary Business Case, a number of standalone options that could potentially be part of MetroWest Phase 2 were assessed using the Department for Transport’s Early Assessment Sifting Tool (EAST). The aim of this exercise was to draw out options that would realistically not meet all of the above five cases.

The assessment concluded that some options should not be developed, such as timetables involving short turnaround times at either Yate or Gloucester, which would pose a risk to the service, network and reliability. Also, the Filton Bank four tracking scheme will include track cross-overs south of Filton Abbey Wood, which would prevent the development of a station at Horfield (Bonnington Walk); however, an alternative site has been identified at Constable Road.

The preliminary assessments identified that service enhancements at Weston Milton would be best delivered outwith Phase 2; these will be promoted by North Somerset Council.

Preliminary Business Case Scheme Options

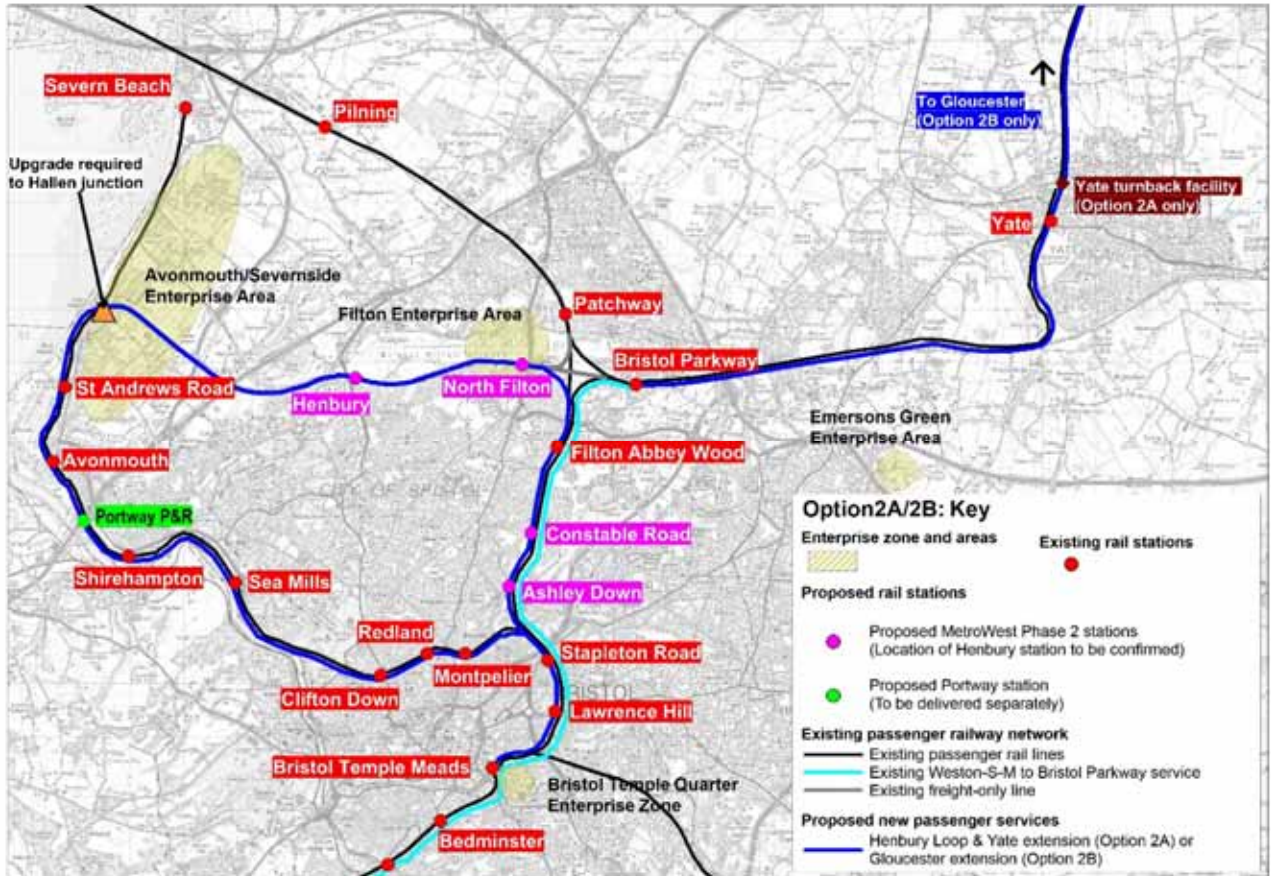
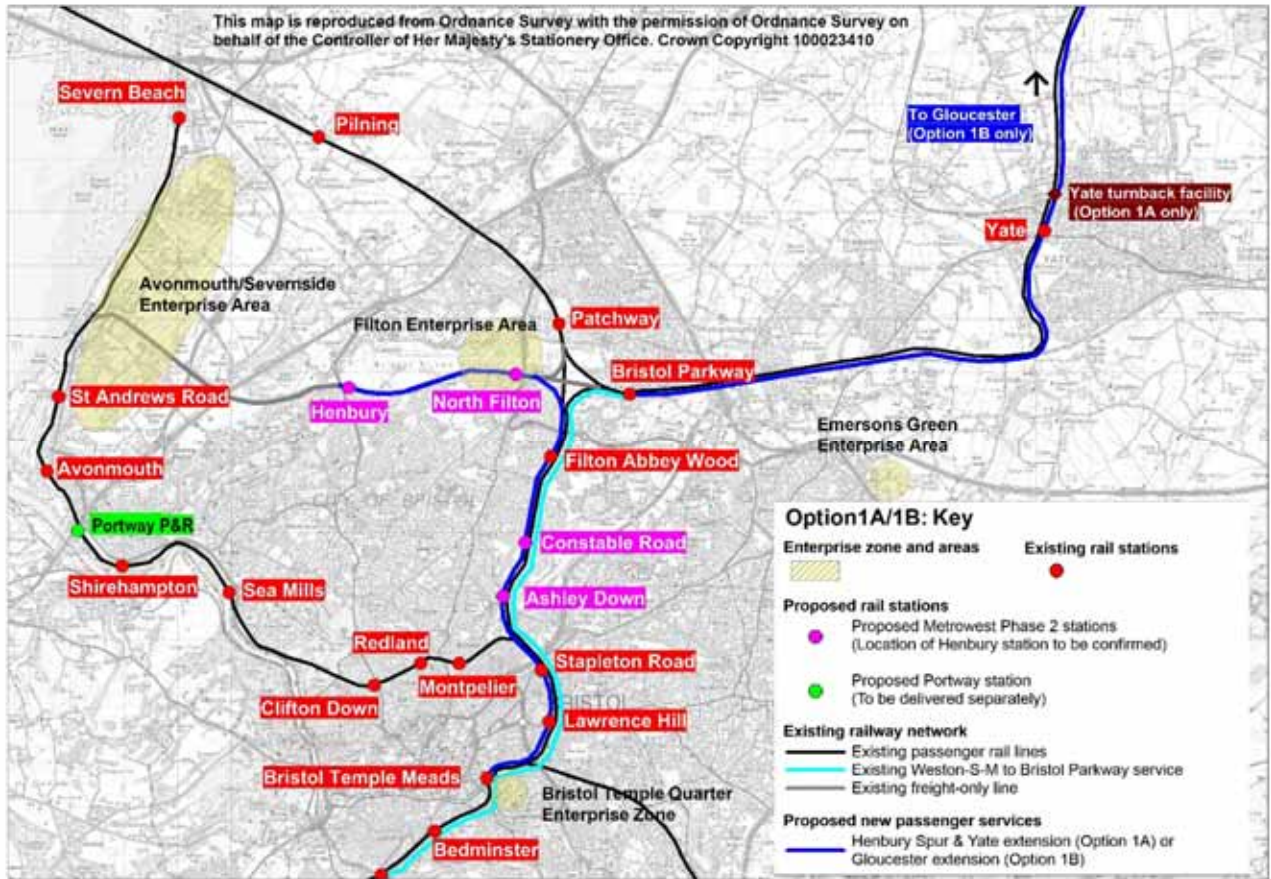
Following this assessment, the standalone options were packaged together to form four options for MetroWest Phase 2 as follows (note that for all options, the location of a new station at Henbury could be on either a new site east of the A4018 or the old site west of the A4018):

Option 1a: Henbury Spur, Yate Extension

- Bristol Temple Meads to Henbury: 1 train per hour (tph) all day
- Extension of existing Weston-Super-Mare to Bristol Parkway service to Yate
- New stations on Filton Bank (Ashley Down and Constable Road)
- New stations at North Filton, Henbury
- Turnback at Yate

Option 1b: Henbury Spur, Gloucester Extension

- Bristol Temple Meads to Henbury: 1 train per hour (tph) all day
- Extension of existing Weston-Super-Mare to Bristol Parkway service to Gloucester
- New stations on Filton Bank (Ashley Down and Constable Road)
- New stations at North Filton, Henbury



Option 2a: Henbury Loop, Yate Extension

- Bristol Temple Meads to Henbury: 1 train per hour (tph) all day via Filton Bank and Avonmouth (clockwise and anti-clockwise directions)
- Extension of existing Weston-Super-Mare to Bristol Parkway service to Yate
- New stations on Filton Bank (Ashley Down and Constable Road)
- New stations at North Filton, Henbury
- Turnback at Yate

Option 2b: Henbury Loop, Gloucester Extension

- Bristol Temple Meads to Henbury: 1 train per hour (tph) all day via Filton Bank and Avonmouth (clockwise and anti-clockwise directions)
- Extension of existing Weston-Super-Mare to Bristol Parkway service to Gloucester
- New stations on Filton Bank (Ashley Down and Constable Road)
- New stations at North Filton, Henbury

Network capacity

Components of all four options have been subject to capability analysis undertaken by Network Rail. Given four-tracking of Filton Bank, improvements to the Bristol East Junction and some further bespoke infrastructure improvements, it was found that all options can be achieved without adversely affecting other passenger and freight services (existing and expected post-electrification), although the amount of bespoke improvement required, and degree to which operating risks can be alleviated, varies.

The Henbury Spur options would have fewer impacts in capacity terms and therefore pose less of a performance risk than the Henbury Loop option. The Henbury Spur options also have a lower operational cost as fewer units are needed to form a timetable compliant with the local operating environment.

The Henbury Spur options would require a bay platform at Henbury and a crossover to enable correct line running between North Filton Station and Henbury Station.

The Henbury Loop options would require doubling of the Hallen Marsh junction (between the Severn Beach Line and the Henbury Line).

The Henbury Loop would have an adverse impact on vehicular traffic to/from Avonmouth Docks at St. Andrews Level Crossing; the Bristol Port Company has commissioned a bespoke GRIP2 study into grade-separating road and rail at this location.

An additional train path to either Yate or Gloucester has been identified. Given the constrained nature of Westerleigh junction, this path is effectively fixed, which in turn defines the requisite train unit and infrastructure requirements.

The capability analysis identified that a number of additional train units are needed to operate the new services, on top of those that would be in use once MetroWest Phase 1 is implemented. The number of units required for each of the options is as follows:

Additional train units required

	Option 1a Henbury Spur, Yate Extension	Option 1b Henbury Spur, Gloucester Extension	Option 2a Henbury Loop, Yate Extension	Option 2b Henbury Loop, Gloucester Extension
Henbury services	1	1	3	3
Yate/Gloucester services	1	2	1	2
Totals	2	3	4	5

The Strategic Case for MetroWest Phase 2

MetroWest Phase 2 has a strong strategic case. The scheme addresses a number of genuine, evidenced problems relating to congestion, resilience and accessibility and the impacts these have on economic growth. If MetroWest Phase 2 is not delivered, these problems would continue and would ultimately prejudice the economic potential of the City Region.

MetroWest Phase 2 has a clear business strategy that is closely aligned with the strategic aims of the four West of England authorities, the Local Enterprise Partnership and Network Rail. It seeks to build on the enhancements offered by MetroWest Phase 1 by further developing a truly 'Metro' level of service for the West of England local rail network and an integrated approach for the public.

The scheme is highly aligned with the business objectives of the rail industry and will build upon the programme of CP5 investment planned for the Western route. This will further extend the benefits of CP5 across the rail network to the wider population and yield economic growth.

The scheme is well-aligned with the business objectives of the rail industry and will build upon the programme of CP5 investment planned for the Western route. Phase 2 would further extend the benefits of CP5 and Phase 1 improvements to a wider population and economic centres.

The scheme has clear objectives that directly address the problems identified and are aligned with the objectives of the JLTP, the various spatial planning policies, and the vision and objectives of the LEP. The MetroWest Phase 2 principal business objectives are:

- To support economic growth, through enhancing the transport links to the Filton Enterprise Area, North Fringe, Yate, Temple Quay Enterprise Zone and Bristol City Centre.
- To deliver a more resilient transport offer, providing more attractive and guaranteed (future proofed) journey times for commuters, business and residents in the area, through better utilisation of strategic heavy rail corridors from Yate and Henbury.
- To improve accessibility to the rail network with new and re-opened rail stations and improved service frequencies.
- To make a positive contribution to social well-being, life opportunities and improving quality of life (along the affected corridors in particular).

The MetroWest Phase 2 supporting objectives are:

- To mitigate transport congestion in the North Fringe and Yate corridor.
- To enhance the carrying capacity of the local rail network.
- To reduce the adverse environmental impacts of the local transport network as a whole.

MetroWest Phase 2 has scheme options which demonstrate 'high' value for money

The modelling and appraisal work undertaken for this Preliminary Business Case is considered sufficiently robust enough to enable decisions to be made to continue progress towards the Outline Business Case stage. The initial analysis takes a TAG approach and includes consideration of:

- Planned housing and employment growth
- Background increases in rail demand
- Rail user benefits for new and existing passengers
- Highway congestion benefits
- Wider impacts are also estimated

The approach:

- Excludes fare revisions to the Severn Beach Line (to bring them in-line with standard fares)
- Excludes the full extent of additional demand and revenue arising from the Temple Quarter Enterprise Zone and Arena
- Does not include the effects of potential mode share changes that could follow implementation of Bristol City residents parking scheme

The assessment work presented in the economic case shows that there is a clear case for the options that include the Henbury Spur (Options 1a and 1b). These scheme options demonstrate 'medium' value for money, largely due to the rail user benefits of the scheme¹. When wider impacts are included, the Henbury Spur Options offer 'high' value for money.

The options that include the Henbury Loop (Options 2a and 2b) have 'poor' value for money ('low' value for money when wider impacts are included). The Henbury Loop options provide slightly better accessibility benefits, but this would not result in large increases in rail or highway user benefits and do not compensate for the increased operating costs of the Loop. The Preliminary Business Case economic indicators for the scheme are:

- Option 1a: Henbury Spur + Yate. NPV = £48.63 million, Initial BCR = 1.90, Adjusted BCR (with Wider Impacts) = 2.50 Value for Money Medium (High, with Wider Impacts)
- Option 1b: Henbury Spur + Gloucester. NPV = £45.36 million, Initial BCR = 1.58, Adjusted BCR (with Wider Impacts) = 2.03 Value for Money Medium (High, with Wider Impacts)
- Option 2a: Henbury Loop + Yate : NPV = -£7.99 million, Initial BCR = 0.93, Adjusted BCR (with Wider Impacts) = 1.23 Value for Money Poor (Low, with Wider Impacts)
- Option 2b: Henbury Loop + Gloucester: NPV = -£9.83million, Initial BCR = 0.93, Adjusted BCR (with Wider Impacts) = 1.19 Value for Money Poor (Low, with Wider Impacts)
- The rail transport user benefits account for around 70% of the total benefits, when wider impacts are not included and 55% of the total benefits, when wider impacts are included. Other benefits include:
 - Highway transport user benefits
 - Wider impacts (as outlined in the DfT TAG guidance which includes wider economic benefits)
- The most significant cost differences between the options relate to the operational costs, which is a product of the number of train units that will be required

The key risks, sensitivities and uncertainties underlying the appraisal are:

- Rail demand forecasts, the pace of future growth in demand at new and existing stations (particularly from the CPNN development)
- Capital and operating costs
- Future year fare assumptions
- Age of data in the GBATS3 transport model

These will be refined and updated in the Outline Business Case (although the relative performance of options would not change).

The West of England - Devolution of Local Major Transport Schemes - Local Transport Body Assurance Framework, December 2014 states that "Schemes which come forward for funding will represent 'high'

¹ Value for Money categories are as follows: High- where benefits are at least double the costs; Medium- where benefits are between 1.5 and 2 times costs; Low- where benefits are between 1 and 1.5 times costs; and Poor- where benefits are less than costs.

value for money (Benefit to Cost Ratio greater than 2:1) at each approval stage, therefore options that offer Low value for money should not proceed to the next stage of the project development.

The economic case for all options are sensitive to operating cost assumptions and rail demand forecasts, in particular future year growth in demand at new and existing stations. Further development of the scheme is likely to change the BCR, and given some BCRs are just within the high value for money category, there is a risk that the Outline Business Case work shows the scheme offers moderate value for money.

MetroWest Phase 2 is commercially viable

The procurement opportunities are follows:

- Scheme preparation stage. Use of Network Rail, framework consultants and council officers to develop the scheme to start of construction.
- Scheme construction stage. Combined GRIP 5-8 design & build contract(s) procured by Network Rail.
- Scheme operations stage. This stage involves three options for the procurement of the train operator and train service. The preferred option is procurement via DfT Rail and eventually the base franchise specification. Through the Direct Award First Great Western (FGW) is committed to working with the West of England Partnership and other bodies to deliver MetroWest and secure suitable rolling stock for the new services. Inclusion in the base franchise specification will be dependent on a strong financial case.

MetroWest Phase 2 scheme funding

A summary of the scheme capital costs and revenue support is shown the table below.

Summary of the scheme capital costs and revenue support

Scheme	A. Yate Turn-back	B. Glos Turn-back	
1. Henbury Spur	£60.2	£56.6	Capital
	£3.7	£7.6	Revenue Support
	£63.9	£64.2	Total
2. Henbury Loop	£65.4	£61.8	Capital
	£10.2	£14.2	Revenue Support
	£75.6	£76.0	Total

The outturn costs for all four options exceed the existing budget of £43m; options including the Spur are around £21m over-budget, options including the Loop more than £33m over budget.

MetroWest Phase 2 is deliverable

The Management Case demonstrates that Spur-based options of MetroWest Phase 2 is deliverable. The Loop-based options do not offer value for money and may not quality for DfT funding.

The GRIP 2 report stated, 'in summary, for passenger services to operate to Henbury Network Rail would recommend the spur service option is taken forward to GRIP 3 as this option imports less risk to train performance and less complex infrastructure intervention.'

Further work will be required to consider:

- Mitigating platform gradients that are greater than 1:500
- Track and signaling design
- Train performance and network capacity of having new stations on Filton Bank

Westerleigh Junction is a known capacity pinchpoint on the local rail network. There will be one spare path across Westerleigh Junction in 2019 which would be required for the MetroWest Phase 2 project. Possible competition for the remaining path is a risk to the project.

The Councils have a proven track record in the delivery of major transport schemes and have the resource, capability and processes required to deliver MetroWest Phase 2 successfully, to time and budget. The Councils already have strong delivery partnerships with Network Rail and the train operating companies, developed over many years and resulting in mature relationships.

The emerging consenting strategy will be developed further as part of the Outline Business Case. Network Rail has permitted development rights for changes to tracks and signalling on operational railways, these do not extend to new stations. The working assumption for MetroWest Phase 2 is that planning permission and/or Transport and Works Act Order(s) would be needed for the new stations. For the Henbury line stations, further work will be required to secure third party land as required primarily by negotiation although compulsory purchase orders may be required.

The capacity exists to deliver the Phase 2 service specification in a number of different ways. This means that the factors used to shape the final timetable can be a balance of inherent performance risk, desired connectivity and operational and capital cost assessments. The Henbury Loop Options present a much higher risk railway operational risk than the Henbury Spur Options.

The Councils have a developed collaborative working arrangements with rail industry partners. There is a strong local governance structure and framework to steer the project and provide accountability to elected representatives and funding partners.

There is a long history of public interest and support for the scheme.

Option 1a_x Henbury Spur + Yate, without Constable Road station

The financial assessment of all four options (1a, 1b, 2a and 2b) exceed the proposed budget. Work has been undertaken to determine whether an alternative option, based on one of the existing options, could achieve the desired benefits of MetroWest Phase 2 and cost less to deliver.

The scheme components costs were reviewed, and Constable Road station is the only single scheme component that could be removed to bring within the project budget, whilst still addressing the scheme objectives.

An option was developed from Option 1a Henbury Spur and Yate Extension which removes the Constable Road station component of the scheme, known as Option 1a_x. This option includes the other elements of the Henbury Spur and Yate Extension proposal such as new stations at Ashley Down, North Filton and Henbury, an hourly rail service to Henbury, a half hourly service to Yate with associated turnback.

In assessing the impacts and benefits of this option, the five headings of the business case (strategic, economic, commercial, financial and management) have been considered.

The economic case assessment shows that the removal of the Constable Road station from the MetroWest Phase 2 strengthens the economic case, resulting in a BCR of 2.50 (without wider impacts) and 3.14 (with wider impacts). The removal of Constable Road station reduces the transport user benefits, and the wider impacts, this reduction is relatively lower than the cost saving, so the overall Net Present Value and Benefit to Cost Ratio improve.

The outturn cost of Option 1a_x is £41.8m, which is within the existing budget of £43m.

Next steps

The table below summaries the next steps for MetroWest Phase 2 project.

Project timetable

Project Stage	Stage Description	Indicative Timescales
Stage 1	Feasibility (including GRIP 1-2)	June 2014 to May 2015
Stage 2	Single option development and scheme case (including GRIP 3)	July 2015 to March 2017
Stage 3	Planning powers and procurement (including GRIP 4-5)	September 2017 to March 2020
Stage 4	Construction and opening (including GRIP 6-8)	July 2020 to May 2021

Recommendations

The Preliminary Business Case and GRIP2 Feasibility Study initially considered a wide range of scheme components, which were then condensed into four options for assessment; only options based on a Henbury Spur would be 'high' value for money and deliver a BCR greater than 2.0 (which is the threshold for devolved major scheme funding). The Henbury Loop would not deliver sufficient additional patronage revenue to offset the increased capital and, especially, operating costs; it would not be value for money (even excluding the cost of mitigating its adverse impact on the entrance to Avonmouth Docks).

Service enhancements at Yate could be delivered by either an extension of services from Parkway to Yate or Gloucester; terminating services at Yate is better value for money than services to Gloucester, however it is recommended both options should be kept open for now to see if there are more opportunities (for services) in Gloucestershire.

The outturn costs for all four options exceed the existing budget of £43m; options including the Spur are around £21m over-budget, options including the Loop more than £33m over budget. The project team explored opportunities to bring Phase 2 within budget whilst still meeting its objectives; a further option was developed that removed the Constable Road station from Option 1a. This options is within budget, offers good value for money, reduces risk and it is recommended this option proceeds to the Outline Business Case (in parallel with continued discussions with Gloucestershire County Council about extending services from Yate to Gloucester).

1 Introduction

1.1 Project overview

MetroWest (formerly known as the Greater Bristol Metro), is an ambitious programme that will improve local rail services across the West of England. MetroWest comprises of a range of schemes from relatively large schemes, entailing both infrastructure and service enhancement, to smaller scale schemes. MetroWest is being jointly promoted and developed by the four West of England councils (Bath & North East Somerset, Bristol City, North Somerset and South Gloucestershire Councils).

The MetroWest programme will address the core issue of transport network resilience, through targeted investment to increase both the capacity and accessibility of the local rail network. The MetroWest concept is to deliver an enhanced local rail offer for the sub-region comprising:

- Existing and disused rail corridors feeding into Bristol
- Broadly half-hourly service frequency (with some variations possible)
- Cross-Bristol service patterns (i.e. Bath to Severn Beach)
- A Metro-type service appropriate for a city region of 1 million population

The programme includes:

- MetroWest Phase 1 – up to half-hourly local service for the Severn Beach line, Bath to Bristol line and a reopened Portishead line with stations at Portishead and Pill
- MetroWest Phase 2 – half-hourly service for the Yate to Bristol line and an hourly service for a reopened Henbury line, with stations at Henbury, North Filton, and possibly Ashley Down and Horfield
- Further additional station openings subject to separate business cases
- Other potential enhancements including the feasibility of extending electrification across the West of England network

The MetroWest programme is to be delivered over the next five to ten years during Network Rail's Control Period 5 (CP5: 2014-2019) and Control Period 6 (CP6: 2019-2024). The MetroWest programme will also extend the benefits of strategic transport interventions that are either in the process of being delivered or have been delivered by the West of England councils. These include the three MetroBus schemes (Ashton Vale to Temple Meads, South Bristol Link and North Fringe to Hengrove Package), Bath Package, Weston Package and the Local Sustainable Travel Fund programme. The delivery of these projects, together with the MetroWest programme, will result in better modal integration between rail, bus and active modes, providing an important step towards seamless modal transfer at key hubs across the West of England.

The MetroWest programme has the full backing of the West of England Local Enterprise Partnership (LEP). The West of England LEP, together with the Executive Members for Transport of the four councils, who collectively comprise the West of England Joint Transport Board, has determined that MetroWest Phase 1 and Phase 2 are its highest priorities for devolved DfT funding.

Figure 1.1 provides an overview of the MetroWest Phase 2 proposed train services.

FIGURE 1.1
Overview of the MetroWest Phase 2 proposed train services

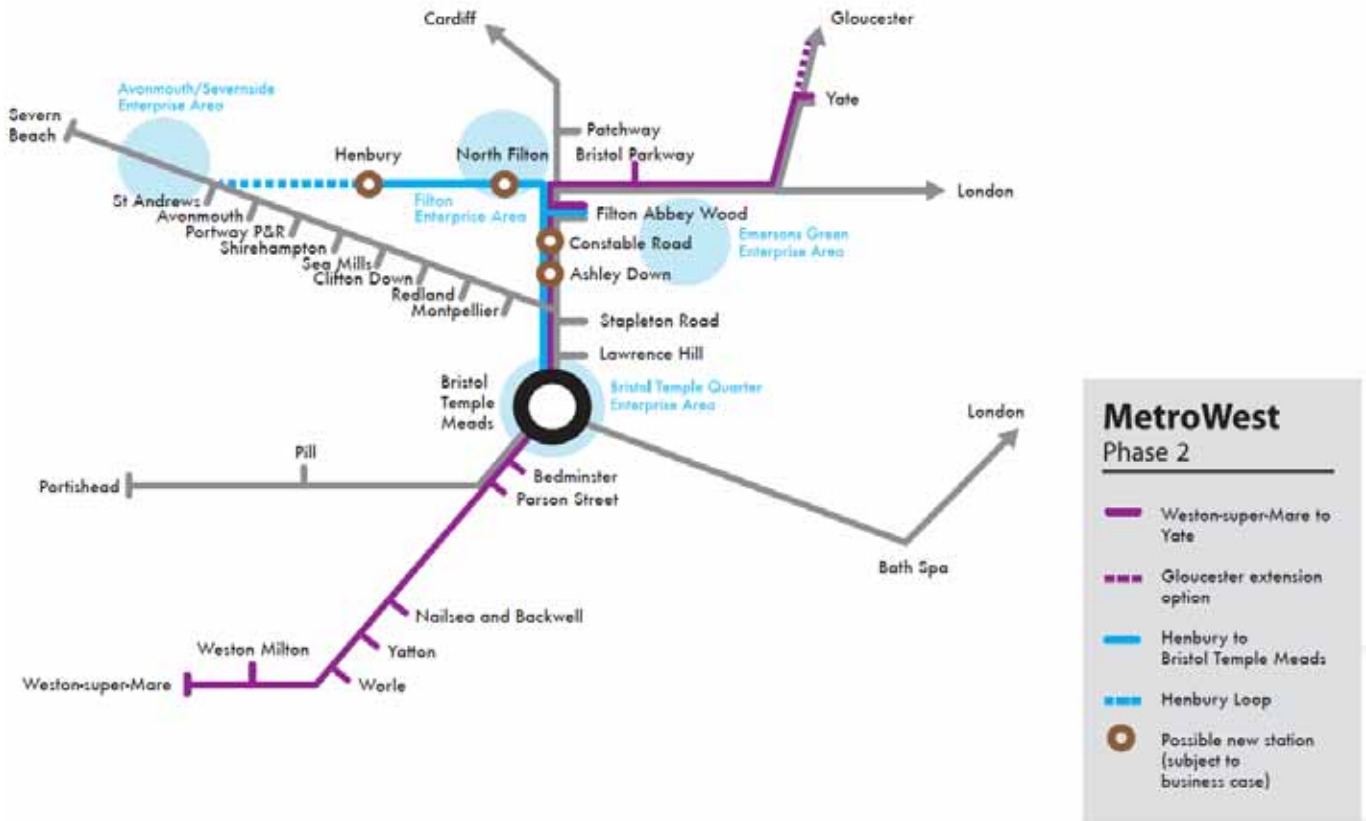
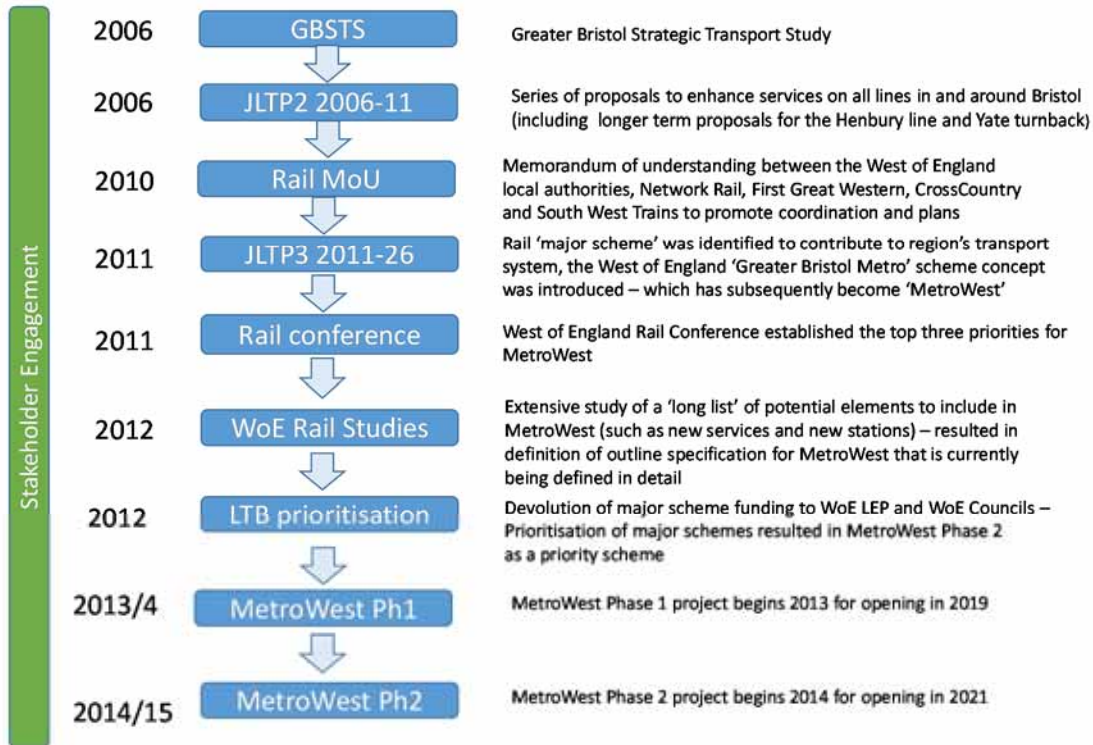


FIGURE 1.2
Summary of work-streams that have informed the MetroWest Phase 2 project



The West of England councils have recognised the strategic importance of the train service network to the local economy for many years. The West of England area enjoys a good network of long distance train services, however the local train network is underdeveloped and underutilised, in comparison with other city regions of a similar size. MetroWest fills this strategic gap and will enable the four councils and the West of England LEP to realise the strategic potential for the local rail network to play a bigger role in meeting the sub-region's transport needs. Furthermore, MetroWest complements committed investment planned by the rail industry during CP5 including electrification of the Great Western line and the Intercity Express Programme, projects which will address network bottlenecks and renewal.

MetroWest (and in its former guise the Greater Bristol Metro) is included in the current Joint Local Transport Plan covering the period 2011-2026 and all of the local authorities' Core Strategies.

A great deal of feasibility work has been undertaken by the West of England councils and Network Rail on MetroWest in its current and former guises. These work-streams are summarised in Figure 1.2.

The outcome of this previous work is that MetroWest Phase 2 is now well-positioned to be taken forward. In summary, MetroWest Phase 2 has:

- Full backing across all four West of England Authorities, including funding for project development
- A robust policy context
- A body of feasibility work and evidence
- Support of the rail industry to be taken forward alongside committed CP5 and CP6 schemes
- Endorsement as a priority scheme from the West of England Local Economic Partnership
- Endorsement by the West of England Joint Transport Board as a priority scheme for devolved major scheme funding, subject to Business Case approval

The scheme will follow the Network Rail Governance for Railway Investment Projects (GRIP) policy NR/L1/INI/PM/GRIP/100 GRIP:

1. GRIP1-2 (output definition and feasibility) - Summer 2014 to Spring 2015
2. GRIP3-4 (option selection and development) –Winter 2017/18
3. GRIP5 (detail design) – Winter 2017/2018 2017 to Spring 2020
4. GRIP6-8 (construction and opening) – Summer 2020 to Summer 2021

1.2 Purpose of this report

This report sets out the Preliminary (Strategic Outline) Business Case for MetroWest Phase 2. In line with the DfT's guidance on transport business cases this report:

- Defines the scope of the project and its outputs and benefits
- Makes the case for change
- Confirms the strategic fit with the departmental business plan and wider government objectives
- States the assumptions made
- Sets out how achievements will be measured
- Outlines the options and carries out an initial sift
- Confirms the governance structure and affordability
- Outlines the sequence in which the project and benefits will be delivered
- Identifies and analyse the stakeholders
- Confirms the assurance arrangements

1.3 Methodology

The five cases presented in this report are the strategic, economic, commercial, financial and management cases. These have been assessed and presented in line with the DfT guidance on Transport Business Cases.

This report has been prepared by the West of England Councils with support from the WoE Transport Framework Consultant, Network Rail and First Great Western (FGW).

1.4 Structure of remainder of this document

Following this introductory section, the report is structured as follows:

- Section 2: Strategic Case
- Section 3: Economic Case
- Section 4: Commercial Case
- Section 5: Financial Case
- Section 6: Management Case
- Section 7: Appraisal of Option 1a_x
- Section 8: Recommendations

2 Strategic Case

2.1 Introduction

This section sets out the Strategic Case for MetroWest Phase 2. It explains the rationale for the scheme; the strategic fit and how MetroWest will further the aims and objectives of the West of England councils. Specifically, this strategic case:

- Sets out the business strategy and context for the scheme, in relation to the West of England authorities' aims and objectives
- Describes the problems identified and the justification for intervention
- Explains the consequences of not changing
- Describes the drivers for change, internal and external
- Outlines the objectives and how they align with the West of England Council's strategic aims
- Sets out the scope of the project
- Identifies any high-level internal or external constraints
- Explains the factors (interdependencies) upon which the successful delivery of the project is dependent
- Outlines the main stakeholder groups and their contribution to the project
- Sets out all the options identified

2.2 Business strategy

2.2.1 Business context

The West of England has a population of over 1 million and this is expected to exceed 1.1 million by 2026. The West of England sub-region is a net contributor with the highest economic growth of any core city region (3.1% of national economic growth (GVA – gross value added))². However, the sub-region's economic prosperity is beginning to be constrained by its transport network. As demand on the transport network increases as a result of economic and population growth, further investment is needed to ensure the transport network is sufficiently accessible and has sufficient capacity and resilience to continue to meet the sub region's needs. Longer-term problems of sustained traffic growth and car dependency also need to be tackled, in addition to wider long-term issues of carbon emissions and social wellbeing.

MetroWest will address these problems and play an important role in achieving the West of England LEP's and Network Rail's strategic aims. The following sections set out the aims of these organisations and the context for delivering the MetroWest scheme.

2.2.2 West of England LEP Strategic Economic Plan

The West of England LEP brings together businesses and the four local authorities of Bath & North East Somerset, Bristol City, North Somerset and South Gloucestershire. Built on decades of partnership working, the LEP covers a natural functional economic area.

The West of England's vision is that, by 2030, it will be one of Europe's fastest growing and most prosperous sub-regions with a buoyant economy, rising quality of life, easier local, national and international travel, and energy-efficient, whilst protecting and enhancing the natural environment.

² Source: West of England Strategic Economic Plan

The LEP vision is to encourage sustainable economic growth and the creation of substantial numbers of new private sector jobs by:

- Supporting growth of key sectors
- Driving innovation and creativity and development of new technologies, products and services
- Skilling the workforce to meet needs of our businesses now and in the future. Retaining existing talent, raising aspirations and marketing talent to inward investors
- Assisting business start-up and growth
- Making the West of England highly attractive to inward investors and existing companies, by securing improved transport, environmental and broadband infrastructure that business needs; providing access to a range of employment land and premises; facilitate new housing and community structure. Maintaining an outstanding physical environment and high quality of life to retain and attract highly skilled workers and graduates.

The LEP's strategy and programme shows how the sub-region will develop its £25 billion economy over the next six years, stimulating sustainable economic growth and creating 25,500 jobs. The details are set out in the West of England Strategic Economic Plan (SEP).

It is the first time a plan of this scale and depth has been developed through the collaboration of the LEP's extensive network of 800 businesses, the four West of England unitary authorities, the region's five further education colleges and its four universities. The plan has also gained the support of all MPs in the region. It was submitted to government in March 2014, alongside plans from England's other 38 LEPs, for a share of the annual £2 billion Local Growth Fund.

By delivering significant improvements to the rail network, MetroWest will contribute towards the achievement of the LEP's overall vision. In July 2014 MetroWest Phase 2 took a further step forward towards delivery with the provisional allocation of £3.2m Local Growth Funding as part of the Government's assessment of the West of England SEP. The West of England continues to punch above its weight with performance on economic growth consistently above capita, which is reflected in the Government's Growth Deal settlement.

2.2.3 Network Rail Business Plan

In the summer of 2012, the government published its vision for Britain's railway, the High Level Output Specification (HLOS). This report summarised what the government expected the rail industry to deliver in Control Period (CP) 5, 2014-2019. Network Rail, the owner and operator of the national rail network, has considered how best to deliver these requirements and the government's wider economic objectives, through strategic business plans. The strategic business plan for England and Wales, which sets out Network Rail's strategy and detailed programme for CP5, was submitted to the Office of Rail Regulation (ORR) in March 2014.

At the same time, Network Rail also published 'A better railway for a better Britain'. This report looks at longer-term challenges and makes clear Network Rail's commitments in ten key areas that will bring benefits for its customers and tax payers. The last decade has seen unprecedented growth in demand for rail travel nationally. One million more trains run every year than ten years ago. Alongside this, public subsidy for rail has reduced, almost halving from its peak in 2006.

In the Network Rail document 'Modernising the Great Western', it is stated that:

'We have a vision for rail in the South West. Our modernisation of the Great Western is the biggest investment in this railway since it was built by Brunel. Faster, more reliable services, more seats, better stations and more freight trains will not only improve the experience of rail users but also stimulate economic growth across the region and beyond.'

First Great Western (FGW) has recently signed a Direct Award with the DfT, under which they will run the Great Western Franchise from September 2015 to March 2019 with a possible one year extension. Under the Direct Award FGW will continue to operate trains between London Paddington, Bristol, South Wales and the south west. Through the Direct Award FGW is committed to working with the West of

England Partnership and other bodies to deliver MetroWest and secure suitable rolling stock for the new services. Appropriate co-operation provisions are included in the Direct Award.

Network Rail's Western Route Study is currently being updated following consultation in late 2014 and will be published later this year. The draft Western Route Study, October 2014 included MetroWest Phase 1 and 2 recognising the importance of these schemes to enhance the local rail network and Network Rail's commitment to seeing them implemented. The Study included an enhanced layout at Bristol East Junction for implementation in Control Period 5 (2014 to 2019). The enhancement will enable the introduction of MetroWest Phase 2 services.

2.2.4 Shared strategic aims

Rail travel across the West of England has doubled in the last ten years and this marks a very clear public appetite to opt increasingly for rail. While the West of England benefits from good long distance rail routes, the local rail network is relatively underdeveloped. Many of the local rail routes do not have a basic half-hourly peak frequency and some terminate at Bristol Temple Meads, rather than operating across the city region. There are also a number of strategically important disused rail lines and reopening these lines is a key part of the four West of England councils' (Bath & North East Somerset, Bristol City, North Somerset and South Gloucestershire) strategy to uplift the local rail network, through the MetroWest programme.

The proposal for MetroWest Phase 2 is being taken forward at a time of considerable investment in the Western Route, led by Network Rail in CP5. The Western Route is to undergo considerable transformation through the delivery of:

- Electrification of the Great Western Main line
- Strategic enhancement projects to deal with bottlenecks
- Increasing capacity; and renewal projects to modernise infrastructure

The CP5 programme of committed schemes focuses on the high volume main lines and various strategic investments spread across the rest of the Western Route. A total of £7.5 billion has been allocated to Network Rail for the Western Route during CP5, underlining its increasing importance and contribution to the national economy.

MetroWest Phase 2 augments both the committed CP5 investment and the planned MetroWest Phase 1 scheme through a modest but strategically expansion of the existing local rail network. MetroWest Phase 2 seeks to reintroduce passenger rail services along the Henbury Line across the North Fringe of Bristol and additional services and stations between Bristol Temple Meads and Bristol Parkway.

The West of England Growth Deal states....

'Tackling congestion and ensuring the West of England has a highly efficient transport network are essential for the area to attract new investors and remain a globally competitive region. This is why the Government has given a long-term commitment to support MetroWest Phases 1 and 2, which opens up rail connections to Portishead and North Bristol, and is providing an additional £20m to upgrade the transport network over the next 6 years.'

2.3 Problems identified and objectives

2.3.1 Overview

This section sets out the problems identified, the impacts of not changing, the MetroWest objectives and the measures that will be used to determine the scheme's success. There is a strong link between these matters, hence they are discussed in sequence for each aspect of change associated with the scheme.

The aspects of change associated with the scheme are:

- Economic growth
- Congestion and transport resilience
- Accessibility
- Environment and social wellbeing

2.3.2 Economic growth

The West of England has a substantial economic growth agenda which is being driven through the Local Economic Partnership's SEP. However, without improvement to the transport network, including rail infrastructure, it is likely that economic prosperity will be constrained by the capacity of the existing transport networks. The LEP's overall vision is to build on previous economic growth through a range of interventions including improving access to major employment sites for the skilled workforce catchment. Population is expected to exceed 1.1 million by 2026.

The 2012 Atkins report 'GVA Impacts of Major Transport Schemes – Final Report: West of England Authorities' concludes that in the West of England, congestion is a barrier to economic growth. It notes that the West of England operates within a complex economic geography in which it is critical to ensure that businesses are able to draw on a suitably skilled labour market to address their growth aspirations. Conversely, it is critical to ensure effective options for travel to work, particularly in terms of connecting areas of employment need with suitable job opportunities.

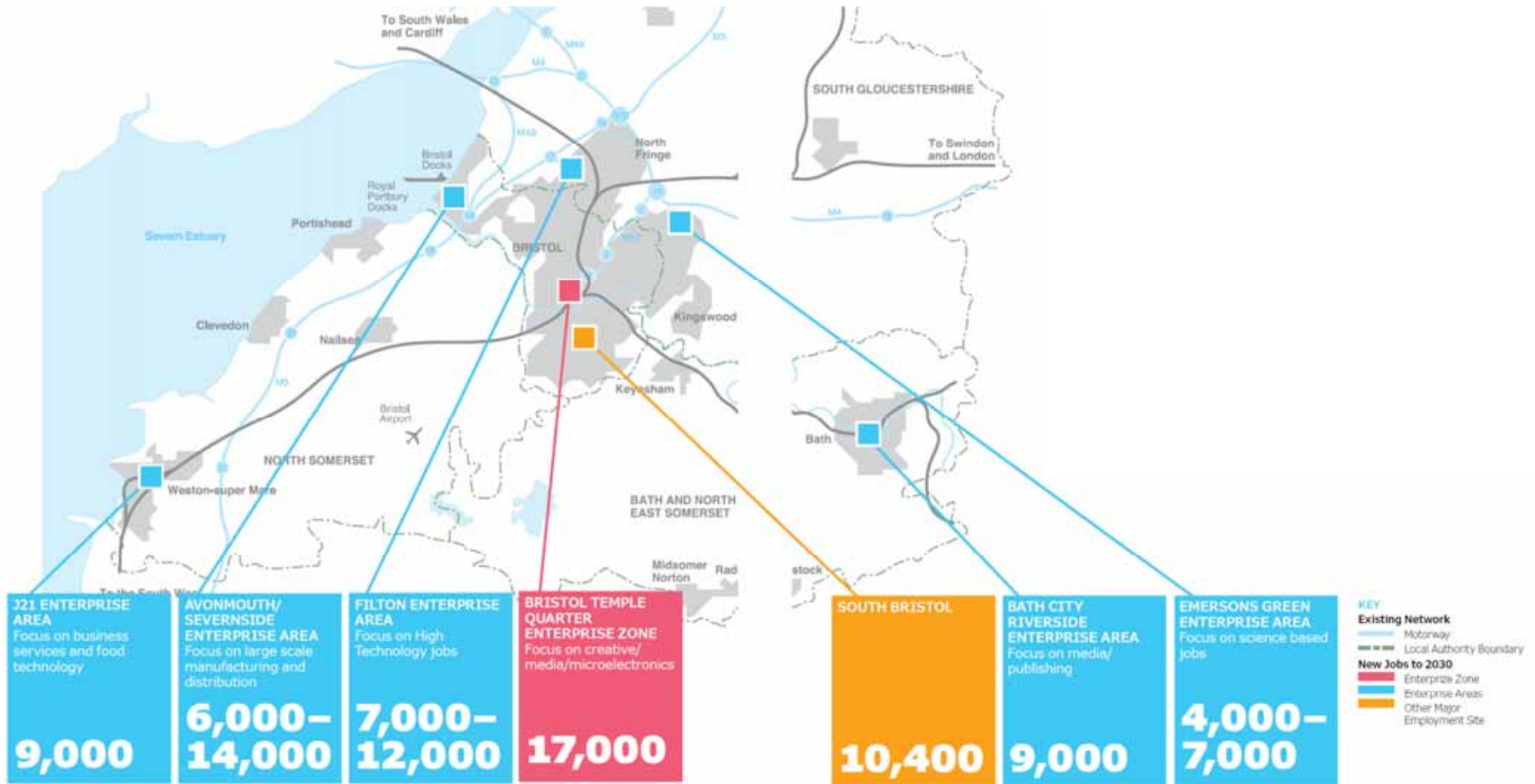
The GVA study included consultation with a range of stakeholders. Their findings highlight that stakeholders feel that:

- Poor perceptions of connectivity and traffic congestion on the road network are a negative influence on business and business reputations in the sub-region. One property agent believed the transport network is '*one of the biggest drawbacks of Bristol City*' and that it is continuing to **depress demand** and property values in the city-region.
- Transport and connectivity is not only key in enabling people and goods to be moved but also contributes to a **positive image** of an area that is 'open to business'. Access to customers and suppliers was a critical issue for business operation and performance. Congestion was reported as a problem in general, especially in key areas of employment such as the North Fringe and on key commuter routes.
- In future, business growth and location decisions will be more strongly related to transport infrastructure. For example, **businesses may decide to move out** of Bristol City centre, because of congestion issues, if it is not essential to stay on operational grounds.
- In certain locations such as the North Fringe and Avonmouth/Sevenside, **poor public transport is cited** as a key reason for employees' dependence on cars. The stakeholders also reported that moves to encourage modal shift were constrained by both the limited availability and reliability of public transport options.
- Although the overall provision of employment land was felt to be sufficient and in the right location, **the lack of suitable infrastructure was regarded as a constraint**. This included, for example, public transport links to the Enterprise Areas.
- Growth and future prospects could be constrained without suitable investment in infrastructure. One business representative stated that '*if the schemes do not go ahead there will be real limitations on businesses' ability to grow, as poor transport infrastructure is a **significant restraint on growth***'. A public sector representative commented that '*the West of England is seen as economically successful and has the right ingredients to be even more successful, but poor transport infrastructure could prevent the rapid growth the West of England is capable of*'.

The target growth in jobs and GVA will be delivered both through higher productivity and increased numbers of people working and living in the area. The GVA report recognises that this will lead to substantial increases in travel demand: without action being taken, it is likely that most of the increased travel demand will be by car, leading to large increases in traffic congestion.

The study concludes that, 'If improvements are not made, the rail network in its current form will continue to play only a minor role in catering for future travel demand in the West of England.' Overall the report recognises that, "The limited catchment of the local rail network and increasingly long journey times by bus within the urban areas will reduce the overall depth of labour markets and limit the potential for clustering benefits.'

FIGURE 2.1
Employment development areas in the MetroWest area (source SEP)



¹ Greater Bristol Bus Network £80m, Bath Package £27m, Weston Package £15m, Local Sustainable Transport Fund £40m

These problems and challenges identify a need for strategic and targeted investment to enhance the local rail network as a part of the West of England's approach **to supporting economic growth**. This has a direct correlation with the SEP objective:

'Create places where people want to live and work, through delivery of cultural infrastructure and essential infrastructure, including broadband, transport and housing to unlock suitable locations for economic growth.'

Enterprise zones/areas are now becoming established and are expected to be major trip generators. Rail will play a significant part in meeting this demand (see Table 2.1).

TABLE 2.1
Enterprise zone and enterprise areas

Enterprise Zone/Area	Jobs	Rail Schemes
Filton Enterprise Area	7,000 to 12,000	MetroWest Phase 2
Emersons Green/Science Park Enterprise Area via Bristol Parkway	4,000 to 7,000	MetroWest Phase 2
Avonmouth Severnside Enterprise Area	6,000 to 14,000	MetroWest Phase 1 (and 2) Additional stations (outside MetroWest phases 1 and 2): Portway P&R
Bristol Temple Quarter Enterprise Zone and new arena	17,000	MetroWest Phase 1 and 2 Additional stations (outside MetroWest phases 1 and 2): Portway P&R, Saltford
Bath City Riverside Enterprise Area	9,000	MetroWest Phase 1 Additional stations (outside MetroWest phases 1 and 2): Saltford
J21 Enterprise Area (Weston-super-Mare)	9,000	MetroWest Phase 1 Weston Milton (timetabling changes)

Source: WoE SEP

As Table 2.2 shows, a considerable number of new homes and jobs are planned in the West of England area to 2029. Table 2.3 underlines this with major housing areas directly served by rail or with potential for rail access.

TABLE 2.2
Planned housing and employment growth in the West of England

Council	Homes	Jobs	Core Strategy Period
Bath & North East Somerset*	13,000	10,300	2011- 2029
Bristol City	32,800	21,900	2011- 2026
North Somerset*	17,130	14,000**	2006- 2026
South Gloucestershire	28,355	18,600-21,870	2006 - 2027
All	91,285	68,070	

Source: Taken from the WoE Response to the GW Franchise, based on Core Strategies and supporting evidence documents

*Proposed figures subject to local plan examinations, ongoing 2014.

** Homes updated February 2014 but job figures to be revised.

TABLE 2.3
Major new housing areas served by rail schemes

Housing Area	Homes	Rail Schemes
Cribbs Patchway New Neighbourhood	5,700 50 ha employment land	MetroWest Phase 2
North Yate	3,000	MetroWest Phase 2
Somerdale (former Cadbury site at Keynsham)	700	MetroWest Phase 1
Weston-super-Mare	11,000	Weston Milton

Source: House numbers from Core Strategies

The Atkins report 'Unlocking Our Potential: The Economic Benefits of Transport Investment in the West of England,' November 2012, found that MetroWest delivers some 2,500 jobs, which based upon on the level of self-containment equates to unlocking some 2,900 homes. MetroWest, therefore, has significant benefits in bringing forward private sector investment.

Table 2.4 sets out the strategic considerations associated with economic growth.

TABLE 2.4
MetroWest Phase 2 economic growth summary

Strategic consideration	MetroWest Phase 2
Problem	<ul style="list-style-type: none"> Congestion and poor accessibility will constrain economic growth particularly the potential of new development
Consequence (impact of not changing)	<ul style="list-style-type: none"> Negative perceptions of transport have an adverse impact on business location decisions and deter investment Depressed demand and property values in some areas Transport could prevent the area from fulfilling its full potential Labour market is constrained Travel time/cost for employees is high
MetroWest Phase 2 objective	<ul style="list-style-type: none"> Business objective – To support economic growth Supporting objective – To enhance the carrying capacity of the local rail network particularly across the North Fringe and Yate corridor
Outcome	<ul style="list-style-type: none"> Jobs unlocked Increased depth and skills base of accessible labour market Increased agglomeration of business activity Reduced cost of business travel Support growth at TQEZ, Filton Enterprise Area and Avonmouth Enterprise Area Improved perceptions of competitiveness Reduced congestion on road network

2.3.3 Tackling congestion and improving transport network resilience

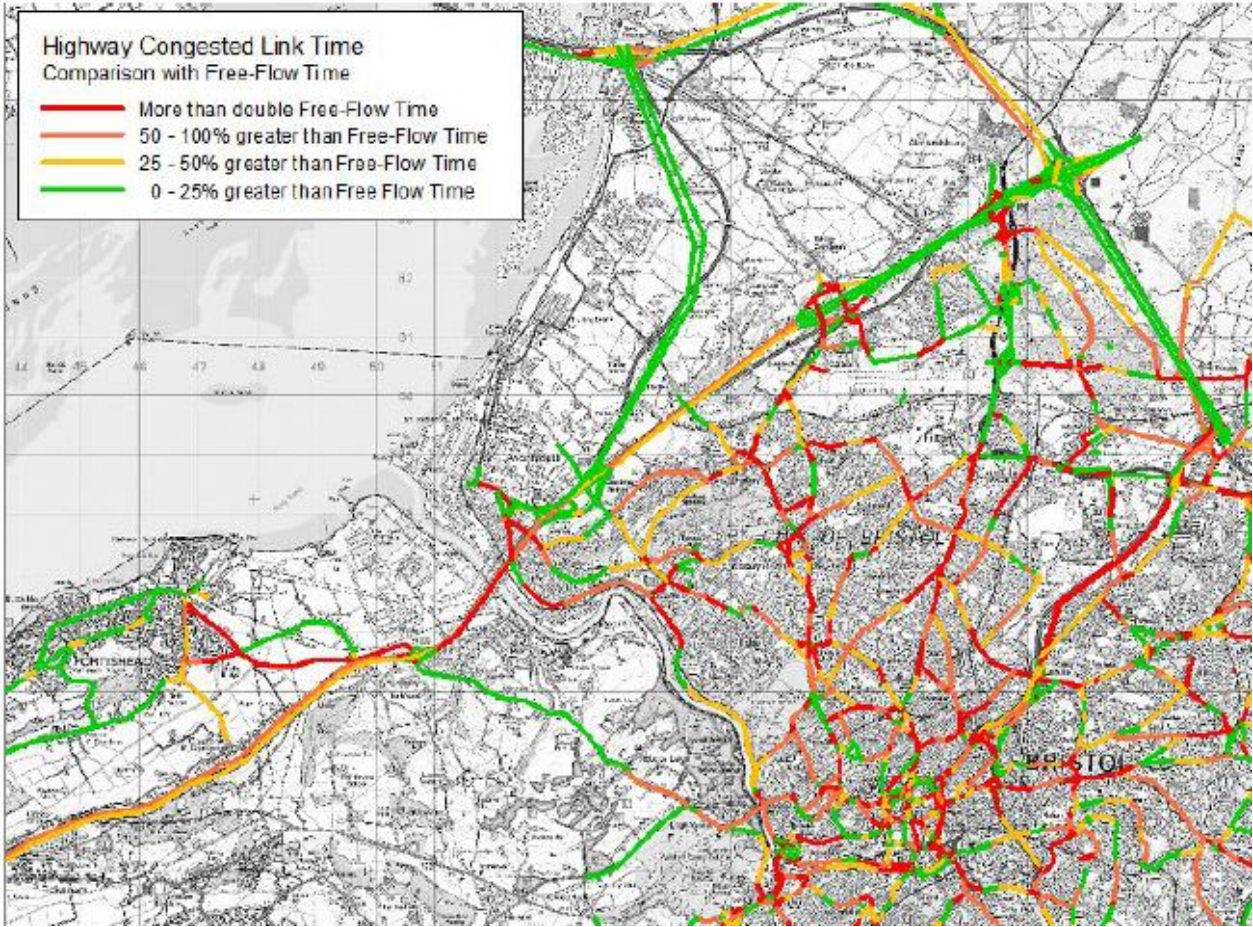
The West of England transport networks are reaching capacity and congestion is particularly notable at:

- Corridors into Bristol city such as the A38 Gloucester Road and the A4018
- Bristol city centre and approaches to Bristol Temple Meads
- The M5 Junction 17
- A432 in Yate

In the strengths/weakness/opportunities/threats (SWOT) analysis, set out in the LEP's SEP, there is a recognition of key weakness of '*Rising congestion within the West of England and on key routes to other regions, and the potential for harm to the environment exacerbated by high levels of growth.*'

Figure 2.2 (source: Atkins 2012 GVA Study) highlights the extent of the likely future congestion problem in 2031. It shows parts of the A38 Gloucester Road and the A4018 double the free flow time.

Figure 2.2
Map showing future congestion in 2031 (source Atkins study)



Data from the GBATS3 modelling, shown in Table 2.5, also helps to illustrate the significant difference between free flow and peak time journey times.

TABLE 2.5
Free flow vs AM Peak journey times on key routes

Route	Observed AM Peak 2013	
	Free Flow JT (mins)	Net Peak hour JT (mins)
M32 Inbound (M32 J1 to Cabot Circus)	4.9	13.1
M32 Outbound (Cabot Circus to M32 J1)	3.8	5.6
A38 Inbound (M5 J16 to St James Barton Rbt)	16.3	33.6
A38 Outbound (St James Barton Rbt to M5 J16)	16.6	32.2
A4018 Inbound (M5 J17 Cribbs to Clifton Triangle)	12.3	29.7
A4018 Outbound (College Green to M5 J17 Cribbs)	12.5	18.1
A432 Inbound (A4174 Badminton Rbt to Old Market St)	15.2	35.6
A432 Outbound (West St to A4174 Badminton Rbt)	15.4	26.3

Free Flow JT = minimum journey time recorded in the period 06:00-10:00

Observed = Strategis data

In the JLTP3, there is a congestion indicator, which uses information from the DfT and figures for 2012/13 (usually a year in arrears). This shows that average traffic speeds have increased over the previous year at a faster rate than nationally, see Table 2.6.

TABLE 2.6

Average vehicle speeds (flow-weighted) during the weekday morning peak on locally managed 'A' roads by local authority in England, annually from 2007/8

	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13	Change 2011/12 to 2012/13
Bath & North East Somerset UA	21.5	22.6	22.4	22.4	22.8	22.0	-3.3%
Bristol, City of UA	15.1	15.9	15.6	15.5	15.7	14.9	-4.8%
North Somerset UA	29.0	29.5	29.4	29.8	30.1	29.8	-1.0%
South Gloucestershire UA	25.1	25.3	24.9	24.6	25.1	24.1	-4.2%
ENGLAND	24.7	25.1	25.0	25.1	25.3	24.9	-1.5%

Data from the 2011 census for the wards located surrounding the MetroWest Phase 2 station location options, reveals some variation in the modes used to travel to work. Table 2.7 shows car use increases whilst public transport and cycling decreases with distance away from the centre of Bristol.

TABLE 2.7

Method of travel to work from the 2011 Census

	Car (incl. sharing)	Bus	Rail	Walking	Cycle	Motorcycle	Works mainly at home
England	63.0%	7.5%	9.5%	10.8%	3.0%	0.8%	5.4%
West of England	64.9%	6.7%	2.3%	14.3%	5.1%	1.2%	5.5%
Bishopston	46.7%	9.3%	2.1%	18.7%	14.9%	0.9%	7.3%
Horfield	56.5%	14.0%	1.3%	14.3%	8.5%	1.1%	4.1%
Lockleaze	60.5%	13.0%	0.6%	12.6%	7.8%	1.5%	3.7%
Filton	61.3%	8.7%	1.4%	16.1%	6.5%	1.7%	3.5%
Henbury	70.3%	10.7%	0.5%	8.2%	4.2%	1.5%	4.3%
Patchway	71.9%	5.9%	0.5%	12.0%	4.9%	1.3%	3.3%
Dodington	79.7%	3.2%	0.8%	7.1%	4.3%	1.8%	2.4%
Yate Central	72.2%	3.3%	0.9%	13.2%	4.2%	1.3%	4.0%
Yate North	77.4%	2.4%	1.7%	9.0%	3.2%	1.2%	4.7%

There is also strong evidence from the Office of the Rail Regulation (ORR) of increasing demand on the rail network, as shown in the data in Table 2.8. This will lead to capacity issues if not addressed.

TABLE 2.8

ORR historic patronage growth in West of England area (2004-2014 figures)

Station groupings	2004/05 to 2013/14	2004/05 to 2013/14
	TOTAL	per annum
Main stations (Bristol Temple Meads, Bristol Parkway & Bath Spa)	64%	5.1%
Severn Beach Line ²	213%	12.1%
Other Bristol urban stations ³	201%	11.6%
B&NES stations (excluding Bath Spa)	107%	7.6%
South Gloucestershire stations (excluding Bristol Parkway)	167%	10.3%
North Somerset stations	59%	4.8%
OVERALL	74.2%	5.7% ¹

Notes: 1: As a comparison, the West of England station survey showed a 6.5% per annum increase from 2005 to 2012

2: Excludes Lawrence Hill and Stapleton Road

3: Includes Parson Street, Bedminster, Lawrence Hill and Stapleton Road

The West of England is largely self-contained with 89 per cent of its workforce living and working within the area (Census 2001). The provision of services that focus on areas of demand would further increase rail patronage in the region.

Table 2.9 sets out the strategic considerations associated with congestion and transport resilience.

TABLE 2.9

MetroWest Phase 2 congestion and transport network resilience summary

Strategic consideration	Issue/response
Problem	<ul style="list-style-type: none"> • Congestion on the road and rail networks
Consequence (impact of not changing)	<ul style="list-style-type: none"> • Slow and unreliable journey times particularly on the A38, A4018, M32 and the A432 • Traffic congestion is delaying buses • Impact on perception/attractiveness of the region for investment/business location • Additional development may increase congestion • Reduced size of accessible labour pool • Cost of congestion • Environmental impact of traffic and congestion (air quality management areas)
MetroWest Phase 2 objective	<ul style="list-style-type: none"> • To support economic growth through enhancing the transport links to the Filton Enterprise Area, North Fringe, Yate, Temple Quay Enterprise Zone and Bristol City Centre • Supporting objective – to deliver a more resilient transport offer, providing more attractive and guaranteed (future proofed) journey times for commuters, business and residents in the area through better utilisation of strategic heavy rail corridors from Yate and Henbury • Supporting objective – to improve accessibility to the rail network with new and re-opened rail stations and improved service frequencies
Outcome	<ul style="list-style-type: none"> • Reduced road congestion • Reduced journey times • More reliable journey times • Improved air quality • Increased rail capacity • Improved transport choice for the North Fringe, A38 and Yate corridors

2.3.4 Accessibility

'Making the Connections' (Social Exclusion Unit, 2003) identified five key barriers impacting on accessibility:

- *The **availability** and physical accessibility of transport: For some people in isolated urban and rural areas there are limited or no public transport services or the services are unreliable, or do not go to the right places or at the right times.*
- ***Cost of transport:** Some people find the costs of personal or public transport very high or unaffordable.*
- *Services and activities located in **inaccessible places:** Developments including housing, hospitals, business and retail are often located in areas not easily accessible to people without a car.*
- ***Safety and security:** Some people will not use public transport or walk to key services because of the fear of crime or anti-social behaviour.*
- ***Travel horizons:** Some people are unwilling to travel long journey times or distances, or may not know about or trust transport services.*

Whilst Bristol Parkway and Filton Abbey Wood have a wide range of frequent rail services, Yate and Patchway typically have one train per hour in both directions. Commuting from the North Fringe, Yate and A38 corridor areas is dominated by car use with bus services also affected by congestion during peak period times. This creates resilience issues with journeys susceptible to delays. The length of the journey may, in some instances, mean some of the local population are discouraged from seeking employment or education opportunities within the wider Bristol area. Table 2.10 sets out the strategic considerations associated with accessibility.

TABLE 2.10
MetroWest Phase 2 accessibility summary

Strategic consideration	Issue / response
Problem	<ul style="list-style-type: none"> Congestion on the roads and the limited existing rail services mean that travel times into Bristol or to key employment centres by bus or car are currently lengthy and costly
Consequence (impact of not changing)	<ul style="list-style-type: none"> Missed work and educational opportunities Likely growing social inequalities Increasing reliance on the car Attractiveness of the bus will decline (will suffer from general congestion and journey time delay)
MetroWest Phase 2 objective	<ul style="list-style-type: none"> Business objective – improve accessibility to the rail network with new and re-opened rail stations and improved service frequencies Supporting objective - To enhance the carrying capacity of the local rail network.
Outcome	<ul style="list-style-type: none"> More people within easy access of a rail station Increased mode choice Rail will be a genuinely attractive alternative to the car Increased range of employment and educational opportunities available

2.3.5 Environment and social well being

Mapping in the DfT's (2008) *Carbon Pathway Analysis* Report shows that the largest CO₂ emissions from transport in the West of England are, not unexpectedly, where traffic levels are greatest. This includes the major urban areas, along the sub-region's motorways and other busy roads.

Whilst reducing congestion and managing traffic flow will deliver some carbon benefits, it is recognised that achieving a 40 per cent target for transport will require a reduction in car-based trips within the urban area.

Transport is estimated to account for over 20 per cent of CO₂ emissions nationally and 36 per cent at the local level. Motorway and trunk road traffic is the major source of emissions, accounting for about 55 per cent of total CO₂ emissions in the West of England, with urban roads responsible for around 30 per cent. Within Bristol's central AQMA, 97 per cent of NO_x emissions are from road traffic. CO₂ emissions are expected to rise 19 per cent by 2011, compared to 2004 levels.

With MetroWest Phase 2, there are two AQMAs to consider. Bristol City Council has declared a single AQMA which covers Bristol city centre and parts of the main radial roads including the M32. This AQMA includes part of the local railway network within the centre of Bristol. The AQMA has been declared for NO₂ (1-hour mean and annual mean objectives) and PM₁₀ (24-hour mean objective). South Gloucestershire Council has declared a single AQMA adjacent to M5 Junction 17 at Cribbs Causeway. Although outside the immediate scheme area, the AQMA has been declared for NO₂ (annual mean objective).

Table 2.11 summarises the CO₂ emissions both for Bristol and South Gloucestershire areas.

TABLE 2.11
Carbon emissions both for Bristol and South Gloucestershire areas 2012

Economic Sector	CO ₂ (Kt)	
	Bristol	S Glos
Road Transport (A roads)	149.3	159.7
Road Transport (motorways)	73.9	497.6
Road Transport (minor roads)	287.0	224.3
Diesel railways	6.5	20.8
Transport other	2.6	2.9
Land Use, Land-Use Change, and Forestry (LULUCF) Net Emissions	5.9	21.6
Total for all sectors (non-transport sectors not shown here)	1,692.7	1,198.2

The total carbon emissions for the two local authorities were estimated at 27.3 Kt for diesel railways (0.6% of total CO₂ emissions), but road transport totalled 1,392 Kt (32.3%).

The West of England office is committed to promoting healthy lifestyles, and transport has an important part to play in this work. The local transport plan provides information about health and transport including the following statements:

- *67 per cent of adults in Bristol are at an increasing risk of ill health due to low levels of physical activity; physically active people reduce their risk of developing chronic diseases- such as coronary heart disease, stroke and type 2 diabetes—by up to 50 per cent, and the risk of premature death by about 20-30 per cent (National Active Travel Strategy 2010).*
- *Walking and cycling are the easiest ways that most people can increase their physical activity levels.*
- *Each additional kilometre walked per day is associated with a 4.8 per cent reduction in the likelihood of obesity. Each additional hour spent in a car per day is associated with a 6 per cent increase.*
- *Increased public transport use contributes to increased physical activity.*

Table 2.12 sets out the strategic considerations associated with the environment and social wellbeing.

TABLE 2.12
MetroWest Phase 2 environment and social wellbeing summary

Strategic consideration	Issue / response
Problem	<ul style="list-style-type: none"> • Worsening air quality, particularly in the Bristol urban area • Health issues – obesity, inactivity which may, in part, be linked to high reliance on the private car
Consequence (impact of not changing)	<ul style="list-style-type: none"> • Traffic will increasingly be a major contributor to high levels of CO₂ and poor air quality • Deteriorating health of the local population
MetroWest Phase 2 objective	<ul style="list-style-type: none"> • Business objective – To make a positive contribution to social well-being, life opportunities and improving quality of life (along the affected corridors in particular) • Supporting objective – To reduce the adverse environmental impacts of the local transport network as a whole.
Outcome	<ul style="list-style-type: none"> • Reduced use of the car, leading to lower levels of CO₂ • Increased levels of physical activity (as rail journeys are more likely to include a walking component)

2.4 Objectives

As shown above, the MetroWest objectives directly address the key problems and issues currently affecting the Bristol city region. In summary, the MetroWest Phase 2 principal business objectives are:

- To support economic growth, through enhancing the transport links to the Filton Enterprise Area, North Fringe, Yate, Temple Quay Enterprise Zone and Bristol City Centre.
- To deliver a more resilient transport offer, providing more attractive and guaranteed (future proofed) journey times for commuters, business and residents in the area, through better utilisation of strategic heavy rail corridors from Yate and Henbury.
- To improve accessibility to the rail network with new and re-opened rail stations and improved service frequencies.
- To make a positive contribution to social well-being, life opportunities and improving quality of life (along the affected corridors in particular).

The MetroWest Phase 2 supporting objectives are:

- To mitigate transport congestion in the North Fringe and Yate corridor.
- To enhance the carrying capacity of the local rail network.
- To reduce the adverse environmental impacts of the local transport network as a whole.

2.4.1 Policy Context

This section demonstrates that the MetroWest Phase 2 objectives are well aligned with those of a wide range of existing policies and that the scheme will help to deliver the visions set out by each of the four authorities in their own policy documents.

Transport planning policy context

The West of England Joint Local Transport Plan 3 (2011-2026) (March 2011) outlines the transport strategy for the sub-region. The transport strategy for the West of England revolves around five aspirational goals: reducing carbon emissions, supporting economic growth, improving accessibility, providing for a safe, healthy and secure population, and enhancing quality of life.

The key strategy of the plan is to support economic growth by providing an affordable, low carbon, accessible, integrated, healthy, safe and reliable transport network. Providing reliable public transport infrastructure is considered to be a vital mechanism for achieving this strategy. In particular, the plan acknowledges a range of major transport schemes that were prioritised and include significant investment in rail infrastructure.

Spatial planning policy context

The relevant spatial planning documents for each local authority area are reviewed briefly below. More detail is provided in the environmental impact assessment (EIA).

South Gloucestershire - The Council's Core Strategy was adopted in December 2013. This supports the improvements to rail services in Policy CS7 (Strategic Transport Infrastructure) and makes specific reference to MetroWest.

The adopted South Gloucestershire Supplementary Planning Document (SPD) for the CPNN, dated March 2014, states under section 5.4 the requirement of developers to identify and safeguard sites for railway stations (and associated interchange facilities) along the route of the Henbury railway line. This is to ensure from the outset that sustainable travel is encouraged and more convenient and attractive than car use wherever possible.

Bristol City – Planning in Bristol is guided by the Core Strategy (adopted in 2011) and a number of policies that are saved from the Bristol Local Plan (1997). The Core Strategy (Policy BCS10) states the council will support the delivery of significant improvements to transport infrastructure to provide an integrated transport systems which improves accessibility within Bristol and supports the proposed level of development. This includes the MetroWest programme and the reintroduction of a local rail passenger service along the Henbury line and a new station at Ashley Down.

2.5 Drivers for change

The proposal for MetroWest Phase 2 is being taken forward during a time of considerable change for the rail network (CP5, 2014 to 2019):

- Electrification of the Great Western Main Line
- Filton Bank four tracking (including the enhanced renewal of Bristol East Junction)

MetroWest Phase 1 and MetroWest Phase 2 would fall in CP6.

Some of the non-rail drivers for change include:

- Significant economic development particularly at TQEZ and enterprise areas across the West of England such as Filton
- Major new mixed-use developments at CPNN and North Yate

2.6 Scope of the scheme

The scheme is being promoted by the West of England councils. The main elements of MetroWest 2 include a half-hourly train service at Yate and hourly services on a reopened Henbury line (with up to two new stations) together with potentially new stations on Filton Bank. The infrastructure requirements are anticipated to be a turn-back at Yate and the upgrade of the Henbury line for use by passenger trains and new stations.

The project seeks to:

- Deliver a reliable public transport service for the residents across the North Fringe of Bristol and enhance the existing service to Yate
- Ensure freight operations and pathing rights are not jeopardised
- Take into consideration other committed West of England Partnership proposals including interaction with MetroBus
- Be delivered in collaboration with Network Rail and the Great Western Train Operating Company, subject to business case, powers to build and operate, and allocation of funding

The following engineering works have been proposed, in order to deliver MetroWest Phase 2 scheme:

- Henbury Line
 - Cross over at Henbury for the Henbury Spur options; or
 - Double tracking at Hallen Junction for Henbury Loop options
 - New signals for the line
- Gloucester Line
 - New turnback and associated signalling at Yate, for options that terminate at Yate
- New stations
 - Henbury (a site to the east or west of the A4018 - to be confirmed)
 - North Filton
 - Ashley Down
 - Constable Road

Further infrastructure may be required for the Henbury Loop options to safeguard/maintain adequate vehicular access to Avonmouth Docks at St. Andrews Level Crossing.

2.7 Constraints

Table 2.13 sets out a summary of the key constraints for the MetroWest Phase 2 project. These matters were considered at the project risk workshop. Further information is set out in the risk register in the GRIP 1/2 report in Appendix A of this report.

TABLE 2.13

Constraints summary

Category	Internal Constraints	External constraints	Further Details
Finance	<ul style="list-style-type: none"> • Availability of funding from JTB, local authorities • Need for train service subsidy in the short term 		Finance Case
Environment	<ul style="list-style-type: none"> • Localised environmental impacts • Developing in a built environment • Integration with adjacent development 		Economic Case

TABLE 2.13
Constraints summary

Category	Internal Constraints	External constraints	Further Details
Governance/ Organisational	<ul style="list-style-type: none"> Multi-party promoted scheme 		Management Case
Technological/ Engineering	<ul style="list-style-type: none"> New stations' designs must interface with the wider railway 	<ul style="list-style-type: none"> Working within the footprint of current rail corridors Network Rail technical guidance to be followed (GRIP) Network is close to/at capacity in key locations Need for timetable solutions, acceptable to rail industry Need to integrate with Phase 1 enhancements 	GRIP 1/2 report – Appendix A Timetable analysis – Appendix A

2.8 Stakeholders

Key business/industry stakeholders include, but are not limited to:

- DfT
- Office of Rail and Road (ORR)
- Network Rail
- Train operating companies (existing and potential)
- Freight operating companies
- Bus operators
- Bristol Port Company

Consultees and stakeholders include, but are not limited to:

- Local Members
- West of England Local Enterprise Partnership
- Joint Scrutiny
- Business West and other business organisations
- Local MPs
- Neighbouring authorities
- Parish and town councils affected by the schemes
- Resident and community groups affected by the schemes
- Public transport users and non-users
- Local rail and transport campaign groups

The West of England authorities have established relationships with stakeholders; See Section 6 for more information.

2.9 Options

An initial sift of scheme options has been undertaken using DfT's Early Assessment Sifting Tool (EAST); this is reported in Appendix B and summarised below.

EAST considered the 'need for the scheme' at two levels:

- At a macro level, in which the scheme is compared against other major schemes in the West of England
- At a mode specific level, considering rail-specific matters in more detail (in parallel with a 'capability (timetable) analysis' undertaken by Network Rail)

2.9.1 Macro-level optioneering

The Joint Local Transport Plan states that:

'... the vision for our transport network, ... is a vision to reduce both congestion and carbon; in particular the rapid transit, bus and rail schemes have a significant part to play in tackling those 5 to 25 mile journeys which account for 43% of CO₂ emissions.'

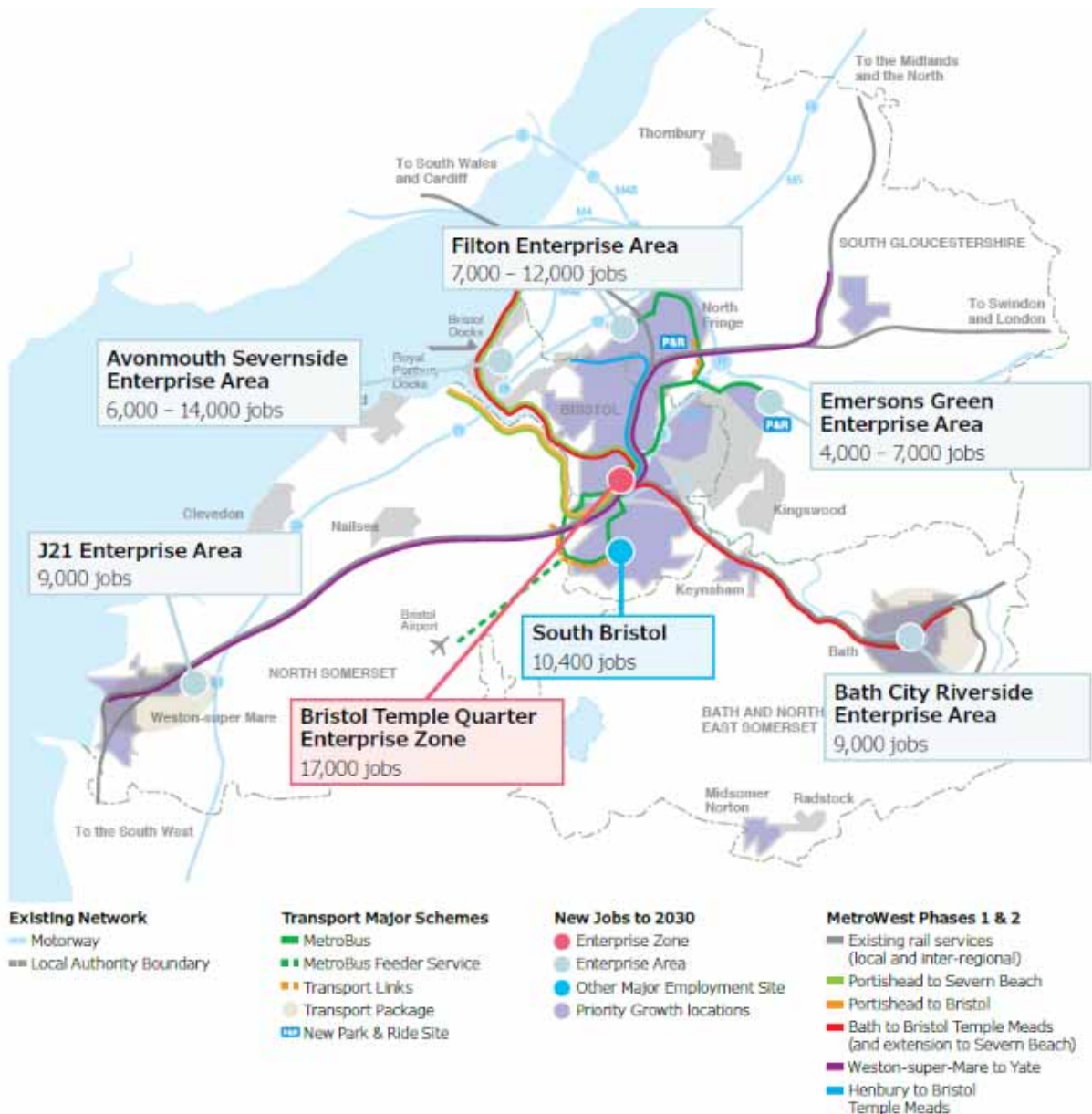
The future West of England transport network has been planned to meet the goals of the JLTP which are:

- Reduce carbon emissions
- Support economic growth
- Promote accessibility
- Contribute to better safety, security and health
- Improve quality of life and a healthy natural environment

The West of England authorities undertook a process of assessment and prioritisation of more than 50 potential major local transport schemes that could meet these objectives. The outcome was reported to the LTTB in June 2013; MetroWest Phase 2 was ranked as a high priority and is now on the Priority Programme for devolved major schemes funding. The JLTP has been reinforced by the Strategic Economic Plan; a summary of the overall strategy is shown in Figure 2.3.

FIGURE 2.3:

West of England Priority transport investment map (Source: Strategic Economic Plan)



2.9.2 Mode and route specific optioneering

The rail options for MetroWest Phase 2 were assessed using DfTs Early Assessment Sifting Tool (EAST in parallel with a Capability Analysis undertaken by Network Rail (which involved building concept timetables using 'Railsys' software)³. The outcomes for each option are described below:

Option 1.1 Henbury line as a loop service (building on MetroWest Phase 1 Option 5B)

- Introducing passenger rail services on the Henbury line and integrating them with Severn Beach line services. The option assumes the loop service (in either direction) would start and terminate at Bristol Temple Meads. The MetroWest Phase 1 service from Severn Beach would operate to Bath Spa meaning that there would be no through services to south Bristol and Portishead.

Option 1.2 Henbury line as a loop service (building on MetroWest Phase 1 Option 6B)

- Introducing passenger rail services on the Henbury line and integrating them with Severn Beach line services. The MetroWest Phase 1 service from Severn Beach would also terminate at Bristol Temple Meads, resulting in no through services to either Portishead or Bath and North East Somerset.

Option 1.3 Henbury line as a spur service (this could build on either MetroWest Phase 1 5B or 6B)

- Introduction of a spur passenger railway service between Bristol Temple Meads and Henbury; services would be self-contained and would result in no changes to the MetroWest phase 1 service pattern.

Option 2.1 Half-hourly service at Yate provided by extending the existing Weston-Super-Mare-Bristol Parkway terminating service to Yate – short turnaround

- Extending the existing weekday Weston-Super-Mare to Bristol Parkway service to Yate. The option assumes no additional train units are required for the service and as a result, requires a very short turnaround period at Yate.

Option 2.2 Half-hourly service at Yate provided by extending the existing Weston-Super-Mare -Bristol Parkway terminating service to Yate – long turnaround

- Extending the existing weekday Weston-Super-Mare to Bristol Parkway service to Yate with a construction of a turnback at Yate. This option is similar to option 2.1, except an additional train unit will be utilised and a turnback siding constructed, resulting in a longer turnaround period at Yate.

Option 2.3 Half-hourly service at Yate provided by extending the existing Weston-Super-Mare -Bristol Parkway terminating service to Gloucester – short turnaround

- Extending the existing weekday Weston-Super-Mare to Bristol Parkway service to Gloucester. This option is similar to option 2.1, except it would provide additional opportunities for movement between the Bristol, Yate and the Gloucester corridor. An additional train unit will be utilised although a very short turnaround is expected at Gloucester.

Option 2.4 Half-hourly service at Yate provided by extending the existing Weston-Super-Mare -Bristol Parkway terminating service to Gloucester – long turnaround

- Extending the existing weekday Weston-Super-Mare to Bristol Parkway service to Gloucester. This option is similar to option 2.2, except it would provide additional opportunities for movement between the Bristol, Yate and the Gloucester corridor. Also two additional train units will be utilised.

Option 3.1 New Henbury station site – Henbury East

- Construction of a new railway station to the immediate east of the A4018 road bridge over the Hallen railway line.

³ The Capability Analysis Report is appended to the GRIP2 Report in Appendix A

Option 3.2 New Henbury station site – former Henbury Station

- Construction of a new railway station on the previous site of the Henbury railway station to the immediate west of the A4018 road bridge.

Option 3.3 New North Filton station (former station site)

- Construction of a new railway station on the previous site of the North Filton railway station to the immediate west of the A38 Gloucester Road bridge.

Option 3.4 New Filton Bank station site – Horfield

- Construction of a new railway station on the previous site of the Horfield railway station close to Bonnington Walk.

Option 3.5 New Filton Bank station site – Ashley Down

- Construction of a new railway station on the previous site of the Ashley Hill railway station, south of Muller Road.

Option 3.6 New Filton Bank station site – Constable Road

- Construction of a new railway station on a new site south of Constable Road.

A summary of how the options meet the five cases is shown in Table 2.14.

TABLE 2.14

Summary of how the scheme options meet the five cases

Option	Strategic case	Economic case	Management case	Financial case	Commercial case
Option 1.1: Henbury Loop (MW Phase 1 – Option 5b)	✓	✓	✗	✓	✓
Option 1.2: Henbury Loop (MW Phase 1 – Option 6b)	✓	✓	✓	✓	✓
Option 1.3: Henbury Spur	✓	✓	✓	✓	✓
Option 2.1: Yate Short Turnaround	✓	✓	✗	✓	✓
Option 2.2: Yate Long Turnaround	✓	✓	✓	✓	✓
Option 2.3: Gloucester Short Turnaround	✓	✓	✗	✓	✓
Option 2.4: Gloucester Long Turnaround	✓	✓	✓	✓	✓
Option 3.1: Henbury East	✓	✓	✓	✓	✓
Option 3.2: Henbury Former Station	✓	✓	✓	✓	✓
Option 3.3: North Filton	✓	✓	✓	✓	✓
Option 3.4: Horfield	✓	✓	✗	✓	✓
Option 3.5: Ashley Down	✓	✓	✓	✓	✓
Option 3.6: Constable Road	✓	✓	✓	✓	✓

The performance risk of Option 1.1 (a loop service linked to an extended loop service to Portishead) is prohibitive. The number of linked constraints will inevitably result in a perturbed service which will have very little opportunity for recovery. Furthermore given that the arrivals and departures at Bristol Temple Meads are tied to each other, this has the added risk of spreading delay to the wider Bristol and Western areas.

Option 1.2 mitigates this risk by terminating all Severn Beach and Loop services at Temple Meads; however, this would result in significant dwell-time at Temple Meads, with an adverse impact on platform capacity. Option 1.2 would also require the re-doubling of Hallen Marsh Junction to preserve existing and future capacity for freight trains.

Option 1.3 (the spur service), by contrast, can be run in relative isolation and as such has a much smaller performance risk. Providing a bay platform at Henbury, the spur option can be timetabled to have a short dwell at Bristol Temple Meads, thereby limiting the impact on platform capacity.

Options 2.1 and 2.3 would require a short turnaround at Yate or Gloucester that would pose too high a risk to the service, network resilience and reliability. With Option 1a_x.4, Network Rail's committed Filton Bank four tracking scheme has a requirement for track cross overs south of Filton Abbey Wood and which would prevent the development of a station at Horfield (Bonnington Walk).

Improving service frequencies at Weston Milton was initially considered as part of Phase 2; however, it became apparent that the geographical fit between this objective and the rest of Phase 2 was lacking. Hence, Weston Milton has been de-coupled from Phase 2 and will be pursued as a bespoke project.

2.9.3 Options considered in the Preliminary Business Case (PBC)

One fundamental aspect of the EAST (and Capability) assessment was the number of options that were interdependent on each other. Station only options were dependent on the service options and vice versa. Station only options were dependent on the service options and vice versa.

For the Preliminary Business Case, the options have been packaged together to form joint infrastructure and service options as shown in Table 2.15.

TABLE 2.15
Summary of MetroWest Phase 2 options

Option	Infrastructure element	Service element
1a: Henbury Spur, Yate Extension	New stations on the Filton Bank (Ashley Down and Constable Road), North Filton, Henbury. Turnback at Henbury and Yate	<ul style="list-style-type: none"> Bristol Temple Meads to Henbury 1 train per hour (tph) all day Extension of current Weston-super-Mare to Bristol Parkway station to Yate
Option 1b: Henbury Spur, Gloucester Extension	New stations on the Filton Bank (Ashley Down and Constable Road), North Filton, Henbury. Turnback at Henbury	<ul style="list-style-type: none"> Bristol Temple Meads to Henbury 1 train per hour (tph) all day Extension of current Weston-super-Mare to Bristol Parkway station to Gloucester
Option 2a: Henbury Loop, Yate Extension	New stations on the Filton Bank (Ashley Down and Constable Road), North Filton, Henbury. Turnback at Yate	<ul style="list-style-type: none"> Bristol Temple Meads to Henbury (East or West) 1tph all day via Filton Bank and Avonmouth (clockwise and anti-clockwise directions) Extension of current Weston-super-Mare to Bristol Parkway station to Yate
Option 2B: Henbury Loop, Gloucester Extension	New stations on the Filton Bank (Ashley Down and Constable Road), North Filton, Henbury.	<ul style="list-style-type: none"> Bristol Temple Meads to Henbury (East or West) 1tph all day via Filton Bank and Avonmouth (clockwise and anti-clockwise directions) Extension of current Weston-super-Mare to Bristol Parkway station to Gloucester

2.10 Summary of strategic case

The evidence presented within this section demonstrates that MetroWest Phase 2 has a strong strategic case. The scheme:

- Has a **clear business strategy which is closely aligned with the strategic aims and responsibilities** of the four West of England authorities, the LEP and Network Rail.
- **Addresses a number of genuine, evidenced problems** relating to congestion, resilience, accessibility and the constraints these have on economic growth.
- Would **support and several housing and employment developments** that are planned in the sub-region.
- Has a **clearly defined scope**.

- **Will affect a wide range of stakeholder groups** and local communities by providing better access to a local rail service.
- Has been **subject to a robust optioneering process**.
- Is **aligned with the business objectives of the rail industry** and the programme of CP5 investment planned for the Western Route. Thus extending the benefits of CP5 further across the rail network to wider population, yielding wider economic growth.
- **Responds to both internal (rail industry) and external (public pressure) drivers for change**.
- Provide an **integrated approach to the travelling public by providing the basis for a truly 'Metro' level of service for West of England local rail network**, alongside the substantial investment in the long distance rail routes to and from the West of England.
- **Has clear objectives** that directly address the problems identified and are aligned with the objectives of the LTP, the various spatial planning policies, and the vision and objectives of the LEP. The MetroWest Phase 2 principal business objectives are:
 - To support economic growth, through enhancing the transport links to the Filton Enterprise Area, North Fringe, Yate, Temple Quay Enterprise Zone and Bristol City Centre.
 - To deliver a more resilient transport offer, providing more attractive and guaranteed (future proofed) journey times for commuters, business and residents in the area, through better utilisation of strategic heavy rail corridors from Yate and Henbury.
 - To improve accessibility to the rail network with new and re-opened rail stations and improved service frequencies.
 - To make a positive contribution to social well-being, life opportunities and improving quality of life (along the affected corridors in particular).

The MetroWest Phase 2 supporting objectives are:

- To mitigate transport congestion in the North Fringe and Yate corridor.
- To enhance the carrying capacity of the local rail network.
- To reduce the adverse environmental impacts of the local transport network as a whole.

3 Economic Case

3.1 Introduction

Devolution of funds and decision-making gives responsibility to approve and fund schemes to the Local Transport Board (LTB) for the West of England; it decides on local prioritisation and ensures rigorous value for money assessment is carried out and is consistent with DfT's TAG.

The methodology employed to model and appraise the schemes brings together a range of organisations (Network Rail, First Great Western, local authorities, WoE Transport Framework Consultant), tools, data and techniques.

This section provides information about the impacts of MetroWest Phase 2, including the economic, environmental, social and distributional impacts" Network Rail GRIP2 Feasibility Report (including scheme concepts and costings, timetabling and capability analysis) (see Appendix A):

- Henbury Station Options Appraisal (see Appendix F)
- Network Rail Economic appraisal using its 'Discounted Cash Flow (DCF) model – presented in the socio-economic Appraisal (see Appendix C)
- The WoE Transport Framework Consultant has used (GBATS3) model to assess the impacts of the scheme on the highway network (see Section 3.3 for further details)
- The WoE Transport Framework Consultant has used (GBATS3) model to assess the wider impacts of the scheme (see Appendix D)

This Section also provides information on:

- Options appraised
- Transport modelling methodology overview
- Summary of modelled scheme impacts
- Key assumptions
- Economy impacts
- Environment impacts
- Social impacts
- Public Account impacts
- Performance of option variants
- Summary of impacts

3.2 Options appraised

Four options have been appraised, these being options 1a, 1b, 2a and 2b. The specifications of each option are outlined in Figures 3.1 to 3.2 and Table 3.1:

FIGURE 3.1

Option 1A Henbury Spur and Yate Extension and Option 1B Henbury Spur and Gloucester Extension

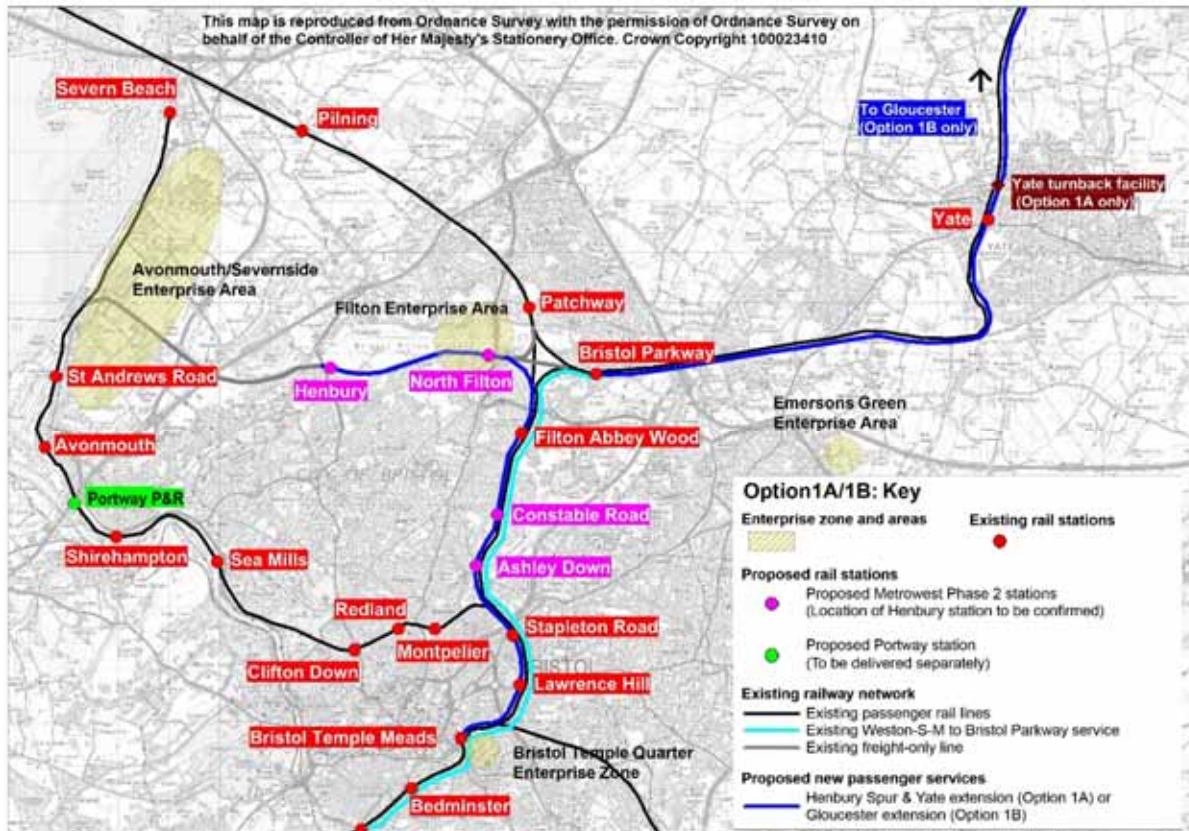


FIGURE 3.2

Option 2A Henbury Loop and Yate Extension and Option 2B Henbury Loop and Gloucester Extension

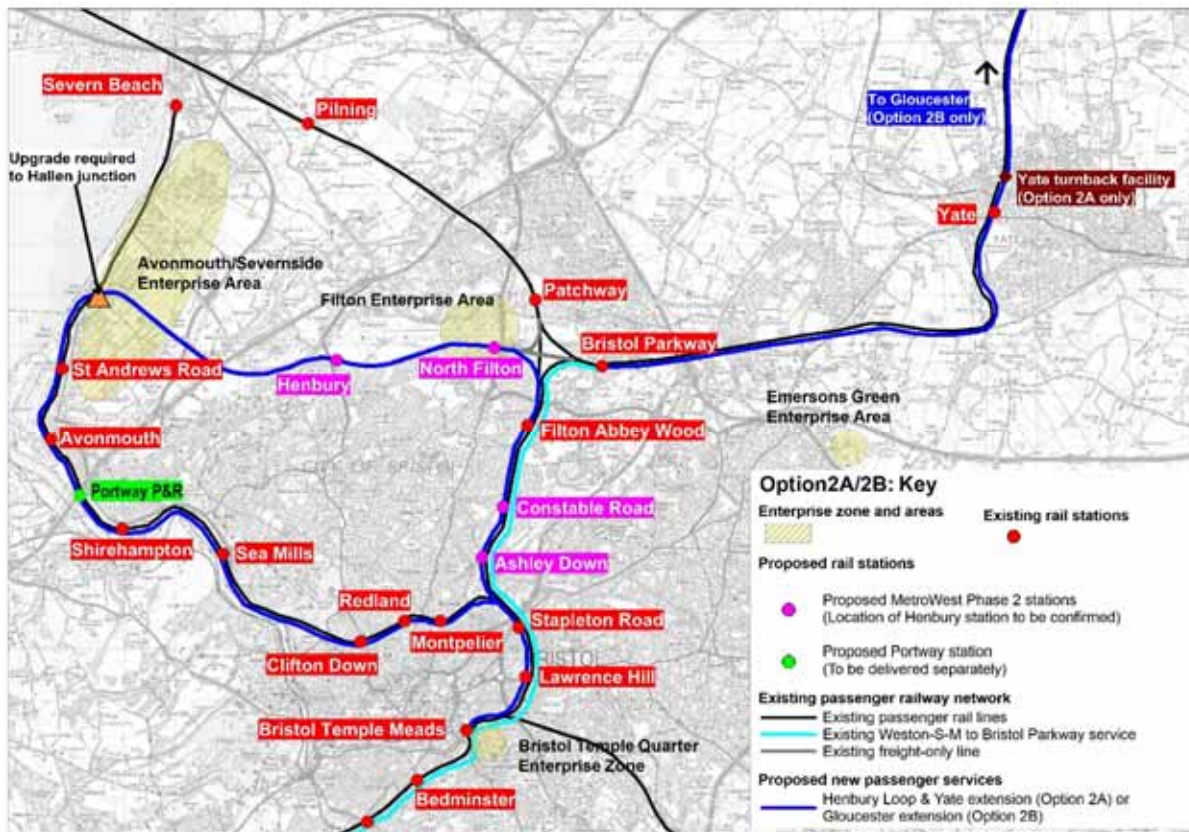


TABLE 3.1
Summary of MetroWest Phase 2 options

Option	Infrastructure required	Services required	Detail
1a: Henbury Spur, Yate Extension	New stations on the Filton Bank (Ashley Down and Constable Road), North Filton, Henbury. Turnback at Henbury and Yate	<ul style="list-style-type: none"> Bristol Temple Meads to Henbury (East or West station site options) 1 train per hour (tph) all day Extension of current Weston-super-Mare to Bristol Parkway station to Yate 	<ul style="list-style-type: none"> Stopping at: Lawrence Hill, Stapleton Road, new stations on the Filton Bank (Ashley Down and Constable Road), Filton Abbey Wood and a new station at North Filton Increasing the number of services to Yate to 2tph all day
Option 1b: Henbury Spur, Gloucester Extension	New stations on the Filton Bank (Ashley Down and Constable Road), North Filton, Henbury. Turnback at Henbury	<ul style="list-style-type: none"> Bristol Temple Meads to Henbury (East or West station site options) 1 train per hour (tph) all day Extension of current Weston-super-Mare to Bristol Parkway station to Gloucester 	<ul style="list-style-type: none"> Stopping at: Lawrence Hill, Stapleton Road, new stations on the Filton Bank (Ashley Down and Constable Road), Filton Abbey Wood and a new station at North Filton Increasing the number of services to Yate to 2tph all day and calling at Cam & Dursley.
Option 2a: Henbury Loop, Yate Extension	New stations on the Filton Bank (Ashley Down and Constable Road), North Filton, Henbury. Turnback at Yate Further infrastructure may be required to safeguard/maintain adequate vehicular access to Avonmouth Docks at St. Andrews Level Crossing.	<ul style="list-style-type: none"> Bristol Temple Meads to Henbury (East or West station site options) 1tph all day via Filton Bank and Severn Beach (clockwise and anti-clockwise directions) Extension of current Weston-super-Mare to Bristol Parkway station to Yate 	<ul style="list-style-type: none"> Stopping at: (Clockwise) Lawrence Hill, Stapleton Road, Montpelier, Redland, Clifton Down, Sea Mills, Shirehampton, Portway P&R, Avonmouth, new stations at Henbury and North Filton, Filton Abbey Wood, new stations on Filton Bank (Ashley Down and Constable Road), Stapleton Road, Lawrence Hill (Anti-clockwise) Lawrence Hill, Stapleton Road, new stations on Filton Bank (Ashley Down and Constable Road), Filton Abbey Wood, new stations at North Filton and Henbury, Avonmouth, Portway P&R, Shirehampton, Sea Mills, Clifton Down, Redland, Montpelier, Stapleton Road, Lawrence Hill Increasing the number of services to Yate to 2tph all day
Option 2B: Henbury Loop, Gloucester Extension	New stations on the: Filton Bank (Ashley Down and Constable Road), North Filton, Henbury. Further infrastructure may be to safeguard/maintain adequate vehicular access to Avonmouth Docks at St. Andrews Level Crossing.	<ul style="list-style-type: none"> Bristol Temple Meads to Henbury (East or West station site options) 1tph all day via Filton Bank and Severn Beach (clockwise and anti-clockwise directions) Extension of current Weston-super-Mare to Bristol Parkway station to Gloucester 	<ul style="list-style-type: none"> Stopping at: (Clockwise) Lawrence Hill, Stapleton Road, Montpelier, Redland, Clifton Down, Sea Mills, Shirehampton, Portway P&R, Avonmouth, new stations at Henbury and North Filton, Filton Abbey Wood, new stations on Filton Bank (Ashley Down and Constable Road), Stapleton Road, Lawrence Hill (Anti-clockwise) Lawrence Hill, Stapleton Road, new stations on Filton Bank (Ashley Down and Constable Road), Filton Abbey Wood, new stations at North Filton and Henbury, Avonmouth, Portway P&R, Shirehampton, Sea Mills, Clifton Down, Redland, Montpelier, Stapleton Road, Lawrence Hill Increasing the number of services to Yate to 2tph all day and calling at Cam & Dursley.

GRIP2 indicates both options for a Henbury Station would be feasible. A desktop appraisal of the two options has been undertaken and is reproduced in Appendix F. In summary, both Henbury station site options perform well in the qualitative assessment, but there are a few factors that differentiate the sites, namely:

- The East site would have better access to areas to the south and east
- Access from the south to the West or former site is constrained by the cement works on the south-side of the railway line
- The West site would have a lesser impact on existing residential properties

On balance, it is considered the East or new site represents the best option. It is proposed that the site options be subject to further stakeholder and community engagement to determine if there is a strong local preference. Pending the outcome of this, both sites should continue to be safeguarded in planning terms until the local authorities identify a preferred site for input to GRIP3 (detailed design).

Capability analysis undertaken by Network Rail has indicated that a number of additional train units are needed to operate the new services, on top of those that would be in use once MetroWest Phase 1 is implemented. The number of units required for each of the options is shown in Table 3.2 (assumed to be 2-car DMUs, which could be either Class 15x or Class 16x units)."

TABLE 3.2

Summary of additional train units required to underpin the MetroWest Phase 2 options

	Option 1a Henbury Spur, Yate Extension	Option 1b Henbury Spur, Gloucester Extension	Option 2a Henbury Loop, Yate Extension	Option 2b Henbury Loop, Gloucester Extension
Henbury services	1	1	3	3
Yate/Gloucester services	1	2	1	2
Totals	2	3	4	5

3.3 Transport modelling methodology overview

The approach to forecasting demand for MetroWest Phase 2 makes use of techniques and data accepted in the rail industry and by DfT, namely:

- National rail data (public) - including National Rail Travel Survey (NRTS) and Office of Rail Regulation (ORR) information
- Local rail data - annual station surveys provide passenger counts and origin-destination information for stations in the West of England authority area
- MOIRA - the rail industry's modelling tool that is used to forecast the impact of changes to timetables, including the effect on passenger numbers and revenue of changes such as stopping patterns, infrastructure and rolling stock performance
- Passenger Demand Forecasting Handbook (PDFH) - providing methods and guidance on assessing the effects of service quality, fares and external factors on rail passenger demand

Using these sources, a combination of bespoke spreadsheet modelling and MOIRA was used to assess rail enhancements offered by MetroWest Phase 2. The main elements covered:

- Trips at new stations and diversions of existing rail trips to new stations (spreadsheets); and
- Changes in demand at existing stations from new or additional services, including suppression of demand by extra station calls (MOIRA).

These tools are combined to form the 'rail demand model' (RDM) for MetroWest.

In order to understand the potential local effects in more detail, the GBATS3 multi-modal transport model⁴ has been used to undertake a cross-check of the decongestion highway benefits of the scheme

⁴ GBATS3 is the multi-modal model for the greater Bristol area which has been developed to be TAG compliant, and has been used to assess a number of schemes in the area that have been given funding approval by the DfT. GBATS3 produces matrices of trips and journey data (time,

identified using a Discounted Cash Flow analysis.⁵ The following 'do minimum' schemes have been assumed to be in place by 2021 (the opening year for Phase 2):

- Great Western mainline electrification and associated improvements
- Filton Bank four-tracking and Bristol East Junction enhanced renewal
- MetroWest Phase 1
- North Fringe to Hengrove Package (NFHP)
- Major developments and associated infrastructure identified in the authorities' Core Strategies (with the pace of development as reported in the authorities' annual monitoring reports)
- Other planned rail service changes consistent with those assumed in the MOIRA analysis

GBATS3 has two forecast years which have been used in the scheme assessment, 2016 and 2031 (results from the former has been adjusted, as appropriate, to align with the 2021 opening year).

The new transport modelling and methodology to support the Preliminary Business Case is reported in:

- Appendix C - Network Rail Socio Economic Appraisal Report including details of the Discounted Cash Flow Modelling
- Appendix D - MetroWest Phase 2 Forecasting Report

Supporting modelling documentation includes:

- South Bristol Link Data Collection Report, April 2013
- South Bristol Link HAM Validation Report, April 2013
- South Bristol Link PTAM Validation Report, April 2013
- South Bristol Link Demand Model Report, April 2013
- South Bristol Link Forecasting Report, April 2013

cost and distance) for three time periods (AM peak, inter-peak and PM peak hours) and several modes (car, bus, rail and MetroBus), also subdivided by user class (commuting, other home based trips and business journeys) and income level of travellers.

⁵ The value for money assessment of MetroWest Phase 2 was undertaken using a Discounted Cash Flow (DCF) model developed by Network Rail. This model is used for socio-economic appraisal and developed in accordance with TAG. It enables the quantification and monetisation of benefits and costs. The model considers a stream of costs and benefits, which are presented in 2010 present values over the appraisal period

3.4 Summary of modelled scheme impacts

Figure 3.3 shows the notional population catchment areas of the MetroWest Phase 2 stations at 2km thresholds.

FIGURE 3.3
2km notional catchment areas of new MetroWest Phase 2 stations

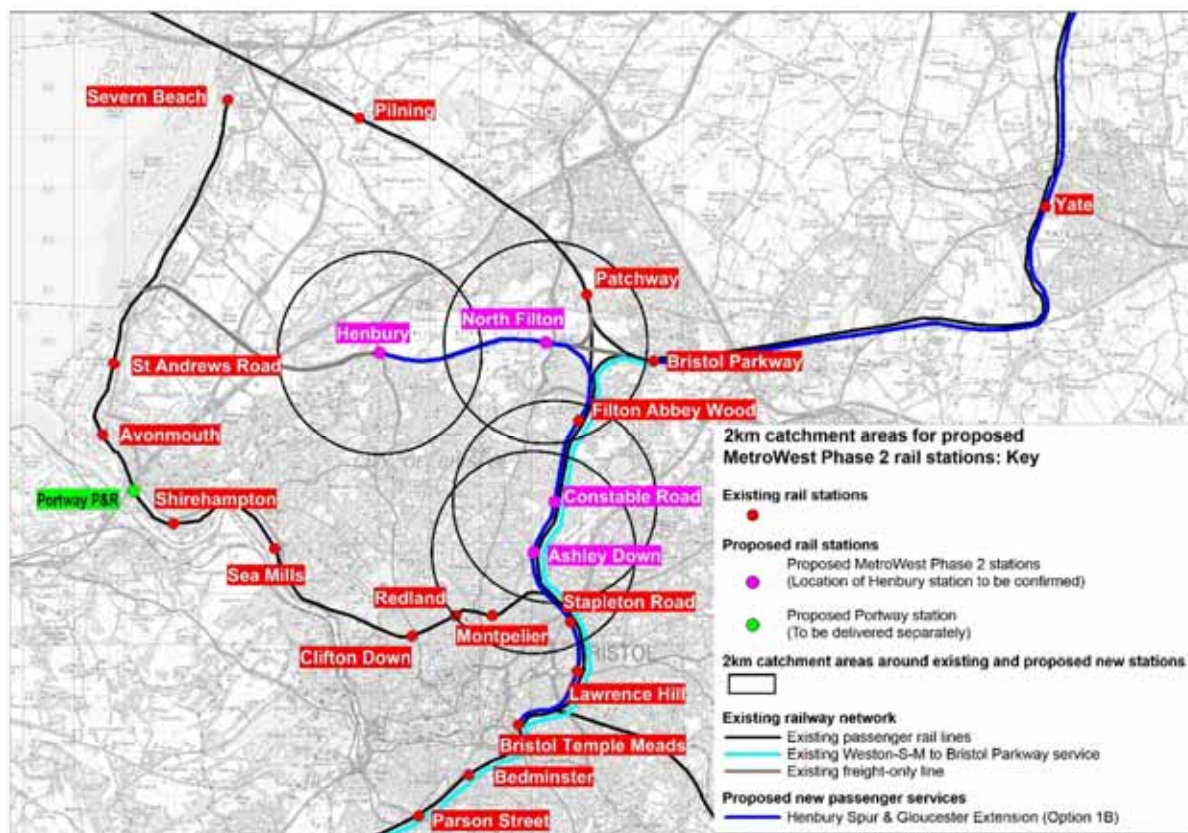


Table 3.3 shows the typical journey times between various stations, indicating in particular the differences between the 'spur' and 'loop' train service options, also illustrating comparable bus journey times where appropriate.

TABLE 3.3
Typical journey times by rail and bus from the proposed stations for all four options

From	Options	To: Severn Beach	St Andrews Rd	Avon'th	Shire h'pton	Sea Mills	Clifton Down	Redland	Montpelier	Temple Meads
Ashley Down	Spur	51*	47*	42*	39*	35*	28*	26*	24*	7
	Loop	41**	23	25	34	35	28	26	24	7
	Bus	Change of bus required							20^	10
Constable Rd	Spur	52*	48*	43*	40*	36*	29*	27*	25*	8
	Loop	40*	22	24	33	36	29	27	25	8
	Bus	Change of bus required						19	23^	11
North Filton	Spur	61*	57*	52*	49*	45*	38*	36*	34*	17
	Loop	30**	13	15	24	28	32	36	34	17
	Bus	Change of bus required				41	Change of bus		42^	35
Henbury	Spur	65*	61*	56*	53*	49*	42*	40*	38*	21
	Loop	26**	9	11	20	24	28	36	38	21
	Bus	Chg bus	14	19	38^	Chg bus	18	60^	51	41

* change at Stapleton Road required. ** change at St Andrews Road required ^ 10+ minutes walk from the nearest bus stop. Journey times include on-vehicle and inter-change times only (not access/egress walk times)

The above summary indicates that journey times from all four stations at Henbury, North Filton, Constable Road and Ashley Down to Bristol Temple Meads would be quicker along the Filton Bank alignment than equivalent bus services. It is recognised, however, those wishing to access the city centre, an additional time for walking or to connect with a bus service will need to be added to total rail time. Similarly, the total time for bus services would be reduced to reflect the direction of routes through the city centre to reach Temple Meads.

The situation regarding accessing trip attractions along the Severn Beach line is more complex. The analysis shows that the loop options do not provide advantages in accessing Montpelier and Redland stations with a connection at Stapleton Road generally providing a quicker service. In terms of Clifton Down, access by bus is quicker where direct bus services are currently available (in the case of Henbury and Constable Road). Further west, the loop offers some advantages above both the spur and bus with a few minutes difference particularly at Avonmouth and Shirehampton. However, it has to be noted that bus services (for example, route 41 between Henbury and Avonmouth/Shirehampton) is more frequent and this will be a further consideration for travellers.

Forecasts of rail use for new stations associated with the Henbury spur and loop options are shown in Table 3.4. In calculating demand at the new stations allowance has been made for the degree to which catchments overlap.

TABLE 3.4
New Station Forecasts (one way trips)

Change in rail use	Option 1a Henbury Spur + Yate	Option 1b Henbury Spur + Gloucester	Option 2a Henbury Loop + Yate	Option 2b Henbury Loop + Gloucester
Ashley Down	89,400	89,400	89,450	89,450
Constable Road	37,700	37,700	37,750	37,750
North Filton	92,300	92,300	93,200	93,200
Henbury	98,850	98,850	100,000	100,000

Notes: rail journeys in year 2021, rounded to the nearest fifty

Table 3.4 shows slight differences in demand between options at both Ashley Down and Constable Road. The Loop-based options show slightly higher demand at Henbury and North Filton, which reflects the improved connectivity between these stations and stations on the Severn Beach line (between Clifton Down and St Andrews Road).

The total increase in demand (one-way journeys) generated by MetroWest Phase 2 is shown in Table 3.5. This is taken from the MOIRA demand forecasts for existing stations, and the new stations forecasts for both the Filton Bank and Henbury spur/loop. Both have been translated to 2021 (opening year) demand levels using the future year rail demand growth profile assumed for West of England area stations.

TABLE 3.5
Increase in rail demand (one way trips)

2021 rail use	Option 1a Henbury Spur + Yate	Option 1b Henbury Spur + Gloucester	Option 2a Henbury Loop + Yate	Option 2b Henbury Loop + Gloucester
Existing stations	58,250	82,250	61,150	85,150
New stations	318,250	318,250	320,400	320,400
Total	376,500	400,500	381,550	405,550

Note: Rounded to the nearest fifty. Net increases in rail demand at existing stations are presented (i.e. the gross forecast from MOIRA is reduced, making an allowance for existing rail trips that transfer to new stations and are therefore not 'new to the railway').

The analysis has been undertaken using the MOIRA forecasting tool and works on a network wide basis therefore disaggregation of benefits at individual stations not readily available.

The forecasting work demonstrates that the scheme has the potential to add around 400,000 one way trips to the local rail network per year. Table 3.5 again illustrates that the Loop does generate some additional patronage when compared to the Spur; some 5,100 trips in year 2021. It also shows that extending the Yate service to Gloucester would generate more demand than terminating at Yate; around 24,000 extra trips in 2021.

Train capacity and crowding will be considered in the Outline Business Case, as more refined details are developed of the train service specification, including departure times and staff/rolling stock utilisation. Initial analysis indicates that 2-car 15Xs diesel multiple unit would not provide adequate capacity in the peak periods at the latter end of the appraisal period.

The multi-modal demand model functionality of the GBATS3 model enabled the mode switch resulting from the rail improvements to be quantified. In turn, this reduction in highway trips has enabled a forecast of reduced congestion in the network. Tables 3.6 and 3.7 summarise these changes.

The impact of MetroWest Phase 2 on the highway network is a measureable (in GBATS3) reduction in traffic, and its commensurate effects. However, the amount of change is very small when compared to overall traffic modelled.

Reductions in car trips of around 0.1% are noted in all options in 2031, though reflecting the congested nature of the road network, car travel times are reduced by around 0.2% in peak periods and total queuing time by up to 0.3% at peak times. Small changes are not unexpected as the quantum of rail trips is much lower in GBATS3 when compared to highway trips (for instance, rail trips are only 3.5% of all trips in the AM peak model). As such, even significant changes in rail demand would not generate large changes on the road network – and MetroWest Phase 2 options only increase rail demand in the modelled area by up to 3% (AM peak).

Differences between options themselves are very small, with slightly greater effects on traffic being noted when comparing options serving Gloucester with those serving Yate, and similarly when comparing options with the Henbury line as a 'loop' service to the Avonmouth and with Henbury as a 'spur'. For instance, total modelled travel times are some 0.05% quicker comparing between Options 1b and 1a, and comparing Option 2b with Option 2a. Similar differences are noted when comparing Option 2a with Option 1a and 2b with 1b.

Table 3.6
2021 Opening Year Highway model network wide statistics

	Do minimum			Option 1a			Option 1b		
	AM	IP	PM	AM	IP	PM	AM	IP	PM
Queues (pcu. hrs./hr.)	7338	4498	7025	7324	4492	7009	7321	4493	7009
Total Travel Time (pcu. hrs./hr.)	26409	18173	25918	26377	18160	25870	26378	18163	25869
Travel Distance (pcu. kms./hr.)	1114346	856032	1091845	1113748	855402	1091298	1113838	855324	1091268
Overall Average Speed (kph)	42	47	42	42	47	42	42	47	42
Total Trips Loaded (pcu/hr)	128148	105253	120262	128104	105216	120208	128101	105213	120205
				1a vs do min			1b vs do min		
				AM	IP	PM	AM	IP	PM
Queues (pcu. hrs./hr.)				-0.2%	-0.1%	-0.2%	-0.2%	-0.1%	-0.2%
Total Travel Time (pcu. hrs./hr.)				-0.1%	-0.1%	-0.2%	-0.1%	-0.1%	-0.2%
Travel Distance (pcu. kms./hr.)				-0.1%	-0.1%	-0.1%	-0.0%	-0.1%	-0.1%
Overall Average Speed (kph)				-	-	0.2%	-	-	0.2%
Total Trips Loaded (pcu/hr)				-0.0%	-0.0%	-0.0%	-0.0%	-0.0%	-0.0%
	Do minimum			Option 2a			Option 2b		
	AM	IP	PM	AM	IP	PM	AM	IP	PM
Queues (pcu. hrs./hr.)	7338	4498	7025	7328	4493	7007	7329	4493	7014
Total Travel Time (pcu. hrs./hr.)	26409	18173	25918	26393	18162	25864	26393	18162	25879
Travel Distance (pcu. kms./hr.)	1114346	856032	1091845	1113674	855375	1091384	1113773	855402	1091409
Overall Average Speed (kph)	42	47	42	42	47	42	42	47	42
Total Trips Loaded (pcu/hr)	128148	105253	120262	128103	105216	120207	128100	105212	120204
				2a vs do min			2b vs do min		
				AM	IP	PM	AM	IP	PM
Queues (pcu. hrs./hr.)				-0.1%	-0.1%	-0.2%	-0.1%	-0.1%	-0.2%
Total Travel Time (pcu. hrs./hr.)				-0.1%	-0.1%	-0.2%	-0.1%	-0.1%	-0.1%
Travel Distance (pcu. kms./hr.)				-0.1%	-0.1%	-0.0%	-0.1%	-0.1%	-0.0%
Overall Average Speed (kph)				-	-	0.2%	-	-	0.2%
Total Trips Loaded (pcu/hr)				-0.0%	-0.0%	-0.0%	-0.0%	-0.0%	-0.0%

Note: The GBATS model assumes 2016 as a proxy for the opening year

Table 3.7
2031 Highway model network wide statistics

	Do minimum			Option 1a			Option 1b		
	AM	IP	PM	AM	IP	PM	AM	IP	PM
Queues (pcu. hrs./hr.)	9999	6278	9483	9979	6250	9475	9974	6259	9457
Total Travel Time (pcu. hrs./hr.)	35635	23855	34845	35562	23805	34745	35540	23814	34725
Travel Distance (pcu. kms./hr.)	1332452	1076024	1310273	1331496	1074421	1308993	1331387	1074707	1308770
Overall Average Speed (kph)	37	45	38	37	45	38	38	45	38
Total Trips Loaded (pcu/hr)	151773	128979	142065	151694	128879	141937	151689	128872	141930
				1a vs do min			1b vs do min		
				AM	IP	PM	AM	IP	PM
Queues (pcu. hrs./hr.)				-0.2%	-0.4%	-0.1%	-0.3%	-0.3%	-0.3%
Total Travel Time (pcu. hrs./hr.)				-0.2%	-0.2%	-0.3%	-0.3%	-0.2%	-0.3%
Travel Distance (pcu. kms./hr.)				-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Overall Average Speed (kph)				-	-	0.3%	0.3%	-	0.3%
Total Trips Loaded (pcu/hr)				-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
				2a vs do min			2b vs do min		
				AM	IP	PM	AM	IP	PM
Queues (pcu. hrs./hr.)				-0.2%	-0.2%	-0.2%	-0.1%	-0.5%	-0.4%
Total Travel Time (pcu. hrs./hr.)				-0.2%	-0.1%	-0.3%	-0.2%	-0.2%	-0.4%
Travel Distance (pcu. kms./hr.)				-0.1%	-0.2%	-0.1%	-0.1%	-0.2%	-0.1%
Overall Average Speed (kph)				0.3%	-	0.3%	-	-	0.3%
Total Trips Loaded (pcu/hr)				-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
	Do minimum			Option 2a			Option 2b		
	AM	IP	PM	AM	IP	PM	AM	IP	PM
Queues (pcu. hrs./hr.)	9999	6278	9483	9978	6268	9467	9984	6247	9449
Total Travel Time (pcu. hrs./hr.)	35635	23855	34845	35557	23825	34726	35566	23801	34715
Travel Distance (pcu. kms./hr.)	1332452	1076024	1310273	1331675	1074365	1308926	1331486	1074218	1308699
Overall Average Speed (kph)	37	45	38	38	45	38	37	45	38
Total Trips Loaded (pcu/hr)	151773	128979	142065	151693	128877	141936	151687	128870	141929

3.5 Key economic assumptions

The main non-project specific economic appraisal parameters and assumptions are drawn from the requisite units of the DfT's appraisal guidance contained in TAG. Key assumptions for the economic assessment are as follows.

General assumptions

- Opening year 2021, construction year 2020
- Appraisal period = 60 years
- Network Rail Discounted Cash Flow model = current model year 2014, first year of benefits 2021
- Price base year and base year for discounting = 2010
- Discount rate = 3.5% for 30 years from current year then 3% thereafter
- The appraisal approach identifies cost items that will be inflated above the prevailing inflation rate

Cost assumptions

- Train operating staff costs to increase in line with average earnings index (AEI)
- Cost of train operating company profit as a percentage of any change in operating costs = 8%
- Optimism bias level for capital costs = 50%
- Optimism bias level for operating costs = 2% per annum
- Capital expenditure is assumed to be funded by devolved major scheme funding, Local Growth Fund and the four Authorities
- Future renewal expenditure is assumed to be Regulatory Asset Base (RAB) funded
- The new infrastructure and assets are to be renewed every 30 years except some elements of the new tracks (ballast is assumed to be renewed every 20 years)
- Each train is assumed to be formed of 2-car 15Xs 'Sprinter' diesel multiple unit (currently used for local services in the area)
- Maintenance costs for the new rail stations is £550k per annum at 2013 prices, at this stage track renewal is excluded
- TOC revenue and operating cost transfer = 100% after expiry of the franchise that is operating at the time of opening
- Network Rail operating cost transfer = 0% during current control period, 100% after current control period

Transport demand assumptions

- Values of time in the DCF model are £31.96 per hour for business users, £6.81 per hour for commuters and £6.04 for other users (all in 2010 prices)
- The 'Rule of a Half' is applied to time savings for new users in calculating benefits
- Value of time is assumed to grow in line with GDP
- Average fare increases (above RPI) = 1% (based on current Government policy for regulated rail fares)
- Highway network growth has been forecast using the GBATS3 multi-modal model, which is in turn based on local development assumptions controlled to DfT's Tempro forecasts
- Modelled growth from the GBATS3 do minimum scenario in car trips is 1.7% per annum to 2016 and 1.3% per annum between 2016 and 2031.
- Growth in background rail demand is assumed to initially carry on from historic trends, tending towards future year forecast rates over time. As such, background rail demand growth in 2014 is assumed at 5.6% per annum, declining to 1.7% per annum by 2033. From 2034, no further growth is assumed, in line with TAG recommendations.

3.6 Economy impacts

3.6.1 Business users & transport providers (TEE Tables)

The annualisation factors used in the economic assessment are set out in Table 3.8. This shows how the AM peak, inter peak and PM peak models have been used to calculate benefits 24 hours a day over a whole year.

Table 3.8

Annualisation factors (Source: GBATS3)

Time Period	Modelled Hour to Period Conversion Factor	Number of Occurrences per Year	Annualisation Factors	Comments
AM	2.55	253	645.15	Conversion based on AM peak hour
IP	6	253	1518	Conversion based on IP average hour
PM	2.56	253	647.68	Conversion based on PM peak hour
Off peak	0.69	253	174.57	Conversion based on IP average hour
Weekend	6.07	56	339.92	Conversion based on IP average hour

The TEE tables for the options are shown in the Tables 3.9-3.12.

TABLE 3.9

TEE Table: Option 1a Henbury Spur + Yate

Consumer - Commuting user benefits	All Modes	Road	Bus	Rail
Travel Time	60,318	11,066	0	49,252
Vehicle operating costs	3,441	3,441	0	0
User charges	-7	-7	0	0
During Construction & Maintenance	-356	-32	0	-323
NET CONSUMER - COMMUTING BENEFITS	63,397	14,468	0	48,929

Consumer - Other user benefits	All Modes	Road	Bus	Rail
Travel Time	24,820	4,553	0	20,267
Vehicle operating costs	1,416	1,416	0	0
User charges	-3	-3	0	0
During Construction & Maintenance	-356	-32	0	-323
NET CONSUMER - OTHER BENEFITS	25,878	5,934	0	19,943

Business	All Modes	Personal	Freight	Personal	Freight	Personal	Freight
Travel Time	15,705	6,510	3,973	0	0	5,222	0
Vehicle operating costs	1,332	338	994	0	0	0	0
User charges	11	8	2	0	0	0	0
During Construction & Maintenance	-712	-65	0	0	0	-647	0
Subtotal	16,337	6,792	4,970	0	0	4,575	0

Private Sector Provider Impacts	All Modes	Road	Bus	Rail
Revenue	0	0	0	0
Operating costs	0	0	0	0
Investment costs	0	0	0	0
Grant/subsidy	0	0	0	0
Subtotal	0	0	0	0

Other business Impacts	All Modes	Road	Bus	Rail
Developer contributions	0	0	0	0
NET BUSINESS IMPACT	16,337			

TOTAL

Present Value of Transport Economic

Efficiency Benefits (TEE)	105,611
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Notes: Benefits appear as positive numbers, while costs appear as negative numbers.
All entries are present values discounted to 2010, in 2010 prices

TABLE 3.10
TEE Table: Option 1b Henbury Spur + Gloucester

Consumer - Commuting user benefits	All Modes	Road	Bus	Rail
Travel Time	60,521	9,675	0	50,845
Vehicle operating costs	3,314	3,314	0	0
User charges	-11	-11	0	0
During Construction & Maintenance	-333	-30	0	-303
NET CONSUMER - COMMUTING BENEFITS	63,490	12,948	0	50,542

Consumer - Other user benefits	All Modes	Road	Bus	Rail
Travel Time	38,849	6,211	0	32,638
Vehicle operating costs	2,127	2,127	0	0
User charges	-7	-7	0	0
During Construction & Maintenance	-333	-30	0	-303
NET CONSUMER - OTHER BENEFITS	40,635	8,300	0	32,335

Business	All Modes	Personal	Freight	Personal	Freight	Personal	Freight
Travel Time	22,375	6,340	6,392	0	0	9,643	0
Vehicle operating costs	1,179	297	882	0	0	0	0
User charges	11	5	6	0	0	0	0
During Construction & Maintenance	-667	-61	0	0	0	-606	0
Subtotal	22,899	6,582	7,280	0	0	9,037	0

Private Sector Provider Impacts	All Modes	Road	Bus	Rail
Revenue	0	0	0	0
Operating costs	0	0	0	0
Investment costs	0	0	0	0
Grant/subsidy	0	0	0	0
Subtotal	0	0	0	0

Other business Impacts	All Modes	Road	Bus	Rail
Developer contributions	0	0	0	0
NET BUSINESS IMPACT	22,899			

TOTAL

Present Value of Transport Economic

Efficiency Benefits (TEE)	127,024
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Notes: Benefits appear as positive numbers, while costs appear as negative numbers.
 All entries are present values discounted to 2010, in 2010 prices

TABLE 3.11
TEE Table: Option 2a Henbury Loop + Yate

Consumer - Commuting user benefits	All Modes	Road	Bus	Rail
Travel Time	54,054	11,509	0	42,545
Vehicle operating costs	4,507	4,507	0	0
User charges	8	8	0	0
During Construction & Maintenance	-391	-36	0	-355
NET CONSUMER - COMMUTING BENEFITS	58,179	15,989	0	42,190

Consumer - Other user benefits	All Modes	Road	Bus	Rail
Travel Time	29,422	6,264	0	23,158
Vehicle operating costs	2,453	2,453	0	0
User charges	4	4	0	0
During Construction & Maintenance	-391	-36	0	-355
NET CONSUMER - OTHER BENEFITS	31,489	8,687	0	22,802

Business	All Modes	Personal	Freight	Personal	Freight	Personal	Freight
Travel Time	16,749	4,890	3,861	0	0	7,998	0
Vehicle operating costs	1,638	321	1,316	0	0	0	0
User charges	4	18	-14	0	0	0	0
During Construction & Maintenance	-782	-71	0	0	0	-711	0
Subtotal	17,609	5,158	5,164	0	0	7,287	0

Private Sector Provider Impacts	All Modes	Road	Bus	Rail
Revenue	0	0	0	0
Operating costs	0	0	0	0
Investment costs	0	0	0	0
Grant/subsidy	0	0	0	0
Subtotal	0	0	0	0

Other business Impacts	All Modes	Road	Bus	Rail
Developer contributions	0	0	0	0
NET BUSINESS IMPACT	17,609			

TOTAL

Present Value of Transport Economic

Efficiency Benefits (TEE)	107,276
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Notes: Benefits appear as positive numbers, while costs appear as negative numbers.
 All entries are present values discounted to 2010, in 2010 prices

TABLE 3.12
TEE Table: Option 2b Henbury Loop + Gloucester

Consumer - Commuting user benefits	All Modes	Road	Bus	Rail
Travel Time	62,687	11,654	0	51,032
Vehicle operating costs	4,010	4,010	0	0
User charges	6	6	0	0
During Construction & Maintenance	-368	-33	0	-335
NET CONSUMER - COMMUTING BENEFITS	66,334	15,637	0	50,697

Consumer - Other user benefits	All Modes	Road	Bus	Rail
Travel Time	39,011	7,253	0	31,758
Vehicle operating costs	2,496	2,496	0	0
User charges	3	3	0	0
During Construction & Maintenance	-368	-33	0	-335
NET CONSUMER - OTHER BENEFITS	41,141	9,718	0	31,423

Business	All Modes	Personal	Freight	Personal	Freight	Personal	Freight
Travel Time	21,707	8,508	3,904	0	0	9,295	0
Vehicle operating costs	1,575	398	1,177	0	0	0	0
User charges	5	8	-3	0	0	0	0
During Construction & Maintenance	-737	-67	0	0	0	-670	0
Subtotal	22,550	8,847	5,078	0	0	8,625	0

Private Sector Provider Impacts	All Modes	Road	Bus	Rail
Revenue	0	0	0	0
Operating costs	0	0	0	0
Investment costs	0	0	0	0
Grant/subsidy	0	0	0	0
Subtotal	0	0	0	0

Other business Impacts	All Modes	Road	Bus	Rail
Developer contributions	0	0	0	0
NET BUSINESS IMPACT	22,550			

TOTAL

Present Value of Transport Economic

Efficiency Benefits (TEE)	130,025
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Notes: Benefits appear as positive numbers, while costs appear as negative numbers.
 All entries are present values discounted to 2010, in 2010 prices

3.6.2 Reliability impacts on Business users

The overall reduction in congestion on the highway network set out in Section 3.6.1 will have some positive impact on journey time reliability. This has not been quantified for this Preliminary Business Case, but will be considered in the Outline Business Case.

3.6.3 Regeneration and Wider Impacts

The assessment seeks to capture the following three types of wider impacts over a 60-year appraisal period from the scheme opening year 2021 to 2081:

- **Agglomeration** – By reducing journey times across the West of England region, the relative agglomeration of business in this area will increase. This will have a direct impact on the productivity and GDP of the UK and is a central element to the estimation of Wider Impacts
- **Output change in imperfectly competitive markets** – A reduction in the costs of transport allows businesses to operate more efficiently, improves their output and intensity of business practices, and hence allows for benefits
- **Labour supply impacts** – This captures tax revenues arising from the welfare effects to the UK economy of having a wider human resource pool. As travel costs are reduced, more workers will be attracted to the workplace from either new areas accessible by the scheme or areas that are already connected receiving an improved service

Input for this assessment include demographic information from Census 2011 and DfT's standard wider impact dataset as well as output from GBATS3 model.

Assessment results are shown in Table 3.13.

TABLE 3.13
Wider Impacts, £000s

Assessment	Option 1a Spur + Yate	Option 1b Spur + Gloucester	Option 2a Loop + Yate	Option 2b Loop + Gloucester
Agglomeration	£29,624	£32,095	£30,061	£32,535
Output change in imperfectly competitive markets	£1,735	£2,180	£2,005	£2,138
Labour supply impacts	£1,513	£1,633	£1,534	£1,654
Total Wider Impacts	£32,873	£35,908	£33,601	£36,327

Note: 2010 year price base

The distribution pattern of the Wider Impacts from MetroWest Phase 2 is consistent with other benefits derived from the scheme. The methodology adopted for the assessment is in line with the latest TAG guidance and is detailed in Appendix E.

The scheme links into a number of regeneration areas, as shown in Figure 2.1. Importantly, the scheme links into the Temple Quarter Enterprise Zone and will support Filton Enterprise Area. Atkins' 'GVA Impacts of Major Transport Schemes' study estimated some 2,700 gross (2,550 net) jobs will be 'unlocked' by rail schemes (MetroWest Phase 1, MetroWest Phase 2 & new stations), resulting in £153m in net additional GVA per annum by 2030.

3.7 Environment impacts

This section provides an overview of the environmental issues. The anticipated level of impact is based on the information available and from supporting studies such as GBATS3 and the GRIP process and compares Phase 2 with the do minimum. Unless explicitly stated otherwise, assessments of impacts are applicable to all Phase 2 options.

3.7.1 Noise

At this stage, a full noise assessment is not appropriate; nevertheless, a review of DEFRA's noise mapping portal indicates the main corridors leading into Bristol exceeding 70db(A). This includes the M32, the A38 Gloucester Road and the A4018. The latter two roads, in particular, should benefit from changes in traffic arising from the scheme as shown in Figure 3.4.

For the Henbury line and access points towards the stations, there are likely to be localised impacts arising from diesel trains accelerating and stopping, vehicle movements and the possibility of station audio announcements. **Overall it is envisaged that the scheme options will have a slight to moderate adverse noise impact.**

3.7.2 Air quality

To assess air quality impacts associated with the introduction of diesel locomotives, Defra (2009) guidance recommends that lines only need to be considered where there is currently heavy traffic from diesel trains and where the estimated background NO₂ concentration is greater than 25 ug/m³. The only line which meets this criteria across the full extent of the scheme is the Bristol Temple Meads to Bristol Parkway line, which will experience additional trains from all options of the scheme. Based on Defra (2009) guidance, the air quality impacts of emissions from diesel locomotives introduced as a result of the scheme are, therefore, expected to be non-significant.

South Gloucestershire Council (SGC) has declared three AQMAs within its boundary as follows:

- Staple Hill – at the Broad Street (A4175), High Street (B4465), Victoria Street and Soundwell Road (A4017) crossroads
- Kingswood – along Regent Street (A420)
- Cribbs Causeway – adjacent to the M5 Roundabout (Junction 17)

Within the Bristol City Council (BCC), the AQMA covers:

- The city centre, the M32 corridor to Frenchay, A38 to Horfield, A432 to Fishponds and A4134 to Brislington.

Figure 3.5 shows the relative locations of the AQMAs to the alignments of the four options. The Bristol and Cribbs Causeway AQMAs are likely to experience a minor reduction in highway traffic as outlined in section 3.4. This suggests highway modelling suggests changes to air quality as set out in Tables 3.14 and 3.15. On balance, it is envisaged that the scheme options will have a **slight beneficial or neutral air quality impact.**

FIGURE 3.4
DEFRA existing noise map (Bristol City Area)

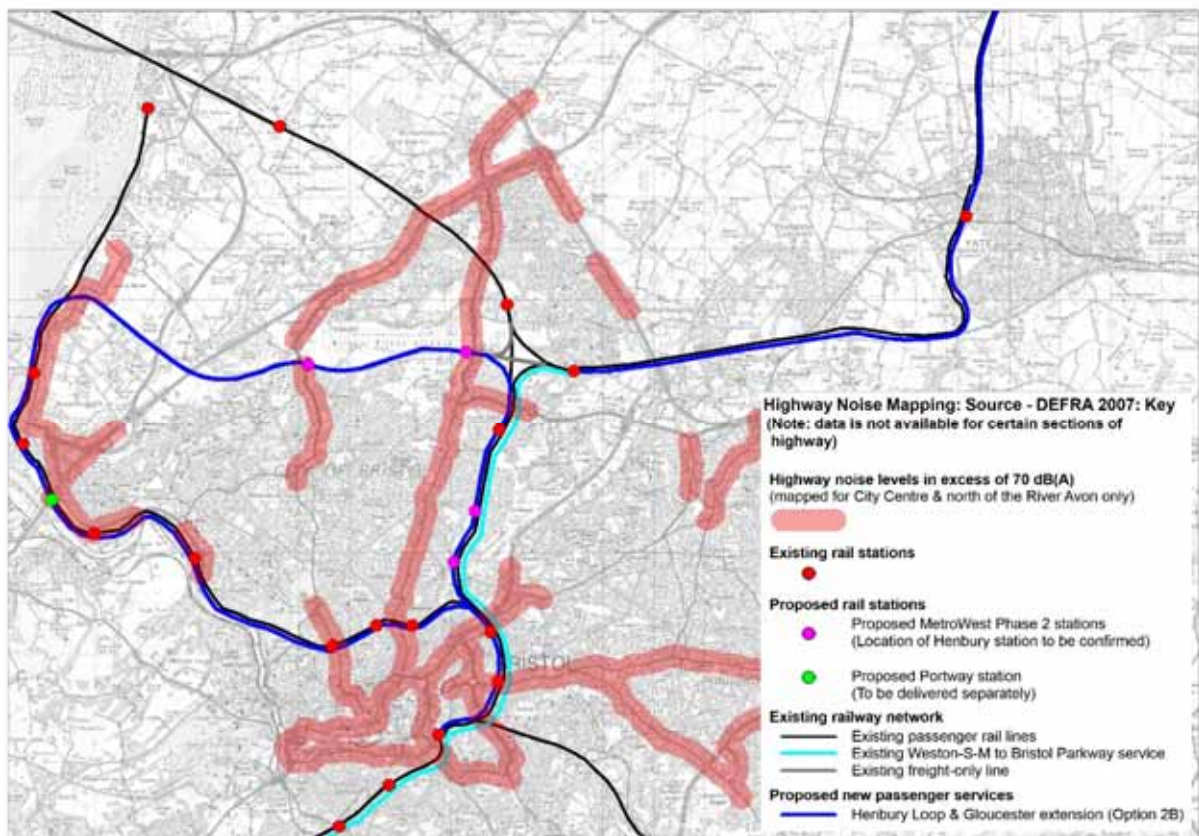


FIGURE 3.5
Plan showing locations of AQMAs and Air Quality Monitoring Sites

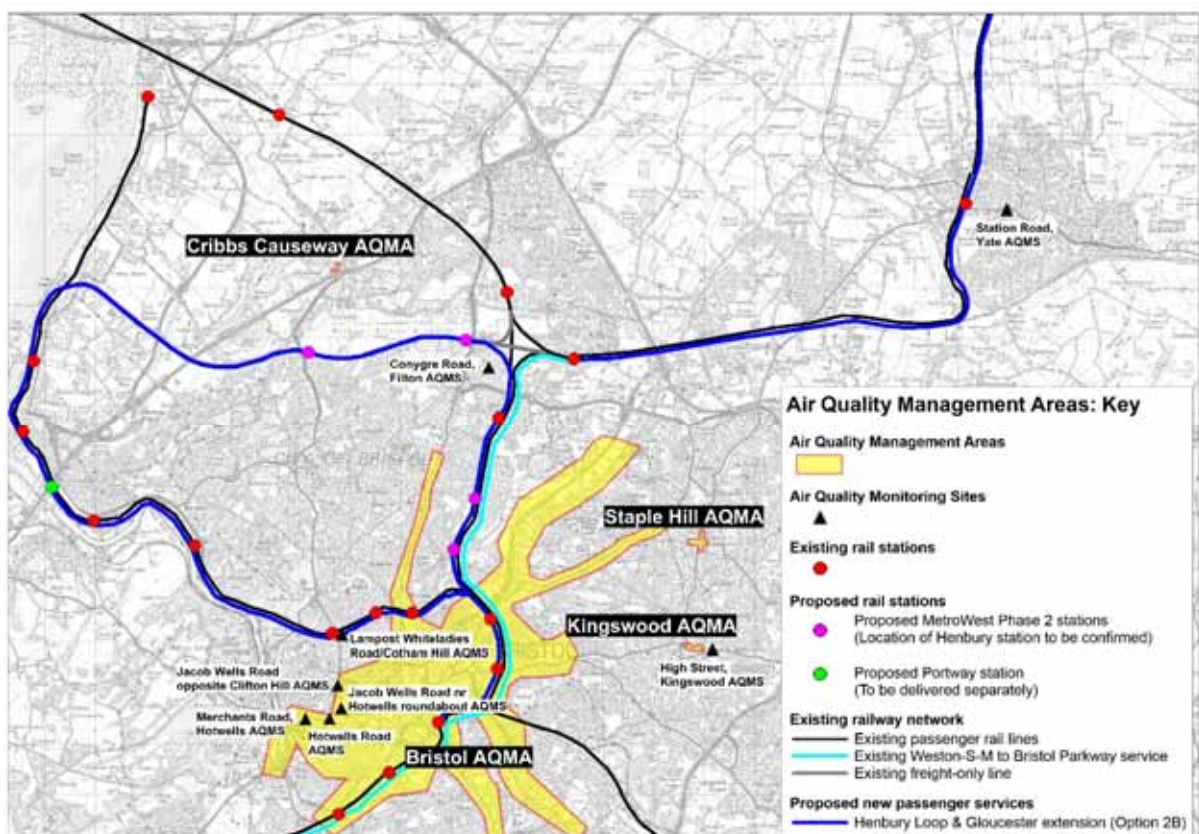


TABLE 3.14
2021 Environmental impacts from changes in highway traffic

Pollutant	units	2021 Baseline			Option 1a			Option 1b			Option 2a			Option 2b		
		AM	IP	PM	AM	IP	PM	AM	IP	PM	AM	IP	PM	AM	IP	PM
CO	kg	8554.96	5956.96	8352.5	8545.62	5952.45	8339.2	8545.69	5952.96	8338.8	8548.69	5952.8	8337.33	8548.5	5952.87	8340.93
CO2	kg	99552.55	72913.96	97821.41	99465.77	72857.49	97708.56	99471.39	72858.16	97703.95	99484.24	72859.34	97699.02	99485.79	72860.85	97723.98
NOX	kg	2140.88	1568.22	2075.13	2139.42	1567.04	2073.47	2139.4	1566.95	2073.47	2139.41	1567.01	2073.39	2139.52	1567.05	2073.64
HC	kg	1550.58	1084.65	1512.93	1548.94	1083.83	1510.63	1548.95	1083.91	1510.56	1549.45	1083.88	1510.32	1549.42	1083.9	1510.92
PB	kg	8.88	6.33	8.64	8.87	6.33	8.63	8.87	6.33	8.63	8.87	6.33	8.63	8.87	6.33	8.63
PM10	kg	8.88	6.33	8.64	8.87	6.33	8.63	8.87	6.33	8.63	8.87	6.33	8.63	8.87	6.33	8.63

Pollutant	units	Option 1a vs 2021 Baseline			Option 1b vs 2021 Baseline			Option 2a vs 2021 Baseline			Option 2b vs 2021 Baseline		
		AM	IM	PM	AM	IM	PM	AM	IM	PM	AM	IM	PM
CO	kg	-9.34	-4.51	-13.3	-9.27	-4	-13.7	-6.27	-4.16	-15.17	-6.46	-4.09	-11.57
CO2	kg	-86.78	-56.47	-112.85	-81.16	-55.8	-117.46	-68.31	-54.62	-122.39	-66.76	-53.11	-97.43
NOX	kg	-1.46	-1.18	-1.66	-1.48	-1.27	-1.66	-1.47	-1.21	-1.74	-1.36	-1.17	-1.49
HC	kg	-1.64	-0.82	-2.3	-1.63	-0.74	-2.37	-1.13	-0.77	-2.61	-1.16	-0.75	-2.01
PB	kg	-0.01	0	-0.01	-0.01	0	-0.01	-0.01	0	-0.01	-0.01	0	-0.01
PM10	kg	-0.01	0	-0.01	-0.01	0	-0.01	-0.01	0	-0.01	-0.01	0	-0.01

Pollutant	units	Option 1a vs 2021 Baseline			Option 1b vs 2021 Baseline			Option 2a vs 2021 Baseline			Option 2b vs 2021 Baseline		
		AM	IM	PM	AM	IM	PM	AM	IM	PM	AM	IM	PM
CO	kg	-0.11%	-0.08%	-0.16%	-0.11%	-0.07%	-0.16%	-0.07%	-0.07%	-0.18%	-0.08%	-0.07%	-0.14%
CO2	kg	-0.09%	-0.08%	-0.12%	-0.08%	-0.08%	-0.12%	-0.07%	-0.07%	-0.13%	-0.07%	-0.07%	-0.10%
NOX	kg	-0.07%	-0.08%	-0.08%	-0.07%	-0.08%	-0.08%	-0.07%	-0.08%	-0.08%	-0.06%	-0.07%	-0.07%
HC	kg	-0.11%	-0.08%	-0.15%	-0.11%	-0.07%	-0.16%	-0.07%	-0.07%	-0.17%	-0.07%	-0.07%	-0.13%
PB	kg	-0.11%	0.00%	-0.12%	-0.11%	0.00%	-0.12%	-0.11%	0.00%	-0.12%	-0.11%	0.00%	-0.12%
PM10	kg	-0.11%	0.00%	-0.12%	-0.11%	0.00%	-0.12%	-0.11%	0.00%	-0.12%	-0.11%	0.00%	-0.12%

Note: The GBATS model assumes 2016 as a proxy for the opening year

TABLE 3.15
2031 Environmental impacts from changes in highway traffic

Pollutant	units	Do Minimum			Option 1a			Option 1b			Option 2a			Option 2b		
		AM	IP	PM	AM	IP	PM	AM	IP	PM	AM	IP	PM	AM	IP	PM
CO	kg	11226.27	7786.34	10908.39	11207.87	7769.04	10886.26	11203.93	7771.21	10878.91	11207.67	7774.86	10880.96	11207.48	7767.32	10872.36
CO2	kg	126133.81	93698.45	123771.8	125972.28	93515.68	123572.94	125941.59	93545.16	123513.15	125975.72	93554.95	123534.03	125964.02	93496.42	123464.27
NOX	kg	2621.89	1997.06	2531.62	2619.32	1993.49	2529.03	2619.1	1993.88	2528.03	2619.64	1993.82	2528.52	2619.17	1993.1	2526.91
HC	kg	2022.9	1414.36	1964.69	2019.68	1411.28	1960.85	2019.02	1411.66	1959.57	2019.68	1412.26	1959.94	2019.61	1410.97	1958.43
PB	kg	11.28	8.18	10.92	11.27	8.16	10.91	11.27	8.16	10.9	11.27	8.16	10.9	11.27	8.16	10.89
PM10	kg	11.28	8.18	10.92	11.27	8.16	10.91	11.27	8.16	10.9	11.27	8.16	10.9	11.27	8.16	10.89

Pollutant	units	Option 1a vs Do Minimum			Option 1b vs Do Minimum			Option 2a vs Do Minimum			Option 2b vs Do Minimum		
		AM	IM	PM	AM	IM	PM	AM	IM	PM	AM	IM	PM
CO	kg	-18.4	-17.3	-22.13	-22.34	-15.13	-29.48	-18.6	-11.48	-27.43	-18.79	-19.02	-36.03
CO2	kg	-161.53	-182.77	-198.86	-192.22	-153.29	-258.65	-158.09	-143.5	-237.77	-169.79	-202.03	-307.53
NOX	kg	-2.57	-3.57	-2.59	-2.79	-3.18	-3.59	-2.25	-3.24	-3.1	-2.72	-3.96	-4.71
HC	kg	-3.22	-3.08	-3.84	-3.88	-2.7	-5.12	-3.22	-2.1	-4.75	-3.29	-3.39	-6.26
PB	kg	-0.01	-0.02	-0.01	-0.01	-0.02	-0.02	-0.01	-0.02	-0.02	-0.01	-0.02	-0.03
PM10	kg	-0.01	-0.02	-0.01	-0.01	-0.02	-0.02	-0.01	-0.02	-0.02	-0.01	-0.02	-0.03

Pollutant	units	Option 1a vs Do Minimum			Option 1b vs Do Minimum			Option 2a vs Do Minimum			Option 2b vs Do Minimum		
		AM	IM	PM	AM	IM	PM	AM	IM	PM	AM	IM	PM
CO	kg	-0.16%	-0.22%	-0.20%	-0.20%	-0.19%	-0.27%	-0.17%	-0.15%	-0.25%	-0.17%	-0.24%	-0.33%
CO2	kg	-0.13%	-0.20%	-0.16%	-0.15%	-0.16%	-0.21%	-0.13%	-0.15%	-0.19%	-0.13%	-0.22%	-0.25%
NOX	kg	-0.10%	-0.18%	-0.10%	-0.11%	-0.16%	-0.14%	-0.09%	-0.16%	-0.12%	-0.10%	-0.20%	-0.19%
HC	kg	-0.16%	-0.22%	-0.20%	-0.19%	-0.19%	-0.26%	-0.16%	-0.15%	-0.24%	-0.16%	-0.24%	-0.32%
PB	kg	-0.09%	-0.24%	-0.09%	-0.09%	-0.24%	-0.18%	-0.09%	-0.24%	-0.18%	-0.09%	-0.24%	-0.27%
PM10	kg	-0.09%	-0.24%	-0.09%	-0.09%	-0.24%	-0.18%	-0.09%	-0.24%	-0.18%	-0.09%	-0.24%	-0.27%

3.7.3 Greenhouse gases

On average, the carbon emissions for Bristol and South Gloucestershire in 2012 were, respectively, approximately 6.5 kt and 20.8 kt for diesel railways and 510.2 kt and 881.6 kt for road transport. Rail transport is more energy-efficient than road transport and gives rise to less pollution per passenger kilometre than road transport; hence, with the forecast modal shift to rail, there should be a reduction in day-to-day carbon emissions from transport. This is supported by results from GBATS3; Table 3.16 shows the results.

TABLE 3.16

Carbon assessment (highway impacts only)

Assessment	Option 1a Henbury Spur + Yate	Option 1b Henbury Spur + Gloucester	Option 2a Henbury Loop + Yate	Option 2b Henbury Loop + Gloucester
Change in non-traded carbon over 60 year (CO ₂)	-36541	-39866	-39761	-44599
Change in traded carbon over 60 year (CO ₂)	-113	-123	-123	-138

The carbon impacts of construction will be principally associated with the materials used for the construction of new railway stations.

On balance, it is envisaged that the scheme will have a **moderate beneficial greenhouse gases impact**.

3.7.4 Landscape

Given that the MetroWest Phase 2 scheme involves the use of existing operational railway lines, the main landscape impacts will arise from the station locations and, potentially, the Yate turn-back. An environmental appraisal of the competing station locations as part of the Network Rail GRIP process has been undertaken as shown in Table 3.17.

TABLE 3.17

Landscape assessment

Assessment	Option 1a Henbury Spur + Yate	Option 1b Henbury Spur + Gloucester	Option 2a Henbury Loop + Yate	Option 2b Henbury Loop + Gloucester
Does the scheme need to clear vegetation or trees on railway land or access routes?	Yes –vegetation needs to be cleared at all stations and Yate turnback	Yes –vegetation needs to be cleared at all stations	Yes –vegetation needs to be cleared at all stations, Yate turnback	Yes –vegetation needs to be cleared at all stations
Does the scheme need to remove hedgerows?	Yes – for the Henbury station locations and at Constable Road	Yes – for the Henbury station locations and at Constable Road	Yes – for the Henbury station locations and at Constable Road	Yes – for the Henbury station locations and at Constable Road

The appraisal identified that surveys to identify tree preservation orders (TPOs), contaminated land and whether the scheme will open up pathways from contaminated areas to environmental receptors (e.g. SSSIs). It is noted that no agricultural land is affected by the options as outline planning permission for housing development has been granted for sites surrounding Henbury Station. Pending more detailed assessment, given the likely number of designations and receptors, all options are envisaged to have a **moderate adverse landscape impact**.

3.7.5 Townscape

At this stage, as the station designs have not been developed in detail so only a broad assessment can be undertaken of the impacts on townscape. Table 3.18 summarises the likely townscape impacts for the four station locations which apply.

TABLE 3.18
Townscape Assessment

Assessment	All options (1a, 1b, 2a and 2b)
Ashley Down	Moderate adverse impact – A ramped footbridge will be required at this site which will have a direct impact on neighbouring properties. In addition, existing cycleway will need to be diverted and this may have an impact on neighbouring properties.
Constable Road	Neutral impact – A ramped footbridge or will be required at this site which will have minor impact on neighbouring properties because it is in cutting.
North Filton	Neutral impact – Access from Gloucester Road will utilise existing bridges and will require ramps down to the station location in a cutting
Henbury	Slight adverse impact –A footbridge will be required at the Henbury East location (for a Loop service) and this will overlook and be visible from neighbouring properties.

On the basis of the above, it is envisaged that the design of the stations and surrounding public realm would have a **slightly adverse impact on the townscape**.

3.7.6 Heritage and historic resources

This section looks at both statutory and non-statutory designations in addition to non-designated cultural heritage assets. Both direct and indirect impacts (such as issues related to visual and historic settings) and effects to both resources are considered.

The construction phase of the scheme will result in impacts to the buried environment, which might result in the loss or degradation of buried archaeological features. Assuming buried archaeology existed in the footprint of the station building or its access infrastructure, a medium value of assets is assumed. Equally, the removal of extant railway architecture, including redundant trackside structures, tracks and sleepers, may have an impact on the cultural heritage. In addition, there is a potential setting issue to designated buildings in the study area.

Heritage assessments have been made of the scheme components (except for the Ashley Down and Constable Road location)s, it is envisaged that the scheme options are likely to have a neutral heritage impact on:

- A listed building, structure or scheduled ancient monument
- A local planning Conservation area, historic landscape features and similar designated area
- Any other historical or man-made feature likely to be of value

Further survey work is required for the Ashley Down and Constable Road locations.

The construction impact constitutes a slight adverse impact due to possible disturbance of buried archaeology due to the new stations and potential earthworks and the removal of railway architecture. There is a neutral impact from operational activities due to a slight negative impact of rolling stock creating setting issues but a slight positive benefit from restoration of the railway line. On balance, it is envisaged that the scheme options will have **neutral heritage impact** for all options.

3.7.7 Biodiversity

As well as adhering to national and local policy, national and local action plans have also been used to inform this business case. Biodiversity 2020: A strategy for England's wildlife and ecosystem services, published in 2011, is the most recent biodiversity strategy for England. Bristol Biodiversity Action Plan (BBAP) and South Gloucestershire Biodiversity Action Plan (SGBAP) identify priority habitats and species and set targets for their conservation (this includes species and habitats of relevance to the proposed scheme, such as woodland, standing open water, rivers and streams, greater horseshoe bat, water vole and hedgehog).

A short assessment of biodiversity as part of the environmental appraisal, suggests detailed survey work will be required in this instance. It is noted that none of the options include locations that are sited on or adjacent to a statutory nature conservation area. Where statutorily protected species are found to be

present following surveys, mitigation strategies (and applications for licences to Natural England, where relevant) will be prepared to protect them in advance of construction works. Overall, at this stage, all the options are considered likely to have a **slight adverse biodiversity impact** for all options.

3.7.8 Water environment

GRIP2 suggests there are no significant impacts on the water environment other than options containing locations located on or close to a water course drainage channel. Principally these relate to the Henbury Loop options 2a and 2b where there are drainage channels in the vicinity of the Hallen Marsh junction area. Further detailed investigation would be undertaken of scheme components as part of GRIP3.

Overall, apart from Hallen Marsh and a requirement for further survey work, it is envisaged that the **scheme will have slight adverse water environment impact for options 2a and 2b. Scheme options for the Henbury Spur (Option 1a and 1b) are likely to have a neutral water environment impact.**

3.7.9 Summary of environmental impacts

Table 3.19 provides a summary of environmental impacts of the scheme options.

TABLE 3.19

Environment assessment summary

Assessment	Option 1a Henbury Spur + Yate	Option 1b Henbury Spur + Gloucester	Option 2a Henbury Loop + Yate	Option 2b Henbury Loop + Gloucester
Noise	Slight/moderate adverse impact	Slight/moderate adverse impact	Slight/moderate adverse impact	Slight/moderate adverse impact
Air Quality	Slight beneficial/neutral impact	Slight beneficial/neutral impact	Slight beneficial/neutral impact	Slight beneficial/neutral impact
Greenhouse gases	Moderate beneficial impact	Moderate beneficial impact	Moderate beneficial impact	Moderate beneficial impact
Landscape	Moderate adverse impact	Moderate adverse impact	Moderate adverse impact	Moderate adverse impact
Townscape	Slight adverse impact	Slight adverse impact	Slight adverse impact	Slight adverse impact
Heritage of historic resources	Neutral impact	Neutral impact	Neutral impact	Neutral impact
Biodiversity	Slight adverse impact	Slight adverse impact	Slight adverse impact	Slight adverse impact
Water environment	Neutral	Neutral	Slight adverse impact	Slight adverse impact

3.8 Social impacts

3.8.1 Commuting and Other users (TEE Tables) and Reliability impacts on Commuting and Other users

See Section 3.6.

3.8.2 Physical activity

There is increasing evidence linking levels of physical activity with health, chronic diseases and mental health. Encouraging physical activity can improve health and reduce short-term absenteeism from work resulting in improved productivity of the workforce. Rail travel quite often involves a walk or cycle at either end (or both) of the primary mode, which would be beneficial. The increase in walking and cycling will also have longer-term benefits associated with the reduced mortality.

The scheme options are, therefore, likely to have a **slight beneficial impact to physical activity.**

3.8.3 Journey quality

Journey quality is a measure of the real and perceived physical and social environment experienced while travelling. Journey quality impacts can be subdivided into three main categories:

3.8.3.1 Traveller Care

The new stations will be built to modern standards and will conform to Equality Act, 2010. The new stations will have at least the appropriate facilities for a Network Rail 'category F' station.

The rolling stock will be an appropriate standard with adequate seating and storage space. Train journeys generally provide a smooth ride. Overcrowding could become a future issue at peak times on the proposed services, based on initial assessments of capacity assuming 2-car Class 150 DMUs are used (this will be further assessed in the Outline Business Case). Digital displays and public announcements will inform the traveller of destinations and delays.

3.8.3.2 Traveller Views

The Filton Bank and Yate elements of the scheme are along existing operational rail passenger lines. The opening of the line to Henbury will offer some new vistas, but much of it is within a tunnel or cutting; extension of services down the Henbury line to Avonmouth would offer some new views.

3.8.3.3 Traveller stress

Journey time reliability is achieved on railways by strategic timetabling. The railways generally suffer less congestion with better progress than highways. The fear of potential accidents could be reduced as rail accidents are rare events compared to collisions on the highway network. Rail lines (except stations and level crossings) are secured to prevent access by pedestrians and cyclists, reducing potential conflict further.

Rail travel usually provides excellent route certainty with timetables accessible at stations and on the internet (on the move). This information is generally 'static' apart for infrequent events such as engineering works.

3.8.3.4 Overview

The increased use of rail use in the West of England should result in a **slight beneficial impact to journey quality**.

3.8.4 Accidents

The new rail services will result in a small amount of modal shift away from cars, and as such a small overall reduction of vehicle-kms travelled on the highway network. This should have the effect of also reducing the number of accidents on the highway. The overall slight reduction in traffic has been used to estimate monetised accident impacts that are included in the option BCRs, using accident benefits derived from TAG Unit A5.4 (Marginal Economic Costs). This overall reduction would mask some localised increase in car trips in the vicinity of the new stations, which could result in accidents, but the overall impact on accidents is still considered beneficial.

The Phase 2 services and stations will be compliant with HMRI (Her Majesty's Rail Inspectorate) safety standards to ensure the highest possible operational safety.

The overall evaluation is that the scheme options would have a **slight beneficial impact to accidents**.

3.8.5 Affordability

The cost of travel can be a major barrier to mobility for certain socio-economic groups and can have an impact on access to key destinations. Although low income households spend less in absolute terms on travel, it forms a significantly higher proportion of their income.

Rail travel is generally slightly cheaper than car ownership and travel (when all the costs of running a car are taken into account). Local rail and bus fares are comparable; as of February 2015, a day return ticket from Bristol Parkway or Patchway to Bristol Temple Meads costs £4.40, or £4.20 from Filton Abbey Wood. A day bus ticket for zone 1 (which covers virtually all of the Bristol urban area) costs £4.40.

However, compared to bus and car travel, journey time savings by rail are considerable. For Filton Bank and the North Fringe stations there would be a significant journey time saving for trips to the Temple Quarter area. An increased frequency of service at Yate will give users greater flexibility when to travel and will provide some element of journey time saving (i.e. reduced average waiting times). Not only will this have a positive knock-on effect in terms of the value attributed to time but also the 'real' value of time savings (for example, a reduction in child care costs).

The scheme options are envisaged to have a **slight beneficial impact to affordability**.

3.8.6 Security

Passenger security is an important element of any public transport scheme especially in attracting patronage from particular user groups, for example women and elderly passengers. Guidelines for railway stations and public transport operators (DETR, 1998) raises a number of security issues:

- Site perimeters, entrances and exits
- Formal surveillance
- Informal surveillance
- Landscaping
- Lighting and visibility
- Emergency call facilities

Whilst it is recognised that rail stations can attract crime (whether personal or vehicular), various mitigation proposals will be incorporated into the design of the new rail stations:

- Closed-circuit television (CCTV)
- Appropriate lighting
- Passenger help points and emergency call facilities
- Designing out crime to improve the effectiveness of formal and natural surveillance including liaison with the Police during the planning process to ensure robustness. For example, it will be important to position cycle parking in areas that are not only convenient but are covered by CCTV, well lit and where there is high footfall

New rail stations may enhance the security of urban locations by providing additional footfall, CCTV, emergency contact points and improved lighting. While there is a general improvement in security of the area, rail stations can also attract crime. The scheme options are therefore envisaged to have a **neutral impact on security**.

3.8.7 Access to services

Table 3.20 describes the improvements to accessibility that MetroWest Phase 2 options would bring to key destinations. It should be noted that all of the key destinations are already well-served by local bus services, so the focus is on accessibility by rail.

The assessment indicates that although existing bus services provide a fairly comprehensive network of services, Phase 2 will provide access improvements, especially for the Temple Quarter Enterprise Zone, the Filton Enterprise Area, South Glos & Stroud and City of Bristol Colleges; the Loop would in addition provide some further benefit for Avonmouth. However, access to the major health centres and the Mall will remain largely unaffected by the scheme, because of their distance to the nearest station(s).

TABLE 3.20
Access to key services by option

	Option 1a: Henbury Spur + Yate	Option 1b: Henbury Spur + Gloucester	Option 2a: Henbury Loop + Yate	Option 2b: Henbury Loop + Gloucester
Access to the Temple Quarter Enterprise Zone	Slight beneficial impact - Improved rail access through new stations at Henbury, North Filton and along the Filton Bank. Improved frequency at Yate will provide greater flexibility to access TQEZ.			
Access to the Filton Enterprise Area	Moderate beneficial impact –the Filton Enterprise Area is adjacent to North Filton station.			
Access to the Avonmouth Enterprise Area	Slight beneficial impact – the spur service would require a change of trains at Stapleton Road to access the Avonmouth area.		Moderately beneficial impact – the loop rail service would improve direct access to Avonmouth from Henbury, Filton, Filton Abbey Wood, Constable Road and Ashley Down.	
Access to FE: S Glos and Stroud College (Filton)	Slight beneficial impact –the college is located in close proximity to the North Filton station.			
Access to FE: S Glos and Stroud College (Stoke Gifford)	Slight beneficial impact – increased number of services and stations served from Filton Abbey Wood station			
Access to FE: City of Bristol (Ashley Down)	Moderate beneficial impact – the college is within walking distance of the new station at Ashley Down			
Access to HE: UWE Coldharbour Lane	Slight beneficial impact – increased number of services and stations served from Filton Abbey Wood station.			
Access to health: Bristol Royal Infirmary	Slight beneficial impact – increased number of services and stations served from Temple Meads.			
Access to health: Southmead Hospital	Neutral – Southmead Hospital is located over 2km from the nearest station (Constable Road) and, hence, the number of hospital related journeys will be limited (especially when considering the network of bus services radiating from the hospital).			
Access to services: Clifton	Slight beneficial impact – increased number of stations served from Clifton Down (although a change of trains will be required at Stapleton Road).		Slight beneficial impact – increased number of stations served from Clifton Down, with direct links to MetroWest Phase 2 new stations and Filton Abbey Wood via loop services (although a change of trains at Stapleton Road will still be quicker for some journeys)	
Access to services: The Mall (Retail and leisure)	Neutral – The Mall is located 2.5km from the closest stations (Henbury, North Filton) and, hence, the number of journeys to and from the Mall is expected to be limited (especially when considering the network of bus services radiating from the Mall).			
Overall assessment	Slight beneficial impact	Slight beneficial impact	Moderate beneficial impact	Moderate beneficial impact

3.8.8 Severance

Community severance is defined as separation of people from existing services due to a significant change in transport infrastructure or traffic flows. Severance is something that normally only impacts on non-motorised modes, particularly pedestrians.

There would be no adverse impacts as a result of the Spur-based options, but the Loop-based options would have a significant adverse impact at St Andrews Level Crossing in Avonmouth, where the frequency of closures to traffic would double (from 2 per hour to 4 per hour). St Andrews Level Crossing is the main entry to Avonmouth Docks and the Bristol Port Company has raised concerns about the adverse impact of the Loop on its existing and future operations.

The Phase 2 GRIP2 study concluded that there were no on-line track and/or signalling improvements that could mitigate the impact of the Loop; hence, the Port Company has commissioned its own GRIP2 study into the feasibility of grade-separating track and highway.

Overall, the Spur-based scheme options are likely to have a **neutral impact on severance**, but the Loop-based options would have a **moderate adverse impact** on severance.

3.8.9 Option Values

As the appraised scheme will introduce passenger rail services to areas currently not served by this mode, option and non-use option values should be accounted for. TAG unit A4.1 states that this should be applied to the opening or closure of local stations and the introduction or loss of good quality bus services. Even in these cases, assessment on the qualitative seven-point scale should be adequate in the majority of cases.

As a result, a full assessment has not been undertaken but the additional number of people that are likely to be connected to the rail network by the new stations is over 100,000 (for all options 1a, 1b, 2a and 2b) at 2 km catchment. Applying the population thresholds laid out in TAG unit A4.1, the option and non-use values are likely to have a **large beneficial impact for all four options**. The increase in option values could affect some households owning more than one car and they may choose to reduce their car ownership, resulting in a beneficial impact to the local road networks.

3.8.10 Distributional impacts

Distributional impacts (DIs) consider the impact of transport interventions across different social groups in respect of: User Benefits; Noise; Air Quality; Accidents; Security; Accessibility; Affordability; and Severance. Maps showing the distribution of different social groups are set out in Figures 3.6 – 3.14.

In summary, analysis of impacts that could have distributional effects are:

- User Benefits – Large beneficial impact
- Noise – Slight to moderate adverse impact
- Air Quality – Slight beneficial to neutral impact
- Accidents - Slight beneficial impact
- Security - Neutral impact
- Accessibility - Slight beneficial impact (Henbury Spur Options, 1a and 1b), moderate beneficial impact (Henbury Loop Options, 2a and 2b),
- Affordability – Slight beneficial impact
- Severance – Neutral impact (Henbury Spur Options, 1a and 1b), moderate adverse impact (Henbury Loop Options, 2a and 2b)

The moderate/large impacts will affect the following particular social groups (in line with the TAG unit A4.2: Distributional Impact Appraisal):

- User Benefits – Effected social group(s) are income deprivation
- Noise – Effected social group(s) are income deprivation and children under 16
- Accessibility - Moderate beneficial impact – Effected social group(s) are income deprivation, children under 16, Young adults (16-25), older people (70 +), people with a disability, people of black and minority ethnic origin, households without a car, and households with dependent children

FIGURE 3.6
Population under 16 (Source: 2011 ONS census data)

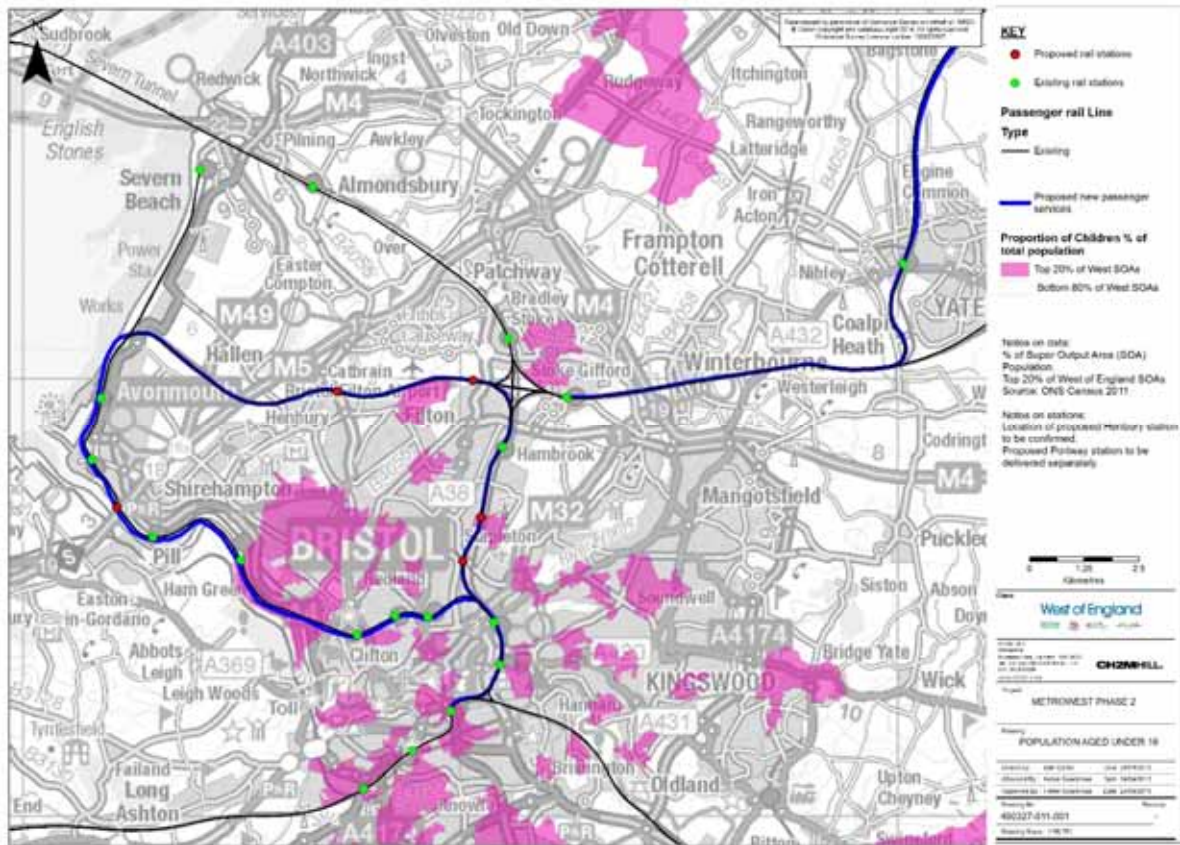


FIGURE 3.7
Population 16-25 (Source: 2011 ONS census data)

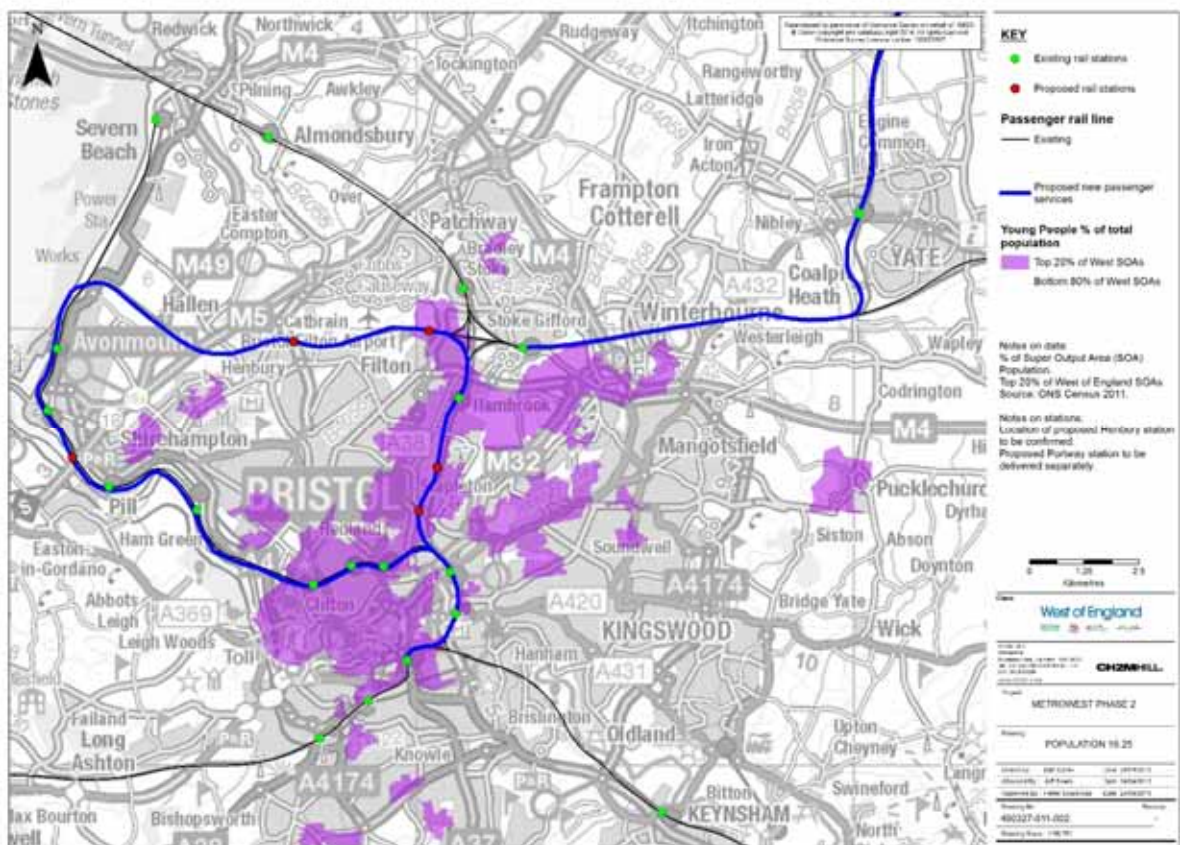


FIGURE 3.8
Population over 70 (Source: 2011 ONS census data)

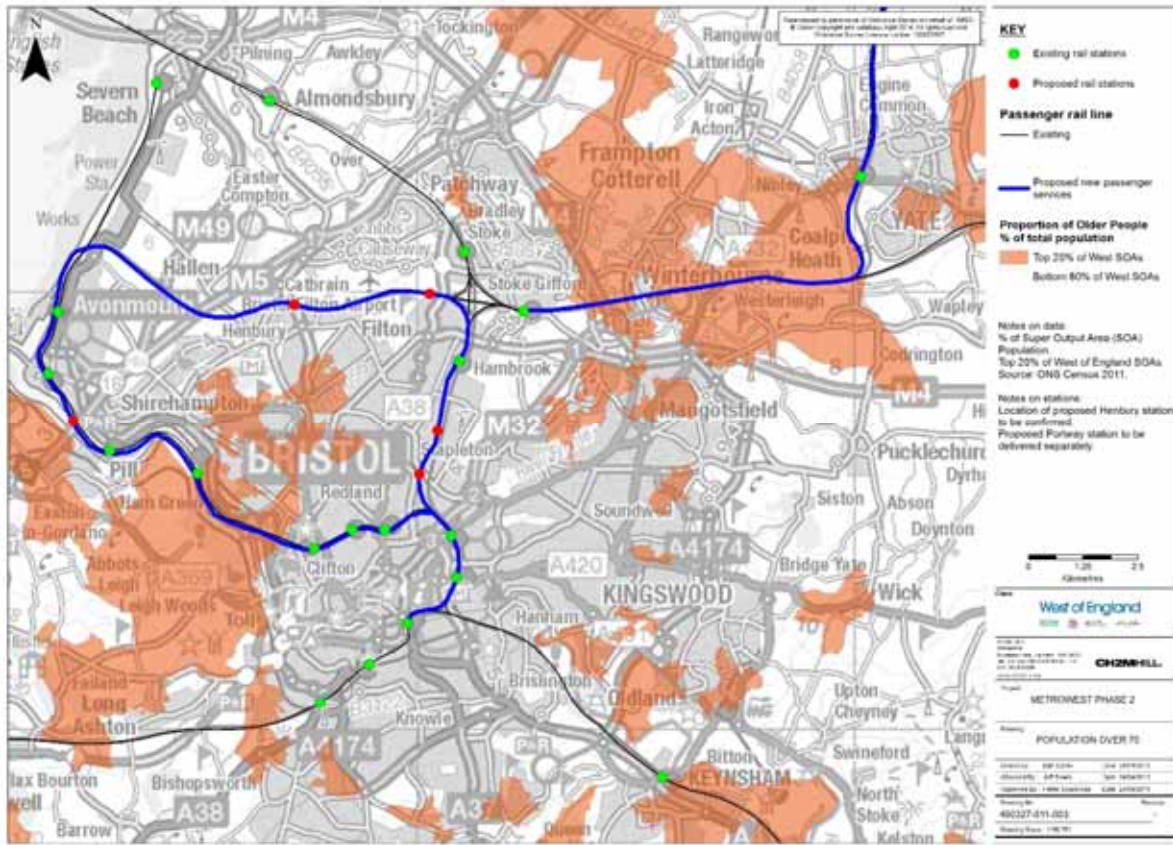


FIGURE 3.9
Population claiming Disability Living Allowance (Source: NOMIS DWP data, November 2013)

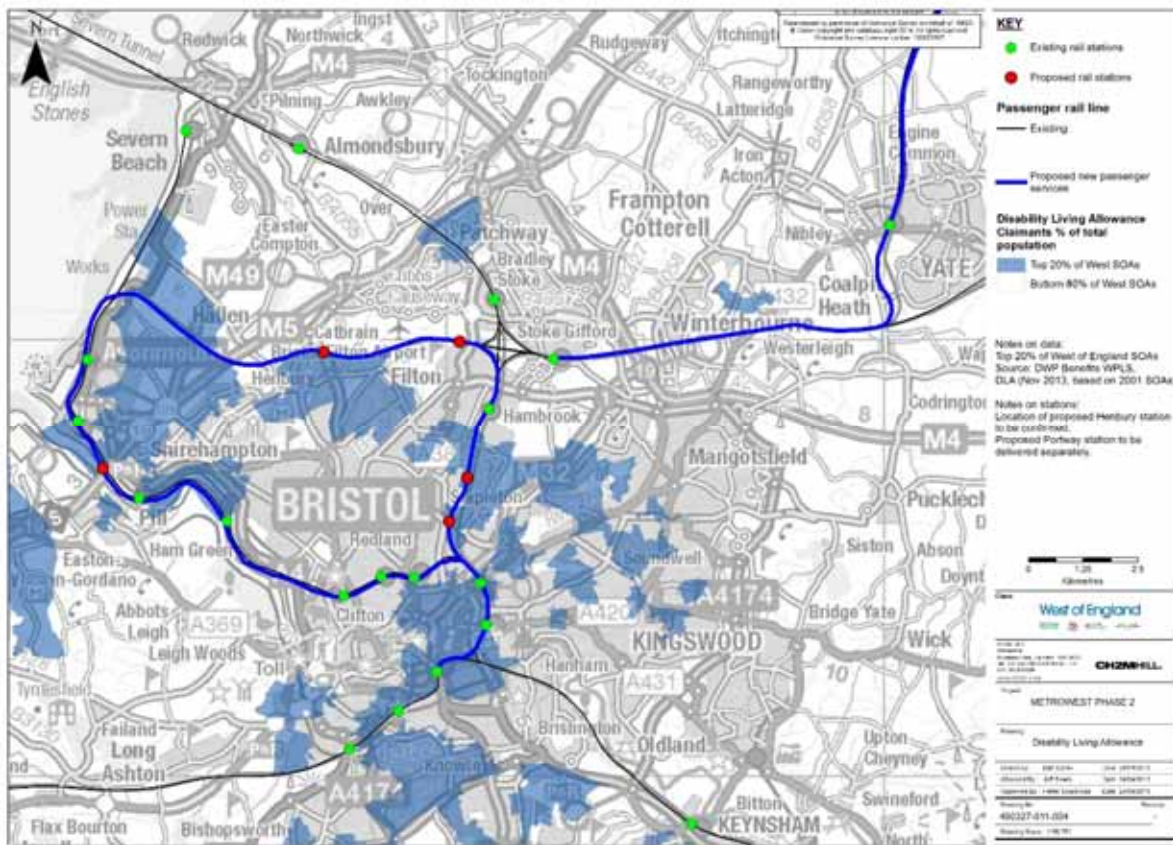


FIGURE 3.10
Population claiming Job Seekers Allowance (Source: NOMIS DWP data November 2013)

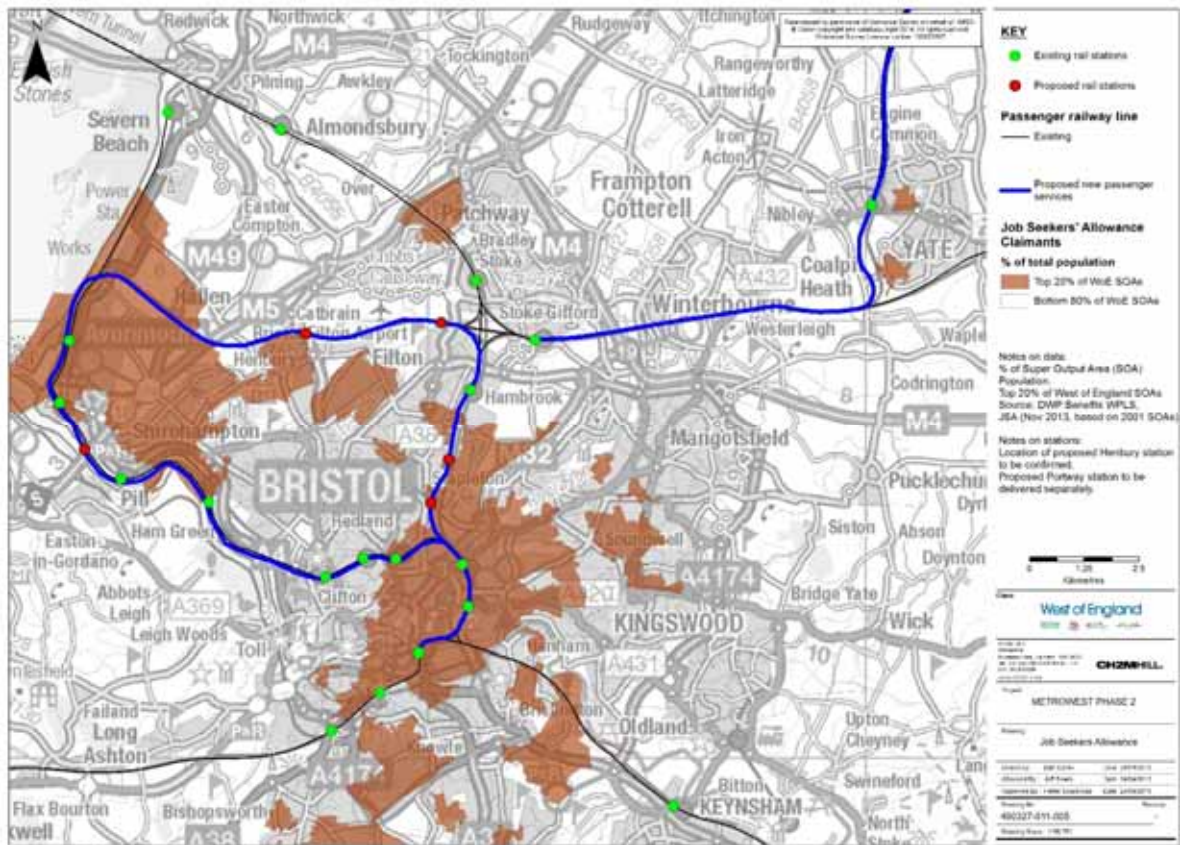


FIGURE 3.11
Black & Minority Ethnic Population (Source: 2011 ONS census data)

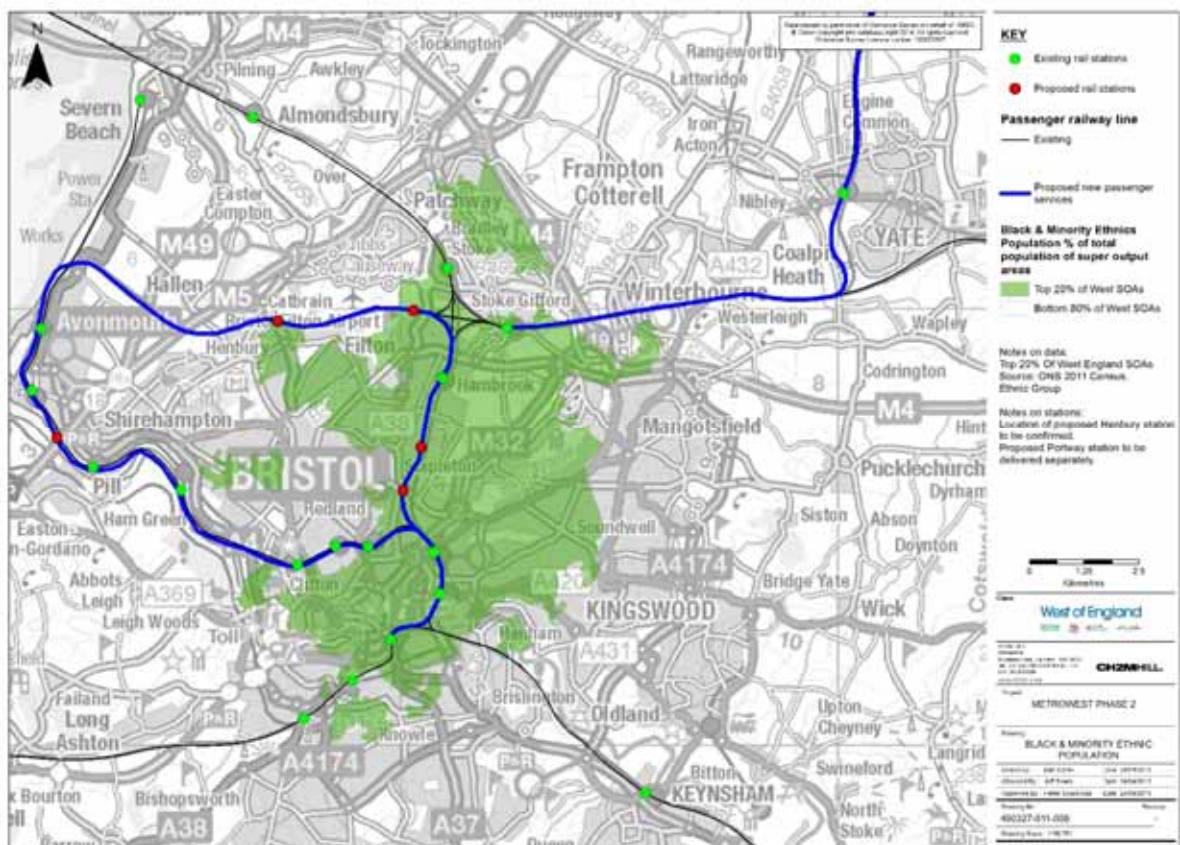


FIGURE 3.12
Households with no car (Source: 2011 ONS census data)

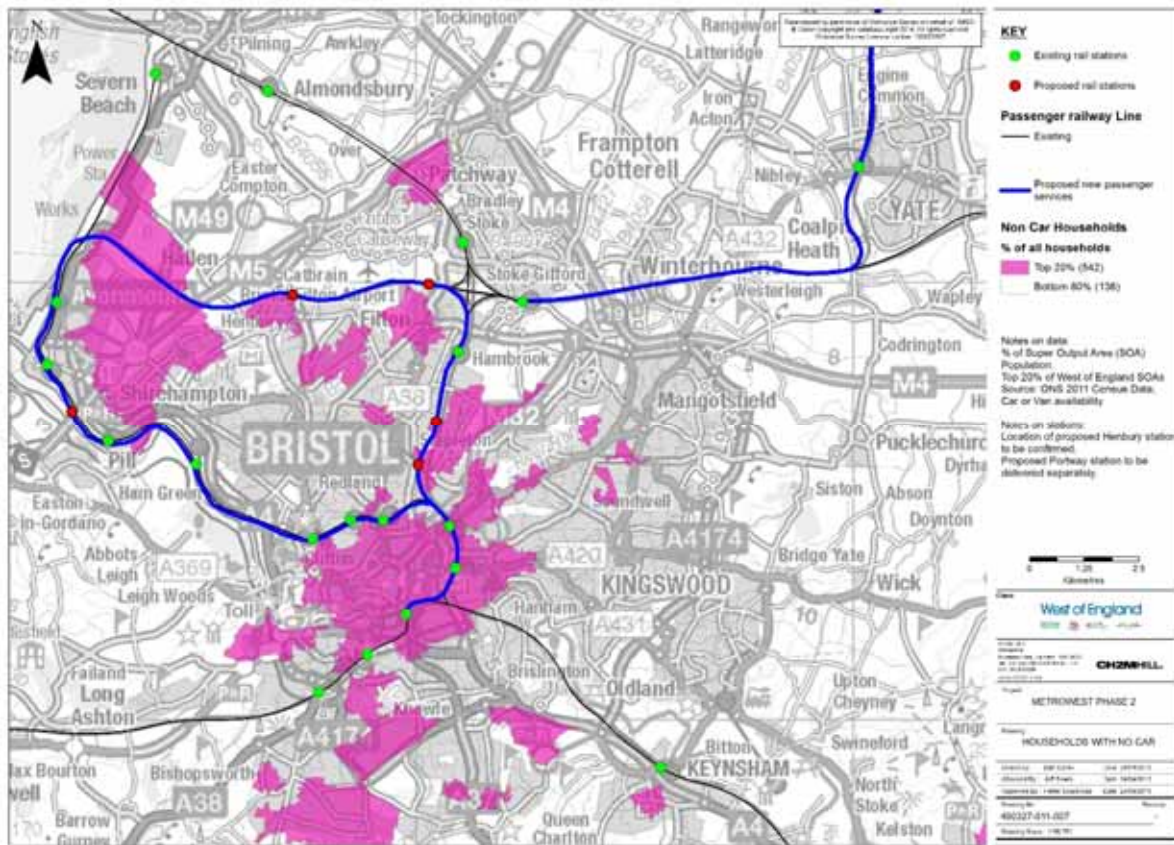


FIGURE 3.13
Index of Income deprivation (Source: 2010 DCLG data)

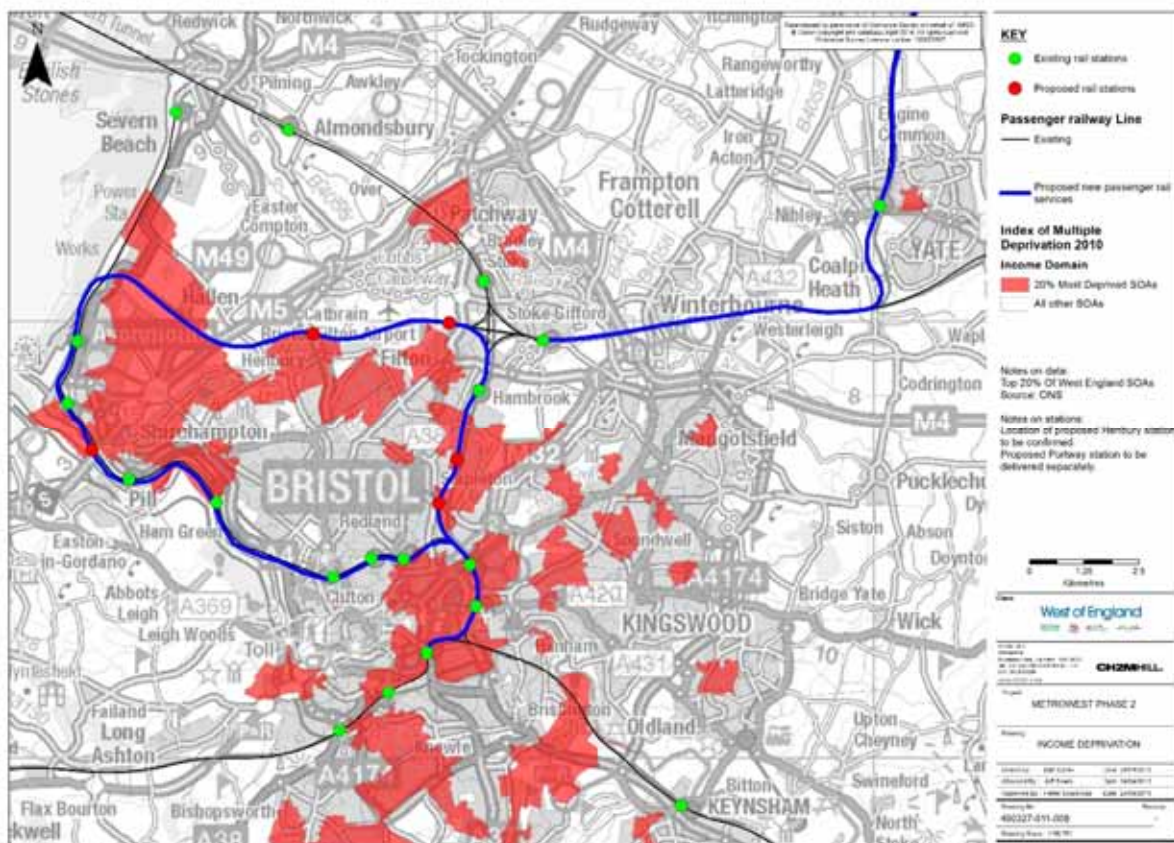
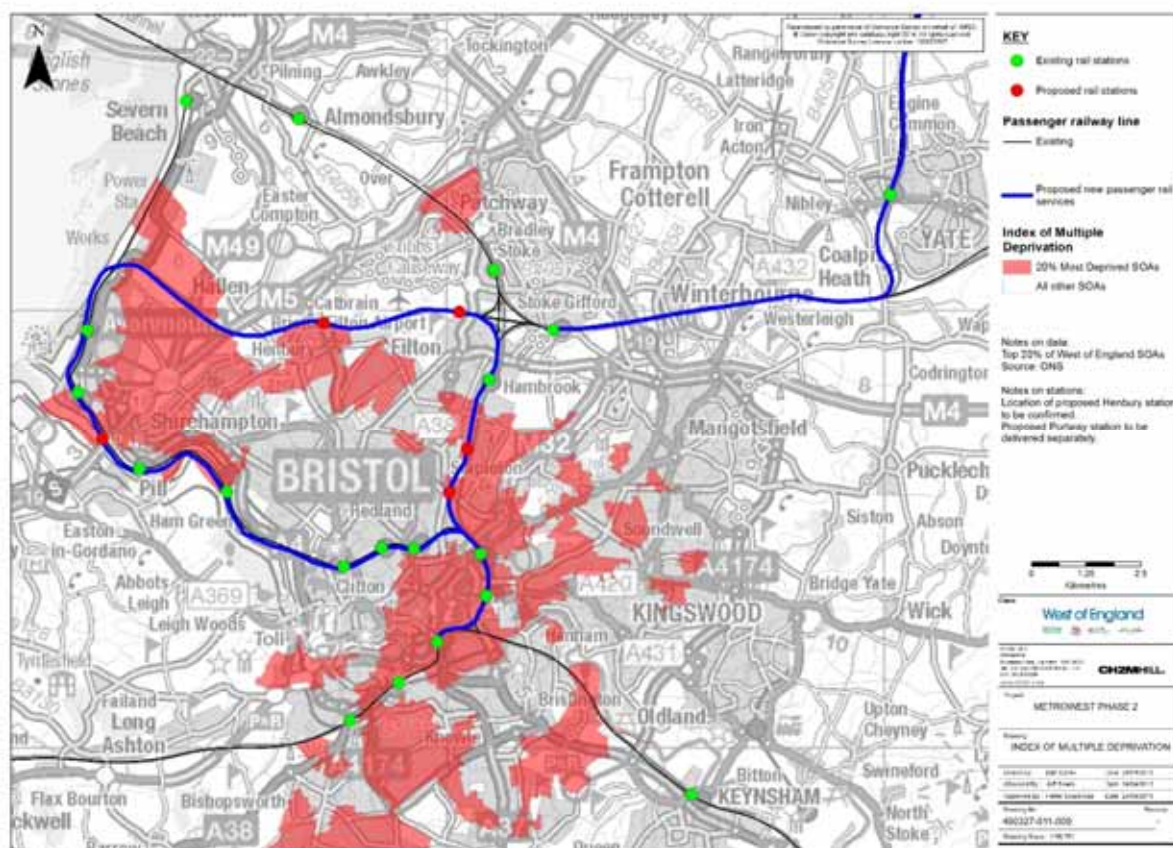


FIGURE 3.14
Index of Multiple Deprivation (Source: 2010 DCLG data)



3.9 Public Accounts impacts

3.9.1 Broad Transport Budget

Tables 3.21 to 3.24 shows the Public Accounts (PA) tables.

3.9.2 Indirect Tax Revenues

The additional rail journeys result in tax costs associated with a reduction in the number of cars on the roads. These tax costs, both fuel duty and VAT, were estimated in accordance with TAG and are presented in the Public Accounts tables in Tables 3.21-3.24

TABLE 3.21
Public Accounts (PA) table: Option 1a Henbury Spur + Yate

Local Government Funding	All Modes	Road	Bus	Rail
Revenue	6	6	0	0
Operating Costs	-72	-72	0	0
Investment Costs	0	0	0	0
Developer Contributions	0	0	0	0
Grant/Subsidy Payments	38,811	0	0	38,811
NET IMPACT	38,746	-66	0	38,811

Central Government Funding: Transport	All Modes	Road	Bus	Rail
Revenue	-56,408	0	0	-56,408
Operating costs	71,894	0	0	71,894
Investment costs	0	0	0	0
Developer Contributions	0	0	0	0
Grant/Subsidy Payments	0	0	0	0
NET IMPACT	15,487	0	0	15,487

Central Government Funding: Non-Transport	All Modes	Road	Bus	Rail
Indirect Tax Revenues	4,086	4,086	0	0

TOTALS	All Modes	Road	Bus	Rail
Broad Transport Budget	54,232	-66	0	54,298
Wider Public Finances	4,086	4,086	0	0

Notes: Costs appear as positive numbers, while revenues and developer contributions appear as negative numbers.
All entries are present values discounted to 2010, in 2010 prices

TABLE 3.22
Public Accounts (PA) table: Option 1b Henbury Spur + Gloucester

Local Government Funding	All Modes	Road	Bus	Rail
Revenue	-4	-4	0	0
Operating Costs	-98	-98	0	0
Investment Costs	0	0	0	0
Developer Contributions	0	0	0	0
Grant/Subsidy Payments	36,274	0	0	36,376
NET IMPACT	36,274	-102	0	36,376

Central Government Funding: Transport	All Modes	Road	Bus	Rail
Revenue	-67,108	0	0	-67,108
Operating costs	109,679	0	0	109,679
Investment costs	0	0	0	0
Developer Contributions	0	0	0	0
Grant/Subsidy Payments	0	0	0	0
NET IMPACT	42,571	0	0	42,571

Central Government Funding: Non-Transport	All Modes	Road	Bus	Rail
Indirect Tax Revenues	4,643	4,643	0	0

TOTALS	All Modes	Road	Bus	Rail
Broad Transport Budget	78,845	-102	0	78,947
Wider Public Finances	4,643	4,643	0	0

Notes: Costs appear as positive numbers, while revenues and developer contributions appear as negative numbers.
All entries are present values discounted to 2010, in 2010 prices

TABLE 3.23
Public Accounts (PA) table: Option 2a Henbury Loop + Yate

Local Government Funding	All Modes	Road	Bus	Rail
Revenue	31	31	0	0
Operating Costs	-74	-74	0	0
Investment Costs	0	0	0	0
Developer Contributions	0	0	0	0
Grant/Subsidy Payments	42,632	0	0	42,632
NET IMPACT	42,589	-43	0	42,632

Central Government Funding: Transport	All Modes	Road	Bus	Rail
Revenue	-57,202	0	0	-57,202
Operating costs	127,081	0	0	127,081
Investment costs	0	0	0	0
Developer Contributions	0	0	0	0
Grant/Subsidy Payments	0	0	0	0
NET IMPACT	69,879	0	0	69,879

Central Government Funding: Non-Transport	All Modes	Road	Bus	Rail
Indirect Tax Revenues	4,140	4,140	0	0

TOTALS	All Modes	Road	Bus	Rail
Broad Transport Budget	112,468	-43	0	112,511
Wider Public Finances	4,140	4,140	0	0

Notes: Costs appear as positive numbers, while revenues and developer contributions appear as negative numbers.
All entries are present values discounted to 2010, in 2010 prices

TABLE 3.24
Public Accounts (PA) table: Option 2b Henbury Loop + Gloucester

Local Government Funding	All Modes	Road	Bus	Rail
Revenue	25	25	0	0
Operating Costs	-100	-100	0	0
Investment Costs	0	0	0	0
Developer Contributions	0	0	0	0
Grant/Subsidy Payments	40,196	0	0	40,196
NET IMPACT	40,121	-75	0	40,196

Central Government Funding: Transport	All Modes	Road	Bus	Rail
Revenue	-67,889	0	0	-67,889
Operating costs	164,866	0	0	164,866
Investment costs	0	0	0	0
Developer Contributions	0	0	0	0
Grant/Subsidy Payments	0	0	0	0
NET IMPACT	96,977	0	0	96,977

Central Government Funding: Non-Transport	All Modes	Road	Bus	Rail
Indirect Tax Revenues	4,583	4,583	0	0

TOTALS	All Modes	Road	Bus	Rail
Broad Transport Budget	137,098	-75	0	137,173
Wider Public Finances	4,583	4,583	0	0

Notes: Costs appear as positive numbers, while revenues and developer contributions appear as negative numbers.
All entries are present values discounted to 2010, in 2010 prices

3.10 Summary of impacts

3.10.1 Value for Money Statement

Table 3.25 sets out the Value for Money Statement for the MetroWest Phase 2 scheme.

TABLE 3.26
Value for Money Statement

Criteria	Option 1a: Henbury Spur + Yate	Option 1b: Henbury Spur + Gloucester	Option 2a: Henbury Loop + Yate	Option 2b: Henbury Loop + Gloucester
Value for Money/Value for Money when Wider impacts are included	Medium/High	Medium/High	Poor/Low	Poor/Low
NPV	£48.63 million	£45.36 million	-£7.99 million	-£9.83 million
Initial BCR	1.90	1.58	0.93	0.93
Adjusted BCR (With Wider Impacts)	2.50	2.03	1.23	1.19
Summary of the benefits and costs	<ul style="list-style-type: none"> Rail transport user benefits (around 72% of the total benefits excluding wider impacts) Highway transport user benefits Wider Impacts £32.9 million <p>The most significant project costs driving the economic case are the operating costs.</p>	<ul style="list-style-type: none"> Rail transport user benefits (around 75% of the total benefits excluding wider impacts) Highway transport user benefits Wider Impacts £35.9 million <p>The most significant project costs driving the economic case are the operating costs.</p>	<ul style="list-style-type: none"> Rail transport user benefits (around 70% of the total benefits excluding wider impacts) Highway transport user benefits Wider Impacts £33.6 million <p>The most significant project costs driving the economic case are the operating costs.</p>	<ul style="list-style-type: none"> Rail transport user benefits (around 72% of the total benefits excluding wider impacts) Highway transport user benefits Wider Impacts £36.3 million <p>The most significant project costs driving the economic case are the operating costs.</p>
Significant non-monetised impacts	Option values			
Key risks, sensitivities and uncertainties underlying the appraisal	<ul style="list-style-type: none"> Operating cost assumptions - potential scope for greater synergies with existing services to reduce staffing and maintenance costs Rail demand forecasts, in particular future year growth in demand at new and existing stations Future year fare assumptions Age of data in the GBATS3 model (model has been revalidated and GBATS4 will be used for the Outline Business Case) 			
Significant social distributional impacts	Not assessed			

The assessment work presented in the economic case shows that there is a clear case for the options that include the Henbury Spur (Options 1a and 1b). These scheme options demonstrate **medium value for money**, largely due to the rail user benefits of the scheme. When wider impacts are included, the Henbury Spur Options offer **high value for money**.

The options that include the Henbury Loop (Options 2a and 2b) have **poor value for money (low value for money** when wider impacts are included). The Henbury Loop options provide slightly better accessibility benefits, but this would not result in large increases in rail or highway user benefits and do not compensate for the increased operating costs of the Loop.

The economic case for all options are sensitive to operating cost assumptions and rail demand forecasts, in particular future year growth in demand at new and existing stations. Further development of the scheme is likely to change the BCR, and given some BCRs are just within the high value for money category, there is a risk that the Outline Business Case work shows the scheme offers moderate value for money.

3.10.2 Analysis of Monetised Costs and Benefits (AMCB) Tables

Tables 3.27 and 3.28 shows the analysis of Monetised Costs and Benefits (AMCB) Tables

TABLE 3.27

AMCB Table

	1a: Henbury Spur + Yate	1b: Henbury Spur + Gloucester	2a Henbury Loop + Yate	2b: Henbury Loop + Gloucester
Noise, air quality & greenhouse gases	1,341	1,823	1,341	1,823
Economic Efficiency: Consumer Users (Commuting)	63,397	63,490	58,179	66,334
Economic Efficiency: Consumer Users (Other)	25,878	40,635	31,489	41,141
Economic Efficiency: Business Users and Providers	16,337	22,899	17,609	22,550
Wider Public Finances (Indirect Taxation Revenues)	-4,086	-4,643	-4,140	-4,583
Present Value of Benefits (PVB)	102,866	124,205	104,478	127,265
Broad Transport Budget	54,232	78,845	112,468	137,098
Present Value of Costs (PVC)	54,232	78,845	112,468	137,098
OVERALL IMPACTS				
Net Present Value (NPV)	48,634	45,360	-7,991	-9,833
Benefit to Cost Ratio (BCR)	1.90	1.58	0.93	0.93

Note: This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.

TABLE 3.28

AMCB Table including wider impacts

	1a: Henbury Spur + Yate	1b: Henbury Spur + Gloucester	2a Henbury Loop + Yate	2b: Henbury Loop + Gloucester
Greenhouse gases	417	567	428	578
Noise	57	78	59	79
Local Air Quality (not assessed)	-	-	-	-
Journey Ambience (not assessed)	-	-	-	-
Accidents	867	1,179	890	1,202
Reliability (not assessed)	-	-	-	-
Rail environment (not assessed)	-	-	-	-
Wider Impacts	32,873	35,908	33,601	36,327
Final PVB	135,738	160,113	138,078	163,592
PVC	54,232	78,845	112,468	137,098
NPV	81,506	81,268	25,610	26,494
BCR	2.50	2.03	1.23	1.19

3.10.3 Appraisal Summary Table (AST)

The ASTs for the four options are shown in Tables 3.29 to 3.32

TABLE 3.29 AST Option 1a Henbury Spur + Yate

Appraisal Summary Table

Appraisal Summary Table		Date produced:	3 July 2015		Contact:				
Name of scheme:	MetroWest Phase 2 - Option 1a, Henbury Spur, Yate Extension				Name	A Rice			
Description of scheme:	New stations at: Filton Bank (Ashley Down and Constable Road), Filton North, Henbury. Turnback at Hallen junction and Yate. Bristol Temple Meads to Henbury 1 train per hour (tph) all day. Extension of current Weston Super Mare to Bristol Parkway station to Yate.				Organisation	SGC			
					Role	PM			
Impacts	Summary of key impacts	Assessment							
		Quantitative			Qualitative	Monetary NPV (£'000s)	Distributional 7-pt scale/vulnerable grp		
Economy	Business users & transport providers	Significant rail user benefits. Journey time savings are significant in areas where impacts of the proposed scheme are anticipated. This covers savings for users using the new services and decongestion benefits for highway users.			Value of journey time changes (£)		Large Beneficial	£16,337	Not assessed
		Net journey time changes (£)							
		0 to 2min	2 to 5min	> 5min					
	Reliability impact on Business users	The reduction in congestion in the highway network will result in improved journey time reliability.	Not assessed				Likely to be Slight Beneficial	Not assessed	
Regeneration	The scheme links into a number of regeneration areas. Importantly, the scheme links into the Temple Quarter Enterprise Zone and will support Filton Enterprise Area.	Not assessed				Likely to be Slight Beneficial	Not assessed		
Wider Impacts	Slight improvements to agglomeration, output changes and labour market supply impacts.	Not assessed				Likely to be Slight Beneficial	£32,873		
Environmental	Noise	Receptors in the vicinity of the Henbury line and new stations will experience increases in noise associated with trains accelerating and decelerating, although receptors are already exposed to noise from existing rail traffic. There will be beneficial impacts to receptors in the vicinity of congested corridors that experience reductions in car traffic due to the scheme.	Not assessed				Likely to be Slight/Moderate Adverse	Not assessed	Not assessed
	Air Quality	The scheme operation is likely to have beneficial impacts due to the modal shift from road to rail but disadvantages for those immediately adjacent to the line.	Not assessed				Likely to be Slight Beneficial / Neutral	Not assessed	Not assessed
	Greenhouse gases	Rail transport is more energy-efficient than road transport and gives rise to less pollution per passenger kilometre than road transport; hence, with the forecast modal shift to rail, there should be a reduction in day-to-day carbon emissions from transport. The carbon impacts of construction will be principally associated with the materials used for the construction of new railway stations. Estimates impacts of changes associated with highway carbon impacts have been quantified.	Change in non-traded carbon over 60y (CO2e)	-36541		Likely to be Moderate Beneficial	£417		
		Change in traded carbon over 60y (CO2e)	-113						
	Landscape	The main landscape impacts will arise from the station locations, with the potential for impacts at the Yate turn-back. Vegetation will need to be cleared at all locations and hedgerows at Henbury and Constable Road.	Not assessed				Likely to be Moderate Adverse	Not applicable	
	Townscape	The station designs have not been developed in detail so only a broad assessment can be undertaken of the impacts on townscape. Footbridges at Ashley Down and Henbury are likely to be visible and overlook neighbouring properties.	Not assessed				Slight Adverse	Not applicable	
	Historic Environment	Likely to be neutral impacts to listed buildings and conservation areas. Removal of old, derelict but historic railway infrastructure.	Not assessed				Likely to be Neutral	Not applicable	
	Biodiversity	Surveys are required to determine presence of protected species. Options include locations on/near a statutory nature conservation area.	Not assessed				Likely to be Slight Adverse	Not applicable	
Water Environment	Based on the environmental appraisal undertaken for Network Rail, there are no impacts on the water environment other than options containing locations located on or close to a water course drainage channel.	Not assessed				Likely to be Neutral	Not applicable		
Social	Commuting and Other users	Significant rail user benefits. Journey time savings are significant in areas where impacts of the proposed scheme are anticipated. This covers savings for users using the new services and decongestion benefits for highway users.			Value of journey time changes (£)		Large Beneficial	£89,275	Not assessed
		Net journey time changes (£)							
		0 to 2min	2 to 5min	> 5min					
	Reliability impact on Commuting and Other users	The reduction in congestion in the highway network will result in improved journey time reliability.	Not assessed				Likely to be Slight Beneficial	Not assessed	
	Physical activity	Increasing physical activity by creating multi-modal trips and introducing shorter journeys which are more realistic and achievable by sustainable modes by encouraging rail passengers to walk or cycle at either end of their rail journey.	Not assessed				Likely to be Slight Beneficial	Not applicable	
	Journey quality	The increase in rail use will also have a positive impact on car users as the highway network will be less congested and journeys less stressful. The main disadvantage would be security, largely at stations where large number of people converge and potential for personal security issues.	Not applicable				Likely to be Slight Beneficial	Not assessed	
	Accidents	The new rail services will result in a small amount of modal shift away from cars, and as such a small overall reduction of vehicle-kms travelled on the highway network. This should have the effect of also reducing the number of accidents on the highway.	Proportion of user benefits assumed				Likely to be Slight Beneficial	£867	Not assessed
	Security	New rail stations may enhance the security of urban locations by providing additional footfall, CCTV, emergency contact points and improved lighting. While there is a general improvement in security of the area, rail stations can also attract crime.	Not applicable				Likely to be Neutral	Not applicable	Not assessed
	Access to services	Improved access to TQEZ, Filton Enterprise Area, Further Education sites at Filton, Stoke Gifford and Coldharbour Lane.	Not assessed				Likely to be Moderate	Not applicable	Not assessed
	Affordability	Rail travel is generally slightly cheaper than car ownership and travel with local rail and bus fares being comparable. However, compared to bus and car travel, journey time savings by rail are considerable. For Filton Bank, North Filton and Henbury there would be significant journey time savings to Temple Quarter.	Not applicable				Likely to be Slight Beneficial	Not applicable	Not assessed
Severance	The scheme itself involves the use of existing operational railway lines and as a result, the extent of severance will be limited for spur based options.	Not applicable				Likely to be Neutral	Not applicable	Not assessed	
Option and non-use values	As the appraised scheme will introduce passenger train services and will benefit more than 1000 households, it is deemed a large beneficial impact.	Not assessed				Likely to be Large Beneficial	Not applicable		
Public Accounts	Cost to Broad Transport Budget	The public sector costs associated with investments for scheme implementation and ongoing support/maintenance, such as capital investment, operating costs and revenue income.						-£54,232	
	Indirect Tax Revenues	The impact on tax and fuel duty loss as a result of reduction in fuel consumption						-£4,086	

TABLE 3.30 AST Option 1b Henbury Spur + Gloucester

Appraisal Summary Table		Date produced:	3 July 2015			Contact:	
Name of scheme:	MetroWest Phase 2 - Option 1b, Henbury Spur, Gloucester Extension					Name	A Rice
Description of scheme:	New stations at: Filton Bank (Ashley Down and Constable Road), Filton North, Henbury. Turnback at Hallen junction. Bristol Temple Meads to Henbury 1 train per hour (tph) all day. Extension of current Weston Super Mare to Bristol Parkway station to Gloucester.					Organisation	SGC
					Role	PM	
Impacts	Summary of key impacts	Assessment					
		Quantitative			Qualitative	Monetary NPV (£'000s)	Distributional 7-pt scale/vulnerable grp
Economy	Business users & transport providers	Value of journey time changes (£)			Large Beneficial	£22,899	Not assessed
		Net journey time changes (£)					
		0 to 2min	2 to 5min	> 5min			
Environmental	Reliability impact on Business users	Not assessed			Likely to be Slight Beneficial	Not assessed	
	Regeneration	Not assessed			Likely to be Slight Beneficial	Not assessed	
	Wider Impacts	Not assessed			Likely to be Slight Beneficial	£35,908	
	Noise	Not assessed			Likely to be Slight/Moderate Adverse	Not assessed	Not assessed
Social	Air Quality	Not assessed			Likely to be Slight Beneficial / Neutral	Not assessed	Not assessed
	Greenhouse gases	Change in non-traded carbon over 60y (CO2e)		-39866	Likely to be Moderately Beneficial	£567	
	Change in traded carbon over 60y (CO2e)		-123				
	Landscape	Not assessed			Likely to be Moderate Adverse	Not applicable	
	Townscape	Not assessed			Likely to be Slight Adverse	Not applicable	
	Historic Environment	Not assessed			Likely to be Neutral	Not applicable	
	Biodiversity	Not assessed			Likely to be Slight Adverse	Not applicable	
	Water Environment	Not assessed			Likely to be Neutral	Not applicable	
Public Accounts	Commuting and Other users	Value of journey time changes (£)			Large Beneficial	£104,125	Not assessed
	Net journey time changes (£)						
	0 to 2min	2 to 5min	> 5min				
	Reliability impact on Commuting and Other users	Not assessed			Likely to be slight beneficial	Not assessed	
	Physical activity	Not assessed			Likely to be slight beneficial	Not applicable	
	Journey quality	Not applicable			Likely to be slight beneficial	Not assessed	
	Accidents	Proportion of user benefits assumed			Likely to be Slight Beneficial	£1,179	Not assessed
	Security	Not applicable			Likely to be Neutral	Not applicable	Not assessed
	Access to services	Not assessed			Likely to be Moderate	Not applicable	Not assessed
Affordability	Not applicable			Likely to be Slight Beneficial	Not applicable	Not assessed	
Severance	Not applicable			Likely to be Neutral	Not applicable	Not assessed	
Option and non-use values	Not assessed			Likely to be Large	Not applicable		
Public Accounts	Cost to Broad Transport Budget					-£78,845	
	Indirect Tax Revenues					-£4,643	

TABLE 3.31 AST Option 2a Henbury Loop + Yate

Appraisal Summary Table

Appraisal Summary Table		Date produced:	3 July 2015		Contact:			
Name of scheme:	MetroWest Phase 2 - Option 2a, Henbury Loop, Yate Extension				Name	A Rice		
Description of scheme:	New stations at: Filton Bank (Ashley Down and Constable Road), Filton North, Henbury. Turnback at Yate. Bristol Temple Meads to Henbury (East or West) 1tph all day via Filton Bank and Severn Beach (clockwise and anti-clockwise directions). Extension of current Weston Super Mare to Bristol Parkway station to Yate.				Organisation	SGC		
				Role	PM			
Impacts	Summary of key impacts	Assessment						
		Quantitative			Qualitative	Monetary NPV (£'000s)	Distributional 7-pt scale/vulnerable grp	
Economy	Business users & transport providers	Value of journey time changes (£)			Large Beneficial	£17,609	Not assessed	
		Net journey time changes (£)						
		0 to 2min	2 to 5min	> 5min				
Economy	Reliability impact on Business users	The reduction in congestion in the highway network will result in improved journey time reliability.			Not assessed	Likely to be Slight Beneficial	Not assessed	
	Regeneration	The scheme links into a number of regeneration areas. Importantly, the scheme links into the Temple Quarter Enterprise Zone and will support Filton Enterprise Area.			Not assessed	Likely to be Slight Beneficial	Not assessed	
	Wider Impacts	Slight improvements to agglomeration, output changes and labour market supply impacts.			Not assessed	Likely to be Slight Beneficial	£33,601	
	Environmental	Noise	Receptors in the vicinity of the Henbury line and new stations will experience increases in noise associated with trains accelerating and decelerating, although receptors are already exposed to noise from existing rail traffic. There will be beneficial impacts to receptors in the vicinity of congested corridors that experience reductions in car traffic due to the scheme.			Not assessed	Likely to be Slight/Moderate Adverse	Not assessed
Air Quality		The scheme operation is likely to have beneficial impacts due to the modal shift from road to rail but disadvantages for those immediately adjacent to the line.			Not assessed	Likely to be Slight Beneficial / Neutral	Not assessed	
Greenhouse gases		Rail transport is more energy-efficient than road transport and gives rise to less pollution per passenger kilometre than road transport; hence, with the forecast modal shift to rail, there should be a reduction in day-to-day carbon emissions from transport. The carbon impacts of construction will be principally associated with the materials used for the construction of new railway stations. Estimates impacts of changes associated with highway carbon impacts have been quantified.			Change in non-traded carbon over 60y (CO2e)	-39761	Likely to be Moderate Beneficial	£428
					Change in traded carbon over 60y (CO2e)	-123		
Landscape		The main landscape impacts will arise from the station locations, with the potential for impacts at the Yate turn-back. Vegetation will need to be cleared at all locations and hedgerows at Henbury and Constable Road.			Not assessed	Likely to be Moderate Adverse	Not applicable	
Townscape		The station designs have not been developed in detail so only a broad assessment can be undertaken of the impacts on townscape. Footbridges at Ashley Down and Henbury are likely to be visible and overlook neighbouring properties.			Not assessed	Likely to be Slight Adverse	Not applicable	
Historic Environment		Likely to be neutral impacts to listed buildings and conservation areas. Removal of old, derelict but historic railway infrastructure.			Not assessed	Likely to be Neutral	Not applicable	
Biodiversity		Surveys are required to determine presence of protected species. Options include locations on/near a statutory nature conservation area.			Not assessed	Likely to be Slight Adverse	Not applicable	
Water Environment		Based on the environmental appraisal undertaken for Network Rail, there could be impacts on the water drainage channels near Hallen junction.			Not assessed	Likely to be Slight Adverse	Not applicable	
Social	Commuting and Other users	Significant rail user benefits. Journey time savings are significant in areas where impacts of the proposed scheme are anticipated. This covers savings for users using the new services and decongestion benefits for highway users.			Value of journey time changes (£)			
					Net journey time changes (£)			
		0 to 2min	2 to 5min	> 5min				
	Reliability impact on Commuting and Other users	The reduction in congestion in the highway network will result in improved journey time reliability.			Not assessed	Likely to be slight beneficial	Not assessed	
	Physical activity	Increasing physical activity by creating multi-modal trips and introducing shorter journeys which are more realistic and achievable by sustainable modes by encouraging rail passengers to walk or cycle at either end of their rail journey.			Not assessed	Likely to be slight beneficial	Not applicable	
	Journey quality	The increase in rail use will also have a positive impact on car users as the highway network will be less congested and journeys less stressful. The main disadvantage would be security, largely at stations where large number of people converge and potential for personal security issues.			Not applicable	Likely to be slight beneficial	Not assessed	
	Accidents	The new rail services will result in a small amount of modal shift away from cars, and as such a small overall reduction of vehicle-kms travelled on the highway network. This should have the effect of also reducing the number of accidents on the highway.			Proportion of user benefits assumed	Likely to be Slight Beneficial	£890	
	Security	New rail stations may enhance the security of urban locations by providing additional footfall, CCTV, emergency contact points and improved lighting. While there is a general improvement in security of the area, rail stations can also attract crime.			Not applicable	Likely to be Neutral	Not applicable	
	Access to services	Improved access to TQEZ, Filton Enterprise Area, Avonmouth Enterprise Area, Further Education sites at Filton, Stoke Gifford and Coldharbour Lane.			Not assessed	Likely to be Moderate	Not applicable	
Public Accounts	Affordability	Rail travel is generally slightly cheaper than car ownership and travel with local rail and bus fares being comparable. However, compared to bus and car travel, journey time savings by rail are considerable. For Filton Bank, North Filton and Henbury there would be significant journey time savings to Temple Quarter.			Not applicable	Likely to be Slight Beneficial	Not applicable	
	Severance	The scheme itself involves the use of existing operational railway lines and the loop based options would have an adverse risk at St Andrew's Level Crossing where the frequency of closures to traffic and other users would double. This is also the main entry to Avonmouth Docks and concerns have been expressed by the Port Company on its operations.			Not applicable	Likely to be moderately adverse impact	Not applicable	
	Option and non-use values	As the appraised scheme will introduce passenger train services and will benefit more than 1000 households, it is deemed a large beneficial impact.			Not assessed	Likely to be Large	Not applicable	
	Cost to Broad Transport Budget	The public sector costs associated with investments for scheme implementation and ongoing support/maintenance, such as capital investment, operating costs and revenue income.					-£112,468	
Indirect Tax Revenues	The impact on tax and fuel duty loss as a result of reduction in fuel consumption					-£4,140		

TABLE 3.32 AST Option 2b Henbury Loop + Gloucester

Appraisal Summary Table		Date produced:	3 July 2015			Contact:				
Name of scheme:	MetroWest Phase 2 - Option 2b, Henbury Loop, Gloucester Extension					Name	A Rice			
Description of scheme:	New stations at: Filton Bank (Ashley Down and Constable Road), Filton North, Henbury. Bristol Temple Meads to Henbury (East or West) 1tph all day via Filton Bank and Severn Beach (clockwise and anti-clockwise directions). Extension of current Weston Super Mare to Bristol Parkway station to Gloucester.					Organisation	SGC			
					Role	PM				
Impacts	Summary of key impacts	Assessment								
		Quantitative			Qualitative	Monetary NPV (£'000s)	Distributional 7-pt scale/vulnerable grp			
Economy	Business users & transport providers	Significant rail user benefits. Journey time savings are significant in areas where impacts of the proposed scheme are anticipated. This covers savings for users using the new services and decongestion benefits for highway users.			Value of journey time changes (£)		Large Beneficial	£22,550	Not assessed	
				Net journey time changes (£)						
				0 to 2min	2 to 5min	> 5min				
	Reliability impact on Business users	The reduction in congestion in the highway network will result in improved journey time reliability.			Not assessed			Likely to be Slight Beneficial	Not assessed	
Regeneration	The scheme links into a number of regeneration areas. Importantly, the scheme links into the Temple Quarter Enterprise Zone and will support Filton Enterprise Area.			Not assessed			Likely to be Slight Beneficial	Not assessed		
Wider impacts	Slight improvements to agglomeration, output changes and labour market supply impacts.			Not assessed			Likely to be Slight Beneficial	£36,327		
Environmental	Noise	Receptors in the vicinity of the Henbury line and new stations will experience increases in noise associated with trains accelerating and decelerating, although receptors are already exposed to noise from existing rail traffic. There will be beneficial impacts to receptors in the vicinity of congested corridors that experience reductions in car traffic due to the scheme.			Not assessed			Likely to be Slight/Moderate Adverse	Not assessed	Not assessed
	Air Quality	The scheme operation is likely to have beneficial impacts due to the modal shift from road to rail but disadvantages for those immediately adjacent to the line.			Not assessed			Likely to be Slight Beneficial / Neutral	Not assessed	Not assessed
	Greenhouse gases	Rail transport is more energy-efficient than road transport and gives rise to less pollution per passenger kilometre than road transport; hence, with the forecast modal shift to rail, there should be a reduction in day-to-day carbon emissions from transport. The carbon impacts of construction will be principally associated with the materials used for the construction of new railway stations. Estimates of changes associated with highway carbon impacts have been quantified.			Change in non-traded carbon over 60y (CO2e)	-44599	Likely to be Moderate Beneficial	£578		
				Change in traded carbon over 60y (CO2e)	-138					
	Landscape	The main landscape impacts will arise from the station locations. Vegetation will need to be cleared at all locations and hedgerows at Henbury and Constable Road.			Not assessed			Likely to be Moderate Adverse	Not applicable	
	Townscape	The station designs have not been developed in detail so only a broad assessment can be undertaken of the impacts on townscape. Footbridges at Ashley Down and Henbury are likely to be visible and overlook neighbouring properties.			Not assessed			Likely to be Slight Adverse	Not applicable	
	Historic Environment	Likely to be neutral impacts to listed buildings and conservation areas. Removal of old, derelict but historic railway infrastructure.			Not assessed			Likely to be Neutral	Not applicable	
	Biodiversity	Surveys are required to determine presence of protected species. Options include locations on/near a statutory nature conservation area.			Not assessed			Likely to be Slight Adverse	Not applicable	
	Water Environment	Based on the environmental appraisal undertaken for Network Rail, there could be impacts on the water drainage channels near Hallen junction.			Not assessed			Likely to be Slight Adverse	Not applicable	
Social	Commuting and Other users	Significant rail user benefits. Journey time savings are significant in areas where impacts of the proposed scheme are anticipated. This covers savings for users using the new services and decongestion benefits for highway users.			Value of journey time changes (£)		Large Beneficial	£107,475	Not assessed	
				Net journey time changes (£)						
				0 to 2min	2 to 5min	> 5min				
	Reliability impact on Commuting and Other users	The reduction in congestion in the highway network will result in improved journey time reliability.			Not assessed			Likely to be slight beneficial	Not assessed	
	Physical activity	Increasing physical activity by creating multi-modal trips and introducing shorter journeys which are more realistic and achievable by sustainable modes by encouraging rail passengers to walk or cycle at either end of their rail journey.			Not assessed			Likely to be slight beneficial	Not applicable	
	Journey quality	The increase in rail use will also have a positive impact on car users as the highway network will be less congested and journeys less stressful. The main disadvantage would be security, largely at stations where large number of people converge and potential for personal security issues.			Not applicable			Likely to be slight beneficial	Not assessed	
	Accidents	The new rail services will result in a small amount of modal shift away from cars, and as such a small overall reduction of vehicle-kms travelled on the highway network. This should have the effect of also reducing the number of accidents on the highway.			Proportion of user benefits assumed			Likely to be Slight Beneficial	£1,202	Not assessed
	Security	New rail stations may enhance the security of urban locations by providing additional footfall, CCTV, emergency contact points and improved lighting. While there is a general improvement in security of the area, rail stations can also attract crime.			Not applicable			Likely to be Neutral	Not applicable	Not assessed
	Access to services	Improved access to TQEZ, Filton Enterprise Area, Avonmouth Enterprise Area, Further Education sites at Filton, Stoke Gifford and Coldharbour Lane.			Not assessed			Likely to be Moderate	Not applicable	Not assessed
	Affordability	Rail travel is generally slightly cheap than car ownership and travel with local rail and bus fares being comparable. However, compared to bus and car travel, journey time savings by rail are considerable. For Filton Bank, North Filton and Henbury there would be significant journey time savings to Temple Quarter.			Not applicable			Likely to be Slight Beneficial	Not applicable	Not assessed
Severance	The scheme itself involves the use of existing operational railway lines and the loop based options would have an adverse risk at St Andrew's Level Crossing where the frequency of closures to traffic and other users would double. This is also the main entry to Avonmouth Docks and concerns have been expressed by the Port Company on its operations.			Not applicable			Likely to be moderately adverse impact	Not applicable	Not assessed	
Option and non-use values	As the appraised scheme will introduce passenger train services and will benefit more than 1000 households, it is deemed a large beneficial impact.			Not assessed			Likely to be Large	Not applicable		
Public Accounts	Cost to Broad Transport Budget	The public sector costs associated with investments for scheme implementation and ongoing support/maintenance, such as capital investment, operating costs and revenue income.							-£137,098	
	Indirect Tax Revenues	The impact on tax and fuel duty loss as a result of reduction in fuel consumption							-£4,583	

4 Commercial case

4.1 Introduction

The MetroWest programme is being delivered through a staged approach, over a ten year period. This has involved prioritising projects within the MetroWest programme and being clear about the scope of each project. The West of England Local Transport Body Board has identified the second tranche of devolved DfT major scheme, from April 2021, for MetroWest Phase 2.

In developing the scope for MetroWest Phase 2 the councils approach has been to:

- Ensure new Phase 2 train services do not compromise train services that will be introduced at the end of this decade (e.g. IEP, MetroWest Phase 1, freight)
- Only include new stations which have a very clear case, particularly in terms of passenger demand and deliverability
- Minimise rolling stock requirements (the number of train units) to maximise value for money

This approach not only reduces risk the councils, but has the following benefits:

This sound commercial footing not only reduces risk the councils but has the following benefits:

- Increases the level of buy-in from the TOCs and increases the credibility of the MetroWest programme
- Minimises the level of revenue support needed in the early years after opening, to establish the new train services
- Has potential to be expanded and scaled up by TOCs as part of their overall business strategy for passenger growth, over the medium to long term

4.2 GRIP2 Feasibility Study

This approach was taken forward with Network Rail, First Great Western and the Freight Operating Companies through GRIP2, starting with value management workshops, capability (timetable) analysis, risk workshops, analysis of technical outputs and formal reporting (see Appendix A). The result of this major work stream is confirmation by Network Rail of robust, viable train service options (Henbury spur-based plus Yate enhancements with a long turn-around at Yate or Gloucester), which carry an acceptable level of performance risk; plus a loop-based option which carries a much higher level of capital and operating costs and performance risk.

4.3 Output based specification

Table 4.1 sets out an overview of the project output specification from this stage of the project.

TABLE 4.1
Overview of Output Specification

Stage of scheme development	Work-stream	Output
Preparation	GRIP 3 (& 4) combined procurement, reported upon completion of each stage – direct procurement with Network Rail	Completion of GRIP 3 (& 4) deliverables feeding into completion of Outline Business Case
	Modelling & Appraisal – WoE Transport Term Consultant	Completion deliverables for TAG compliant Outline Business Case and Full Business Case

TABLE 4.1
Overview of Output Specification

Stage of scheme development	Work-stream	Output
	Environmental assessment – WoE Transport Term Consultant	Completion of evidence base for any environmental assessments required
	Project Management Support – WoE Transport Term Consultant, on-going	Provision of sufficient project management capacity, reflecting the dimensions of the scheme
	Legal – in-house (supported by extant framework) and/or Network Rail	Provision of legal support to acquire statutory consents (e.g. planning)
	Communications – WoE communications Team and Project Management Team led, on-going	Provision of support for Stakeholder management and in connection with the consents requirements
	Land & Property – in-house	Provision of support for land negotiation, referencing and assembly
	Rail Operations – Parallel dialogue between incumbent operator (FGW) and DfT Rail – Project Management Team led	All operational requirements
	Commercial – Project Management Team led, on-going	Approach for procurement of construction and operation of scheme, is set out below
	Station accesses, parking, interchanges - in-house (supported by extant framework) and/or Network Rail	Non-trackside infrastructure design.
Construction	Rail Construction <ul style="list-style-type: none"> • New stations • Track & signalling 	New stations (track-side facilities), track and signalling to meet compliance requirements for acceptance into national rail network (i.e. GRIP 7 & 8 handover and project close, is contractors liability) Works completed in accordance with programme
	Non-trackside infrastructure <ul style="list-style-type: none"> • New station accesses and associated facilities 	New station accesses and associated facilities to meet compliance requirements for acceptance into national rail network (i.e. GRIP 7 & 8 handover and project close, is contractors liability).
Operations	Train Operator and Train Service	Train operator is procured and train service commences in accordance with programme

4.4 Procurement strategy

4.4.1 Proposed procurement packages, options and approach

4.4.1.1 Preparation

Table 4.1 sets out the main work-streams; other than GRIP 3 (&4), they will be undertaken in-house and/or through extant framework contracts. It is proposed to appoint Network Rail to undertake GRIP 3 and, if appropriate GRIP 4; Network Rail would procure contractors from its frameworks. Whilst only GRIP 3 is required for input to the Outline Business Case, procurement of a combined GRIP 3 and 4 contract could yield efficiencies and save time compared with procuring them separately. This will be considered further and approval for the preferred option sought from Members and the Board.

4.4.1.2 Construction

Table 4.1 sets out two major work streams; rail construction (track, signalling, stations) and non-trackside construction (station accesses and associated facilities out-with Network Rail ownership).

It is proposed that rail construction be one or more GRIP 5-8 Design and Build contracts through a competitive procurement led by Network Rail; this would be alongside a separate 'Delivery Agreement' between the councils and Network Rail.

There are options for the non-trackside infrastructure construction: bundling the works into the aforementioned Network Rail trackside construction contracts; or separate contracts using the council's in-house resources and/or framework contractors. Contracts for station construction could be split station by station, by groups of stations or as a single parcel of work.

4.4.1.3 Operations

The West of England Growth Deal includes the following commitment:

'The Department (for Transport) commits to working with the West of England LEP to develop the existing franchise obligations in respect of any second direct award franchise agreement which might be negotiated with First Great Western to succeed the current franchise agreement in September 2015 and in respect of any subsequent franchise competition.'

There are three options for the procurement of the train services:

- a) Procurement via DfT Rail and a base franchise specification
- b) Priced option for subsequent franchise specification
- c) Bilateral agreement with the TOC for new services with or without DfT input

The preferred option is (a), 'procurement via DfT Rail'; because the start of Phase 2 services would be in 2021, which would be in the early years of the next Great Western franchise and the specification for Phase 2 could be fed into the tender specification.

The MetroWest Phase 2 project team will engage with DfT Rail and the TOC on the above options, as the project progresses through GRIP 3 and the Outline Business Case. Phase 2 will follow the Phase 1 template currently under development with FGW for the Operational Configuration of the train service and other operational aspects. It is noted that through the Direct Award FGW is committed to working with the West of England Partnership and other bodies to deliver MetroWest and secure suitable rolling stock for the new services. Appropriate co-operation provisions are included in the Direct Award. Inclusion of MetroWest Phase 2 in the base franchise specification for a future Great Western franchise will be dependent on a strong financial case.

4.5 Summary of commercial case

There are robust, viable and deliverable options for a Henbury spur plus Yate enhancements with a long turn-around at Yate or Gloucester, which carry an acceptable level of performance risk. There is also a Henbury loop-based option, which carries a much higher level of capital and operating costs and performance risk.

The procurement strategy set out above will be developed further as the scheme progresses to the Outline Business case. Nevertheless, many elements of the commercial case that are known as follows:

- The scheme preparation work streams will be largely undertaken using in-house resources, framework consultants and Network Rail
- Scheme track-side construction will be undertaken by Network Rail, with non-trackside works undertaken by Network Rail or separate contracts using the council's in-house resources and/or framework contractors
- It is proposed that train services should be procured via DfT Rail, the TOC and the next base Great Western franchise specification. This is in preference to a 'priced option' and an open market approach.

5 Financial case

5.1 Introduction

This section unpacks the details of the scheme costs and the funding package over the 5- stage cost lifecycle shown in Figure 5.1.

FIGURE 5.1
Scheme Cost Lifecycle



5.2 Feasibility Costs

Feasibility costs of £610k have been incurred up to April 2015; this expenditure is ‘sunk’ and out-with the scheme costs described hereon-in.

5.3 Preparation Costs

The preparation stage of the project will commence with the approval of a single option by the JTB and promoting authorities for input to GRIP3. At the conclusion of GRIP3, an **Outline Business Case** will be submitted to the JTB. When the JTB approves the Outline Business Case and subject to funding, GRIP4 and GRIP5 stages will be commissioned in sequence; at the conclusion of GRIP5, a **Full Business Case** will be submitted to the JTB.

GRIP3-5 includes many work-streams, including:

- Design
- Securing train services
- Environmental assessment
- Securing requisite consents and licenses
- Land acquisition
- Business case updates
- Project management of these work-streams

Table 5.1 includes the preparation costs for each option; it should be noted that the estimate of GRIP3-5 costs is directly-related to the cost capital cost of an option (called the ‘point estimate’); that is, the more expensive an option, the more expensive the GRIP3-5 costs.

5.4 Construction Costs

Construction costs include:

- Land Costs – Purchase of 3rd party land prior to construction.
- Rail Construction Costs (GRIP6), including track, signalling and trackside station infrastructure and Network Rail site supervision.
- Highway or Non-trackside Construction Costs, including station accesses, parking and associated infrastructure.
- Project Management Costs to oversee the construction phase and manage the council's interests.
- Network Rail project handover and close down GRIP 7 & 8. These costs include provision for NR supervision of the construction phase.
- Part 1 Claims – people making a claim of depreciation to the value of their property as a direct result of the environmental impact of the scheme.
- Monitoring & Evaluation Costs to assess the effectiveness of the project against KPI's and delivery of the project objectives.

Table 5.1 sets out a summary of the composition of capital costs.

TABLE 5.1

Capital Cost Summary (£Million)

Item	Option 1a Henbury Spur + Yate	Option 1b Henbury Spur + Gloucester	Option 2a Henbury Loop + Yate	Option 2b Henbury Loop + Gloucester
Preparation - UA	£1.10	£1.10	£1.10	£1.10
Preparation – Rail	£3.78	£3.54	£4.12	£3.89
Construction – UA	£0.85	£0.85	£0.85	£0.85
Construction – Rail	£29.17	£27.34	£31.85	£30.02
Risk/Contingency – UA	£1.27	£1.27	£1.27	£1.27
Risk/Contingency - Rail	£13.18	£12.35	£14.39	£13.56
Rail Industry Fees @7.5%	£2.47	£2.32	£2.70	£2.54
Sub-total	£51.82	£48.77	£56.27	£53.22
Inflation @ 3.2 pa	£8.37	£7.87	£9.10	£8.60
Total	£60.19	£56.63	£65.38	£61.82

Notes:

1. The price base is 2014.
2. The ROSSI indices is defined as the retail price index excluding mortgage interest payments, council tax, housing depreciation and rents. For simplicity, 3.2% pa inflation assumed throughout the period.
3. The UA preparation costs cover client-side project management, planning and communication costs plus consultant costs to cover preparation of subsequent business cases (i.e. costs out-with GRIP). Land and Part 1 costs are included under UA Construction costs; note that some land for Henbury Line stations has been secured through planning gain. The high proportion of risk to costs reflects a specific provision to cover a statutory process, be it TWAO or CPO, the need for which will be confirmed during GRIP3.

At GRIP stage 2 Network Rail apply a contingency of 40% of the estimated construction cost, which is based on an historic industry bell curve. At GRIP stage 3 the contingency reduces to 30%, stage 4 is 20% and stages 5 to 8 is 10%. This industry rule of thumb approach does not consider any scheme specific factors e.g. the extent of technical work undertaken in total, the scheme specific risks.

A qualitative risk assessment was undertaken as part of GRIP stage 2, this together with the GRIP2 report and comprehensive deliverables are attached in Appendix A.

5.5 Operational costs

The operational costs of the scheme are the incremental costs of enhancing existing services and adding new services, see Table 5.2 for details.

TABLE 5.2
Train Service Operating Costs per annum (2014 Prices)

£Million outturn	Option 1a Spur + Yate	Option 1b Spur + Gloucester	Option 2a Loop + Yate	Option 2b Loop + Gloucester
No. of additional train units	2	3	4	5
TOC staff cost	£1.05	£1.57	£2.10	£2.62
TOC vehicle leasing cost	£0.66	£1.00	£1.33	£1.66
TOC vehicle opex cost	£0.42	£1.05	£0.57	£1.19
TOC opex costs (other)	£0.55	£0.55	£0.58	£0.58
Total	£2.68	£4.17	£4.57	£6.05

Notes: Costs are shown as positive. Costs are in 2014 factor prices, at GRIP stage 2 and refer to the first full year; they are undiscounted and exclude optimism bias.

5.6 Long term Asset Renewals Costs

The long term asset renewal costs and any medium term train service subsidy costs would fall to Network Rail and DfT respectively; they are included in the calculation of the BCR over a 60-year appraisal period.

5.7 Funding

5.7.1 Preparation and Capital

The funding requirement for preparation and capital is shown in Table 5.3.

TABLE 5.3
Capital Funding Requirement by Year

£Million outturn	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022+	Totals
Option 1a	£0.45	£1.63	£1.92	£3.84	£1.92	£40.03	£10.20	£0.20	£60.19
Option 1b	£0.44	£1.56	£1.82	£3.68	£1.81	£37.56	£9.56	£0.20	£56.63
Option 2a	£0.48	£1.75	£2.06	£4.07	£2.07	£43.62	£11.12	£0.20	£65.38
Option 2b	£0.46	£1.67	£1.96	£3.91	£1.96	£41.16	£10.49	£0.20	£61.82

Note: Excludes costs of borrowing against devolved funding, which only becomes available from April 2021.

5.7.2 Operational

The headline train service subsidy position is set out in Table 5.4.

TABLE 5.4

Operating costs, revenue & surplus/deficit

Option	Year	Revenue	Operating Cost	Surplus/deficit	New journeys NET	Surplus/deficit per new journey
		£M	£M	£M		£
1a Henbury Spur + Yate	2021	£1.64	£3.04	-£1.40	376,520	-£3.72
	2022	£1.93	£3.13	-£1.20	441,290	-£2.72
	2023	£2.18	£3.23	-£1.05	484,090	-£2.17
	TOTAL	£5.75	£9.40	-£3.65	1,301,900	-£2.80
1b Henbury Spur + Gloucester	2021	£1.99	£4.70	-£2.70	400,530	-£6.75
	2022	£2.31	£4.84	-£2.53	468,970	-£5.39
	2023	£2.59	£4.99	-£2.40	513,990	-£4.67
	TOTAL	£6.90	£14.52	-£7.63	1,383,500	-£5.51
2a Henbury Loop + Yate	2021	£1.66	£5.17	-£3.51	381,570	-£9.20
	2022	£1.96	£5.34	-£3.38	447,200	-£7.56
	2023	£2.21	£5.51	-£3.30	490,570	-£6.73
	TOTAL	£5.83	£16.03	-£10.20	1,319,340	-£7.73
2b Henbury Loop + Gloucester	2021	£2.02	£6.83	-£4.81	405,580	-£11.87
	2022	£2.34	£7.05	-£4.71	474,880	-£9.91
	2023	£2.62	£7.27	-£4.65	520,470	-£8.94
	TOTAL	£6.98	£21.15	-£14.17	1,400,930	-£10.12

Note: After 3-years, operating subsidy or profit is assumed pass to the DfT/operator franchise for scheme options with a BCR greater than 2.0 (i.e. options 1a and 1b only)

The forecast revenue set out in Table 5.4 takes a standard TAG approach and includes development at the CPNN however, there are reasons to suggest this could be a pessimistic approach because:

- It excludes fare revisions to the Severn Beach Line (to bring them in-line with standard fares)
- It excludes the full extent of additional demand and revenue arising from the Temple Quarter Enterprise Zone and Arena
- Does not include the effects of potential mode share changes that could follow implementation of Bristol City residents parking scheme

Figures 5.2 to 5.5 show the longer term profile between revenue and operating costs for each of the four options.

Note that the scale of the short-fall for the Loop-based options suggest revenue support would be required over the long-term to the extent that DfT may not be prepared to include a Loop service into the next Great Western Franchise.

FIGURE 5.2

Long term revenue and operational cost profile for Option 1a: Henbury Spur and Yate

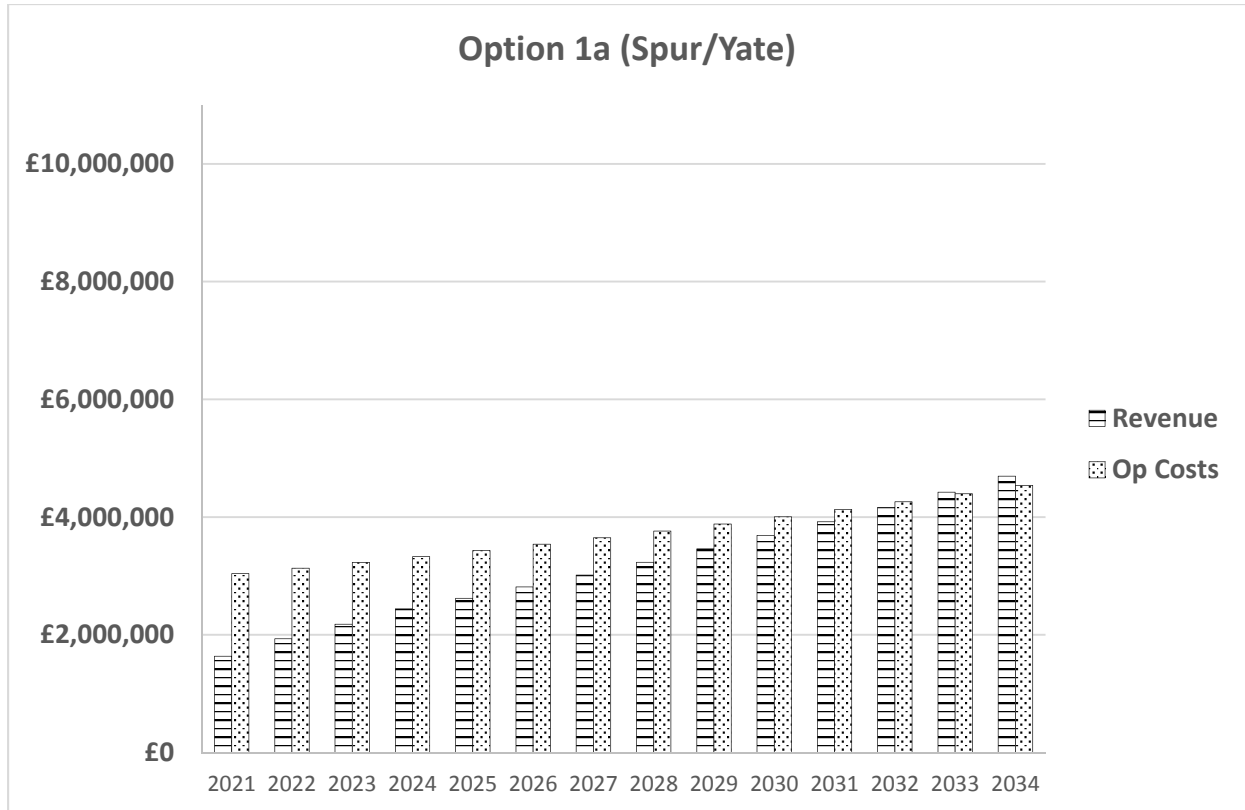


FIGURE 5.3

Long term revenue and operational cost profile for Option 1b: Henbury Spur and Gloucester

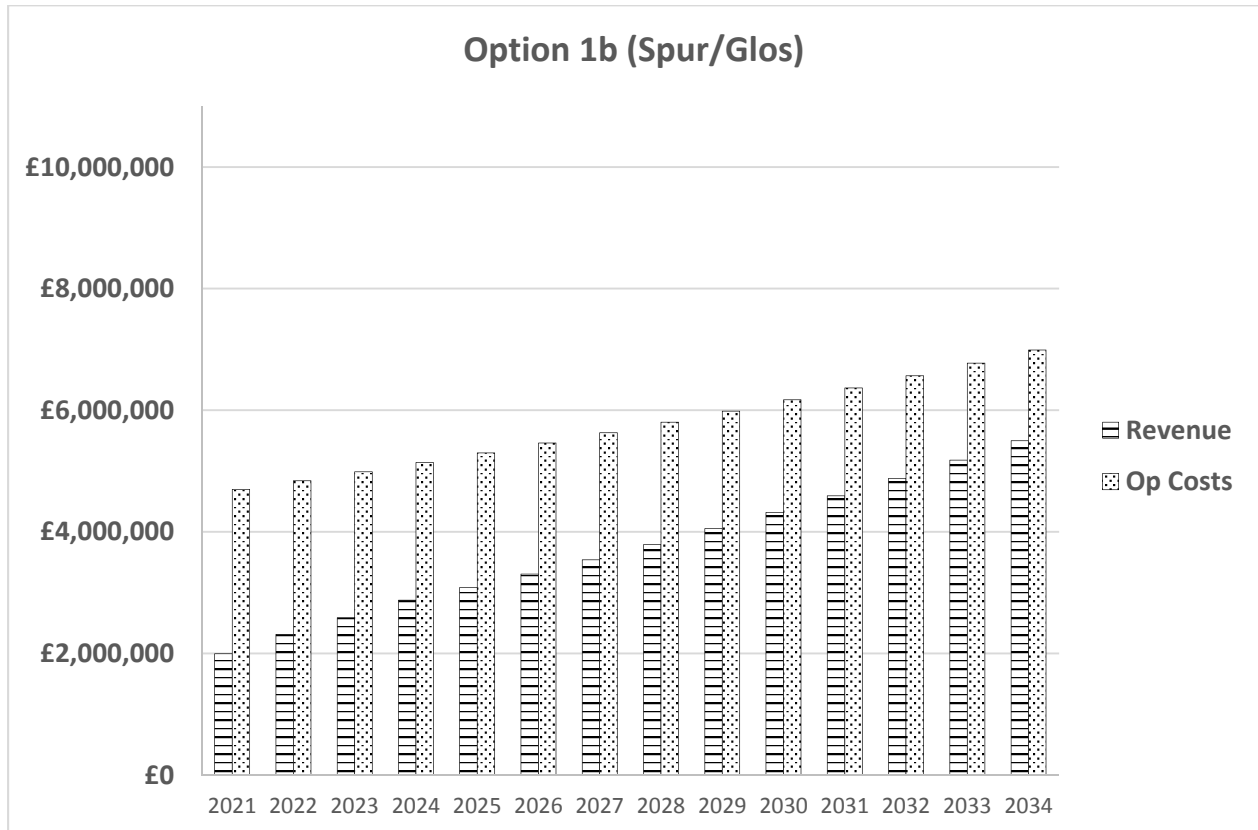


FIGURE 5.4
Long term revenue and operational cost profile for Option 2a: Henbury Loop and Yate

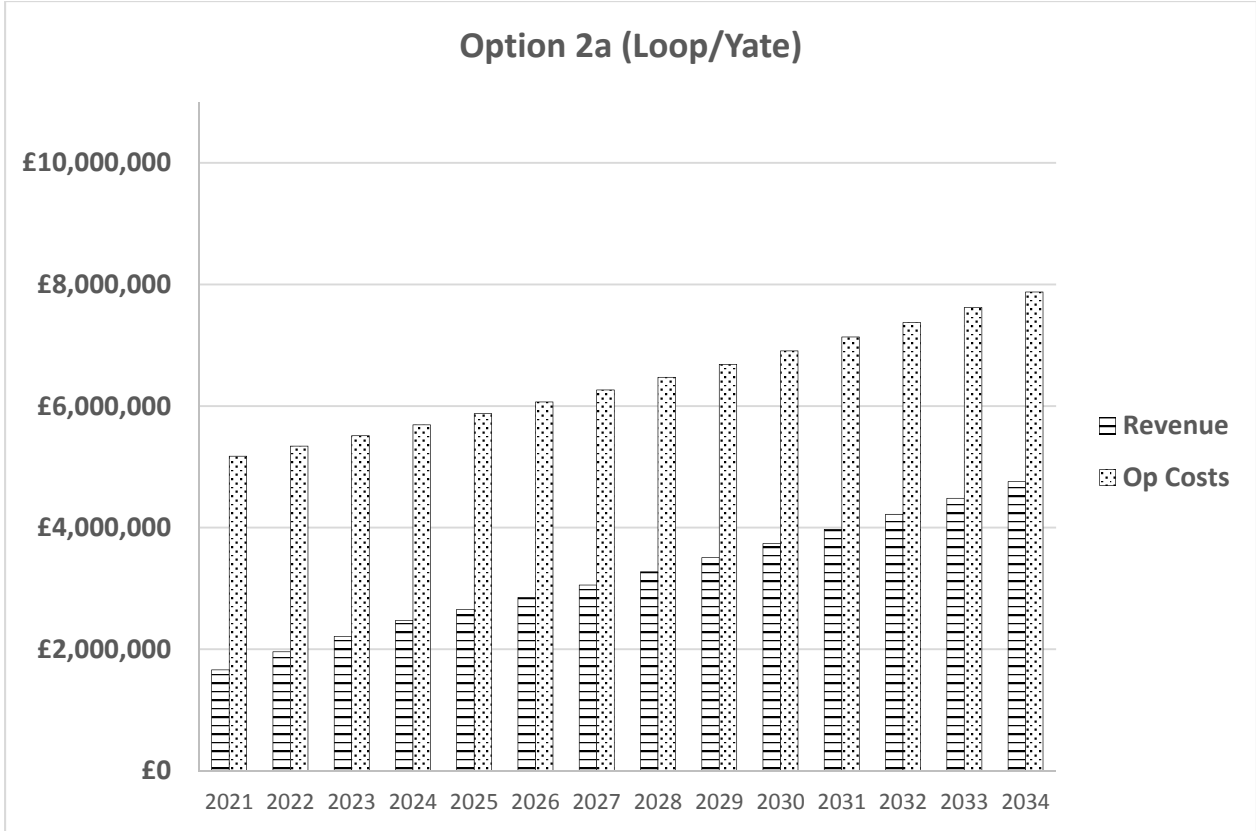
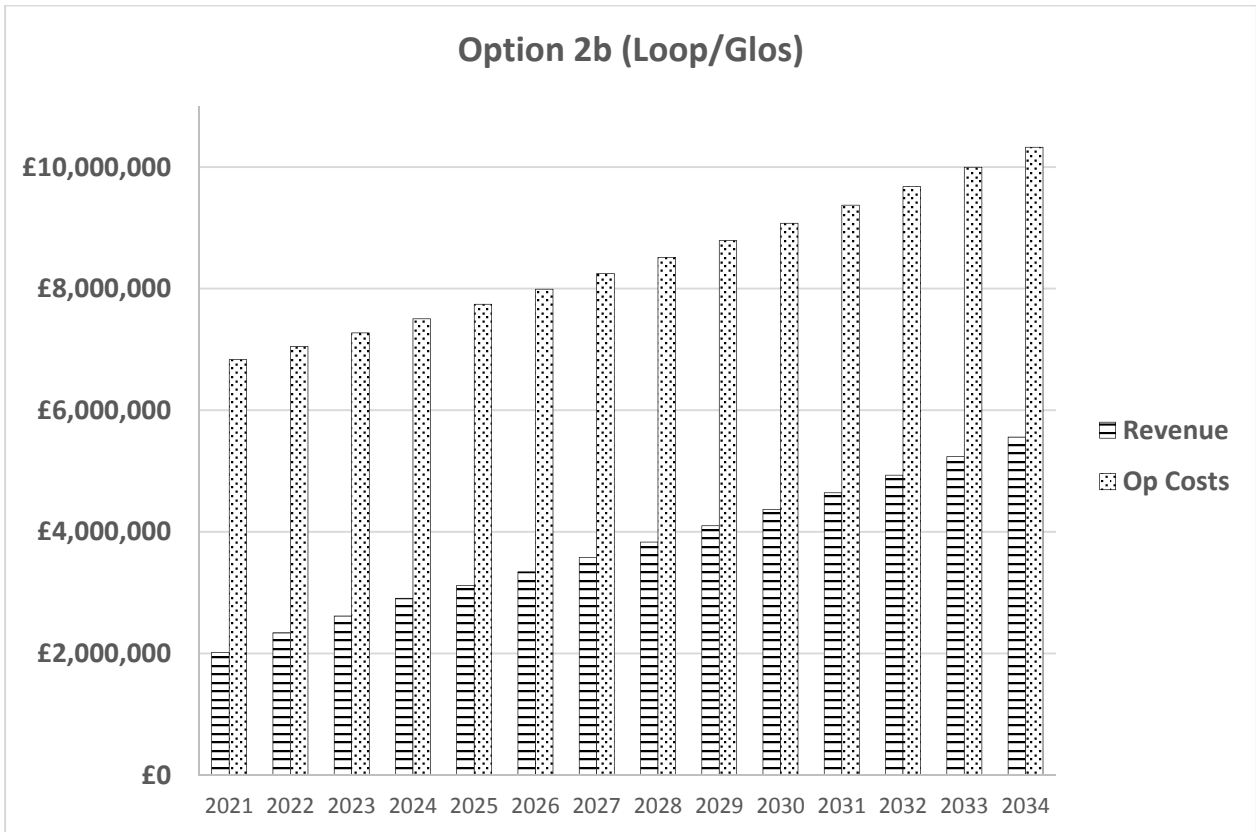


FIGURE 5.5
Long term revenue and operational cost profile for Option 2b: Henbury Loop and Gloucester



5.7.3 Sources of funding

Funding to-date has been provided primarily by South Gloucestershire Council, with contributions from Bristol City and North Somerset Council. Henceforward, the primary sources of capital funding are as follows:

- Devolved major scheme funding - £36m (available from April 2021) via the 10 Year City Deal
- WoE Local Growth Fund - £3m
- Local authority contributions - £2m
- Developer contributions - £2m

The total identified funding is £43m.

It can be seen that, even for the Spur-based options, the emerging costs are forecast to exceed the £43m identified funding. Table 5.5 shows a comparison of budget versus emerging costs.

TABLE 5.5
Summary of emerging costs

Option costs – Budget (£43)m £-outturn	A. Yate Turn-back	B. Glos Turn-back
1. Henbury Spur	+20.9	+21.2
2. Henbury Loop	+32.6	+33.0

Exclusions:

- Sunk feasibility costs incurred before Apr'15.
- Measures to mitigate adverse impact of the Loop on Bristol Port's main entrance at St. Andrews Road Level Crossing.

The BCR of less than 2.0 for the Loop-based options mean that they do not qualify for devolved major scheme funding under the West of England's Assurance Framework rules. The Assurance Framework states that 'Schemes which come forward for funding will represent 'high' value for money (BCR greater than 2.0) at each approval stage.' The ongoing revenue support requirements for a Loop mean there is a risk that DfT would not support its inclusion into a subsequent Great Western franchise (i.e. permanent revenue support would be needed from the authorities).

To derive a Loop-based scheme with better value for money would require a substantial increase in patronage plus a reduction in operating costs. Land within the catchments of Loop stations is already developed or will be developed; both are included in the appraisal. Hence, the scope for additional patronage would be limited to generating much higher than normal rail patronage from existing and planned developments adjacent to Loop stations; and/or provision of additional stations on the Loop (if feasible in design, operational and value for money terms).

The key to reducing operating costs would be to reduce the number of units required to operate the Loop; the Capability Analysis demonstrates that a train would take just over an hour to complete the Loop, which 'requires a minimum of 3 extra units, over the Phase 1 minimum requirement'. To reduce the requirement to 2 units would necessitate a very significant journey time saving (of more than 15-minutes) and/or dropping station stops (which rather defeats the point of MetroWest); this would seem highly problematic.

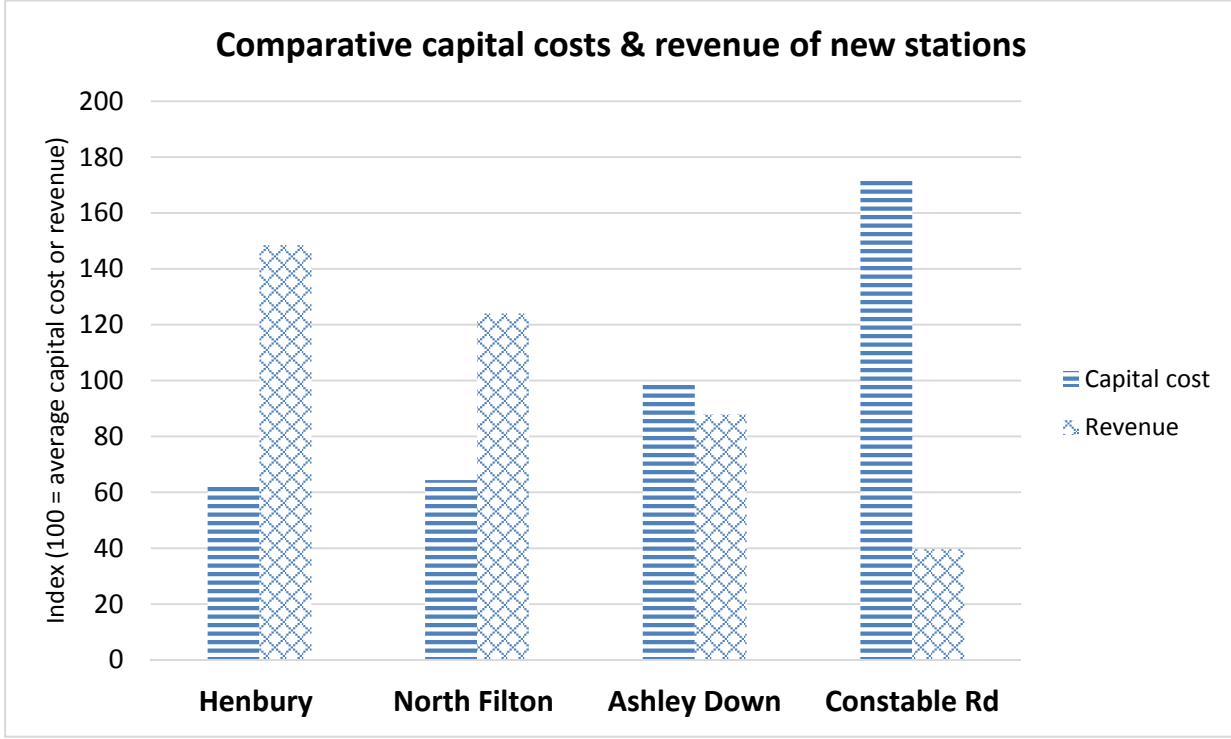
Hence, at this time, further development of a Loop as the preferred option for Phase 2 carries a high financial risk and the potential to delay Phase 2 as a whole.

Turning to the Spur-based options, there is a funding shortfall of around £21m for the whole project (i.e. capital and 3-years of revenue support). There is sufficient secured funding to take the project through GRIP3 and GRIP4 preparatory stages (completing in 2018), but then a funding gap opens-up.

Alternatively, Phase 2 could be de-scoped to bring costs in-line with budget. The project team has considered the relative strengths and weaknesses of components of the scheme to see one item could be removed without significant adverse impact on the overall performance of the scheme. Of all the new stations, Constable Road is by far the most expensive (because of its location) and generates the

fewest trips (because its catchment area is ‘squeezed’ by Filton Abbey Wood and Ashley Down). The disaggregate cost and revenue estimates cannot be published due to commercial factors; however, the graph in Figure 5.6 compares the relative costs and revenue from each new station (compared to the averages across all MetroWest Phase 2 new stations).

FIGURE 5.6
Comparison of the relative costs and revenue from each new station (compared to the average)



If Constable Road were to be removed from Phase 2, Spur-based options could be delivered and operated (for 3-years) within the existing budget, whilst the BCR would actually be improved (Option 1a/b respectively, 2.6 / 1.9 without WBS, 3.5 / 2.5 with WBS). If Constable Road were to be removed from Phase 2 Loop-based options, the scheme would remain more than £10m over-current budget and the BCR would be still be less than 2.0 (BCR up to 1.4 with WBS). Constable Road could be delivered as a later, separate MetroWest project.

5.8 Summary of financial case

A summary of the scheme capital costs and revenue support is shown in Table 5.6.

TABLE 5.6

Summary of the scheme capital costs and revenue support

Scheme	A. Yate Turn-back	B. Glos Turn-back	
1. Henbury Spur	£60.2	£56.6	Capital
	£3.7	£7.6	Revenue Support
	£63.9	£64.2	Total
2. Henbury Loop	£65.4	£61.8	Capital
	£10.2	£14.2	Revenue Support
	£75.6	£76.0	Total

The outturn costs for all four options exceed the existing budget of £43m; options including the Spur are around £21m over-budget, options including the Loop more than £33m over budget.

The scheme components costs have been reviewed, and Constable Road station is the only single scheme component that could be removed to bring within the project budget, whilst still addressing the scheme objectives. This is appraised in Section 7 of this report.

6 Management Case

6.1 Introduction

This section sets out how the West of England authorities propose to deliver MetroWest Phase 2. It explains:

- The capability and capacity of the four authorities to deliver the scheme, drawing on evidence from other similar projects
- How plans for MetroWest Phase 2 take account of dependencies on other projects, decisions and deliverables
- Arrangements for project governance, including organisational structure and allocation of roles and decision-making powers
- The project programme, which has been carefully planned to ensure that it is realistic and deliverable
- The process being used to ensure that all the necessary assurance and approvals are obtained in a timely and efficient manner, and associated reporting
- The strategy for effective communication and stakeholder management
- The strategy and approach adopted to ensure effective risk management

MetroWest is an exciting and ambitious project which will transform rail services across Bristol. The four authorities, as joint promoters of the scheme, are confident that they have the resource, capability and systems required to deliver this project successfully, to time and on budget.

The authorities have a track record of delivering major transport schemes, and will draw on this experience for this project. They have already developed strong working relationships with external stakeholders, notably Network Rail, who can help make this project a success.

6.2 Engineering and operational feasibility

The GRIP2 report set out in Appendix A contains details of the engineering and operational feasibility of the scheme. The report conclusions and recommendations are set out below.

A GRIP2 Feasibility Study has been undertaken by Network Rail to support the Preliminary Business Case; it includes a 'Capability Analysis' of Phase 2 proposals using Railsys timetable modelling software to determine the:

- Feasibility of the proposed new services
- Infrastructure improvements required to support them
- Impact on the wider network and services
- The number of additional train units required

The Capability Analysis concluded that the Phase 2 services would be feasible with the following infrastructure improvements:

- Bristol East Junction enhanced renewal (for the Henbury Line options only); Network Rail is progressing the delivery of the scheme
- Ashley Down Station (on its former site on Filton Bank)
- Constable Road Station (on a new site on Filton Bank)
- North Filton Station (on its former site by the A38)
- Henbury Station at
 - East (of the A4018), a new site; or
 - West (of the A4018), the former site;
 - with a bay platform for the Spur option;
- Hallen Marsh Junction re-doubling (for the Loop service only);

- Yate turn-back (for services extended to Yate only);
- Gloucester (for services extended to Yate, Cam & Dursley and Gloucester) - no track or signalling improvements required.

The Capability Analysis confirmed that existing and future freight paths on the Henbury Line could be provided in tandem with either Spur or Loop services (as long as the above infrastructure improvements are implemented).

Westerleigh Junction is a known capacity pinchpoint on the local rail network. There will be one spare path across Westerleigh Junction in 2019. Network Rail has considered improvements to the junction, as the existing infrastructure cannot accommodate the draft Western Route Study's 2043 Indicative Train Service Specification. There are no quick fixes at Westerleigh Junction, at a high level there are a number of options available (on or off line) but all are costly and with deliverability issues.

GRIP2 confirmed the 'in principle' technical feasibility of the new infrastructure for Phase 2, but with the caveats described below (which would be explored further in GRIP3).

The new stations would not comply with Railway Group Standards for longitudinal gradient, which require that the gradient be less severe than 1:500. The current longitudinal gradients are as follows:-

- Ashley Down Station – 1:76;
- Constable Road Station - 1:76;
- North Filton Station – 1:210;
- Henbury Loop Station -1:120 (East) or 1:264 (West).

There is a recognised rail industry process for the identification of risks associated with platform gradients steeper than 1:500 and this process would be invoked; the outcome would confirm whether a station scheme can proceed and whether any mitigation measures are required. Former station locations are more likely to receive a derogation than new station locations.

The station at Henbury for a Spur would comprise a new siding and bay platform on the north-side for terminating services, which would be built on the level and for which no derogation is required.

For the Loop service to operate 'substantial trackwork and significant signalling alterations are required to Hallen Marsh Junction to enable both passenger and freight services to operate'. The Loop would also reduce standage on the port arrival and departure lines (i.e. the length of trains that can be stored off the running lines). Infrastructure and disruptive service costs are significantly higher and design and build more complex for the Loop service option.

The Loop option would also double the number of train crossings at St. Andrews Level Crossing in Avonmouth, from 2 per hour to 4, which would have an adverse impact on road traffic to/from Avonmouth Docks. Phase 2 GRIP2 has confirmed there are no minor track and signalling interventions that could mitigate the adverse impact of these additional train crossings on the Port.

GRIP2 concluded: 'In summary for passenger services to operate to Henbury Network Rail would recommend the spur service option is taken forward to GRIP 3 as this option imports less risk to train performance and less complex infrastructure intervention. The station for the spur option would be constructed off the main lines on a level gradient with a straight horizontal alignment; no derogation to the Railway Group Standard would be required.'

In respect of Ashley Down and Constable Road Stations, GRIP2 noted they are 'within close proximity of each other and relatively close to Filton Abbey Wood Station..... Further work will need to be undertaken to assess the wider impacts of train performance and network capacity of having a new station(s) on the Filton Bank.'

For MetroWest services to Yate, GRIP2 noted '... it will be necessary for additional infrastructure to be built off of the main lines to reduce the risk to performance by providing a turn-back siding. However if MetroWest services are to extend to Gloucester the new turn-back facility would not be required. The WoE will need to establish the viability of a service extension to Gloucester and whether the Yate turn-back is required as an interim measure or not at all.'

6.3 Evidence of similar projects

The West of England authorities, both individually and collectively, have a proven track record of delivering major transport infrastructure including:

- Greater Bristol Bus Network (GBBN)
- Cycling City
- Weston Package

These projects were complex and demanding and required new ways of working across the authorities and with stakeholders.

Through the Cycling City project, Bristol and South Gloucestershire Councils have delivered £11.4 million of government funding, along with £13.9 million of locally matched investment, on time and on budget. This delivery has included 102.5 miles of cycle paths and routes, either upgraded, improved or built from scratch as part of 35 different infrastructure projects. Similarly for the current £70 million GBBN project, the DfT grant-funded tasks are on track and to budget in year three of a 4-year programme.

The Weston Package is complete and a ministerial launch took place in February 2014. The scheme made a significant double achievement of completing ahead of programme and under budget. Weston Package is already providing benefits with large reductions in congestion and queuing at Junction 21 of the M5 and across the town.

The West of England authorities are currently managing around £292 million worth of major schemes⁶. Recent schemes relevant to the MetroWest Phase 2 scheme are:

- MetroBus - North Fringe to Hengrove Package. Successful planning application and development of the Compulsory Purchase Order and Side Road Order. Some preliminary works have started on site pending full approval from the DfT.
- Bath Transportation Package. The majority of the elements of the package have been completed including the Newbridge park and ride site.
- MetroBus - Ashton Vale to Temple Meads. Work has started on the scheme with contractors now on site following the award of £34.5m of DfT funding in September 2014 towards the £45m scheme.
- MetroBus - South Bristol Link Scheme. Full approval secured from the DfT in January 2015 with formal land acquisition now taking place.
- Local Sustainable Transport Fund (LSTF) – WEST. Completion of cycling and walking infrastructure improvements, public consultation, marketing of sustainable transport continues and engagement with businesses.

In summary, the West of England authorities have considerable experience of:

- Delivering major transport schemes on time and on budget
- Successfully obtaining consents for major infrastructure schemes
- Developing and maintaining good working relationship with key partners and stakeholders
- Internal resourcing and governance requirements for major schemes

The authorities have considerable internal knowledge, experience and capability of major transport schemes to bring the MetroWest Phase 2 project, combined with established working arrangements with its transport framework consultant.

⁶ Details of the major schemes can be found at <http://www.travelwest.info/projects>

6.4 Project dependencies

The MetroWest Phase 2 project is dependent upon both CPNN development as outlined in the Supplementary Planning Document (SPD) and strategic investments being made by the rail industry through Control Period 5 (2014 to 2019).

The CPNN SPD outlines the need to safeguard station sites to enable the provision of interchange facilities with walking, cycling, bus and cycle/car parking provision. The SPD also stresses the requirement that access routes to local centres by sustainable modes including the routing of bus services to enable interchange opportunities.

In terms of the CP5 schemes, MetroWest Phase 2 is dependent on Filton Bank four tracking scheme, and Bristol East junction enhancement.

MetroWest Phase 2 project programme takes account of all these project dependencies and complementary schemes, summarised in Table 6.1.

TABLE 6.1

Project dependencies – projects which interface with MetroWest Phase 2

Project	Timetable/key dates	Extent to which MetroWest Phase 2 is dependent on this project
<u>Cribbs Patchway New Neighbourhood</u>		
New neighbourhood that will comprise approximately 5,700 new homes and 50ha of employment land together with associated community facilities and services.	2014 - 2027	Dependent – The new urban area is fundamental to provide both the demand and related access infrastructure by all modes that will underpin the use of passenger rail services along the Hallen line.
<u>Committed CP5 Network Rail projects</u>		
Electrification of Great Western main line and Intercity Express programme	2017/18	Related - Electric trains will be quicker to accelerate and have higher top speed, allowing shorter journey times and releasing some network capacity. The IEP programme will facilitate the cascade of DMUs to the West of England.
Resignalling – Bristol Area Signalling Renewal (BASRE)	2017	Related – Signalling renewal is likely to yield some additional capacity, which will help operational robustness
Bristol Temple Meads platform 0/1 extension and station environment improvements	2020	Related – Platform capacity enhancements will help operational robustness and provide greater timetable flexibility
Additional platform at Bristol Parkway	2017/18	Related - Additional platform will help operational robustness and provide greater timetable flexibility
Filton Bank four-tracking	2017/18	Dependent - Without four-tracking, there is insufficient capacity for the additional MetroWest Phase 2 trains
Bristol East junction enhancement	2017/2018	Dependent (Spur options only) - Without the junction enhancement, there is insufficient capacity for the additional MetroWest Phase 2 trains
<u>MetroWest phase 1</u>		
Portishead line reopening and enhanced frequencies on the Severn Beach line and from Bristol Temple Meads to Bath	2018 - 2019	Do Minimum – MetroWest Phase 1 is assumed to be operational prior to Phase 2 implementation. There are potential synergies in operating fleets, but services could be largely independent, depending on service option.

TABLE 6.1

Project dependencies – projects which interface with MetroWest Phase 2

Project	Timetable/key dates	Extent to which MetroWest Phase 2 is dependent on this project
		<p>Overall therefore, Phase 2 is both related and dependent on Phase 1.</p> <p>Related – the use of trains sets is likely to have some benefits in terms of operational robustness for Phase 2 irrespective of which Phase 2 operating options are implemented.</p> <p>Dependent – enhanced services on the Severn Beach line would be required for a ‘loop’ service to operate on the Hallen Line via Henbury</p>
<u>Western Route rail franchise</u>		
Franchise replacement	2015 to 2019 (possible 1 year extension to 2020)	Related - MetroWest is identified as a third party scheme in the May 2014 DfT franchise consultation. The councils are making the case for MetroWest to be included in the base case post 2019/2020 franchise specification
<u>Other Rail Schemes</u>		
Portway platform	2016	Related – Portway platform is being promoted by Bristol City Council and is planned to be opened before MetroWest Phase 2 opens
Saltford	2019 +	Related – Saltford station is reliant on the MetroWest Phase 1 proposals and GWML electrification. The Henbury loop options could impact on the Phase 1 services that could serve Saltford
Weston Milton (Timetabling)	2016 +	Related – This scheme proposes to reconfigure existing timetables and services in order to provide Weston Milton with a more frequent service

Network Rail’s draft Western Route Study, October 2014 identifies Bristol Parkway as having significant passenger congestion and capacity constraints in Control Period 5 (2014 - 2019). For Bristol Parkway this includes an additional platform and associated station requirements as part of the Intercity Express Programme. It is not a requirement of MetroWest Phase 2. The Study states that should capacity not be addressed during Control Period 5, then it remains a priority for investment in Control Period 6 (2019 – 2024).

In addition to the changes to the rail network, the following committed schemes will deliver improvements to the local transport networks (highway, bus, cycle and pedestrian networks):

- MetroBus - North Fringe to Hengrove Package
- MetroBus - Ashton Vale to Temple Meads
- MetroBus - South Bristol link scheme
- MetroBus – Cribbs Patchway Extension
- Local Sustainable Transport Fund schemes
- 20 mph speed limits

6.5 Governance, organisational structure and roles

MetroWest Phase 2 is one of a series of individual rail projects currently being developed as part of a broader programme of rail works by the West of England authorities. Therefore, governance arrangements are in place at both programme and project level.

6.5.1 Working with the rail industry

The success of the MetroWest Phase 2 scheme is dependent on successful relationships between the West of England authorities and the rail industry. The GRIP2 feasibility study has involved high levels technical interaction, particularly with Network Rail and the Train Operating Company (TOC), advancing established relationships and broadening collective understanding and intelligence. Key relationships have and continue to be developed with:

- DfT Rail
- Various teams at Network Rail
- Train operating companies
- Freight operating companies

This experience has influenced the development of the project governance arrangements. Working relationships with the rail industry have been embedded into the governance arrangements, and are not simply a 'bolt on' to a local authority structure (further details are provided in Sections 6.5.2 and 6.5.3).

In respect of GRIP 1-2, which reported in Appendix A, the following agreements have been put in place:

- Basic Services Agreement
- Development Services Agreement

The approach developed for GRIP2 commenced with regular Pre GRIP meetings, between MetroWest Phase 2 Project Team and the Network Rail Project Development Manager and Project Sponsor, during the scoping and authorisation process. As the GRIP 1-2 work stream was mobilised, the technical interface between the MetroWest project team and the Network Rail project team evolved, resulting in a genuinely collaborative Joint Project Team. Issues, problems, risks and constraints were shared and tackled through a combination of workshops, technical analysis and structured meetings. This joined and integrated up approach has not only resulted in better technical understanding for the scheme promoter, but has also advanced relationships and working processes between all parties. The positive working relations developed during GRIP2 are reflection of the comprehensiveness of the GRIP2 deliverables produced (see Appendix A).

6.5.2 Programme-level governance

The West of England **Strategic Leaders Board** overall objective is to focus on strategic economic issues and to unlock barriers to growth in support of delivering the West of England SEP. Membership of the Strategic Leaders Boards comprises the Leaders of South Gloucestershire, Bath and North East Somerset, North Somerset councils and the Mayor of Bristol.

The West of England **Local Transport Body Board (LTBB)** brings together the local authority executive members with responsibility for transport. In South Gloucestershire Council this falls to the Chair of the Planning, Transportation and Strategic Environment Committee and for Bristol the Assistant Mayor for Transport and two representatives from the Local Enterprise Partnership. The LTBB decides on the allocation of devolved DfT capital funding and oversees the delivery of prioritised schemes. It receives and considers high-level quarterly reports and exception reports, via the Rail Programme Board (RPB) and Programme Assurance Board (PAB). The LTBB is the ultimate decision-making body for changes escalated through the governance structure. Since March 2014, the LTBB meets with the Joint Transport Executive Committee for the West of England (JTEC) to form the Joint Transport Board. (JTB)

The **Programme Assurance Board (PAB)** provide high-level challenge and independent assessment. It receives high-level reports on all rail schemes across the West of England. The PAB has a particular emphasis of overseeing the programme budget. The PAB is responsible for:

- Ensuring programme priorities are met and cross-scheme actions are delivered
- Providing critical review, monitoring of progress and performance, and oversight of joint actions
- Overseeing the integrated programme plan and Benefits Realisation Plan
- Ensuring strategic programme-level risks are effectively managed
- Overseeing strategic relationships with the Local Enterprise Partnership (LEP) and other key stakeholders
- Reporting high-level progress to the LEP

A Programme **Senior Responsible Owner (SRO)** is responsible for ensuring that the Rail Programme's objectives are met. The Programme SRO, Colin Medus, represents the West of England and is accountable to the PAB and LTBB.

The responsibilities of the Programme SRO include:

- Stakeholder engagement in the identification of the vision, objectives, options and policies for rail.
- Ensuring the appropriate programme and project management and governance structures and milestones are in place for each of the individual projects. The Programme SRO is accountable for overall programme management.
- Problem resolution and referral from the Rail Programme Board and Project SROs. The Programme SRO is empowered by the Rail Programme Board to make decisions and approve changes and to seek authorisation from the Rail Programme Board, PAB or the JTB, if required.
- Monitoring and evaluating project progress and final assessment of outcomes.
- Providing guidance and direction to the individual projects' managers.

The SRO is supported by the **Programme Manager**, James White. The Programme Manager will:

- Provide the West of England level overview for the Rail Programme
- Ensure coordination between projects
- Support the Programme SRO
- Report updates to the Rail Programme Board
- Set up and manage the high-level steering group
- Organise and support Rail Programme board meetings
- Manage communications and stakeholder involvement
- Manage programme correspondence
- Monitor budgets for the individual projects
- Manage the programme risk register
- Provide quality assurance for the individual projects
- Organise, support and chair Core Project Team meetings

The programme organogram is shown in Figure 6.1.

6.5.3 Project-level governance

The overall rail programme is made up of a number of projects including MetroWest Phase 2. A **Rail Programme Board** directs, steers and oversees the direction of each project. The Rail Programme Board

authorises project plans to be delivered by the project managers and authorise strategic decisions, or seeks authority for key strategic decisions from the Rail Programme Board, PAB or JTB.

Rail Programme Board meetings are linked to key milestones (at least quarterly). The board considers highlight and exception reports, changes to the project risk log and other key deliverables as defined in the project plan. It consists of authority officers with responsibility for transport who are able to act for their organisation, within the thresholds defined in the project initiation document.

The Rail Programme Board nominates an SRO who acts as the lead for individual projects representing the authorities and the Rail Programme Board.

The **SRO** for MetroWest Phase 2 is Janet Kings from South Gloucestershire Council. Her role is to:

- Report to and receive feedback from the Rail Programme Board
- Ensure the appropriate resources, project management and technical expertise are in place for the project
- Liaise with nominated senior officers from neighbouring authorities
- Make decisions and approve changes within agreed tolerances or seek authorisation from the board, or the JTB, if required
- Monitor and evaluate project progress against milestones and assess outcomes
- Provide guidance, support and direction to the project manager and project team

The MetroWest Phase 2 **Project Manager**, Alistair Rice, is also from South Gloucestershire Council. His role is to:

- Lead and coordinate the project team and its work-streams
- Procure consultants and contractors
- Prepare and report project budgets
- Manage project risks and issues
- Report to and receive feedback from the SRO
- Produce periodic progress reports for the JTB, Joint Scrutiny, directors, and the Local Enterprise Partnership

The **Core Project team** (see Figure 6.2) includes nominated representatives from the authorities, West of England office, Network Rail, the train operating companies and technical advisors from the framework consultant.

The Core Project team is the point of contact for information and liaison with colleagues within each particular organisation. Members are responsible for communications about the project within their organisations. It is also a source of experience and expertise and connection to expertise within their organisations.

The following organisations, consultants and contractors are assisting with delivery of the project:

- Network Rail (modelling and appraisal, GRIP, procurement, delivery)
- Incumbent operator First Great Western (operational advice)
- Existing/future WoE transport planning framework (modelling and appraisal, technical support)
- Specialist planning, legal support and land agents (compulsory purchase order if required)

FIGURE 6.1
MetroWest Programme Organogram

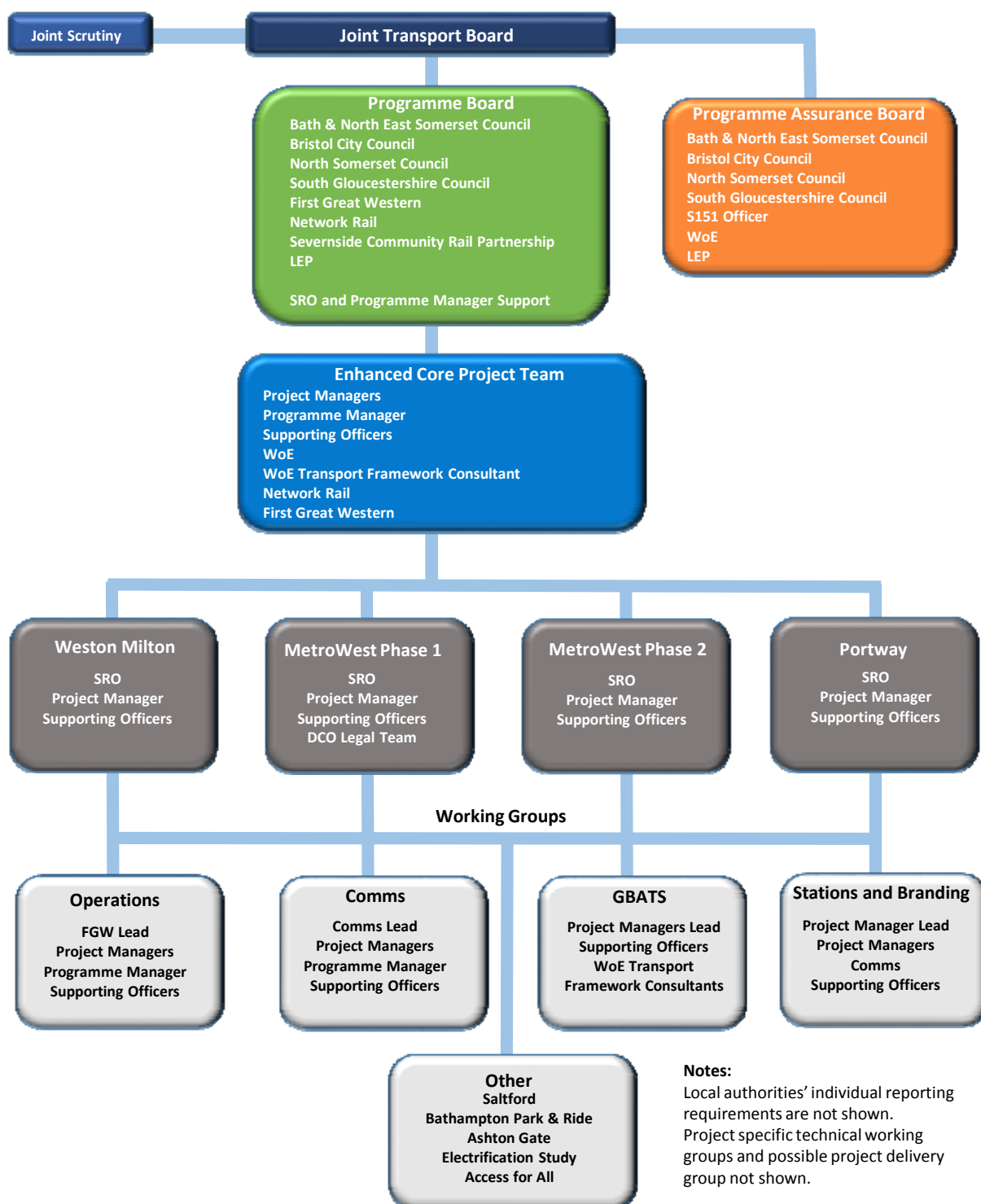
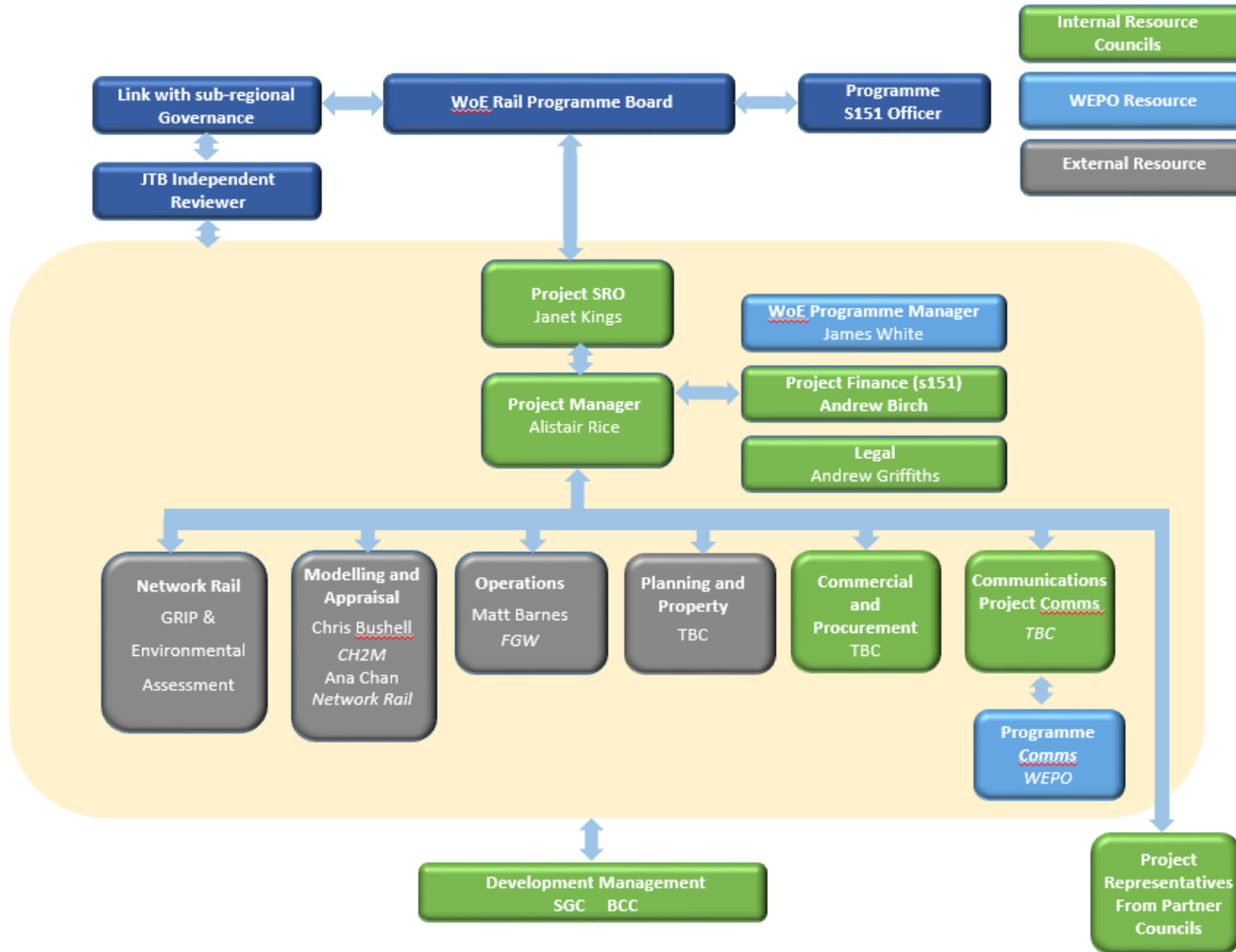


FIGURE 6.2
MetroWest Phase 2 Project Organogram for Stages 1 to 3 – Project Case / Powers / Procurement change Summer 2014 to Summer 2021



6.6 Programme/project plan

High-level programme and project Gantt charts are set out in Figure 6.3 and 6.4.

Key to the organisation of the MetroWest Phase 2 project is the overarching project plan/programme. This shows activities, durations, deadlines and critical paths for all activities up to completion of works.

6.6.1 Key stages

The programme has four key stages as shown in Table 6.2.

TABLE 6.2
Project timetable

Project Stage	Stage Description	Indicative Timescales
Stage 1	Feasibility (GRIP 1-2)	Summer 2014 to Spring 2015
Stage 2	Option development and scheme case (GRIP 3)	Autumn 2015 to Spring 2017
Stage 3	Planning powers and procurement (GRIP 4-5)	Winter 2016/17 to Winter 2019/20
Stage 4	Construction and opening (GRIP 6-8)	Spring 2020 to Spring 2022 (service start Spring 2021)

6.6.2 Project milestones

Key milestones are outlined in Table 6.3.

Table 6.3
Project Milestones

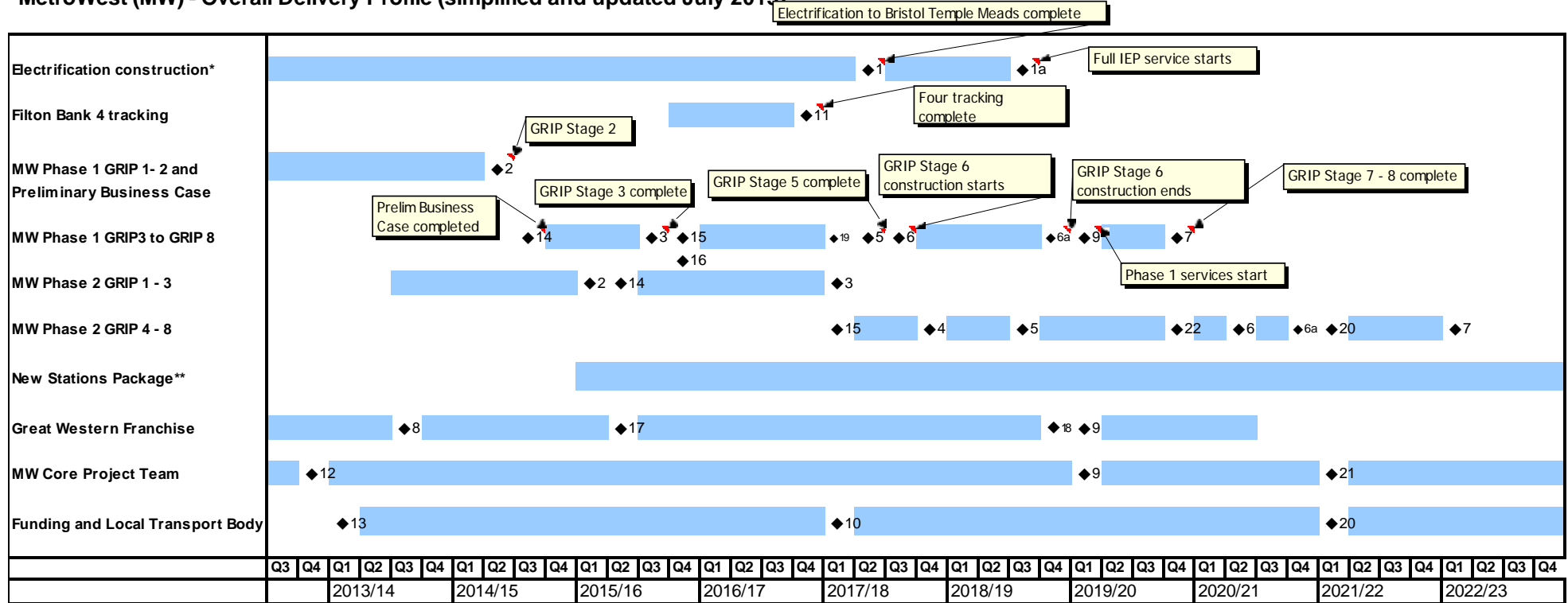
Milestone Completion Dates	Current
GRIP 1 Output Definition	Jun 2014
GRIP 2 Feasibility (option development)	May 2015
Prelim Outline Business Case – Option Selection	Jul 2015
GRIP 3 Option Selection (single option outline design)	Apr 2017
Outline Business Case Approval	Jun 2017
GRIP4 Single Option Development	Mar 2018
Secure statutory powers	Dec 2019
GRIP5 Detail Design (final signalling design)	Dec 2019
Contract Prices	Dec 2019
Full Business Case Approval	Mar 2020
GRIP 6 Construction Start	Jun 2020
GRIP 6 Construction Completion	Mar 2021
Operation	May 2021
GRIP 7-8 Project hand-over & close	May 2022

Key tasks on the critical path include:

- Completion of key dependent projects
- Completion of GRIP design work
- Completion of business cases
- Planning application
- Land acquisition and CPO if required

FIGURE 6.3:
Programme Gantt Chart

MetroWest (MW) - Overall Delivery Profile (simplified and updated July 2015)

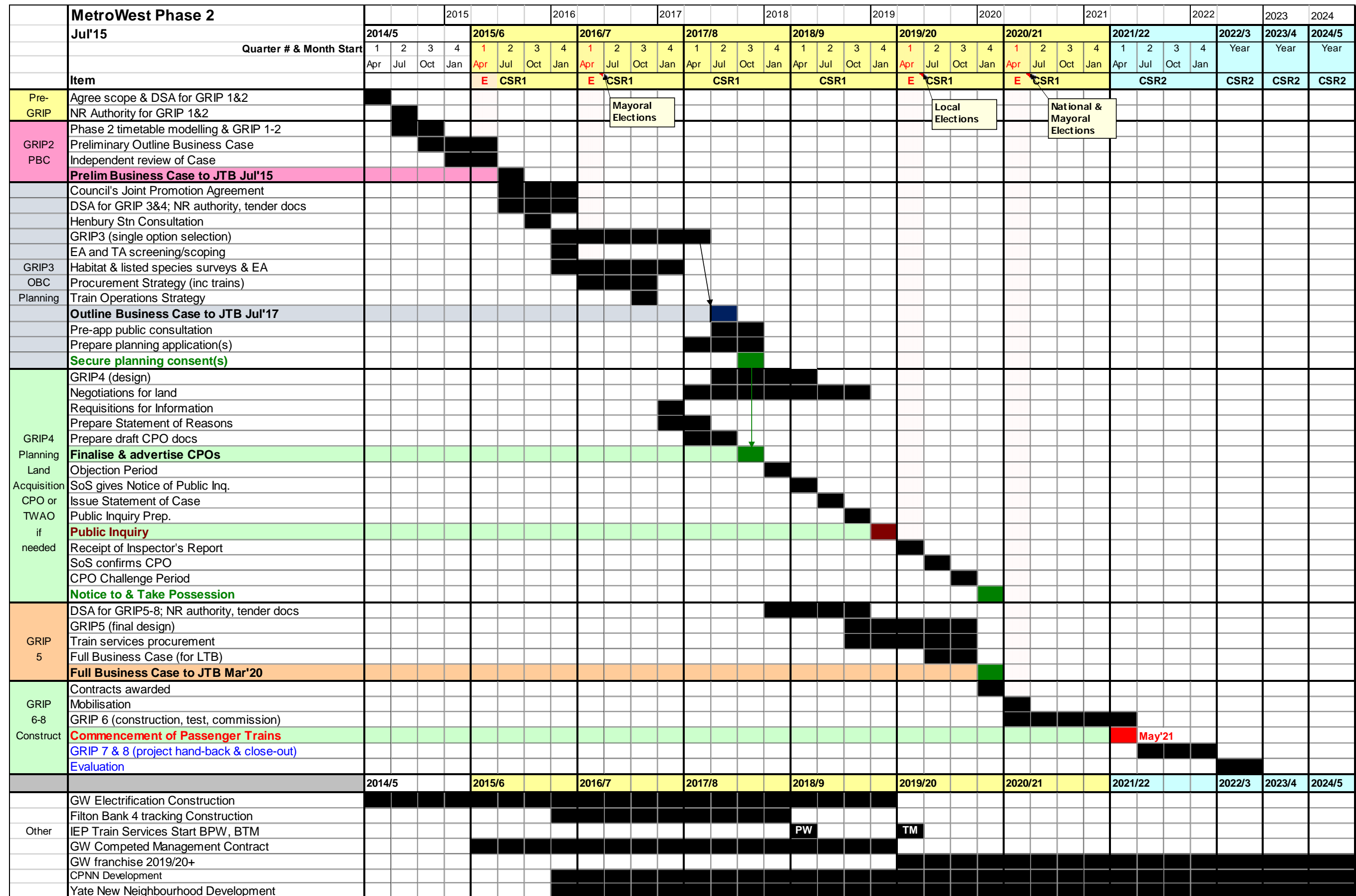


■ = Task ◆ = Key milestone

Notes

- | | | | |
|---|---|---|---|
| 1. Electrification complete | 7. GRIP Stage 7 - 8 complete | 15. Outline Business Case | * Electrification to Bristol Temple Meads May 2017 |
| 1a. Full IEP train service starts | 8. 2 year Direct Award GW Franchise starts | 16. Submit Development Consent Order | Electrification of Filton Bank Easter 2017 |
| 2. GRIP Stage 2 complete | 9. Phase 1 passenger services start | 17. 3½ year Direct Award starts | Electrification to Cardiff Dec 2017 |
| 3. GRIP Stage 3 complete | 10. Devolved funding for Phase 1 starts | 18. Direct Award ends (possible 1 year extension) | ** Subject to value for money, Business Cases and funding . |
| 4. GRIP Stage 4 complete | 11. Four tracking Filton Bank complete | 19. Development Consent Order received | |
| 5. GRIP Stage 5 complete | 12. Core Project Team in place | 20. Devolved funding for Phase 2 starts | |
| 6. GRIP Stage 6 construction starts | 13. Local Transport Body funding prioritised | 21. Phase 2 passenger services start | |
| 6a. GRIP Stage 6 construction completed | 14. Preliminary Outline Business Case completed | 22. Full Business Case | |

FIGURE 6.4
MetroWest Phase 2 Project Gantt Chart



6.6.3 Stage 1 – Feasibility

This Preliminary Business Case concludes the completion of scheme stage 1 – Feasibility. Stage 1 essentially comprises strategic deliverables and GRIP 1-2 deliverables, together with the Preliminary Business Case deliverables.

The GRIP 1-2 deliverables include (see Appendix A):

- GRIP2 Feasibility Report
- Alignment Engineering Drawings and General Arrangement Engineering Drawings
- Qualitative Cost Risk Assessment
- Capacity Analysis (Railsys) Report
- Environmental Assessment
- Signalling Appraisal

6.7 Assurance, approvals' plan and reporting

This project is working within a number of wider processes which have their own assurance and approvals processes, as summarised in Figure 6.5.

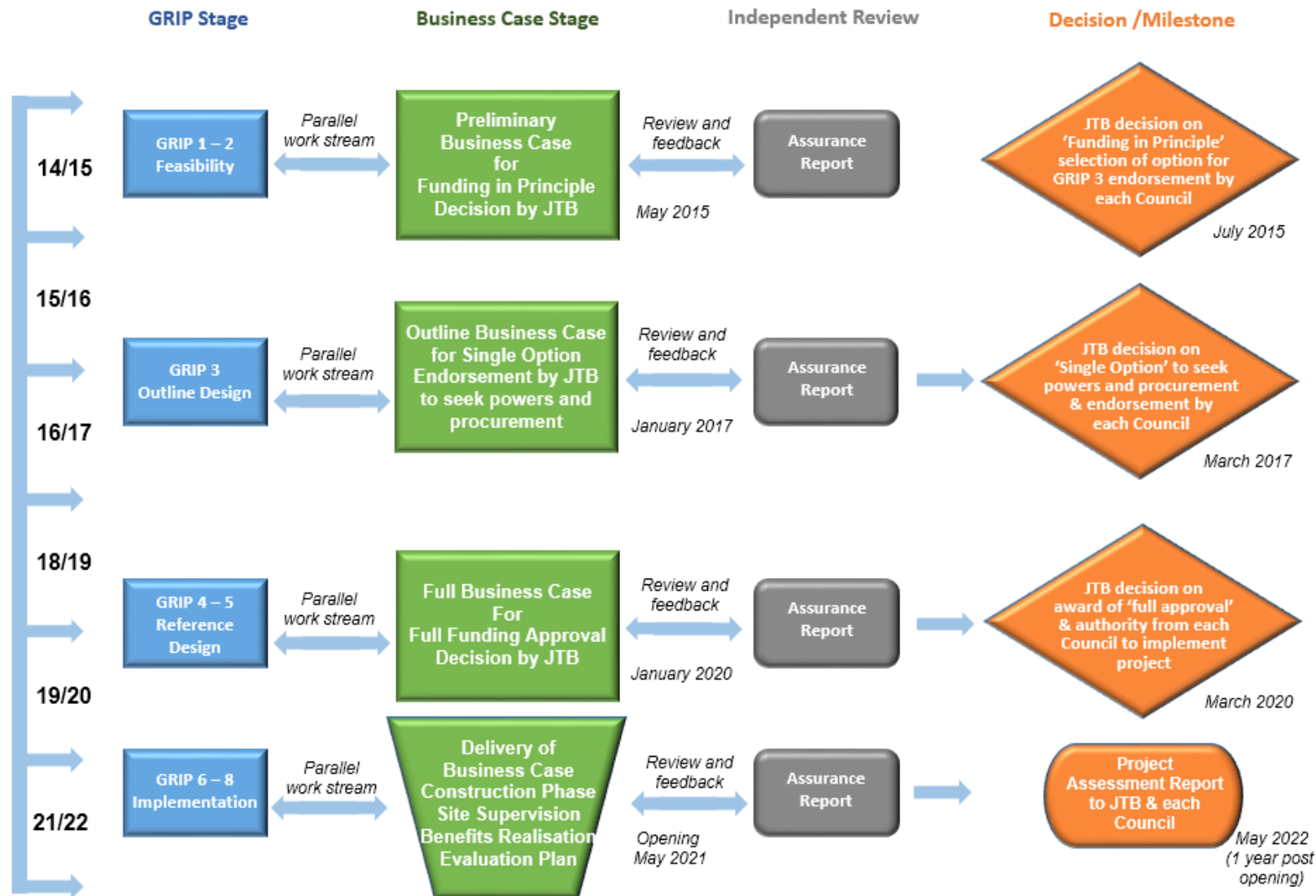
Internal and rail industry processes:

- The Local Transport Body Assurance Framework - providing an independent review of the business case including the economic case and value for money
- Network Rail's GRIP process – providing technical rail operational and engineering assurance
- Project management assurance and approvals

External statutory processes:

- Compulsory purchase order and documentation (if required)
- Planning consents and consultation assurance
- Other contents, habitats regulation, General Permitted Development prior approval

FIGURE 6.5:
Interfaces of assurance processes



6.7.1 LTB Assurance Framework/DfT Business Case process

The four authorities are working in accordance with the principles of the LTB Assurance Framework (December 2013). This requires schemes to go through the following approvals' process:

- Initial priority status. MetroWest Phase 2 was approved by the LTBB as a priority scheme for the devolved funding allocation at its meeting on 14 June 2013
- Outline business case sufficient to support statutory processes
- Final approval to secure release of funds supported by a full business case

This process incorporates a series of processes and procedures for quality assurance, approvals and reporting as shown in Figure 6.6.

FIGURE 6.6:

The Transport Business Cases' process (source: DfT publication)



At each stage of the business case process, the JTB will require an independent review of documentation. It will be developed in accordance with DfT's TAG.

6.7.2 Planning consent

Dependent upon the preferred option identified at the Outline Business Case stage, the planning consent process will be based on a number of factors:

- For works that fall within the operational railway, Network Rail's permitted development rights will apply. Network Rail will submit Prior Approval planning applications to both Bristol City Council and South Gloucestershire Council under Part 11 Class A of the Town and Country Planning (General Permitted Development) Order 1995 (GDPO).
- For any station locations that use previous station sites, permitted rights under existing private acts or orders may apply. However, this will be dependent upon the location and layout of the proposed station including access arrangements and ancillary facilities such as parking.
- For any stations or other infrastructure such as an extension of the operational railway onto private land, a planning application and/or a Transport and Works Act Order will be submitted by the project sponsor. Where this will involve the acquisition of third party land, attempts will be made to purchase the land by negotiation, and if this fails the CPO process is likely to be undertaken by the local authority.
- In terms of the requirement for an Environmental Impact Assessment and the supporting Environment Statement, a screening request will need to be submitted to the relevant local planning authority depending on the preferred scheme and the related infrastructure.

6.7.3 The GRIP process

The MetroWest Phase 2 project is being undertaken in accordance with Network Rail's Governance for Rail Investment Projects (GRIP) process with its built-in process of checking and assurance, including sign-offs and gateway reviews. The GRIP process is based on best practice within industries that undertake major infrastructure projects and practice recommended by the major professional bodies.

These include the Office of Government Commerce (OGC), the Association of Project Management (APM) and the Chartered Institute of Building (CIOB).

GRIP divides a project into eight distinct stages. The overall approach is product rather than process driven and, within each stage, an agreed set of products are delivered:

1. Output definition
2. Feasibility
3. Option selection
4. Single option development
5. Detailed design
6. Construction test and commission
7. Scheme hand back
8. Project close-out

Formal stage gate reviews are held at varying points within the GRIP lifecycle. The stage gate review process examines a project at critical stages in its lifecycle to provide assurance that it can successfully progress to the next stage.

The various stages of the GRIP process are aligned with development of the business case, see Figure 6.5. This figure also shows key decision points, aligned with the JTB process of review and approval.

6.7.4 Project level approvals and assurance

At the project level, quality assurance is the responsibility of the SRO. Quality assurance will be managed through the following processes:

- Peer group reviews and benchmarking. The purpose of the group is to provide an internal 'challenge' role to support the Rail Programme Board when considering highlight and exception reports from the project manager. The group will not undertake any audits or reviews at this level but rather raise formal issues via the nominated Rail Programme Board member if concerns are identified.
- External quality reviews, including those required by the GRIP process will be undertaken at the relevant points in the programme throughout its duration. The approval for such a review will include a detailed proposal for: the reasons (linked to issues/risks, peer review reports or change controls); scope; timescale; and budgetary requirements for the review. All quality reviews will include the following minimum requirements:
 - Establishing a review team
 - Agreed scope and timescale
 - Agreed list of documentation for the Programme SRO to provide in advance
 - Formal report following conclusion of the review with, if necessary, an exception report for the Rail Programme Board to consider

6.7.5 Reporting

The process for reporting is closely aligned with the process for approvals and assurances. The levels of reporting required are:

- Reporting to the Rail Programme Board and JTB, the business case deliverables including:
 - Preliminary business case
 - Outline business case
 - Full business case
 - Regular highlight reports
- Each business case stage will report the relevant technical stage the project has reached in respect of project design, GRIP, powers and consents, and procurement.

- Reporting to the Rail Programme Board and JTB progress and sign off of Network Rail, GRIP stages:
 - GRIP 1-2 Feasibility report
 - GRIP 3 Option selection report
 - GRIP 4 Single option development report
 - GRIP 5 Detailed design report
 - GRIP products developed and reported through the process include:
 - Estimating management
 - Risk and value management
 - Stakeholder management plan
 - Stage gate checklist
 - Consents and approvals
 - Environmental management
 - Project management plan
 - Project requirements' specification
 - Health and safety management
 - Contracts and procurement
 - Safety verification process
 - Change management
 - Delivering work within possessions
- Reporting to the Rail Programme Board and the JTB the overall management of the project/programme.
 - Highlights reports
 - Exception reporting
 - Project risk register
 - Issue log

6.8 Communications and Stakeholder Management

6.8.1 Communications with stakeholders and the public

Aspirations for rail are high and there is a clear need to explain what is happening, promote understanding and encourage support for proposals across the programme. The Communications Framework for MetroWest is co-ordinated at the Rail Programme Board level.

The Communications Framework for MetroWest is based on the following principles:

- Specific communication activities are focussed at the right level for particular consultees and stakeholders. Different groups will have their own concerns and require either a different level of information or have specific interests in the project.
- Projects seek an appropriate level of feedback from consultees and stakeholders to be incorporated into the development of MetroWest.
- Concerns of potential objectors are addressed as far as possible.
- The Core Project Team will be responsible for ensuring statutory consultation meets the requirements for the appropriate process.

6.8.2 Consultation undertaken to date

The West of England authorities have an established history of partnership working with Network Rail and train operators. Regular contact is maintained with the Bristol Port Company, in respect of both Phase 1 and 2. These are all critical stakeholders for this project. Details of other consultations are set out below.

6.8.2.1 Local Transport Body Board and Joint Transport Board - ongoing

Meetings of the Local Transport Body Board on 13 March 2013 and 14 June 2013 discussed and then prioritised major transport schemes for devolved DfT funding from 2015/16. Both meetings were held in public with the opportunity for public statements. The Local Transport Body Board is now meeting alongside the Joint Transport Executive Committee which has responsibility for council revenue and capital expenditure. The two boards now make up the Joint Transport Board.

6.8.2.2 MetroWest Stakeholder meetings – ongoing

MetroWest Stakeholder meetings are held quarterly following each Joint Transport Board meeting.

6.8.2.3 Engagement with rail interest groups - ongoing

There is considerable interest in the scheme from rail interest groups such as Friends of Suburban Bristol Railways and other groups. The project team will continue to liaise with these and other local interest groups throughout the scheme development work.

6.8.2.4 TravelWest stakeholder event - 13 October 2013

Around 70 delegates attended the TravelWest stakeholder event at BAWA Healthcare and Leisure on 13 October 2013. There was a focus on MetroWest, plus presentations on improvements to the Great Western mainline from Network Rail, followed by a question and answer session.

6.8.2.5 Joint Local Transport Plan 3 - 2011 to 2026 consultation

Extensive public consultation was carried out to produce the Joint Local Transport Plan 3 (JLTP3) including Joint Transport Forums in July and September 2010. The 'Let's Talk' campaign and 'Transport matters' website generated 4,500 people questionnaire responses with the strongest support for investing in public transport. The Greater Bristol Metro were included in the final JLTP3, published in March 2011.

6.8.2.6 Consultation on the Strategic Economic Plan (SEP)

The SEP was prepared with the support of local businesses, the four authorities, MPs, and education and skills' providers. Consultation on the draft SEP took place from December 2013 to January 2014 and around 100 responses were received. A stakeholder conference attracted several hundred delegates.

6.8.2.7 Rail conference 2011

Stakeholders were asked to prioritise their top three rail schemes. Their priorities were:

- 1) Greater Bristol Metro (former guise of MetroWest)
- 2) Portishead line reopening
- 3) Additional rolling stock

6.8.2.8 Memorandums of understanding

In July 2010 the West of England authorities, Network Rail, First Great Western, Cross Country and South West Trains signed a memorandum of understanding promoting 'effective co-ordination and co-operation' between the organisations. The key principles were openness, explanation and discussion together with shared responsibility and ownership of problems and solutions.

In October 2013, Bristol City Council, the West of England LEP, the Homes and Community Agency, English Heritage and Network Rail signed a 25-year memorandum of understanding to 'promote effective co-ordination and co-operation between the five organisations to achieve the development of Bristol Temple Meads Station as part of the Temple Quarter Enterprise Zone'. Again, the key principles are of 'openness, explanation and discussion together with shared responsibility and ownership of problems and solutions'.

6.8.2.9 Consultation on planning policy documents

MetroWest, either in its current or past guises, is incorporated in each of the authorities' Core Strategies as well as the Joint Local Transport Plan. As a result, the scheme has been subject to consultations at various stages in the plan preparation process.

The adopted South Gloucestershire Supplementary Planning Document (SPD) on the Cribbs Patchway New Neighbourhood (CPNN) states that the requirement of the Council to identify and safeguard sites for railway stations (and associated interchange facilities) along the route of the Hallen line.

6.8.2.10 Forthcoming consultation

The following consultation on aspects of the MetroWest Phase 2 scheme is in the process of being planned:

- Consultation about the location of the proposed Henbury station, proposed for Autumn 2015
- The West of England Joint Strategic Planning and Transport Strategy, Summer 2015

6.9 Risk management strategy

6.9.1 Programme-level risk

Risks and mitigation measures are dealt with at the Rail Programme Board level because of the close inter-relationship between the rail projects. Programme and project SROs and managers will regularly review the risk register and report to the Rail Programme Board. The most significant risks will be reviewed at each board meeting, via the highlight report. A risk owner will be identified who will be the person best able to manage the risk.

The Programme Manager is responsible for tracking and monitoring programme level-risks. This will include both risks which are common across the rail programme and those which are scheme-specific but could have a significant impact on the whole programme. The Programme SRO will be responsible for approving actions to mitigate risks at the programme level. The key project level and the programme risks will be considered at each Rail Programme Board meeting.

The top three risks will be reported to the quarterly meetings of the Rail Programme Board, PAB and JTB. This process will enable these strategic risks to be considered appropriately through the corporate risk management processes of the authorities.

6.9.2 Project-level risk

During the development of the MetroWest Phase 2 scheme, the identification of potential risk and consideration of how this can be mitigated has been an ongoing task, occurring in parallel to the design and development of the scheme, as part of an iterative process.

The top three high level risks are:

- A failure to secure JTB and/or DfT requirements and approvals at key milestones such as the Outline Business Case
- Delays in securing local funding contributions to meet the scheme programme
- A failure or delay in securing third party land

One of the Core Project Team's key tasks is to identify risks on scope of work or budget. Risk is reported to every second Rail Programme Board meeting unless there is an exception. The Core Project Team will review the risk register monthly.

6.10 Benefits' realisation plan, monitoring and evaluation

6.10.1 Benefits' realisation plan

A benefits' realisation plan will be developed that sets out:

- Expected scheme outcomes
- Methods of quantifying the benefits
- Data and metric requirements
- Plan management details

6.10.2 Monitoring and evaluation

Monitoring and evaluation, in line with DfT guidance, will be undertaken to assess the realisation of the benefits. The evaluation will inform performance improvement and will be disseminated to authorities, DfT and others.

Responsibility for monitoring and evaluation will sit within a nominated officer in South Gloucestershire Council, who reports to the project manager. The project manager monitors and in turn reports to a Senior Responsible Officer. The Senior Responsible Officer reports to the MetroWest Programme Board that is accountable to the JTB.

The principal approach to monitoring is to utilise existing and ongoing annual surveys, namely:

- Employer Travel Survey – used to identify the impact of the scheme on jobs and mode of travel to work
- West of England Rail Survey – used to quantify patronage at new and existing stations plus mode of travel to these stations
- Employment Land Survey – used to quantify the take-up of employment land and anticipated jobs and
- Residential Land Survey – used to quantify the completion of residential units.

The spatial extent of surveys will focus on areas within the catchment areas of new and existing stations that would see an improvement as a consequence of the scheme.

For this scheme, the baseline year for monitoring will be 2015. A report on the baseline will be submitted with the Outline Business Case at the end of 2016 with an interim report with the Full Business Case in 2020. Annual progress reports will be published from 2022 to 2026.

Beyond reporting to the JTB through annual output and outcome reports, internal reporting will be provided to the Programme Board and other stakeholders. Lessons generated from the monitoring and evaluation project will be disseminated to key stakeholders as above and through professional/academic networks/events.

Appendix G contains the monitoring and evaluation plan for MetroWest Phase 2.

6.11 Project management

The West of England councils have a considerable wealth of experience in delivering major transport schemes, as set out in Section 6.3. Each major scheme brings specific technical and organisational challenges and requires honed and adaptable project management and leadership skills for successful delivery. MetroWest Phase 2 is being led by south Gloucestershire Council on behalf of the West of England councils. South Gloucestershire Council have established and proven project management protocols which are aligned with PRINCE2 principles/Association of Project Managers.

Project management is the process of planning, delegating, monitoring and controlling a project or scheme. At the heart of this process, project management entails the management of costs, timescales, quality, scope, risk and benefits. The following project management principals provide a framework for successful project management:

- Continue business justification
- Learn from experience
- Defined roles and responsibilities
- Manage by stages
- Manage by exception
- Focus on products
- Tailor to suit the project environment

In summary the councils have deployed proven project management principals and have the capability and capacity to successfully deliver MetroWest Phase 2.

6.12 Summary of management case

A GRIP2 Feasibility Study has been undertaken by Network Rail to support the Preliminary Business Case; it includes a 'Capability Analysis'.

The Capability Analysis concluded that the Phase 2 services would be feasible with the following infrastructure improvements:

- Bristol East Junction enhanced renewal (for the Henbury Line options only); Network Rail is progressing the delivery of the scheme
- Ashley Down Station (on its former site on Filton Bank)
- Constable Road Station (on a new site on Filton Bank Bank); Notwithstanding the capital costs associated with this component
- North Filton Station (on its former site by the A38)
- Henbury Station at
 - East (of the A4018), a new site
 - West (of the A4018), the former site
 - with a bay platform for the Spur option
- Hallen Marsh Junction re-doubling (for the Loop service only)
- Yate turn-back (for services extended to Yate only)
- Gloucester (for services extended to Yate, Cam & Dursley and Gloucester) - no track or signalling improvements required.

Westerleigh Junction is a known capacity pinchpoint on the local rail network. There will be one spare path across Westerleigh Junction in 2019 which would be required for the MetroWest Phase 2 project. Possible competition for the remaining path is a risk to the project.

GRIP2 confirmed the 'in principle' technical feasibility of the new infrastructure for Phase 2, but further work required to consider:

- Mitigating platform gradients that are greater than 1:500
- Track and signalling design
- Train performance and network capacity of having new stations on Filton Bank

In summary, other key aspects of the management case are:

- The Councils have a proven track record in the delivery of major transport schemes and have the resource, capability and processes required to deliver MetroWest Phase 2 successfully, to time and budget
- The Councils already have strong delivery partnerships with Network Rail and the train operating companies, developed over many years and resulting in mature relationships
- The Councils have developed collaborative working arrangements, particularly at the technical interface
- The project benefits from a strong governance structure and framework
- Risk management is an important and integral part of the scheme development and project governance
- Good communications have been an important part of developing the MetroWest Phase 2 scheme from its inception
- There is considerable public support for the scheme

7 Appraisal of Option 1a_x

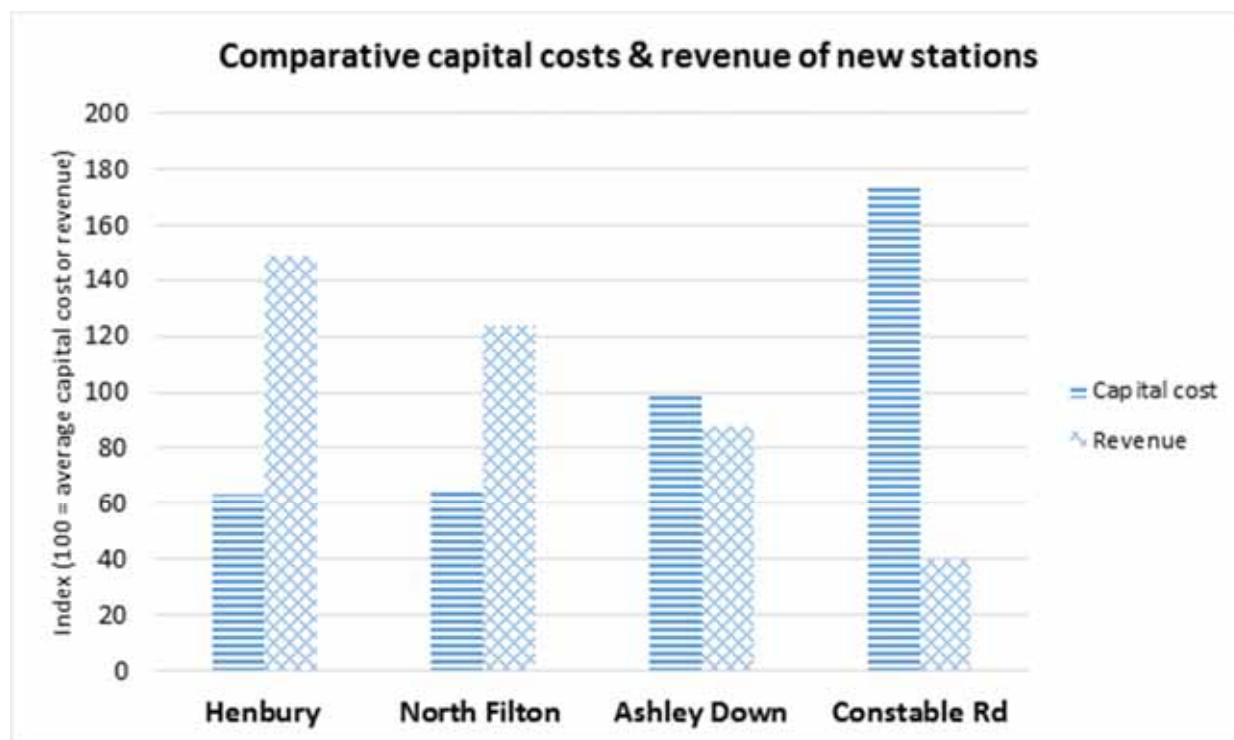
7.1 Introduction

This Section reports the assessment of an additional option, considering whether an alternative scheme, based on one of the existing options, could achieve the desired benefits of MetroWest Phase 2 but cost less to deliver. All four options (1a, 1b, 2a and 2b) assessed exceed the project budget of £43m; hence, the project team was required to consider the relative strengths and weaknesses of components of the scheme to see if one item could be removed without significant adverse impact on the overall performance of the scheme against its objectives.

Of all the new stations, Constable Road is by far the most expensive (because of its location) and generates the fewest trips (because its catchment area is 'squeezed' by Filton Abbey Wood and Ashley Down). The disaggregate cost and revenue estimates cannot be published due to commercial factors; however, the graph in Figure 7.1 compares the relative costs and revenue from each new station (compared to the average).

FIGURE 7.1

Comparative capital costs and revenue of new stations



Whereas Constable Road accounts for a significant proportion of the total costs of MetroWest Phase 2, it contributes a disproportionately small proportion of revenue. The other three new stations contribute a much higher proportion of revenue generated by the new stations than they account for in terms of costs. Note that the other key capital element of MetroWest Phase 2 (investment in a turn-back at Yate) is relatively modest in cost, and its removal would not address the budget shortfall.

In the first instance, therefore, an outline assessment of the potential value for money of all of the four options without the inclusion of Constable Road station was made. This is summarised in Table 7.1.

TABLE 7.1
Summary of value for money of the 4 options without Constable Road

Costs £m-outturn	Key	A. Yate Turn-back	B. Glos Turn-back
1. Henbury Spur w/o Constable Rd	Capital	£38.1	£34.6
	Revenue Support (first 3-years)	£3.5	£7.4
	Revenue Support (after 3-years)	£0	£0
	Total	£41.6	£42.0
	<i>BCR without WBS</i>	<i>2.46</i>	<i>1.96</i>
	<i>BCR with WBS</i>	<i>3.21</i>	<i>2.46</i>
2. Henbury Loop w/o Constable Rd	Capital	£43.3	£39.8
	Revenue Support (first 3-years)	£10.0	£14.0
	Revenue Support (after 3-years)	£34.9	£51.5
	Total	£88.2	£105.3
	<i>BCR without WBS</i>	<i>1.02</i>	<i>1.05</i>
	<i>BCR with WBS</i>	<i>1.34</i>	<i>1.35</i>

Includes:

- Capital risk & contingency.
- DfT takes over revenue support in franchise after year-3 for options with a BCR greater than 2.0.

Exclusions:

- Sunk feasibility costs incurred before Apr'15.
- Measures to mitigate adverse impact of the Loop on Bristol Port's main entrance at St.Andrews Road Level Crossing.
- Local revenue support requirement after year 2034.

The initial assessments of options without Constable Road stations have indicated that spur-based options could be delivered and operated (for 3-years) within the existing budget, whilst the BCR would actually be improved. If Constable Road station were to be removed from Phase 2 Loop-based options, the scheme would remain over-current budget and the BCR would be still be less than 2.0.

Therefore, this chapter continues with an assessment of a Spur-based option without Constable Road station, called Option 1a-x; to the same standard of analysis as the four main options considered in the PBC. This option includes a Yate turn-back because this scheme provides the highest value for money (although the impacts of an option including a Spur and Gloucester turn-back would be similar in many respects).

In assessing the impacts and benefits of this option, the five headings of the business case (strategic, economic, commercial, financial and management) have been considered again. The main difference, however, within this section is where this option demonstrates no change or no difference compared to the other four options, these are not reported. In short, this section examines whether the removal of the Constable Road component could result in a tangible difference in the business case.

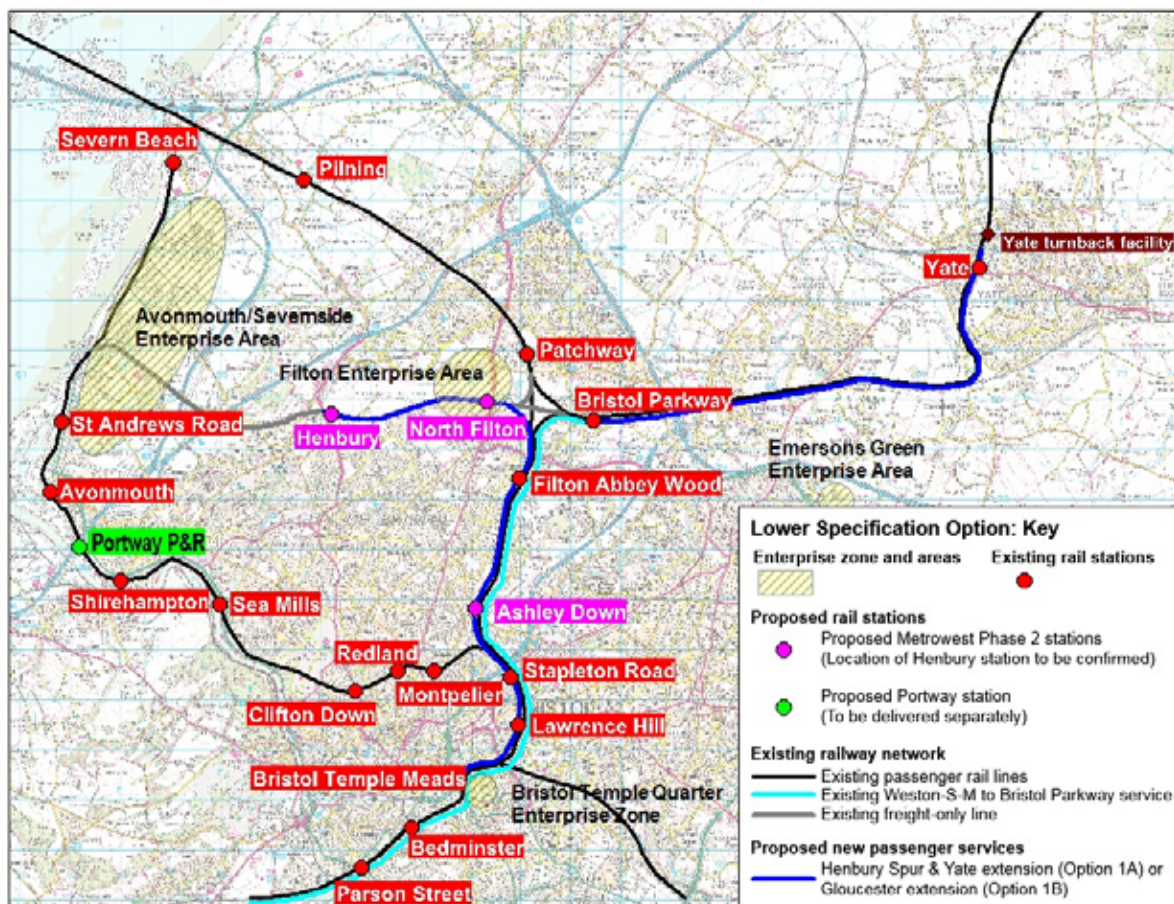
7.2 Description of option modelled

Figure 7.2 shows a map of Option 1a_x and Table 7.2 summarises the detail of the option.

TABLE 7.2
Summary of Option 1a_x

Option	Infrastructure required	Services required	Detail
Option 1a_x	New stations at Ashley Down, North Filton, Henbury. Turnback at Henbury and Yate	<ul style="list-style-type: none"> • Bristol Temple Meads to Henbury 1 train per hour (tph) all day • Extension of current Weston-super-Mare to Bristol Parkway station to Yate 	<ul style="list-style-type: none"> • Stopping at: Lawrence Hill, Stapleton Road, new station at Ashley Down, Filton Abbey Wood and a new station at North Filton • Increasing the number of services to Yate to 2tph all day

FIGURE 7.2
Option 1a_x – Henbury Spur and Yate Extension Plan



7.3 Strategic Case for Option 1a_x

Option 1a_x has the same Strategic Case as the other four scheme options, and it:

- Has a **clear business strategy which is closely aligned with the strategic aims and responsibilities** of the four West of England authorities, the LEP and Network Rail.
- **Addresses a number of genuine, evidenced problems** relating to congestion, resilience, accessibility and the constraints these have on economic growth.
- Would **support and several housing and employment developments** that are planned in the sub-region.
- Has a **clearly defined scope**.
- **Will affect a wide range of stakeholder groups** and local communities by providing better access to a local rail service.
- Has been **subject to a robust optioneering process**.
- Is **aligned with the business objectives of the rail industry** and the programme of CP5 investment planned for the Western Route. Thus extending the benefits of CP5 further across the rail network to wider population, yielding wider economic growth.
- **Responds to both internal (rail industry) and external (public pressure) drivers for change**.
- Provide an **integrated approach to the travelling public by providing the basis for a truly 'Metro' level of service for West of England local rail network**, alongside the substantial investment in the long distance rail routes to and from the West of England.
- **Has clear objectives** that directly address the problems identified and are aligned with the objectives of the LTP, the various spatial planning policies, and the vision and objectives of the LEP.

7.4 Economic Case for Option 1a_x

7.4.1 Introduction

In assessing the economic case for Option 1a_x, the analysis indicates that there are a number of impacts that differ from those outlined previously for Option 1a, these relate to:

- The modelled impacts of the scheme
- Transport user benefits
- Wider impacts
- Landscape/townscape and heritage of historic resources
- Access to services
- Public accounts

The remainder of this section considers these impacts in turn.

7.4.2 Summary of modelled scheme impacts

Table 7.3 shows new stations demand forecasts for Option 1a_x (Henbury Spur and Yate, with no Constable Road station), compared with equivalent figures for Option 1a.

TABLE 7.3

New Station Forecasts (one way trips)

Change in rail use	Option 1a Henbury Spur + Yate	Option 1a_x Henbury Spur + Yate, without Constable Road station
Ashley Down	89,400	100,850
Constable Road	37,700	-
North Filton	92,300	92,300
Henbury	98,850	98,850

Notes: rail journeys in year 2021, rounded to the nearest fifty

The table indicates that implementing Option 1a_x would result in a lower combined demand at the three remaining new stations in Option 1a_x than the combined demand at the four stations in Option 1a. However, it is notable that Ashley Down as a stand-alone station attracts a greater usage than when operating in conjunction with Constable Road.

The total increase in demand (one-way journeys) generated by MetroWest Phase 2 is shown in Table 7.4. This is taken from the MOIRA demand forecasts for existing stations, and the new stations forecasts for both Filton Bank and Henbury loop. Both have been translated to 2021 (opening year) demand levels using the future year rail demand growth profile assumed for West of England area stations.

TABLE 7.4

Increase in rail demand (one way trips)

2021 rail use	Option 1a Henbury Spur + Yate	Option 1a_x Henbury Spur + Yate, without Constable Road station
Existing stations	58,250	58,200
New stations	318,250	292,100
Total	376,500	350,200

Note: Rounded to the nearest fifty. Net increases in rail demand at existing stations are presented (i.e. the gross forecast from MOIRA is reduced, making an allowance for existing rail trips that transfer to new stations and are therefore not 'new to the railway').

Table 7.4 again illustrates that there is a modest reduction in the additional rail demand generated by Option 1a_x compared to Option 1a. The forecast patronage at Constable Road station in Option 1a would not be totally 'lost' to the railway in Option 1a_x, with approximately 30% of demand generated by Constable Road forecast to use alternative stations, principally Ashley Down.

The multi-modal demand model functionality of the GBATS3 model enabled the mode switch resulting from the rail improvements to be quantified. In turn, this reduction in highway trips has enabled a forecast of reduced congestion in the network. Tables 7.5 and 7.6 summarise these changes.

The impact of Option 1a_x on the highway network in comparison with Option 1a Henbury Spur and Yate is very minor when compared to the overall traffic modelled.

Reductions in car trips of around 0.1% are noted in all options in 2031, though reflecting the congested nature of the road network, car travel times are reduced by around 0.2% in peak periods and total queuing time by up to 0.3% at peak times. Small changes are not unexpected as the quantum of rail trips is much lower when compared to highway trips (for instance, rail trips are only 3.5% of all trips in the AM peak model). As such, even significant changes in rail demand would not generate large changes on the road network.

TABLE 7.5
2021 Opening Year Highway model network wide statistics

	Do minimum			Option 1a Henbury Spur + Yate			Option 1a_x Henbury Spur + Yate, without Constable Road station		
	AM	IP	PM	AM	IP	PM	AM	IP	PM
Queues (pcu. hrs./hr.)	7338	4498	7025	7324	4492	7009	7323	4493.4	7014.7
Total Travel Time (pcu. hrs./hr.)	26409	18173	25918	26377	18160	25870	26403	18161	25880
Travel Distance (pcu. kms./hr.)	1114346	856032	1091845	1113748	855402	1091298	1113850	855594	1091404
Overall Average Speed (kph)	42	47	42	42	47	42	42	47.1	42
Total Trips Loaded (pcu/hr)	128148	105253	120262	128104	105216	120208	128108	105219	120212
				Option 1a Henbury Spur + Yate vs Do minimum			Option 1a_x Henbury Spur + Yate, without Constable Road station vs do min		
				AM	IP	PM	AM	IP	PM
Queues (pcu. hrs./hr.)				-0.2%	-0.1%	-0.2%	-0.2%	-0.1%	-0.1%
Total Travel Time (pcu. hrs./hr.)				-0.1%	-0.1%	-0.2%	0.0%	-0.1%	-0.1%
Travel Distance (pcu. kms./hr.)				-0.1%	-0.1%	-0.1%	0.0%	-0.1%	0.0%
Overall Average Speed (kph)				-	-	0.2%	-	-	0.2%
Total Trips Loaded (pcu/hr)				-0.0%	-0.0%	-0.0%	0.0%	0.0%	0.0%

Note: The GBATS model assumes 2016 as a proxy for the opening year

TABLE 7.6
2031 Highway model network wide statistics

	Do minimum			Option 1a Henbury Spur + Yate			Option 1a_x Henbury Spur + Yate, without Constable Road station			
	AM	IP	PM	AM	IP	PM	AM	IP	PM	
Queues (pcu. hrs./hr.)	9999	6278	9483	9979	6250	9475	9981	6252	9472	
Total Travel Time (pcu. hrs./hr.)	35635	23855	34845	35562	23805	34745	35595	23806	34759	
Travel Distance (pcu. kms./hr.)	1332452	1076024	1310273	1331496	1074421	1308993	1331106	1074645	1308991	
Overall Average Speed (kph)	37	45	38	37	45	38	37	45	38	
Total Trips Loaded (pcu/hr)	151773	128979	142065	151694	128879	141937	151701	128887	141948	
				Option 1a Henbury Spur + Yate vs Do minimum			Option 1a_x Henbury Spur + Yate, without Constable Road station vs do min			
				AM	IP	PM	AM	IP	PM	
Queues (pcu. hrs./hr.)				-0.2%	-0.4%	-0.1%	-0.2%	-0.4%	-0.1%	
Total Travel Time (pcu. hrs./hr.)				-0.2%	-0.2%	-0.3%	-0.1%	-0.2%	-0.2%	
Travel Distance (pcu. kms./hr.)				-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	
Overall Average Speed (kph)				-	-	0.3%	-	-	0.3%	
Total Trips Loaded (pcu/hr)				-0.1%	-0.1%	-0.1%	-0.0%	-0.1%	-0.1%	

7.4.3 Business users & transport providers (TEE Tables)

The TEE tables for the options are shown in the Table 7.7.

TABLE 7.7

TEE Table: Option 1a_x

Consumer - Commuting user benefits	All Modes	Road	Bus	Rail
Travel Time	47,983	7,069	0	40,914
Vehicle operating costs	2,837	2,837	0	0
User charges	-12	-12	0	0
During Construction & Maintenance	-218	-20	0	-199
NET CONSUMER - COMMUTING BENEFITS	50,590	9,875	0	40,715

Consumer - Other user benefits	All Modes	Road	Bus	Rail
Travel Time	26,474	3,900	0	22,574
Vehicle operating costs	1,565	1,565	0	0
User charges	-7	-7	0	0
During Construction & Maintenance	-218	-20	0	-199
NET CONSUMER - OTHER BENEFITS	27,815	5,439	0	22,375

Business	All Modes	Personal	Freight	Personal	Freight	Personal	Freight
Travel Time	15,459	5,011	2,625	0	0	7,823	0
Vehicle operating costs	680	244	436	0	0	0	0
User charges	19	9	10	0	0	0	0
During Construction & Maintenance	-437	-40	0	0	0	-397	0
Subtotal	15,721	5,224	3,071	0	0	7,426	0

Private Sector Provider Impacts	All Modes	Road	Bus	Rail
Revenue	0	0	0	0
Operating costs	0	0	0	0
Investment costs	0	0	0	0
Grant/subsidy	0	0	0	0
Subtotal	0	0	0	0

Other business Impacts	All Modes	Road	Bus	Rail
Developer contributions	0	0	0	0
NET BUSINESS IMPACT	15,721			

TOTAL

Present Value of Transport Economic

Efficiency Benefits (TEE)	94,126
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Notes: Benefits appear as positive numbers, while costs appear as negative numbers.
All entries are present values discounted to 2010, in 2010 prices

7.4.4 Wider impacts

The assessment seeks to capture the following three types of wider impacts over a 60-year appraisal period from the scheme opening year 2021 to 2081:

- Agglomeration
- Output change in imperfectly competitive markets
- Labour supply impacts

Table 7.8 shows summary and total values of wider impacts for Option 1a_x, in comparison with option 1a. It can be noted that, as with other options, there is not a significant difference between the options, and Option 1a_x generates slightly lower benefits overall than option 1a Henbury Spur and Yate.

TABLE 7.8

Wider Impacts (£000s)

Assessment	Option 1a Spur + Yate	Option 1a_x Henbury Spur + Yate, without Constable Road station
Agglomeration	£29,624	£27,061
Output change in imperfectly competitive markets	£1,735	£2,021
Labour supply impacts	£1,513	£1,389
Total Wider Impacts	£32,873	£30,470

Note: 2010 year price base

7.4.5 Landscape

Given that the MetroWest Phase 2 scheme involves the use of existing operational railway lines, the main landscape impacts will arise from the station locations and, potentially, the Yate turn-back. An environmental appraisal of the competing station locations as part of the Network Rail GRIP process has been undertaken as shown in Table 7.9.

TABLE 7.9

Landscape assessment

Assessment	Option 1a Henbury Spur + Yate	Option 1a_x Henbury Spur + Yate, without Constable Road station
Does the scheme need to clear vegetation or trees on railway land or access routes?	Yes –vegetation needs to be cleared at all stations and Yate turnback	Yes –vegetation needs to be cleared at all stations and Yate turnback
Does the scheme need to remove hedgerows?	Yes – for the Henbury station locations and at Constable Road	Yes – for the Henbury station locations only

Whilst more detailed assessment and survey is required, given the likely number of designations and receptors, Option 1a_x is envisaged to have a **moderate adverse landscape impact**.

7.4.6 Townscape

At this stage, the station designs have not been developed in detail, so only a broad assessment can be made undertaken of the impacts on the townscape. For Option 1a_x, the townscape assessment concludes that:

- A moderate adverse impact at Ashley Down station. A ramped footbridge will be required at this site which will have a direct impact on neighbouring properties.
- A neutral impact at North Filton station. Access from Gloucester Road will utilise existing bridges and will require ramps down to the station location in a cutting.
- A slight adverse impact at the Henbury locations. Although a footbridge is not required for the spur service, the station will be located close to existing residential properties.

On the basis of the above, it is envisaged that the design of the stations and surrounding public realm would have a **slightly adverse impact on the townscape**.

7.4.7 Heritage of historic resources

This section looks at both statutory and non-statutory designations in addition to non-designated cultural heritage assets. Both direct and indirect impacts (such as issues related to visual and historic settings) and effects to both resources are considered.

Heritage assessments have been made of Option 1a_x scheme components and with the exception of Ashley Down where further survey work would be required, it is envisaged that there will be a neutral heritage impact on:

- A listed building, structure or scheduled ancient monument
- A local planning Conservation area, historic landscape features and similar designated area
- Any other historical or man-made feature likely to be of value

On balance, it is envisaged that the scheme will have a **neutral heritage impact**.

7.4.8 Summary of environmental impacts

Table 7.10 provides a summary of environmental impacts of the scheme options.

TABLE 7.10

Environment assessment summary

Assessment	Option 1a	Option 1a_x
	Henbury Spur + Yate	Henbury Spur + Yate, without Constable Road station
Noise	Slight/moderate adverse impact	Slight/moderate adverse impact
Air Quality	Slight beneficial/neutral impact	Slight beneficial/neutral impact
Greenhouse gases	Moderate beneficial impact	Moderate beneficial impact
Landscape	Moderate adverse impact	Moderate adverse impact
Townscape	Slight adverse impact	Slight adverse impact
Heritage of historic resources	Neutral impact	Neutral impact
Biodiversity	Slight adverse impact	Slight adverse impact
Water environment	Neutral	Neutral

7.4.9 Access to services

In considering the impact on access to services of options 1a_x, particularly relative to option 1a, it should again be noted that all of the key destinations considered are already well-served by local bus services, so the focus is on accessibility by rail. Differences between option 1a_x and option 1a are limited to the issues that some of residential catchment of Constable Road would not gain all of the rail access benefits generated by option 1a, and that Constable Road itself was the closest new station to Southmead Hospital. As such, there are very slightly lower (rail) access benefits to all services for residents in the immediate vicinity of Constable Road. Likewise rail based access to Southmead Hospital remains via Filton Abbey Wood, rather than a new Constable Road station. Table 7.11 outlines the improvements to accessibility to key destinations for the two options.

TABLE 7.11

Access to key services by option

	Option 1a Henbury Spur + Yate	Option 1a_x Henbury Spur + Yate, without Constable Road station
Access to the Temple Quarter Enterprise Zone	Slight beneficial impact - Improved rail access through new stations at Henbury, North Filton and along the Filton Bank. Improved frequency at Yate will provide greater flexibility to access TQEZ.	Slight beneficial impact - Improved rail access through new stations at Henbury, North Filton and Ashley Down. Improved frequency at Yate will provide greater flexibility to access TQEZ.
Access to the Filton Enterprise Area	Moderate beneficial impact –the Filton Enterprise Area is adjacent to North Filton station.	
Access to the Avonmouth Enterprise Area	Slight beneficial impact – the spur service would require a change of trains at Stapleton Road to access the Avonmouth area.	
Access to FE: S Glos and Stroud College (Filton)	Slight beneficial impact –the college is located in close proximity to the North Filton station.	
Access to FE: S Glos and Stroud College (Stoke Gifford)	Slight beneficial impact – increased number of services and stations served from Filton Abbey Wood station.	
Access to FE: City of Bristol (Ashley Down)	Moderate beneficial impact – the college is within walking distance of the new station at Ashley Down.	
Access to HE: UWE Coldharbour Lane	Slight beneficial impact – increased number of services and stations served from Filton Abbey Wood station.	
Access to health: Bristol Royal Infirmary	Slight beneficial impact – increased number of services and stations served from Temple Meads.	
Access to health: Southmead Hospital	Neutral – Southmead Hospital is located over 2km from the nearest station (Constable Road) and, hence, the number of hospital related journeys will be limited (especially when considering the network of bus services radiating from the hospital).	Neutral – Closest station to Southmead under this option will be the existing Filton Abbey Wood station which is located approximately 3km away. The number of hospital related journeys will be very limited given the network of bus services radiating from the hospital.
Access to services: Clifton	Slight beneficial impact – increased number of stations served from Clifton Down (although a change of trains will be required at Stapleton Road).	
Access to services: The Mall (Retail and leisure)	Neutral – The Mall is located 2.5km from the closest stations (Henbury, North Filton) and, hence, the number of journeys to and from the Mall is expected to be limited (especially when considering the network of bus services radiating from the Mall).	
Overall assessment	Slight beneficial impact	Slight beneficial impact

The assessment indicates that although existing bus services provide a fairly comprehensive network of services, both options will provide access improvements, especially for the Temple Quarter Enterprise Zone, the Filton Enterprise Area, South Glos & Stroud and City of Bristol Colleges. However, access to the major health centres and the Mall will remain largely unaffected by the scheme, because of their distance to the nearest stations.

7.4.10 Indirect Tax Revenues

The additional rail journeys result in tax costs associated with a reduction in the number of cars on the roads. These tax costs, both fuel duty and VAT, were estimated in accordance with TAG and are presented in the Public Accounts tables in Table 7.12, the Public Accounts (PA) Table for Option 1a Henbury Spur + Yate is in Table 3.21.

TABLE 7.12

Public Accounts (PA) table: Option 1a_x

Local Government Funding	All Modes	Road	Bus	Rail
Revenue	5	5	0	0
Operating Costs	-71	-71	0	0
Investment Costs	0	0	0	0
Developer Contributions	0	0	0	0
Grant/Subsidy Payments	23,830	0	0	23,830
NET IMPACT	23,764	-66	0	23,830

Central Government Funding: Transport	All Modes	Road	Bus	Rail
Revenue	-53,445	0	0	-53,445
Operating costs	68,727	0	0	68,727
Investment costs	0	0	0	0
Developer Contributions	0	0	0	0
Grant/Subsidy Payments	0	0	0	0
NET IMPACT	15,282	0	0	15,282

Central Government Funding: Non-Transport	All Modes	Road	Bus	Rail
Indirect Tax Revenues	3,393	3,393	0	0

TOTALS	All Modes	Road	Bus	Rail
Broad Transport Budget	39,046	-66	0	39,112
Wider Public Finances	3,393	3,393	0	0

Notes: Costs appear as positive numbers, while revenues and developer contributions appear as negative numbers. All entries are present values discounted to 2010, in 2010 prices

7.4.11 Value for Money Statement

Table 7.13 sets out the Value for Money Statement for the MetroWest Phase 2 scheme.

TABLE 7.13
Value for Money Statement

Criteria	Option 1a: Henbury Spur + Yate	Option 1a_x Henbury Spur + Yate, without Constable Road station
Value for Money/Value for Money when Wider impacts are included	Medium/High	High/High
NPV	£48.63 million	£53.01 million
Initial BCR	1.90	2.36
Adjusted BCR (With Wider Impacts)	2.50	3.14
Summary of the benefits and costs	<ul style="list-style-type: none"> Rail transport user benefits (around 72% of the total benefits excluding wider impacts) Highway transport user benefits Wider Impacts £32.9 million <p>The most significant project costs driving the economic case are the operating costs.</p>	<ul style="list-style-type: none"> Rail transport user benefits (around 77% of the total benefits excluding wider impacts) Highway transport user benefits Wider Impacts £30.5 million <p>The most significant project costs driving the economic case are the operating costs.</p>
Significant non-monetised impacts	Option values	
Key risks, sensitivities and uncertainties underlying the appraisal	<ul style="list-style-type: none"> Operating cost assumptions - potential scope for greater synergies with existing services to reduce staffing and maintenance costs Rail demand forecasts, in particular future year growth in demand at new and existing stations Future year fare assumptions Age of data in the GBATS3 model (model has been revalidated and GBATS4 will be used for the Outline Business Case) 	
Significant social distributional impacts	Not assessed	

The assessment work presented in the economic case shows that the removal of the Constable Road station from the MetroWest Phase 2 strengthens the economic case. The removal of Constable Road station reduces the transport user benefits, and the wider impacts, this reduction is relatively lower than the cost saving, so the overall net present value and benefit to cost ration of the scheme improve.

7.4.12 Analysis of Monetised Costs and Benefits (AMCB) Tables

Tables 7.14 and 7.15 shows the analysis of Monetised Costs and Benefits (AMCB) Tables

TABLE 7.14
AMCB Table

	Option 1a Henbury Spur + Yate	Option 1a_x Henbury Spur + Yate, without Constable Road station
Noise, air quality & greenhouse gases	1,341	1,322
Economic Efficiency: Consumer Users (Commuting)	63,397	50,590
Economic Efficiency: Consumer Users (Other)	25,878	27,815
Economic Efficiency: Business Users and Providers	16,337	15,721
Wider Public Finances (Indirect Taxation Revenues)	-4,086	-3,393
Present Value of Benefits (PVB)	102,866	92,054
Broad Transport Budget	54,232	39,046
Present Value of Costs (PVC)	54,232	39,046
OVERALL IMPACTS		
Net Present Value (NPV)	48,634	53,008
Benefit to Cost Ratio (BCR)	1.90	2.36

Note: This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.

TABLE 7.15
AMCB Table including wider impacts

	Option 1a Henbury Spur + Yate	Option 1a_x Henbury Spur + Yate, without Constable Road station
Greenhouse gases	417	411
Noise	57	56
Local Air Quality (not assessed)	-	-
Journey Ambience (not assessed)	-	-
Accidents	867	854
Reliability (not assessed)	-	-
Rail environment (not assessed)	-	-
Wider Impacts	32,873	30,470
Final PVB	135,738	122,524
PVC	54,232	39,046
NPV	81,506	83,478
BCR	2.50	3.14

7.4.13 Appraisal Summary Table (AST)

The AST for Option 1a_x is shown in table 7.16.

TABLE 7.16
AST for Option 1a_x

Appraisal Summary Table		Date produced:	3	July	2015	Contact:					
Name of scheme:	MetroWest Phase 2 -Additional Option 1a_x - Henbury Spur, Yate Extension					Name	A Rice				
Description of scheme:	New stations at: Ashley Down, Filton North, Henbury. Turnback at Hallen junction and Yate. Bristol Temple Meads to Henbury 1 train per hour (tph) all day. Extension of current Weston Super Mare to Bristol Parkway station to Yate.					Organisation	SGC				
					Role	PM					
Impacts	Summary of key impacts	Assessment				Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp			
		Quantitative									
Economy	Business users & transport providers	Value of journey time changes(£)			Large Beneficial	£15,721	Not assessed				
		Net journey time changes (£)									
		0 to 2min	2 to 5min	> 5min							
Environmental	Reliability impact on Business users	The reduction in congestion in the highway network will result in improved journey time reliability.			Likely to be Slight	Not assessed					
	Regeneration	The scheme links into a number of regeneration areas. Importantly, the scheme links into the Temple Quarter Enterprise Zone and will support Filton Enterprise Area.			Likely to be slight beneficial	Not assessed					
	Wider Impacts	Slight improvements to agglomeration, output changes and labour market supply impacts.			Likely to be slight beneficial	Not assessed					
	Noise	Receptors in the vicinity of the Henbury line and new stations will experience increases in noise associated with trains accelerating and decelerating, although receptors are already exposed to noise from existing rail traffic. There will be beneficial impacts to receptors in the vicinity of congested corridors that experience reductions in car traffic due to the scheme.			Likely to be Slight/Moderate Adverse	Not assessed	Not assessed				
Social	Air Quality	The scheme operation is likely to have beneficial impacts due to the modal shift from road to rail but disadvantages for those immediately adjacent to the line.			Likely to be Slight Beneficial/ Neutral	Not assessed	Not assessed				
	Greenhouse gases	Rail transport is more energy-efficient than road transport and gives rise to less pollution per passenger kilometre than road transport; hence, with the forecast modal shift to rail, there should be a reduction in day-to-day carbon emissions from transport. The carbon impacts of construction will be principally associated with the materials used for the construction of new railway stations. Estimates impacts of changes associated with highway carbon impacts have been quantified.			Change in non-traded carbon over 60y (CO2e)	-27221	Change in traded carbon over 60y (CO2e)	-85	Likely to be moderately beneficial	£411	
	Landscape	The main landscape impacts will arise from the station locations, with the potential for impacts at the Yate turn-back. Vegetation will need to be cleared at all locations and hedgerows at Henbury.			Not assessed	Moderate Adverse	Not applicable				
	Townscape	The station designs have not been developed in detail so only a broad assessment can be undertaken of the impacts on townscape. Footbridges at Ashley Down and Henbury are likely to be visible and overlook neighbouring properties.			Not assessed	Slight Adverse	Not applicable				
	Historic Environment	Likely to be neutral impacts to listed buildings and conservation areas. Removal of old, derelict but historic railway infrastructure.			Not assessed	Likely to be Neutral	Not applicable				
	Biodiversity	Surveys are required to determine presence of protected species. Options include locations on/near a statutory nature conservation area.			Not assessed	Likely to be Slight Adverse	Not applicable				
	Water Environment	Based on the environmental appraisal undertaken for Network Rail, there are no impacts on the water environment other than options containing locations located on or close to a water course drainage channel.			Not assessed	Neutral	Not applicable				
	Commuting and Other users	Journey time savings are significant in areas where impacts of the proposed scheme are anticipated. This covers savings for users using the new services and decongestion benefits for highway users.			Value of journey time changes(£)			Net journey time changes (£)			
		0 to 2min	2 to 5min	> 5min	Large Beneficial	£78,405	Not assessed				
Public Accounts	Reliability impact on Commuting and Other users	The reduction in congestion in the highway network will result in improved journey time reliability.			Not assessed	Likely to be Slight Beneficial	Not assessed				
	Physical activity	Increasing physical activity by creating multi-modal trips and introducing shorter journeys which are more realistic and achievable by sustainable modes by encouraging rail passengers to walk or cycle at either end of their rail journey.			Not assessed	Likely to be Slight Beneficial	Not applicable				
	Journey quality	The increase in rail use will also have a positive impact on car users as the highway network will be less congested and journeys less stressful. The main disadvantage would be security, largely at stations where large number of people converge and potential for personal security issues.			Not applicable	Likely to be Slight Beneficial	Not assessed				
	Accidents	The new rail services will result in a small amount of modal shift away from cars, and as such a small overall reduction of vehicle-kms travelled on the highway network. This should have the effect of also reducing the number of accidents on the highway.			Proportion of user benefits assumed	Likely to be Slight Beneficial	£854	Not assessed			
	Security	New rail stations may enhance the security of urban locations by providing additional footfall, CCTV, emergency contact points and improved lighting. While there is a general improvement in security of the area, rail stations can also attract crime.			Not applicable	Likely to be Neutral	Not applicable	Not assessed			
	Access to services	Improved access to TQEZ, Filton Enterprise Area, Further Education sites at Filton, Stoke Gifford and Coldharbour Lane.			Not assessed	Likely to be Moderate	Not applicable	Not assessed			
	Affordability	Rail travel is generally slightly cheap than car ownership and travel with local rail and bus fares being comparable. However, compared to bus and car travel, journey time savings by rail are considerable. For Filton Bank, North Filton and Henbury there would be significant journey time savings to Temple Quarter.			Not applicable	Likely to be Slight Beneficial	Not applicable	Not assessed			
	Severance	The scheme itself involves the use of existing operational railway lines and as a result, the extent of severance will be limited for spur based options.			Not applicable	Likely to be Neutral	Not applicable	Not assessed			
	Option and non-use values	As the appraised scheme will introduce passenger train services and will benefit more than 1000 households, it is deemed a large beneficial impact.			Not assessed	Likely to be Large	Not applicable				
	Cost to Broad Transport Budget	The public sector costs associated with investments for scheme implementation and ongoing support/maintenance, such as capital investment, operating costs and revenue income.					-£39,046				
Indirect Tax Revenues	The impact on tax and fuel duty loss as a result of reduction in fuel consumption					-£3,393					

7.5 Commercial Case for Option 1a_x

The Commercial Case, as outlined in Section 4 of this document, considered the following:

- Whether the options would result in a viable train service and would carry an acceptable level of performance risk (Network Rail GRIP2 stage)
- An output specification that details the various work streams required to underpin the scheme
- A procurement strategy.

It can be concluded that Option 1a_x would not have different impacts to the Commercial Case headings that were considered.

7.6 Financial Case for Option 1a_x

7.6.1 Introduction

In assessing the financial case, this section considers only those matters where there are specific differences for this option. This includes the construction costs, operational costs and the funding aspects for the preparation, capital and operational stages for Option 1a_x.

7.6.2 Construction Costs

Table 7.17 sets out a summary of the composition of capital costs.

TABLE 7.17
Capital Cost Summary (£Million)

Item	Option 1a Henbury Spur + Yate	Option 1a_x Henbury Spur + Yate, without Constable Road station
Preparation - UA	£1.10	£1.11
Preparation – Rail	£3.78	£2.32
Construction – UA	£0.85	£0.67
Construction – Rail	£29.17	£17.91
Risk/Contingency – UA	£1.27	£1.27
Risk/Contingency - Rail	£13.18	£8.09
Rail Industry Fees @7.5%	£2.47	£1.52
Sub-total	£51.82	£32.88
Inflation @ 3.2 pa	£8.37	£5.24
Total	£60.19	£38.13

Notes:

1. The price base is 2014.
2. The ROSSI indices is defined as the retail price index excluding mortgage interest payments, council tax, housing depreciation and rents. For simplicity, 3.2% pa inflation assumed throughout the period.
3. The UA preparation costs cover client-side project management, planning and communication costs plus consultant costs to cover preparation of subsequent business cases (i.e. costs out-with GRIP). Land and Part 1 costs are included under UA Construction costs; note that some land for Henbury Line stations has been secured through planning gain. The high proportion of risk to costs reflects a specific provision to cover a statutory process, be it TWAO or CPO, the need for which will be confirmed during GRIP3.

The removal of the Constable Road station element has a significant impact on the overall scheme costs. The construction costs fall by £11.26m with a corresponding fall in risk/contingency of £5.09m.

7.6.3 Operational costs

The operational costs of the scheme are the incremental costs of enhancing existing services and adding new services, see Table 7.18 for details.

TABLE 7.18

Train Service Operating Costs per annum (2014 Prices)

£Million outturn	Option 1a Spur + Yate	Option 1a_x Henbury Spur + Yate, without Constable Road station
No. of additional train units	2	2
TOC staff cost	£1.05	£1.05
TOC vehicle leasing cost	£0.66	£0.66
TOC vehicle opex cost	£0.42	£0.42
TOC opex costs (other)	£0.55	£0.55
Total	£2.68	£2.68

Notes: Costs are shown as positive. Costs are in 2014 factor prices, at GRIP stage 2 and refer to the first full year; they are undiscounted and exclude optimism bias. Option1a_x train operating costs are assumed to be the same as Option 1a.

7.6.4 Funding - Preparation and Capital

The funding requirement for preparation and capital is shown in Table 7.19.

TABLE 7.19

Capital Funding Requirement by Year

£Million outturn	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022+	Totals
Option 1a	£0.45	£1.63	£1.92	£3.84	£1.92	£40.03	£10.20	£0.20	£60.19
Option 1a_x	£0.36	£1.15	£1.33	£2.86	£1.27	£24.88	£6.29	£0.20	£38.34

Note: Excludes costs of borrowing against devolved funding, which only becomes available from April 2021.

7.6.1 Funding - Operational

The headline train service subsidy position is set out in Table 7.20.

TABLE 7.20

Operating costs, revenue & surplus/deficit

Option	Year	Revenue £M	Operating Cost £M	Surplus/deficit £M	New journeys NET	Surplus/deficit per new journey £
1a Henbury Spur + Yate	2021	£1.64	£3.04	-£1.40	376,520	-£3.72
	2022	£1.93	£3.13	-£1.20	441,290	-£2.72
	2023	£2.18	£3.23	-£1.05	484,090	-£2.17
	TOTAL	£5.75	£9.40	-£3.65	1,301,900	-£2.80
Option 1a_x Henbury Spur + Yate, without Constable Road station	2021	£1.55	£2.87	-£1.33	350,174	-£3.78
	2022	£1.82	£2.96	-£1.14	410,924	-£2.77
	2023	£2.06	£3.06	-£1.00	451,323	-£2.21
	TOTAL	£5.43	£8.89	-£3.46	1,212,422	-£2.85

Note: After 3-years, operating subsidy or profit is assumed pass to the DfT/operator franchise.

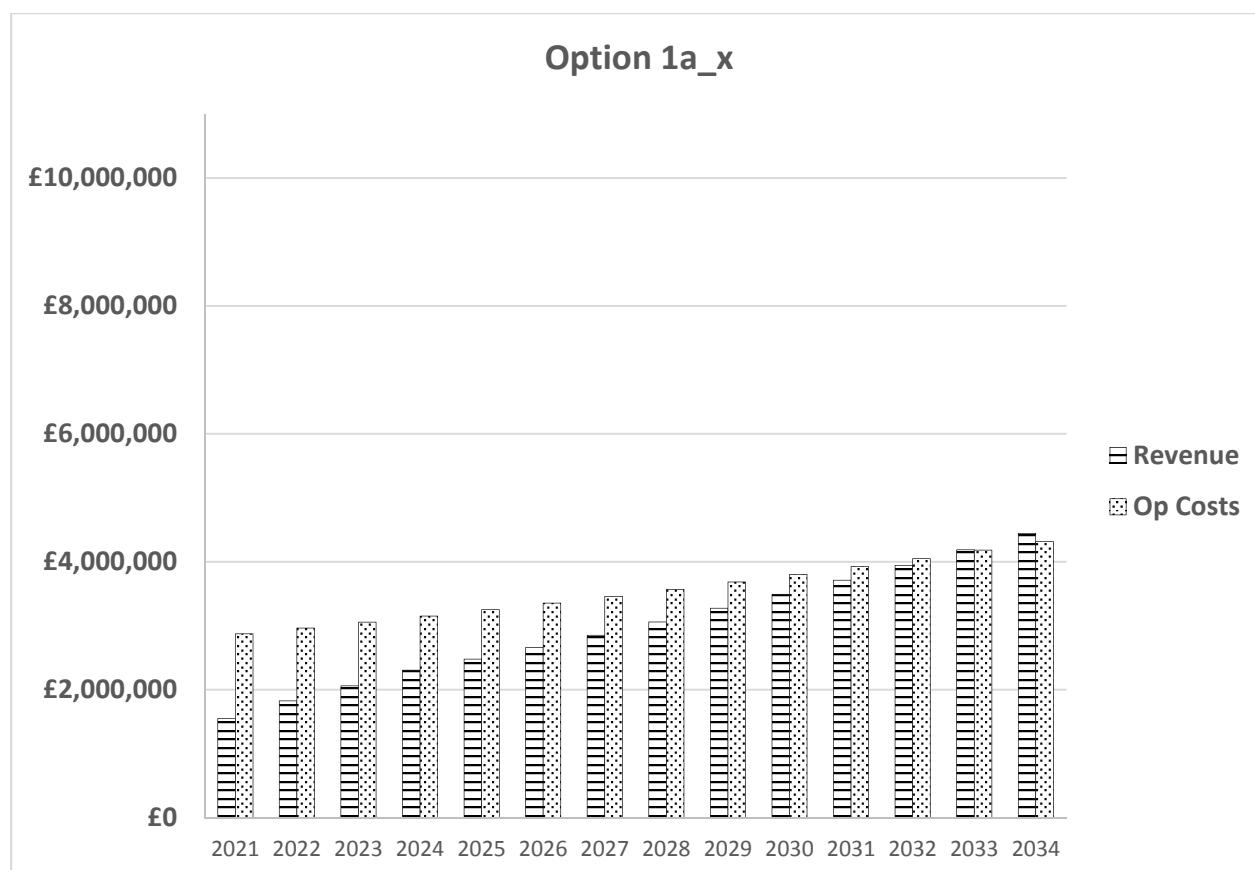
The forecast revenue set out in Table 7.20 takes a standard TAG approach and includes development at the CPNN however, there are reasons to suggest this could be a pessimistic approach because:

- It excludes fare revisions to the Severn Beach Line (to bring them in-line with standard fares)
- It excludes the full extent of additional demand and revenue arising from the Temple Quarter Enterprise Zone and Arena
- Does not include the effects of potential mode share changes that could follow implementation of Bristol City residents parking scheme

Figure 7.3 show the longer term profile between revenue and operating costs for each of the four options.

FIGURE 7.3

Long term revenue and operational cost profile for Option 1a_x



The long term revenue and operational cost profile for Option 1a and Option 1a_x show both options breakeven (i.e. revenues are equal to operating costs) in 2033.

7.6.2 Summary of financial case

A summary of the scheme capital costs and revenue support is shown in Table 7.21.

TABLE 7.21

Summary of the scheme capital costs and revenue support

£ Million outturn	Option 1a Spur + Yate	Option 1a_x Henbury Spur + Yate, without Constable Road station
Capital	£60.2	£38.3
Revenue support	£3.7	£3.5
Total	£63.9	£41.8

The outturn cost of Option 1a_x, is within the existing budget of £43m.

7.7 Management Case for Option 1a_x

In considering the management case for this option, with the exception of engineering and operational feasibility, no other elements would differ from Option 1A.

The principal difference between Option 1a and 1a-x is that some of the Network Rail's concerns about Filton Bank stations would be addressed by the removal of Constable Road from Phase 2. Even though the removal of Constable Road at this stage would have some positive impacts, further work will need to be undertaken to assess the wider impacts of train performance and network capacity of having a new station at Ashley Down.

8 Recommendations

The Preliminary Business Case and GRIP2 Feasibility Study initially considered a wide range of scheme components, which were then condensed into four options for assessment; only options based on a Henbury Spur would be 'high' value for money and deliver a BCR greater than 2.0 (which is the threshold for devolved major scheme funding). The Henbury Loop would not deliver sufficient additional patronage revenue to offset the increased capital and, especially, operating costs; it would not be value for money (even excluding the cost of mitigating its adverse impact on the entrance to Avonmouth Docks).

Service enhancements at Yate could be delivered by either an extension of services from Parkway to Yate or Gloucester; terminating services at Yate is better value for money than services to Gloucester, however it is recommended both options should be kept open for now to see if there are more opportunities (for services) in Gloucestershire.

The outturn costs for all four options exceed the existing budget of £43m; options including the Spur are around £21m over-budget, options including the Loop more than £33m over budget. The project team explored opportunities to bring Phase 2 within budget whilst still meeting its objectives; a further option was developed that removed the Constable Road station from Option 1a. This option is within budget, offers good value for money, reduces risk and it is recommended this option proceeds to the Outline Business Case (in parallel with continued discussions with Gloucestershire County Council about extending services from Yate to Gloucester).