MetroWest

Portishead Branch Line (MetroWest Phase 1)

TR040011
Applicant: North Somerset District Council

8.3 Preliminary Business Case 2014, Part 1 of 3, Chapters 1 to 6 & Appendix A (Part 1)
The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009, regulation 5(2)(q). NB. required by para 4.5 of NN NPS Planning Act 2008
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NetworkRail · West of England Local Enterprise Partnership · West of England Combined Authority · HM Government · Bath & North East Somerset Council · Bristol City Council · North Somerset Council · South Gloucestershire Council · travelwest

Document Purpose

Part 1 of 3 comprises:

- Contents, Executive Summary, Chapter 1 to 6
- Appendix A Scheme Drawings Part 1
- Appendix A Scheme Drawings Part 2
- Appendix A Alignment Drawing Ham Green to Pill
- Appendix A Alignment Drawing Pill to Portbury Old Station
- Appendix A Alignment Drawing Portbury Old Station to Portishead
- Appendix A Bathampton Turnback Drawing

This document evidences the technical case for intervention into the transport network, through the investment in and the delivery of the DCO Scheme (and wider MetroWest Phase 1 project), based on feasibility engineering design.

The document refers to the promoters business name North Somerset Council, rather than its legal name North Somerset District Council.

MetroWest

MetroWest Phase 1

Preliminary Business Case Report

3 September 2014

travelwest

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

MetroWest Phase 1 Preliminary (Strategic Outline) Business Case

3 September 2014

West of England

Bath & North East Somerset Council

Bristol City Council

North Somerset Council

South Gloucestershire Council

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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
CO_2	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
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
LAQM	Local Air Quality Management
LDF	Local Development Framework
LEP	Local Enterprise Partnership
LFRMS	Local Flood Risk Management Strategy
NCA	National Character Area
NMU	Non-motorised users
NO_2	Nitrogen dioxide
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
NPV	Net Present Value
NR	Network Rail
NSC	North Somerset Council
OBC	Outline Business Case
OD	Ordnance Datum
OHLE	Overhead line electrification
ORR	Office of Rail Regulation
OS	Ordnance Survey
PM_{10}	Particulate matter
PRoW	Public rights of way
SAC	Special Area of Conservation
SADMP	Site Allocations and Development Management Policies Document
SEBs	Statutory environmental bodies
SEP	Strategic Economic Plan
SGC	South Gloucestershire Council
SM	Scheduled monument
SNCI	Site of National Conservation Interest
SSSI	Site of Special Scientific Interest
TOC	Train operating company
TQEZ	Temple Quarter Enterprise Zone
WHS	World Heritage Site
WOE	West of England

Executive Summary

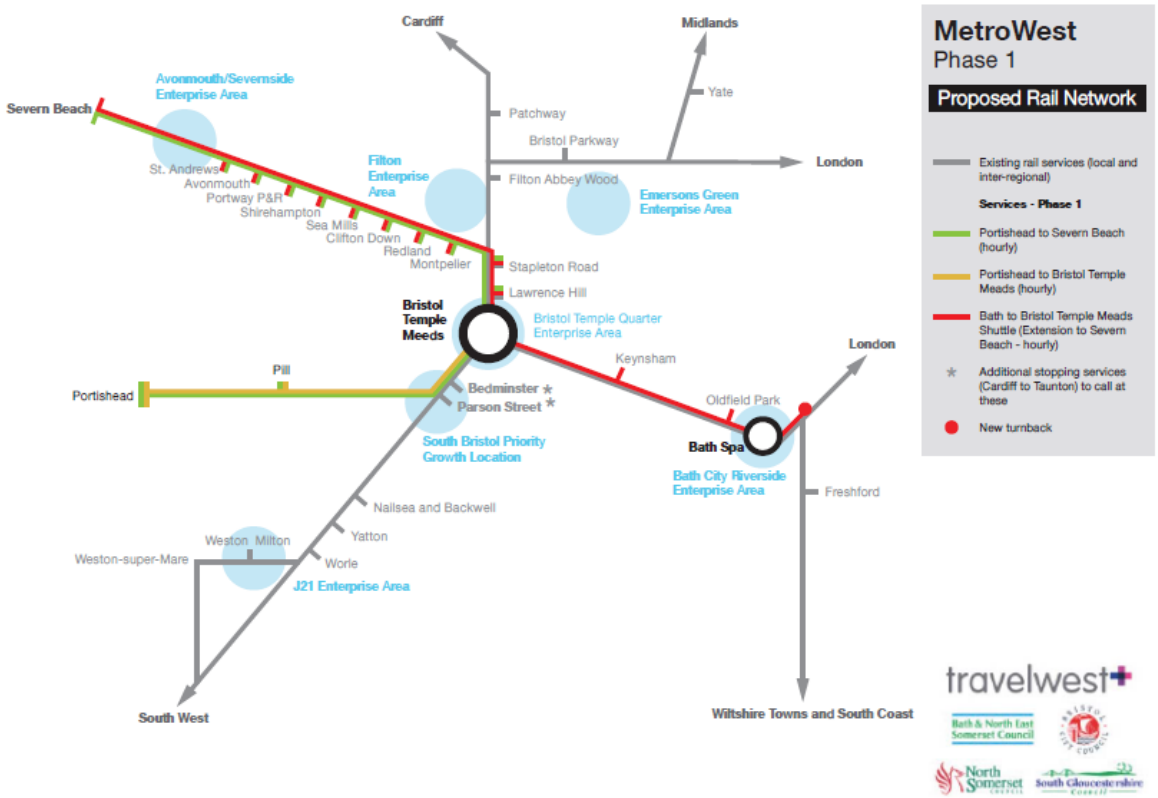
What is MetroWest Phase 1?

MetroWest (formerly known as the Greater Bristol Metro), is an ambitious programme that will transform the provision of local rail services across the West of England. MetroWest comprises of a range of projects from relatively large major schemes, entailing both infrastructure and service enhancement, to smaller scale projects. 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

MetroWest Phase 1 offers a half-hourly local service for the Severn Beach line, Bath to Bristol line and a reopened Portishead line with stations at Portishead and Pill, as illustrated below.



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 1 will play a key role in supporting economic growth and major employment areas including Temple Quarter Enterprise Zone and the five Enterprise Areas across the West of England.

What is the scope of 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 public 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 (Strategic Outline) Business Case, is the first of three business cases that consider these cases. Subsequent Outline and Full business cases, will update the information presented in this business case with more refined assessments based on the more detailed scheme development work to be undertaken from autumn 2014.

Infrastructure requirements

The following engineering works have been proposed, in order to deliver MetroWest Phase 1 scheme:

- Rebuild the disused Portishead to Pill line (5km)
- Closure of historic crossings
- New station at Portishead
- Reopening of former station at Pill
- Double track works at Pill and Ashton Gate area
- Improvements to highway access to Pill tunnel
- Environmental mitigation measures
- Enhancement of Parson Street junction
- New signals for the entire line between Temple Meads and Portishead
- Bathampton turn-back
- Additional signalling at Avonmouth station to facilitate turn-back
- Partial reinstatement of down relief line to assist recessing and regulation of freight trains

Preliminary Business Case scheme options

This Preliminary Business Case considers the following options:

<u>Option 5b</u>

- Severn Beach to Bath Spa: 1 train per hour (tph) all day
- Avonmouth to Portishead: 1tph all day
- Portishead to Bristol Temple Meads: 1tph in the morning and evening three-hour peaks only

<u>Option 5b enhanced</u>

Same as Option 5b except:

- Portishead to Bristol Temple Meads: 1tph all day

<u>Option 6b</u>

- Portishead to Bath Spa: 1tph in the morning and evening three-hour peaks only
- Portishead to Avonmouth: 1tph all day

- Severn Beach to Bristol Temple Meads: 1tph all day

Off peak service pattern is as above but operating 1tph Bristol Temple Meads to Bath Spa rather than Portishead to Bath Spa.

Option 6b enhanced

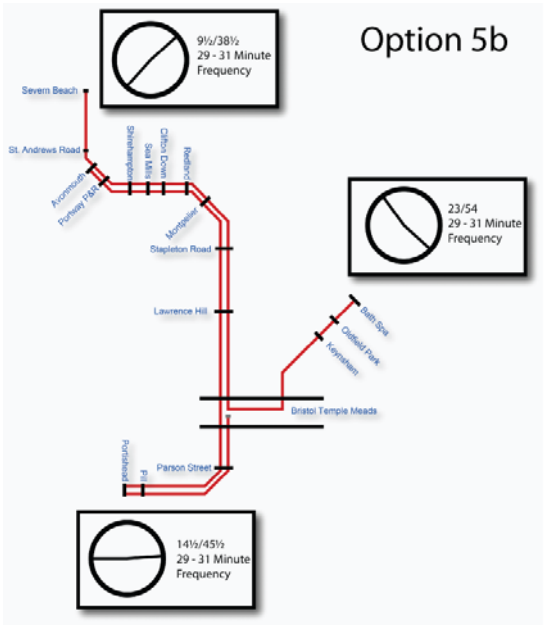
Same as Option 6b except:

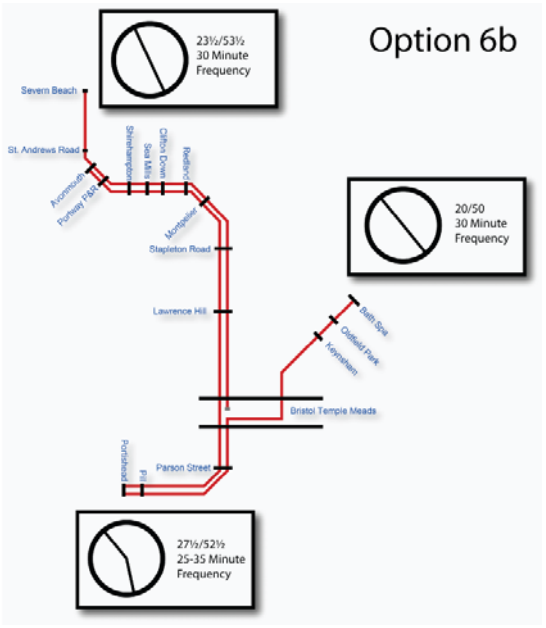
- Portishead to Bath Spa operates 1tph all day, i.e. Portishead line has half hourly frequency on weekday

Two scenarios of train set requirement have been tested for each option, 6 and 7 two-car diesel multiple sets, which is an additional 4/5 train sets to the 2 train sets used to provide current services on the Severn Beach line. The assumptions used in the business case is that there are 2 car formations in the do minimum scenario. However as the business case considers the benefits associated with the additional services to the do minimum scenario, therefore refinement of the do minimum scenario (e.g. including a standardised 3 car formulation would not have a big impact to business case).

Network capacity and Railsys analysis

Both option 5B and 6B have been subject to capacity (Railsys) modelling and both have been found to be operationally feasible. The capacity modelling was based on Crossrail/IEP Iteration 5 and has also confirmed the infrastructure requirements of the scheme. In respect of operational feasibility, both option 5B and 6B provide a symmetrical service pattern and both require a minimum of 6 train sets, giving a very efficient operation with a high levels of efficiency (see figure below). Allowing for the 2 train sets currently in operation on the Severn Beach line, the net additional requirement is 4 train sets (4 x 2 car formations).





The modelling has shown that the operating margin using 6 train sets is towards the upper ceiling and further modelling will be needed in GRIP 3 to simulate timetable robustness against the Passenger Performance Measure. However the timetabling modelling has found that other infrastructure and operational proposals that while currently unfunded, would potentially yield operational performance benefits for MetroWest Phase 1.

The timetable analysis demonstrates that journey time between Portishead and Bristol Temple Meads averages at 17 minutes, this major improvement in transport provision results in significant economic benefits and is a key driver for the scheme.

MetroWest Phase 1 presents a robust case for change

MetroWest Phase 1 has a strong strategic case. The scheme addresses a number of genuine, evidenced problems relating to constrained economic growth, congestion, resilience and accessibility. If MetroWest is not delivered, these problems would continue and would ultimately prejudice the economic potential of the city region.

MetroWest Phase 1 has a clear business strategy and is closely aligned with the strategic aims and responsibilities of the four West of England authorities, the Local Enterprise Partnership (LEP) and Network Rail and provides a tangibly 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.

The scheme is highly 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.

MetroWest Phase 1 provides a highly efficient operation, which has potential for medium to longer term passenger and revenue growth and associated commercial expansion by the Train Operating Company

The scheme 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 1 principal business objectives are:

- To support economic growth, through enhancing the transport links to the Temple Quay Enterprise Zone (TQEZ) and into and across Bristol city centre, from the Portishead, Bath and Avonmouth and Severn Beach arterial corridors
- To deliver a more resilient transport offer, providing more attractive and guaranteed (future-proofed) journey times for commuters, business and residents into and across Bristol, through better utilisation of strategic heavy rail corridors from Portishead, Bath and Avonmouth, and Severn Beach
- To improve accessibility to the rail network with new and reopened rail stations and reduce the cost (generalised cost) of travel for commuters, business and residents
- To make a positive contribution to social well-being, life opportunities and improving quality of life, across the three arterial corridors

The MetroWest Phase 1 supporting objectives are:

- To contribute to reducing traffic congestion on the Portishead, Bath and Avonmouth, and Severn Beach arterial corridors
- To contribute to enhancing the capacity of the local rail network, in terms of seats per hour in the AM and PM peak.
- To contribute to reducing the overall environmental impact of the transport network

MetroWest Phase 1 demonstrates high value for money

The modelling and appraisal work undertaken for this Preliminary Business Case is considered robust enough to allow decisions to be made about continuation to the Outline Business Case stage of the project. Further refinement of the modelling and appraisal assessment including the use of the updated transport model (GBATS4), operational costs assumptions, rail demand forecasts, and future year fare assumptions will change the headline economic indicators, although it is envisaged that the scheme would still offer high Net Present Value (NPV) and a high Benefit to Cost Ratio (BCR).

The modelling and appraisal work undertaken for the Economic Case indicates that the best performing scenario is "Scenario 5: Option 5b enhanced with 6 train sets" and the worst performing scenario is "Scenario 4: Option 6b with 7 train sets[1]".

The Preliminary Business Case economic indicators for the scheme are:

- Highest BCR is Scenario 5: Option 5b enhanced with 6 train sets. This option has an initial BCR of 4.88 (Very High Value for Money) and a BCR adjusted to include wider economic impacts of 5.99
- Lowest BCR is Scenario 4: Option 6b with 7 train sets. This option has an initial BCR of 1.78 (Medium Value for Money) and a BCR adjusted to include wider economic impacts of 2.28
- Highest NPV is Scenario 5: Option 5b enhanced with 6 train sets. This option has a NPV of £184m
- Lowest NPV is Scenario 4: Option 6b with 7 train sets. This option has a NPV of £83m
- The rail transport user benefits account for around 70% of the total benefits. Other benefits include:
    - Highway transport user benefits
    - Wider Economic Benefits
- The most significant scheme costs driving the economic case are the operating costs.
- The key risks, sensitivities and uncertainties underlying the appraisal are:
    - Operation costs assumptions, in particular the limited knowledge at present for the scope for synergies with the existing services in providing staffing and maintenance (expected to reduce costs)
    - Rail demand forecasts, in particular future growth in demand at new and existing stations
    - Future year fare assumptions
    - Age of data in the GBATS3 model (model is currently being revalidated for use in the Outline Business Case)

These assumptions will be refined and updated in the preparation of the Outline Business Case.

MetroWest Phase 1 is commercially viable

The procurement strategy is being developed, this strategy considers the procurement opportunities as follows:

- Scheme preparation stage. This stage involves ten major work streams, two of which need to be procured via a competitive process over the coming months.
- Scheme construction stage. This stage involves two major work streams, one entailing a build only procurement (highway works) and the other entailing a single combined GRIP 5-8 design & build contract 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 the base franchise specification. There is a strong case for MetroWest Phase 1 to be included in the proposed direct award Great Western franchise covering the period September 2015 to September 2020, given the high degree of alignment with the wider CP5 programme, its state of readiness for delivery, the extent of support for the scheme and the opportunity for integrated delivery.

[1] An additional 4/5 train sets to the 2 train sets used to provide current services on the Severn Beach line

Network Rail's emerging Western Route Study work (June, 2014), as part of the Long Term Planning Process, has identified the need for MetroWest Phase 1 to provide sufficient capacity by 2023 to meet the demand on services travelling into Bristol.

MetroWest Phase 1 is affordable

The total funding gap to deliver the scheme is £4,694,762 (up to 2022) based on the assumptions set out in the Finance Case. This is comprises of:

- Feasibility, preparation and construction costs of £1,270,120 (2015/2106 and 2017/2018
- Estimated operational costs ranging from £1.141 million per annum average for the first three years (£3.425 million over three years) to £1.765 million per annum average for the first three years (£5.297 million over three years), when the Councils will have the revenue liability.

The estimated operational costs of £3,424,642 for three years are based on a sensitivity test comprising of a 5% increase in revenue and a 5% reduction in operating costs from the initial Network Rail Socio-Economic analysis.

The initial analysis takes a standard WebTAG approach and makes no account of the following:

- Proposed fare revisions to the Severn Beach Line
- Additional passenger demand and revenue arising from the Temple Quarter Enterprise Zone, Bristol arena and wider economic benefits
- Additional passenger demand and revenue arising from Bristol City residents parking scheme

The councils and the funding body (West of England of England Local Transport Body Board which meets as part of the West of England Joint Transport Board) now need to consider the detail set out in this Preliminary Business Case and determine whether the project should continue to the Outline Business Case stage.

MetroWest Phase 1 is deliverable

The Management Case demonstrates that MetroWest Phase 1 is deliverable.

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 1 successfully, to time and budget.

The emerging consenting strategy identifies the scheme is a Nationally Significant Infrastructure Project (NSIP), and therefore requires a Development Consent Order. This six stage process has been incorporated into the scheme programme alongside other major work streams.

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 a developed 'intelligent client' capability and have developed collaborative working arrangements, particularly at the technical interface, this will be delivered within a strong governance structure and framework.

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

Next steps

The table below summaries the next steps for MetroWest Phase 1 project.

Project timetable

Project Stage	Stage Description	Indicative Timescales
Stage 1	Feasibility (including GRIP 1-2)	Summer 2013 to Summer 2014
Stage 2	Option development and scheme case (including GRIP 3)	Autumn 2014 to Winter 2015/16
Stage 3	Planning powers and procurement (including GRIP 4-5)	Winter 2015/16 to Autumn 2017
Stage 4	Construction and opening (including GRIP 6-8)	Autumn 2017 to Spring 2019

The workstreams that will be undertaken as part of the Stage 2 work include:

- GRIP 3 – Option Selection Report
- Refinement of Railsys train timetable analysis
- Commencement of Development Consent Order workstream
- Further scoping of the procurement of the train services
- Outline Business Case
- Further refinement of the scheme funding package

Summary

The Preliminary Business Case work indicates that Option 5B enhanced (6 train sets[2]) has the strongest economic case, and is therefore the current best performing option. The Outline Business Case work will develop the scheme's evidence base to determine the final option to be implemented.

There is a strong case for MetroWest Phase 1 to be included in the proposed direct award Great Western franchise covering the period September 2015 to September 2020.

In summary MetroWest Phase 1 is supported by a robust case for change, demonstrates (very) high value for money, has a sound commercial footing, is financially affordable and is deliverable by 2019.

[2] An additional 4 train sets to the 2 train sets used to provide current services on the Severn Beach line

1 Introduction

1.1 Project overview

MetroWest (formerly known as the Greater Bristol Metro), is an ambitious programme that will transform the provision of 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:

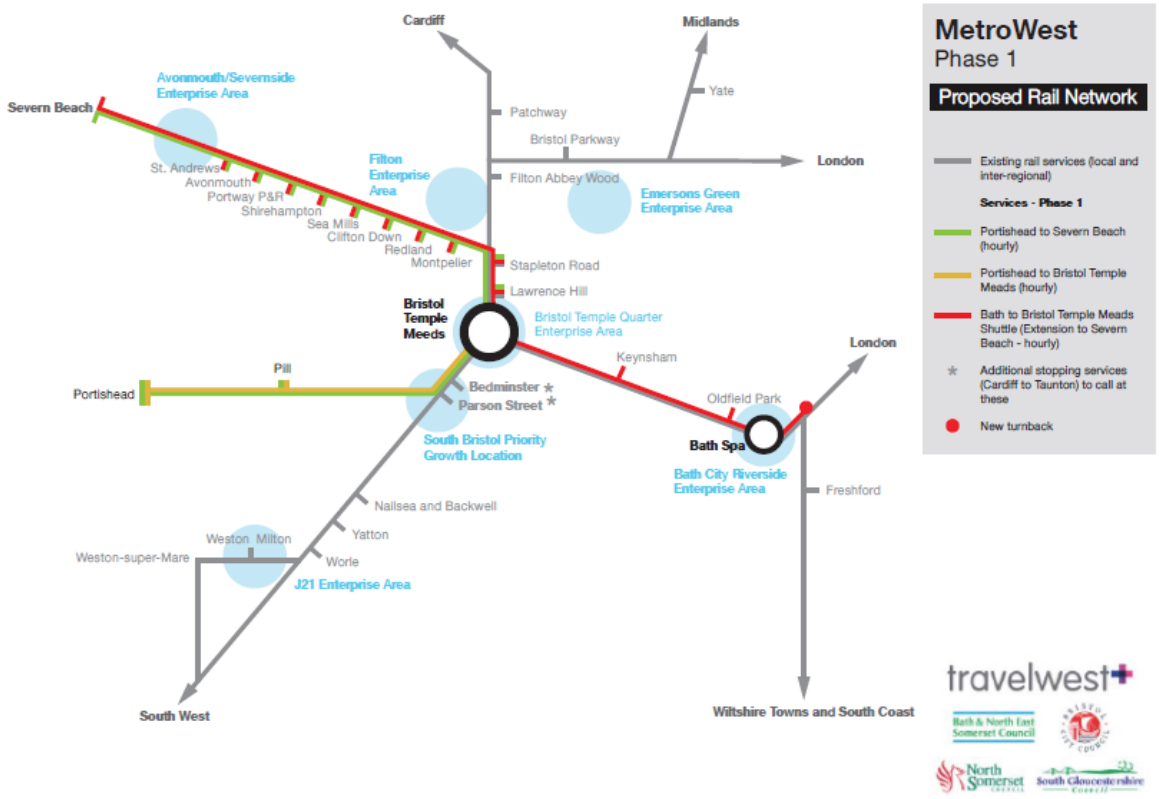
- MetroWest Phase 1 – half-hourly local service for the Severn Beach line, Bath to Bristol line and a reopened Portishead line with stations at Portishead and Pill
- MetroWest Phase 2 – half-hourly service for the Yate to Bristol line and an hourly service for a reopened Henbury line, with stations at 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 Control Period 5 (2014-2019) and 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 1 proposed train services.

Figure 1.1: Overview of the MetroWest Phase 1 proposed train services

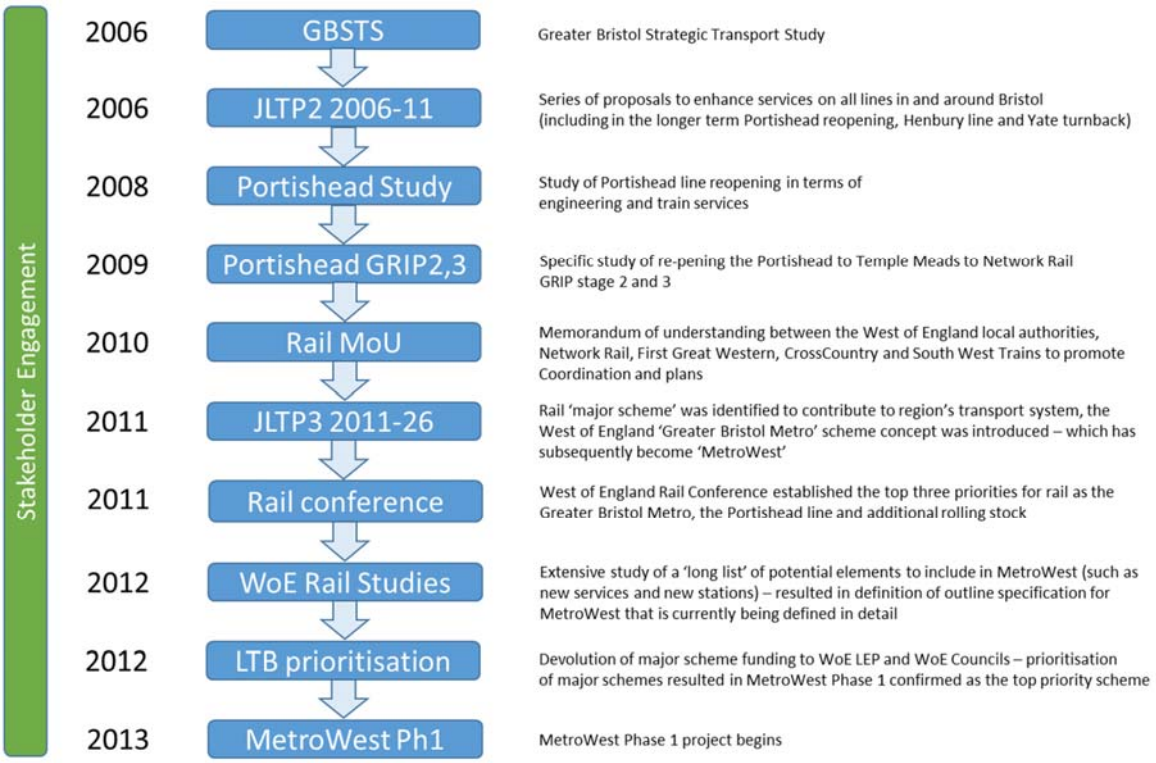


The West of England councils have recognised the strategic importance of the train service network to the local economy for many years. The West of England area enjoys a good network of long distance train services, however the local train network is underdeveloped and underutilised, in comparison with 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-steams are summarised in Figure 1.2.

Figure 1.2: Summary of work-streams that have informed the MetroWest Phase 1 project



The outcome of this previous work is that MetroWest Phase 1 is now well-positioned to be taken forward. In summary, MetroWest Phase 1 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
- Full backing of the rail industry to be taken forward alongside committed CP5 schemes
- An agreed output specification
- Endorsement as a priority scheme from the West of England Local Economic Partnership
- Endorsement by the West of England Local Transport Body Board (now the Joint Transport Board) as the top priority scheme for devolved major scheme funding, subject to Business Case approval

The programme has four key stages (taken from a presentation to Network Rail):

1. Feasibility (including GRIP 1-2) - Summer 2013 to Summer 2014
2. Option development and scheme case (including GRIP 3) - Autumn 2014 to Winter 2015-16
3. Planning powers and procurement (including GRIP 4-5) - Winter 2015-16 to Autumn 2017
4. Construction and opening (including GRIP 6-8) - Autumn 2017 to Spring 2019

The scheme capital outturn cost is £55.398 million.

1.2 Purpose of this report

This report sets out the Preliminary (Strategic Outline) Business Case for MetroWest Phase 1. 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 CH2M Hill and Network Rail.

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

2 Strategic Case

2.1 Introduction

This section sets out the Strategic Case for MetroWest Phase 1. 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 to UK PLC, with the highest economic growth of any core city region (3.1% of national economic growth (GVA – gross value added))[3]. 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.

[3] 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 the 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 1 took a further step forward towards delivery with the provisional allocation of £8.5m Local Growth Funding as part of the Governments assessment of the West of England Strategic Economic Plan. 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."

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 1 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 1 augments committed CP5 investment through a modest but strategically important expansion of capacity of the existing local rail network, in parallel with extending the accessibility of the local rail network through reopening of the disused line between Portishead and Bristol. MetroWest Phase 1 is the largest third party promoted rail scheme in England and is the foundation for the MetroWest programme over the next decade.

The West of England Growth Deal states….

The Department (..for Transport) has included obligations on the current operator, First Great Western, to work specifically in the development of Phase 1 of MetroWest (including acting reasonably and in good faith in the proposal for operation of passenger services) and also more generally in relation to locally-promoted rail enhancement schemes.

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, and 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 Strategic Economic Plan (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'. The importance of transport was noted by one business representative organisation as '*top of the pile for most businesses'*.
- Poor access to the south of Bristol is **deterring investment**. One agent commented that, in their search for properties, some businesses rule out particular areas from the outset due to poor access and connectivity. In particular, access to the South Bristol area was highlighted as the most prominent issue. One business representative believes that '*businesses in the south of Bristol are at a real disadvantage compared with the north of the City due to poor transport connections'*.
- 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.
- 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.

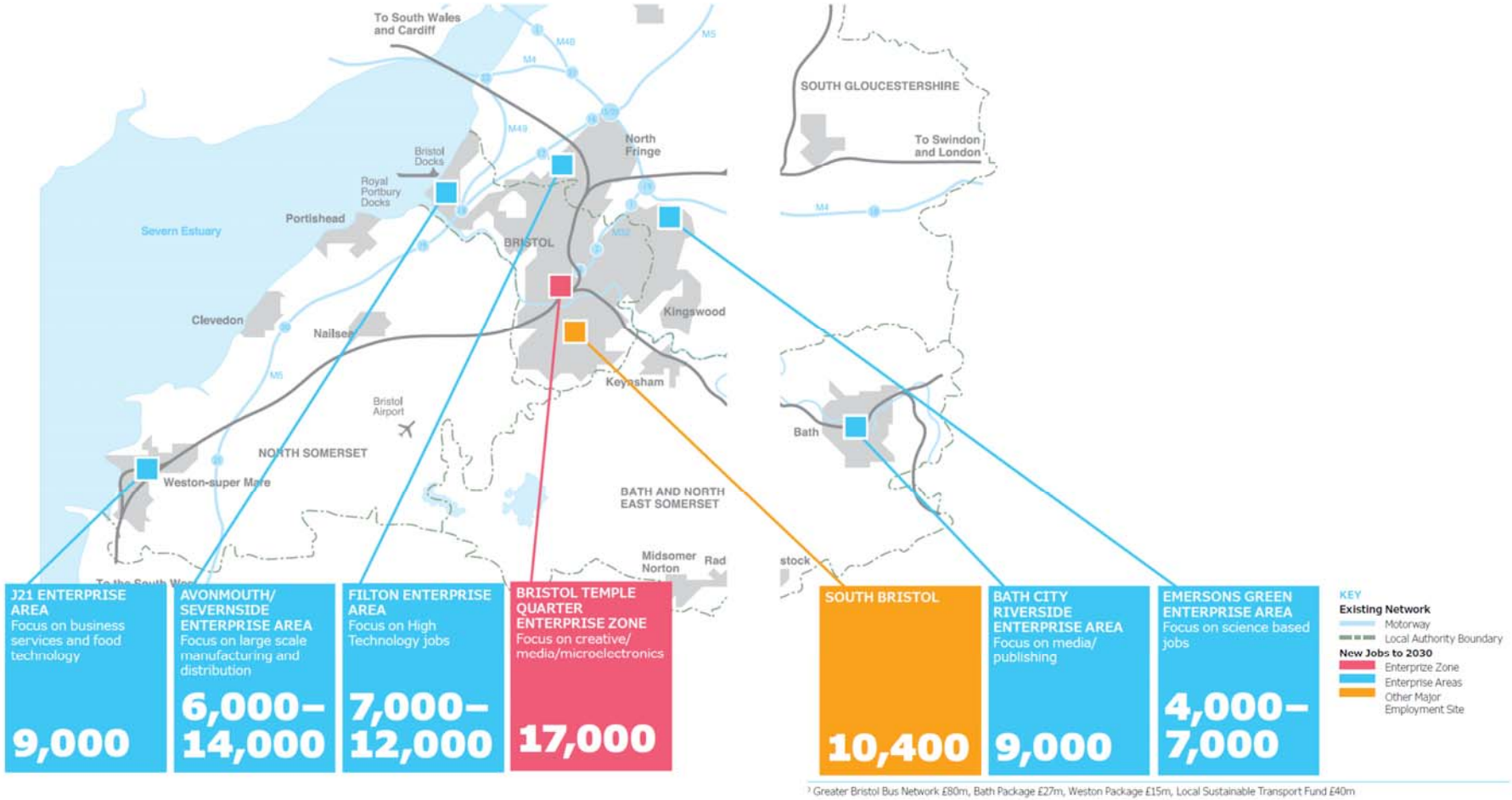
Whilst some demand could be accommodated through public transport, it is likely that more local rail services would reach capacity and would not be able to accommodate further growth in demand. The study concludes that, "If improvements are not made, the rail network in its current form will continue 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."

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."

Figure 2.1 shows the relationship between employment development areas and the MetroWest scheme.

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



Planning for this growth means the city region needs to make sure its transport infrastructure is not only fit-for-purpose, but has the ability to respond to increasing demand and, therefore, maximise potential for continued economic growth. The modal share for journey to work within the Temple Quay Enterprise Zone (TQEZ) is increasing rapidly; the recent TQEZ Transport Report (June 2012, Halcrow/CH2M Hill) forecasts that 15 per cent of trips to/from the Enterprise Zone will be by rail).

Enterprise 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
Bristol Temple Quarter Enterprise Zone and new arena	17,000	MetroWest Phase 1 and 2 New stations package Portway platform
Bath City Riverside Enterprise Area	9,000	MetroWest Phase 1 New stations package
J21 Enterprise Area (Weston-super-Mare)	9,000	MetroWest Phase 1 and 2
Emersons Green/Science Park Enterprise Area via Bristol Parkway	4,000 to 7,000	MetroWest Phase 2
Filton Enterprise Area	7,000 to 12,000	MetroWest Phase 2
Avonmouth Severnside Enterprise Area	6,000 to 12,000	MetroWest Phase 1 and 2
South Bristol Priority Growth Location	10,400	MetroWest Phase 1

Source: WoE Response to the GW Franchise, updated using information from the 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 (Henbury Line)
North Yate	3,000	MetroWest Phase 2
Somerdale (former Cadbury site at Keynsham)	700	MetroWest Phase 1
Weston-super-Mare	11,000	MetroWest Phase 1 and 2

Source: Core Strategies. Housing area figures are included in the 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 1 economic growth summary

Strategic consideration	MetroWest Phase 1
Problem	• Congestion and poor accessibility constrain economic growth and will increasingly
Consequence (impact of not changing)	• 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 1 objective	• Business objective – To support economic growth • Supporting objective – To enhance transport links to the TQEZ and into and across Bristol city centre, from the Portishead, Bath and Avonmouth/Severn Beach arterial corridors
Outcome	• 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 • 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:

- Bristol city centre and approaches to Bristol Temple Meads
- The M5 Junction 19

- The A369 between the M5 and Portishead
- The A4 between Bath and Bristol
- Corridors into Bristol city.

In the strengths/weakness/opportunities/threats (SWOT) analysis, set out in the LEP's SEP, there is a recognition that there is a 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."*

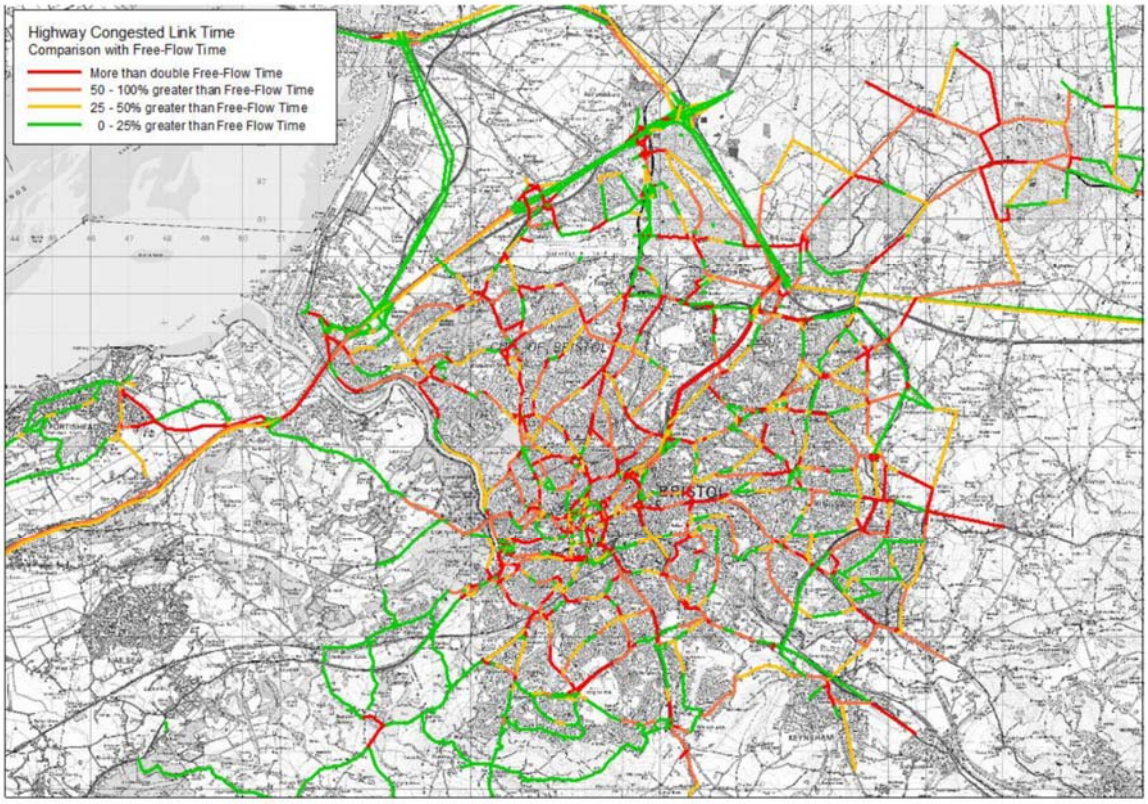
The West of England Congestion Delivery Plan (2009 update) which is a daughter document of the Joint Local Transport Plan (JLTP), states that *"Peak hour traffic speeds in the Greater Bristol area, at an average of 15 mph, are the slowest of the English `core' cities. At peak periods, 21% of travelling time is spent stationary and DfT data indicate that there has been until recently a steady decline in average speeds."*

The vision identified in the Bristol Core Strategy is for a city of sustainable communities that combine housing, employment, retail, education, training and leisure functions, all linked by a strong public transport network. At present, however, traffic congestion and journey time unreliability make Bristol one of the most congested cities in Britain. In order to tackle congestion and air pollution, the Core Strategy's vision is for a less car-dependent city and an emphasis on walking, cycling, bus, rapid transit and rail.

The JLTP estimates the cost of congestion will be £600 million by 2016.

Figure 2.2 (source: Atkins 2012 GVA Study) highlights the extent of the likely future congestion problem in 2031. It shows the A369 from the M5 to Portishead and parts of the A4 between Bath and Bristol as having more than double the free flow time.

Figure 2.2: Map showing future congestion in 2031 (source Atkins GVA 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 (Oct 2013)		Observed AM Peak (May 2013)	
	Free Flow JT (mins)	Net Peak hour JT (mins)	Free Flow JT (mins)	Net Peak hour JT (mins)
A4 (Keynsham to Bath Bridge)	11.4	29.5	10.2	22.5
A4 Portway (Avonmouth to Hotwells)	10.6	21.4	9.5	17.0
A369 (Portishead to Ashton Gate)	11.8	22.7	11.5	17.6

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 2011/12 (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 2006/7

	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	Percent change 2010/11 to 2011/12
Bath & North East Somerset UA	21.9	21.5	22.6	22.4	22.4	22.8	1.5
Bristol, City of UA	14.7	15.1	15.9	15.6	15.5	15.7	1.1
North Somerset UA	28.9	29.0	29.5	29.4	29.8	30.1	0.8
South Gloucestershire UA	25.3	25.1	25.3	24.9	24.6	25.1	2.0
ENGLAND	24.6	24.7	25.1	25.0	25.1	25.3	0.8

The Portishead to Bristol corridor (A369) suffers congestion and journey time reliability problems. This not only causes delays and lost productivity for car drivers and goods vehicle operators but also presents a major hurdle for an attractive public transport mode along the corridor. The problems and context of the A369 corridor are summarised as:

- The A369 is the only transport corridor directly linking Portishead with Bristol which is just 10 miles to the east.
- The capacity constraints on the A369 are exacerbated by the fact that it crosses junction 19 of the M5. This is one of the busiest parts of the M5 with the Avonmouth Bridge immediately to the north.
- The A369 continually suffers from the knock-on effects of incidents on the M5 with high volumes of traffic using a constrained local road corridor with few alternative route options.

The West of England trend for high rates of private car ownership is magnified in Portishead where only 12% of households (2011 Census) do not have access to a private vehicle. This emphasises the town's over-reliance on private car ownership. These patterns are reflected in the high proportion of residents

who travel to work using private vehicles (as car/motorcycle drivers or passengers). At 81 per cent, the proportion of commuters travelling by private vehicle is considerably above both the West of England (69 per cent) and nationwide averages (66 per cent). Less than 1 per cent of commuters locally use rail services (2011 Census), see Table 2.7.

TABLE 2.7
Mode of Travel to Work, (2011 Census)

Mode of Travel to Work	Pill	Portishead	West of England	England
Train	0.5%	0.8%	2.3%	5.6%
Motor Vehicle	72.6%	80.8%	69.2%	66.4%

There is also strong evidence from the Office of the Rail Regulator (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
2004-2012 figures

Station groupings	2004/05 to 2012/13 TOTAL	2004/05 to 2012/13 per annum
Bristol main (Temple Meads and Parkway)	60%	6.7%
Severn Beach line*	190%	21.1%
Other Bristol urban**	172%	19.1%
B&NES (including Keynsham)	58%	6.4%
South Gloucestershire (excluding Parkway)	153%	17.0%
North Somerset	54%	6.0%
OVERALL	67%	7.4%

*Assume excl. Lawrence Hill and Stapleton Road

**Assume incl. Lawrence Hill, Stapleton Road, Bedminster, Parson Street

However, the growth in patronage does not wholly relate to the geographical nature of travel demand in the area. West of England is largely self-contained with 89 per cent (Census 2001) of its workforce living and working within the area. 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 1 congestion and transport network resilience summary

Strategic consideration	MetroWest Phase 1
Problem	• Congestion on the road and rail networks
Consequence (impact of not changing)	• Slow and unreliable journey times (particularly on the A4, A369/M5 and routes into and within Bristol city) • Traffic congestion is delaying buses • Impact on perception/attractiveness of the region for investment/business location

TABLE 2.9
MetroWest Phase 1 congestion and transport network resilience summary

Strategic consideration	MetroWest Phase 1
	• Reduced size of accessible labour pool • Cost of congestion (expected to reach £600 million by 2016) • Environmental impact of traffic and congestion (air quality management area in Bristol)
MetroWest Phase 1 objective	• Business objective - to deliver a more resilient transport offer • Supporting objective – to contribute to reducing traffic congestion and providing more attractive and guaranteed (future-proofed) journey times on the Portishead, Bath and Avonmouth/Severn Beach arterial corridors. • Supporting objective – to contribute towards enhancing the capacity of the local rail network, in terms of seats per hour in the AM and PM peak.
Outcome	• Reduced road congestion • Reduced journey times • More reliable journey times • Improved air quality • Increased rail capacity • Improved transport choice on the Portishead, Bath Spa and Severn Beach line 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.*

Commuting from Portishead to Bristol city centre under typical morning peak hour traffic conditions takes approximately of 50 minutes, as congestion can make the journey both longer and unreliable. Given distance is just 10 miles, the resulting average vehicle speed is very low, with peak hour trips taking considerably longer than the same journey in the off-peak (see Figure 2.4). Reducing the travel times will reduce the overall cost of travel.

The lack of a rail link between Bristol and Portishead also means that people without access to a car face additional difficulties. Bus journeys can take over an hour in peak periods, and are susceptible to delay due to the overall levels of congestion on this corridor. This length of journey may, in some cases, mean that residents of Portishead are unable to (or discouraged from) seeking employment or education opportunities in the Bristol area.

The Severn Beach line stations have different levels of service, from every 40 minutes between Temple Meads and Avonmouth, to every 1 or 2 hours at St Andrew's Road and Severn Beach stations. This results in the following accessibility issues:

- Poor access to the employment opportunities in the Avonmouth area
- Poor access from the residential areas around the Severn Beach line

The residential areas around the Severn Beach line have a higher proportion of residents claiming Job Seekers Allowance and with no car compared to other parts of the West of England.

Accessibility into Bath suffers from the low level of train services for Keynsham and Oldfield Park.

The provision of the new stations at Portishead and Pill will increase the accessibility of the rail network to residents in North Somerset. In particular, this will benefit the 16,000[4] people who live within a mile of Portishead station and around 2,000 people who live within a mile of Pill station.

Table 2.10 sets out the strategic considerations associated with accessibility.

TABLE 2.10
MetroWest Phase 1 accessibility summary

Strategic consideration	MetroWest Phase 1
Problem	• 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)	• 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 1 objective	• Business objective – improve accessibility • Supporting objective – ensure that more people have easy access to the rail network • Supporting objective – to reduce the overall generalised cost of travel for commuters, businesses and residents
Outcome	• 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 "Carbon Pathway Analysis," 2008 Report shows that the largest CO_2 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 CO_2 emissions nationally and 36 per cent at the local level. Motorway and trunk road traffic is the major source of emissions, accounting for about

[4]The catchment of Portishead station is related to the location of the station site, the catchment of people living within a mile could range from less than 10,000 to 16,000.

55 per cent of total CO_2 emissions in the West of England, with urban roads responsible for around 30 per cent. Within Bristol's central AQMA, 97 per cent of NOx emissions are from road traffic. CO_2 emissions are expected to rise 19 per cent by 2011, compared to 2004 levels.

Further information about the AQMAs effected by the scheme are is set out Section 3.7.2

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 extends approximately 1 km east of the Portbury Freight Line and includes part of the local railway network within the centre of Bristol. The AQMA has been declared for NO_2 (1-hour mean and annual mean objectives) and PM10 (24-hour mean objective).

Bath & North East Somerset Council has also declared one AQMA in the centre of Bath, which extends along the main roads including Warminster Road and London Road. The Bath AQMA is located approximately 500 m from the proposed Bathampton turn-back and has been declared for NO_2 (1-hour mean and annual mean objectives).

Further information about air quality issues are set out in Table 2.11.

TABLE 2.11: EMISSIONS INFORMATION

BCC, NSC and B&NES CO_2 emissions for 2011 for different economic sectors

Economic Sector	CO_2 (Kt)		
	BCC	NSC	B&NES
Road Transport (A roads)	149	102	131
Road Transport (motorways)	77	247	0
Road Transport (minor roads)	290	172	108
Diesel railways	6	7	7
Transport other	3	13	1
Land Use, Land-Use Change, and Forestry (LULUCF) Net Emissions	4	27	10
Total for all sectors (non-transport sectors not shown here)	2,036	1,351	897

On average, the carbon emissions for all three local authorities were estimated at 7 Kt for diesel railways (0.003 per cent of total CO_2 emissions), with road transport accounting for about 516 Kt (25 per cent of total CO_2 emissions) for BCC and NSC.

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 1 environment and social wellbeing summary

Strategic consideration	MetroWest Phase 1
Problem	• 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)	• Traffic will increasingly be a major contributor to high levels of CO_2 and poor air quality • Deteriorating health of the local population
MetroWest Phase 1 objective	• Business objective – to make a positive contribution to the environment and social wellbeing • Supporting objective – to contribute towards achieving a reduction in CO_2 levels • Supporting objective – to contribute towards improved life opportunities, health and quality of life
Outcome	• Reduced use of the car, leading to lower levels of CO_2 • 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 1 principal business objectives are:

- To support economic growth, through enhancing the transport links to the TQEZ and into and across Bristol city centre, from the Portishead, Bath and Avonmouth and Severn Beach arterial corridors
- To deliver a more resilient transport offer, providing more attractive and guaranteed (future-proofed) journey times for commuters, business and residents into and across Bristol, through better utilisation of strategic heavy rail corridors from Portishead, Bath and Avonmouth, and Severn Beach
- To improve accessibility to the rail network with new and reopened rail stations and reduce the cost (generalised cost) of travel for commuters, business and residents
- To make a positive contribution to social well-being, life opportunities and improving quality of life, across the three arterial corridors

The MetroWest Phase 1 supporting objectives are:

- To contribute to reducing traffic congestion on the Portishead, Bath and Avonmouth, and Severn Beach arterial corridors
- To contribute to enhancing the capacity of the local rail network, in terms of seats per hour in the AM and PM peak.
- To contribute to reducing the overall environmental impact of the transport network

2.4.1 Policy Context

This section provides details of the local polices and documents relevant to the MetroWest Phase 1 scheme. It demonstrates that MetroWest's 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 through the DfT's Regional Funding Allocation in 2010. These major schemes include significant investment in rail infrastructure, such as MetroWest Phase 1.

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).

North Somerset - An updated core strategy was adopted in April 2012. However, the High Court has ruled that the part of the document, relating to the number of new dwellings required up to 2026, has to be re-examined. The Core Strategy re-examination took place 18 to 20 March 2014. The Inspectors' Report determined that additional housing allocation is needed. Therefore, the North Somerset Sites and Policies Development Plan Document is undergoing revision and will be subject to public consultation. It will be formally adopted in due course. Consequently, the North Somerset Core Strategy 2012 and saved policies from the North Somerset Replacement Local Plan 2007, comprise the current planning policies for regulatory purposes.

The Core Strategy positively supports MetroWest which clearly aligns with policy in respect of transport and climate change. The Core Strategy presents a clear vision for Portishead which states that *"By 2026…Access by public transport within Portishead and between the other towns will be improved. A passenger rail or rapid transit link into central Bristol will have been reinstated, providing a real alternative to residents commuting into Bristol for work."*

The North Somerset Replacement Local Plan 2007 (policy T/3) safeguarded a site for Portishead station at the rear of Waitrose, close to the former station site in 1964, known as site option 1A. Policy T/3 remains a saved Replacement Local Plan and site option 1A is currently the only safeguarded site for the station.

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 BCS1) has an overall objective to regenerate south Bristol and to focus the development within the existing built up area connected by high quality transport networks. MetroWest will support this objective by providing a high quality transport route. Policy BCS10 confirms the support for the reopening of the Portishead to Bristol Rail Line.

Bath & North East Somerset - The adopted development plan in the Bath & North East Somerset Council (B&NES) area is the B&NES Local Plan 2007, its saved policies (under the Planning and Compulsory Purchase Act 2004) and its accompanying proposals map. The plan is the subject of a saving direction from the Secretary of State. The Core Strategy is in the final stages of production (having been subject to examination hearings in March and April 2014). The MetroWest scheme is well aligned with the policies of the Local Plan and those emerging through the Core Strategy.

South Gloucestershire - The Council's Core Strategy was adopted in December 2013; it supports improvements to rail services in Policy CS7 (Strategic Transport Infrastructure), which makes specific reference to the 'Greater Bristol Rail Metro Project' (now called MetroWest).

2.5 Drivers for change

The proposal for MetroWest Phase 1 is being taken forward at a time of considerable investment in the Western Route through CP5, 2014-2019. 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 and increase 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. MetroWest Phase 1 is not a CP5 committed scheme but is it the largest third party promoted rail scheme in England. MetroWest Phase 1 is the foundation for the MetroWest programme over the next decade.

A further driver for change is the renewal of the Great Western Franchise. The DfT have undertaken consultation to inform stakeholders of the planned approach for securing Great Western franchised services when the current direct award franchise ends in September 2015. The West of England councils put forward its views on the specification for the proposed 5 year direct award franchise September 2015 to 2020, during which time MetroWest Phase 1 opens in April 2019.

2.6 Scope of the scheme

The scheme is being promoted and funded by the West of England councils. The scheme would introduce rail passenger services across Bristol with a service pattern operating between Portishead, Bath Spa and Severn Beach, with intermediate stops. This will entail upgrading the existing freight only route between Parson Street junction and Portbury Dock junction, reinstatement of the current disused line between Portbury Dock junction and Portishead, work on the main line between Parson Street and Bristol Temple Meads, plus a turn-back at Bathampton. A new terminus will be required at Portishead with an intermediate station at Pill.

The project is to:

- Deliver a reliable public transport service for the residents of Portishead and Pill and enhance the existing service for the Severn Beach line and Bath line
- Ensure freight operations and pathing rights are not jeopardised
- Take into consideration other committed West of England Partnership proposals including interaction with MetroBus
- Not to preclude future cross-Bristol services such as MetroWest Phase 2 and potential future services such as Portishead to Bristol Parkway
- Be delivered in collaboration with Network Rail and the West of England councils, subject to business case, powers to build and operate, and allocation of funding
- Provide a timetable to enable a journey between Bristol Temple Meads and Portishead to take about 17 minutes and a service frequency of every half an hour for all three lines (Portishead, Severn Beach and Bath to Bristol), where appropriate

The following engineering works have been proposed, in order to deliver MetroWest Phase 1 scheme:

- Rebuild the disused Portishead to Pill line (5km) (see summary in Figure 2.3)
- Closure of historic crossings
- New station at Portishead
- Reopening of former station at Pill
- Double track works at Pill and Ashton Gate area
- Improvements to highway access to Pill tunnel
- Environmental mitigation measures
- Enhancement of Parson Street junction
- New signals for the entire line between Temple Meads and Portishead
- Bathampton turn-back (see summary in Figure 2.4)

- Additional signalling at Avonmouth station to facilitate turn-back
- Partial reinstatement of down relief line to assist recessing and regulation of freight trains

Figure 2.3: Summary of Portishead rail line engineering work

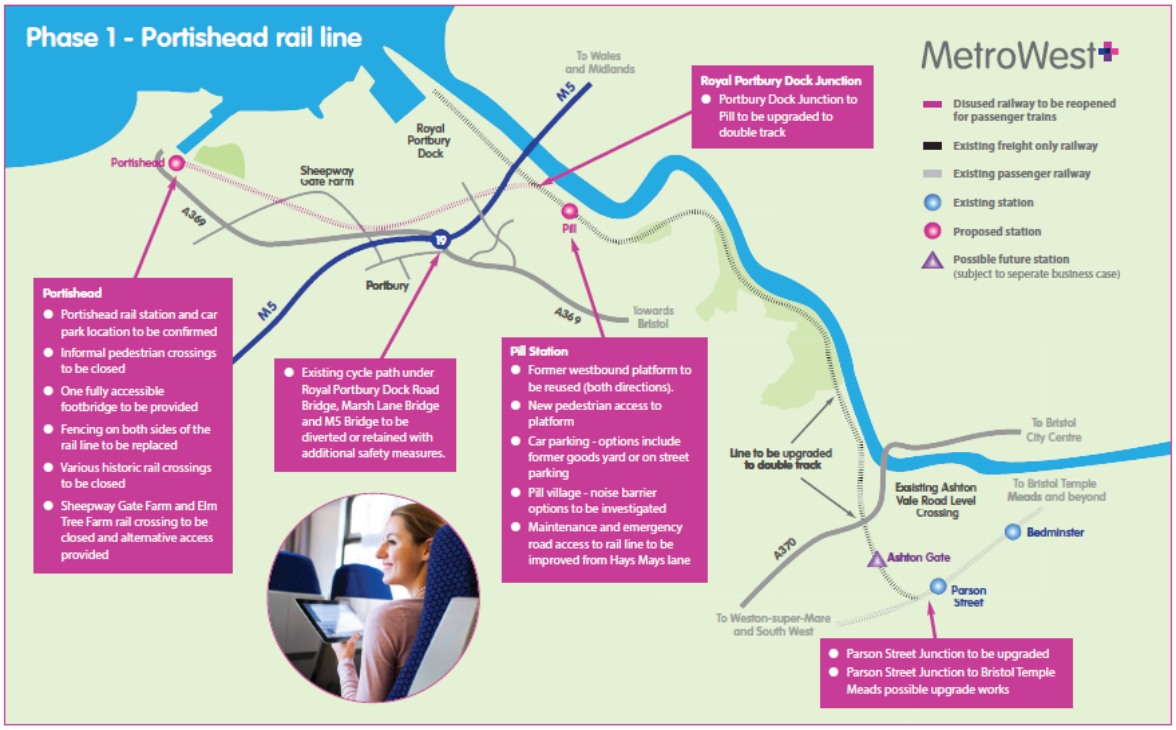
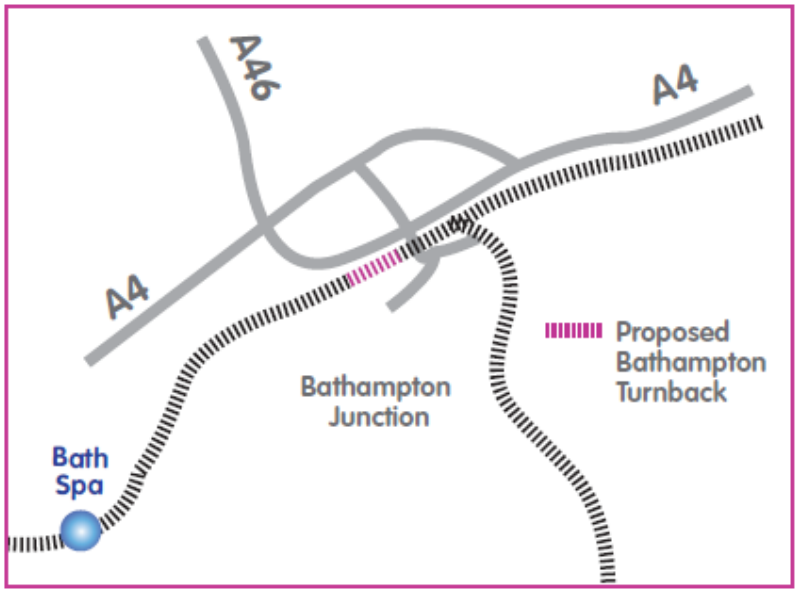


Figure 2.4: Location of Bathampton turn-back



Further details of the schemes engineering feasibility are set out in Section 6.2.

2.7 Constraints

Table 2.13 sets out a summary of the key constraints for the MetroWest Phase 1 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	• Availability of funding from LTB, local authorities • Need for train service subsidy in the short term		Finance Case
Environment	• Site of Special Scientific Interest/Special Area of Conservation • Developing in a built environment	• Need for environmental licences	Economic Case
Governance/Organisational	• Multi-party promoted scheme		Management Case
Technological/Engineering	• New stations' designs must interface with adjacent highway designs	• Working within the footprint of the disused and 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 • Future provision for Phase 2	GRIP 1/2 report – Appendix A Timetable analysis – Appendix A
Consents and approvals	• LTB assurance process to be followed	• DCO guidance to be followed (including formal consultation, EIA etc.) • Other consents outside the DCO process	Management Case
Asset management		• Asset to be owned, operated and maintained by Network Rail, thus asset transfer must be acceptable	Management Case

2.8 Inter-dependencies

Successful delivery of MetroWest Phase 1 is dependent on the completion of the Filton Bank four tracking scheme, without this there is insufficient capacity for additional trains. Further details are set out in Section 6.4.

2.9 Stakeholders

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

- DfT
- Office of Rail Regulation (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

Meetings with local stakeholders and consultees will be held to share technical work where possible. This will help inform a more technical rather than aspirations-based approach and enable better understanding of the projects. The frequency of meetings will depend on the level of involvement needed by different stakeholders and consultees in the project.

The West of England authorities are experienced at successfully managing relationships with stakeholders in relation to major projects, as is evident on the support and progress for recent and ongoing major schemes (see further details in Section 6).

2.10 Options

An initial sift of scheme options has been undertaken using DfT's Early Assessment Sifting Tool (EAST). The work is set out in a separate report in Appendix B. This work considered the question of 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.

2.10.1 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 CO_2 emissions."

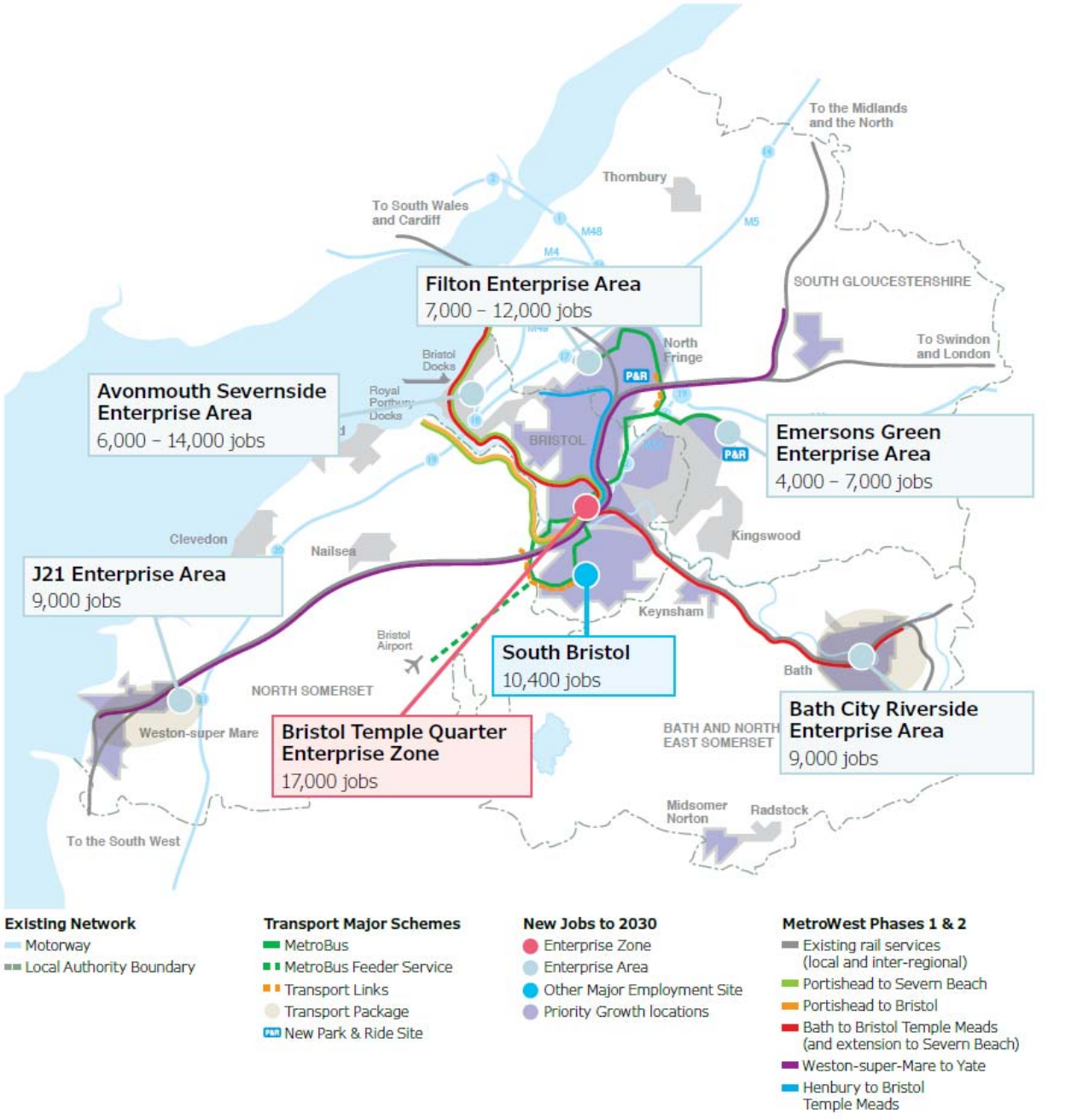
The future West of England transport network has been planned to meet the goals of the LTP which are:

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 network provides a range travel options for different areas and corridors. s Whilst a number of constraints (such as lack of highway space) and opportunities (such as disused railway lines) have influenced the strategic optioneering. A summary of the overall strategy is shown in Figure 2.5.

Figure 2.5: West of England Priority transport investment map (Source: Strategic Economic Plan)



On A4 between Bath and Bristol and the A369 Portishead corridors, levels of congestion are such that highway based modes would still have congestion issues meaning unattractive journey times and journey time reliability. This combined, with the availability of the existing rail corridors makes rail based solutions appropriate.

The West of England authorities undertook a process of assessment and prioritisation of more than 50 potential major local transport schemes. The outcome was reported to the LTTB in June 2013. MetroWest Phase 1 was ranked as the highest priority and is now on the Priority Programme for Devolved Major Schemes Funding.

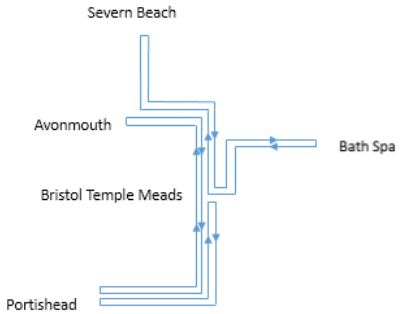
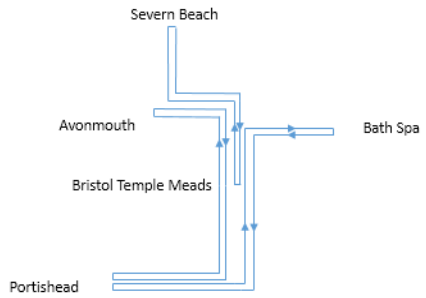
2.10.2 Mode and route specific optioneering

The rail options considered for the Portishead line, Severn Beach line and Bath Spa to Bristol Temple Meads were considered in an EAST assessment. The EAST assessment was undertaken on the following options:

- Option 1: shuttles (base case)
- Option 2a and b: Portishead – Bath Spa and Severn Beach shuttle
- Option 3a and b: Portishead – Severn Beach and Bath shuttle
- Option 4a and b: Severn Beach – Bath Spa and Portishead shuttle
- Option 5a and b: Severn Beach to Bath and Severn Beach to Portishead
- Option 6a and b: Portishead to Bath Spa and Portishead to Severn Beach

The EAST work concluded that Options 5B and 6B should be taken forward to the Preliminary Business Case. The details of these options are set out in Table 2.14.

TABLE 2.14
Preferred Options

Option		Specification
Option 5b: Severn Beach to Bath Spa and Portishead		Link Severn Beach – Bath Spa and Portishead • 1tph Severn Beach – Bath Spa • 1tph Portishead - Avonmouth • 1tph Portishead – Bristol Temple Meads (BTM)
Option 6b: Portishead to Severn Beach and Bath Spa and Severn Beach Shuttle		Link Portishead – Avonmouth and Bath Spa • 1tph Portishead – Bath Spa • 1tph Portishead - Avonmouth • 1tph Severn Beach - BTM

In order to ensure that MetroWest Phase 1 does not constrain the delivery of MetroWest Phase 2, the MetroWest Phase 1 train service cannot operate a half hourly service to Seven Beach and St Andrews Road stations. The MetroWest Phase 2 'loop' proposal entails extending the MetroWest Phase 1 train service from Avonmouth to and from the existing Henbury freight line, providing an hourly service. Consequently MetroWest Phase 2 necessitates MetroWest Phase 1 operating one train per hour to and from Avonmouth. The result of this is St. Andrews Road and Severn Beach stations will be upgraded from the existing two hourly service to an hourly service, through MetroWest Phase 1. The modelling also shows the journey time between Portishead and Bristol Temple Meads averages at 17 minutes, this major improvement in transport provision results in significant economic benefits and is a key driver for the scheme.

2.10.3 Options considered in the Preliminary Business Case (PBC)

The results of the EAST work were that options 5B and 6B were the best performing options and hence deemed to take forward into this business case. The details of these options are set out in Table 2.15.

TABLE 2.15
Train route and service specification for inclusion in the PBC option assessment

Option	No of train sets	Baseline Specification	Enhanced Specification
5b	Additional 4 or 5 train sets comprising of 2-car DMUs* Assume class 15x or 16x	• Severn Beach to Bath 1tph all day (Bath line service tops up existing service giving 2tph) • Avonmouth to Portishead 1tph all day • Portishead to Bristol Temple Meads (BTM) 1tph peak only • Stopping at: Pill, Parson Street, BTM, Keynsham, Oldfield Park, St Andrews Road, Avonmouth, Portway, Shirehampton, Sea Mills, Clifton Down, Redland, Montpelier, Stapleton Road and Lawrence Hill. Hours of operation - to fit with Railsys but broadly: Mon – Fri 7am arrivals at BTM to 7pm departures from BTM, operating half-hourly all day (except Portishead line is half-hourly peak only). From 7pm hourly service with last departure from Bristol TM at 11pm, operating on the following routes - Severn Beach to BTM (short) and Portishead to BTM. Saturday as Mon – Fri but operating only the following routes – Avonmouth to Portishead and Severn Beach to Bath to 7pm only, then operates Severn Beach to BTM (short), ie Portishead line has an hourly service only and Bath line has no evening service (other than existing service). Sunday 10am arrivals at BTM to 7pm departures from BTM, operating an hourly only pattern on the following routes - Severn Beach to BTM (short) and Portishead to BTM.	As baseline but Portishead to Bristol TM operates 1tph all day, ie Portishead line is half-hourly weekday daytime. Also all trains on Portishead line call at Bedminster.

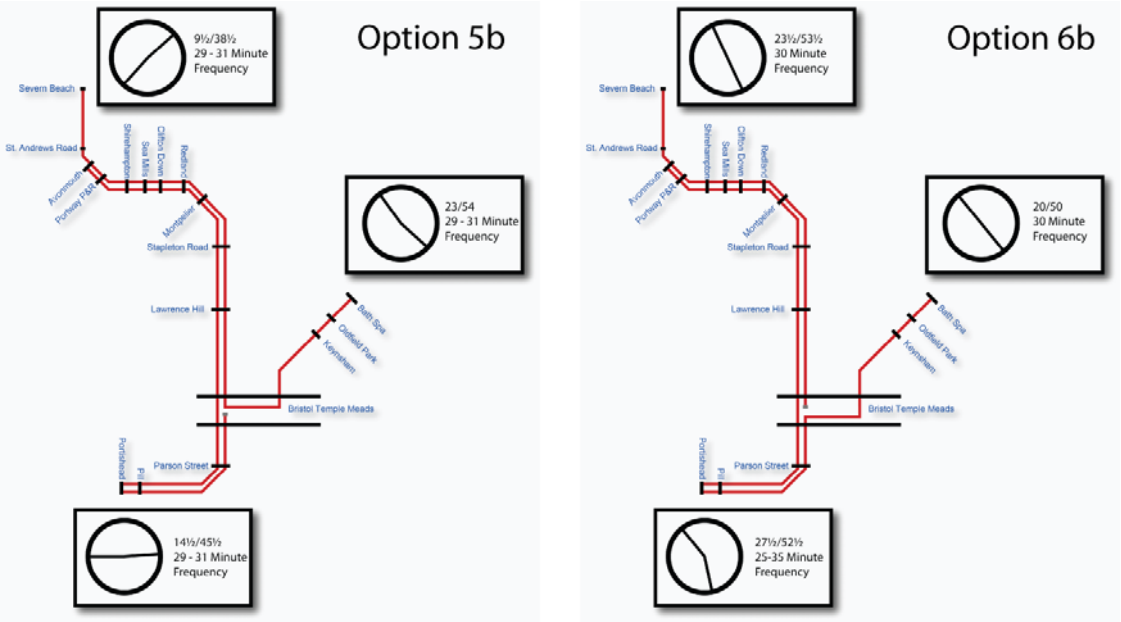
TABLE 2.15
Train route and service specification for inclusion in the PBC option assessment

Option	No of train sets	Baseline Specification	Enhanced Specification
6b ver2	Additional 4 or 5 train sets comprising of 2-car DMUs* Assume class 15x or 16x	• Portishead to Bath 1 tph peak only (Bath line service tops up existing service giving 2tph) • Portishead to Avonmouth 1 tph all day • Severn Beach to Bristol TM, 1 tph, all day • Off peak pattern as above but operating BTM to Bath (short) 1 tph rather than Portishead to Bath • Stopping at: Pill, Parson Street, BTM, Keynsham, Oldfield Park, St Andrews Road, Avonmouth, Portway, Shirehampton, Sea Mills, Clifton Down, Redland, Montpelier, Stapleton Road and Lawrence Hill. • Hours of operation - to fit with Railsys but broadly: Mon – Fri 7am arrivals at BTM to 7pm departures from BTM, operating half hourly all day (except Portishead line is half hourly peak only). From 7pm hourly service with last departure from BTM at 11pm, operating on the following routes Portishead to BTM (short) and Severn Beach to BTM. Saturday as Mon – Fri but operating BTM to Bath (short) to 7pm only ie Portishead line has an hourly service only and Bath line has no evening service (other than existing service). Sunday 10am arrivals at B TM to 7pm departures from BTM, operating an hourly only pattern on the following routes - Portishead to BTM (short) and Severn Beach to BTM.	As baseline but Portishead to Bath operates 1tph all day, ie Portishead line is half hourly weekday daytime. Also all trains on Portishead line call at Bedminster.

*a simplified assumption has been for the economic appraisal, assuming 2-cars DMUs would be operating on all amended services. However as the business case considers the benefits associated with the additional services to the do minimum scenario, therefore refinement of the do minimum scenario (e.g including a standardised 3 car formulation would not have a big impact to business case.

Both option 5B and 6B have been subject to capacity (Railsys) modelling and both have been found to be operationally feasible (see Network Rail Capacity / Railsys Analysis Report – Appendix A). The capacity modelling was based on Crossrail/IEP Iteration 5 and has also confirmed the infrastructure requirements of the scheme. In respect of operational feasibility, both option 5B and 6B provide a symmetrical service pattern and both require a minimum of 6 train sets, giving a very efficient operation with a high levels of unit efficiency (see Figure 2.6). Allowing for the 2 train sets currently in operation on the Severn Beach line, the net additional requirement is 4 train sets (4 x 2 car formations) and this would result in 6 train sets overall. The Preliminary Business Case also assesses the performance of Options 5B and 6B with 7 train sets, which is a net additional requirement is 5 train sets (5 x 2 car formations).

Figure 2.6: Option 5B and 6B Train route configuration diagrams



In terms of practicalities of rolling stock formation, further considerations is required in conjunction with discussions with DfT. In particular the cascading of DMUs to the West of England in light of the electrification programme. There is an aspiration for 16x units will be cascaded to the West of England local road network. Taking into account existing passenger volumes, future passenger growth, the ideal level of provision would be class 16x 3 car formations.

Train capacity and crowding will be considered in the development of the Outline Business Case, as more refined details are developed of the train service specification, including departure times and staff/rolling stock utilisation. The demand for individual train services is clearly related to overall demand, but increasing demand does not necessarily change individual train loadings by the same amounts. For instance, as demand for a train service rises, it is typical for the 'best' timed departures to become overloaded first. People may then choose to use an earlier or later service. However, if the service pattern is not particularly frequent or has irregular intervals, this may not be practical for many people. If it is not possible to run additional departures, the only response that operators may then have is to lengthen the existing departures.

A survey of boarding and alighting passengers on Severn Beach line trains carried out by the Severnside Community Rail Partnership (12th June 2014) indicate that capacity is already close to or exceeded to a certain extent for some departures, in particular for some journeys between Montpelier and Bristol Temple Meads, and Stapleton Road and Clifton Down, in both the morning and evening peak periods. Indeed, some morning peak departures have already been increased to 3-car formations, where the remainder are provided by 2-car formations.

MetroWest Phase 1 will make services on the Severn Beach line more frequent and even out the service pattern. This which will have the effect of increasing both carrying capacity and demand, as well as give more flexibility for some users to shift to earlier or later departures to avoid services that are particularly well subscribed.

To consider the effect of demand and capacity, the Outline Business Case will aim to understand the current use of individual Severn Beach line departures in more detail, in order to ascertain the current notionally spare capacity and thus determine the future capacity in comparison. Demand forecast can then be applied to the future service pattern to assess whether crowding is an issue, based on train service capacity and demand growth. A similar exercise would also be carried out for the Portishead line, albeit not based on existing behaviour, but by referencing detailed patronage elsewhere and applying this to demand forecasts and train service capacities.

The modelling has shown that the operating margin using 6 train sets is towards the upper ceiling and further modelling will be needed in GRIP 3 to simulate timetable robustness against the Passenger Performance Measure. However the modelling has found that other infrastructure and operational proposals that while currently unfunded, would potentially yield operational performance benefits for MetroWest Phase 1. This is summarised in the following extract form the modelling report:

"*The enhancement of Bristol East Junction is desirable for the development of this project, due to the increased number of moves across Bristol temple Meads Eastern throat under MetroWest. Deliver of this scheme would have a performance, timetabling and operational benefits for both the MetroWest project and the wider Bristol Area."*

and

"It is recommended that the ability of the project to procure Class 165 units for MetroWest services be explored as thoroughly as possible. Whilst it is not anticipated that this rolling stock will provide journey time benefits, it has the potential to mitigate performance risk inherent in the scheme."

The modelling has also confirmed journey times for the line rail routes, as follows:

TABLE 2.16A
Option 5B journey times

	To Bristol	From Bristol
Bath Spa	17 minutes	16 ½ minutes
Avonmouth	33/31 minutes	26/26 ½ minutes
Portishead	17 ½ /18 ½ minutes	16 ½ /16 ½ minutes

TABLE 2.16A
Option 6B journey times

	To Bristol	From Bristol
Bath Spa	17 minutes	16 ½ minutes
Avonmouth	30/35 ½ minutes	25 ½ 27 ½ minutes
Portishead	17 /15 ½ minutes	16 ½ /16 ½ minutes

These journey times are a key driver of the project, two of the three routes offer a journey time approximately half the journey time of a comparative journey by car.

2.10.4 Consideration of a lower cost alternative

Consideration has been given to lower cost alternatives to ensure the scheme delivered provides optimum value for money. De-scoping the scheme, to reduce costs, would necessitate a reduction in the number of lines included in the scheme, and this would fundamentally undermine the schemes ability to meet objectives and hence was not feasible. The opportunities to reduce capital costs through de-scoping engineering requirements are very limited, given the scheme is to operate 18 hours a day, 365 days a year. Furthermore the engineering design must compile with GRIP engineering design standards.

During the Preliminary Business Case development a lower cost option was considered. The option comprises rebuilding the dis-used line just as far as M5 Junction 19 where a park and ride station could be built rather than rebuilding the dis-used line all the way to Portishead. The advantages of this option could be it:

- Potentially saves in the order of £10million
- The North Somerset Council Local Plan / DPD identifies space off Royal Portbury Dock Road for a station)

The potential disadvantages of the option is that it not fully address the scheme objectives as:

- The scheme would not connect Portishead town directly to the national rail network, thus not providing direct access for an additional 30,000 people. This would result a range of social and economic disadvantages for the residents, business and visitors to the town
- The vast majority of users would effectively have to inter-change at the park & ride station as the residential walking catchment would be almost non-existent
- Access to the station at J19 would be limited to car users and possibly feeder bus services
- The scheme would also result in some undesirable social distributional impacts

This low cost option would serve a very different demand to the options assessed in this Business Case. As part of the preparation of the Outline Business Case some work will be undertaken to assess this option further and quantify the potential demand for the service.

2.11 Summary of strategic case

In summary, the strategic case, presented above, illustrates that MetroWest Phase 1:

- Has **a clear business strategy and 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 constrained economic growth, congestion, resilience and accessibility. If MetroWest is not delivered, these problems would continue and would ultimately prejudice the economic potential of the city region.
- **Responds to both internal (rail industry) and external (public pressure) drivers for change.**
- **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.
- Has a **clearly defined scope.**
- Is **only dependant on the Filton Bank four-tracking scheme**, which is a committed CP5 scheme.
- **Will affect a wide range of stakeholder groups** but these **relationships are being actively managed.**
- Has been **subject to a robust optioneering process**.
- Is **highly 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.
- **Provides a highly efficient operation**, which has potential for medium to longer term passenger and revenue growth and associated commercial expansion by the Train Operating Company.
- Provide a **tangibly 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.

3 Economic Case

3.1 Introduction

Devolution of funds and decision making, with local prioritisation, gives responsibility to approve and fund schemes to the Local Transport Body Board (LTBB) for the West of England, though the LTBB still insists on rigorous value for money assessment consistent with WebTAG. A collaborative approach is being taken to develop MetroWest, led by the project's promoters and consultants, with technical support from the rail industry through the involvement of Network Rail.

The methodology employed to model and appraise the schemes brings together a diverse range of organisations, tools, data and techniques.

This section provides information about the Economic Case for the MetroWest Phase 1 scheme. This supporting work includes:

- Network Rail have undertaken engineering scheme and cost development work – presented in the GRIP 1/2 report in Appendix A
- Network Rail have undertaken timetabling analysis – presented in the report in Appendix A
- Network Rail have undertaken economic appraisal analysis, including appraising the scheme using their 'Discounted Cash Flow (DCF) model – presented in the Socio-economic Appraisal Report in Appendix C
- CH2M Hill are in the process of preparing an Environmental Impact Assessment Report (EIA) report for the scheme, this work has provided high level information for the environmental section of the report
- CH2M Hill have used (GBATS3) model to assess the impacts of the scheme on the highway network (see Section 3.4 for further details)
- CH2M Hill have used (GBATS3) model to assess the wider economic benefits of the scheme (see Appendix D)

This Section provides information on:

- Section 3.2 Options appraised
- Section 3.3 Transport modelling methodology overview
- Section 3.4 Summary of modelled scheme impacts
- Section 3.5 Key assumptions
- Section 3.6 Economy impacts
- Section 3.7 Environment impacts
- Section 3.8 Social impacts
- Section 3.9 Public Account impacts
- Section 3.10 Performance of option variants
- Section 3.11 Summary of impacts

3.2 Options appraised

Two main options of service specifications are proposed for business case assessment, which are Option 5b and Option 6b. There are two variants to each option. The service specification of each option is described as follows:

Option 5b

- Severn Beach to Bath Spa: 1 train per hour (tph) all day;
- Avonmouth to Portishead: 1tph all day; and
- Portishead to Bristol Temple Meads: 1tph in the morning and evening three-hour peaks only.

Stopping at: Pill, Parson Street, Bristol Temple Meads, Keynsham, Oldfield Park, St. Andrews Road, Avonmouth, Portway, Shirehampton, Sea Mills, Clifton Down, Redland, Montpelier, Stapleton Road, Lawrence Hill and route terminus stations.

Option 5b enhanced

Same as Option 5b except:

- Portishead to Bristol Temple Meads: 1tph all day

Option 6b

- Portishead to Bath Spa: 1tph in the morning and evening three-hour peaks only;
- Portishead to Avonmouth: 1tph all day; and
- Severn Beach to Bristol Temple Meads: 1tph all day.

Off peak service pattern is as above but operating 1tph Bristol Temple Meads to Bath Spa rather than Portishead to Bath Spa.

Option 6b enhanced

Same as Option 6b except:

- Portishead to Bath Spa operates 1tph all day, i.e. Portishead line has half hourly frequency on weekday.

Stopping at: Pill, Parson Street, Bristol Temple Meads, Keynsham, Oldfield Park, St. Andrews Road, Avonmouth, Portway, Shirehampton, Sea Mills, Clifton Down, Redland, Montpelier, Stapleton Road and Lawrence Hill.

Two scenarios of train rolling stock unit requirement have been tested for each option. Scenarios with both, 6 and 7 two-car diesel multiple units, have been tested for each option because operational analyses have indicated that while a 6 train set service is achievable, a 7 train set service would have more operational flexibility[5].

With the four options above, this gives a total of eight scenarios which are as follows:

- Scenario 1: Option 5b with 6 train sets
- Scenario 2: Option 5b with 7 train sets
- Scenario 3: Option 6b with 6 train sets
- Scenario 4: Option 6b with 7 train sets
- Scenario 5: Option 5b enhanced with 6 train sets
- Scenario 6: Option 5b enhanced with 7 train sets
- Scenario 7: Option 6b enhanced with 6 train sets
- Scenario 8: Option 6b enhanced with 7 train sets

This report appraises the following scenarios in detail (which were chosen to provide information on the "best" and "worst" economic performance):

[5] An additional 4/5 train sets to the 2 train sets used to provide current services on the Severn Beach line

- Scenario 4: Option 6b with 7 train sets (which offers the worst economic performance)
- Scenario 5: Option 5b enhanced with 6 train sets (which offers the best economic performance)

Then headline information is presented for the other scenarios in Section 3.10, as scheme variants to the two detailed scenarios.

3.3 Transport modelling methodology overview

The approach to assessing the change in demand for rail for MetroWest Phase 1 makes extensive use of techniques applied in the rail industry. These employ empirical methods relating to features that affect the demand for rail services, drawing on a variety of data sources and methods, comprising:

- Passenger Demand Forecasting Handbook (PDFH) - providing methods and guidance on assessing the effects of service quality, fares and external factors on rail passenger demand
- 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
- 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

A combination of bespoke spreadsheet models and rail ticket sales data from MOIRA have been used to assess rail enhancements delivered by MetroWest Phase 1. There are three rail demand elements:

- Trips at new stations
- Diversions of existing rail trips to new stations
- Changes in demand at existing stations from new or amended services (including suppression of demand by extra station calls)

These tools are combined to form a 'rail demand model' (RDM) for MetroWest. Demand at new stations cannot be modelled using MOIRA therefore a bespoke model is needed utilising demand data from MOIRA.

In order to understand the potential local effects in more detail, GBATS3 has been used to undertake a cross-check of the decongestion highway benefits of the scheme identified using the Discounted Cash Flow analysis discussed above.

GBATS3 is the existing multi-modal model for the greater Bristol area which has been developed to be WebTAG 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, cost and distance) for three time periods (AM peak, inter-peak and PM peak hours) and several modes (car, bus, rail and MetroBus), also sub-divided by user class (commuting, other home based trips and business journeys) and income level of travellers.

MetroWest Phase 1 represents a major transport scheme development in the West of England area. In modelling its effects, other key planned infrastructure / transport developments have been included in the 'do minimum' assumptions prior to MetroWest Phase 1 interventions being included. The do minimum includes highway, MetroBus and rail schemes of:

- South Bristol Link (SBL)
- Ashton Vale to Temple Meads (AVTM)
- North Fringe to Hengrove Package (NFHP)
- Major development infrastructure / bus services

- 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 2019 opening year).

The new transport modelling undertaken 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 1 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

3.4 Summary of modelled scheme impacts

The main changes in transport use are associated with new opportunities to access the railway at Portishead and Pill stations and the journey time savings associated with new service patterns at existing stations. These changes will increase rail use and will therefore also reduce car use.

The timetable analysis presented in Section 2 indicates that the journey time will be around 17-19 minutes from Portishead to Bristol Temple Meads. A similar car journey, under typical morning peak hour traffic conditions takes approximately of 50 minutes, as congestion can make the journey both longer and unreliable. There is consequently some scope for faster and/or more reliable journeys should MetroWest Phase 1 be implemented.

Forecasts of rail use for Scenario 4: Option 6b with 7 trains sets and Scenario 5: Option 5b enhanced with 6 train sets are shown in Table 3.1.

TABLE 3.1
New Station Forecasts

Change in rail use	Scenario 4: Option 6b with 7 train sets	Scenario 5 Option 5b enhanced with 6 train sets
Portishead	451,406	464,778
Pill	204,289	210, 378

Note rail journeys in 2019

The total increase in demand (one-way journeys) generated by MetroWest Phase 1 is shown in Table 3.2. This is taken from the MOIRA demand forecasts for existing stations, and the new stations forecasts for the Portishead line. Both have been translated to 2019 (opening year) demand levels using the future year rail demand growth profile assumed for West of England area stations.

TABLE 3.2
Increase in rail demand – one-way journeys

2019	5B baseline	5B enhanced	6B baseline	6B enhanced
Existing stations	524,000	535,000	392,000	401,000
New stations	656,000	675,000	656,000	675,000
Total	1,180,000	1,210,000	1,048,000	1,076,000

[a] Rounded to nearest '000

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. Table 3.3 summarises these changes.

TABLE 3.3
Highway impacts

	2012 Base year			2016			2031		
	AM	IP	PM	AM	IP	PM	AM	IP	PM
Do Minimum									
Queues (PCU. HR./HR)	6768	3906	6801	8513	4791	8583	14193	7010	14141
Total travel time (PCU. HRS/HR)	22690	15743	22176	26503	18217	25984	35702	23924	34928
Travel distance (PCU. KMS/HR)	1030834	783188	1006413	1117977	858587	1095510	1333785	1078829	1310820
Overall average speed (KPH)	45	50	45	42	47	42	37	45	38
Total trips loaded (PCUS/HR	120133	97165	112211	128165	105367	120346	151692	129160	142075
Scenario 4 (Option 6b)									
Queues (PCU. HR./HR)				8494	4778	8565	14071	6990	14124
Total travel time (PCU. HRS/HR)				26459	18195	25953	35545	23894	34894
Travel distance (PCU. KMS/HR)				1116526	858083	1094681	1331978	1078308	1309747
Overall average speed (KPH)				42	47	42	38	45	38
Total trips loaded (PCUS/HR				128061	105315	120285	151556	129088	141999
Scenario 5 (Option 5b Enhanced)									
Queues (PCU. HR./HR)				8490	4788	8559	14070	7001	14107
Total travel time (PCU. HRS/HR)				26455	18199	25945	35543	23894	34875
Travel distance (PCU. KMS/HR)				1116584	857613	1094541	1331786	1077492	1309658
Overall average speed (KPH)				42	47	42	38	45	38
Total trips loaded (PCUS/HR				128046	105310	120277	151536	129080	141988

The highway assignment results indicate improvements in network operating conditions as a result of the MetroWest scheme. Whilst there are highway benefits the results indicate the differences between options are limited in terms of highway network impacts.

3.5 Key economic assumptions

The key assumptions for the economic assessment are as follows (more detailed assumptions are contained in the MetroWest Phase 1 Forecasting Report, July 2014 and the Network Rail MetroWest Phase 1 Economic Appraisal Report). Note that main non-project specific economic appraisal parameters and assumptions are drawn from the requisite units of the DfT's appraisal guidance contained in WebTAG.

General assumptions

- Opening year 2019, construction years 2017 and 2018
- Appraisal period = 60 years
- Network Rail Discounted Cash Flow model = current model year 2014, first year of benefits 2019
- Price base year and base year for discounting = 2010
- Discount rate = 3.5% for 30 years from current year then 3% thereafter

Cost assumptions

- Train operating company 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.)
- Sets of train crew (drivers and train managers) required to operate six train sets of diesel multiple units per working day = 36 (this increases to 42 for seven train sets), further details of operational costs are set out in Section 5.4
- 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 infrastructure £550k per annum at 2013 prices
- TOC revenue and operating cost transfer = 50% during current franchise, 100% after current franchise
- Network Rail operating cost transfer = 0% during current control period, 100% after current control period

Transport demand assumptions

- The growth in rail demand is assumed to be 4.3% per annum from 2013 to 2020, 2.2% per annum from 2021 to 2034 and 0% per annum thereafter
- 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 Tempro forecasts
- Modelled growth in car trips is 1.7% per annum to 2016 and 1.3% per annum between 2016 and 2031

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 3.4. Table 3.4 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 3.4
Annualisation factors

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 Scenarios 4 and 5 are shown in Table 3.5.

TABLE 3.5

TEE Table Scenario 4:Option 6b, 7 train sets (all values are presented in 2010 market prices)

	Total in 2010 price base £	Cars, LGVs & goods vehicles	Bus & Coach	Rail Total	Rail infra-structure - Network Rail	Rail passengers, TOCs
Non-business commuting benefits						
Travel time saving	128,876,903	8,775,750		120,101,153		120,101,153
Vehicle operating costs	6,509,000	6,509,000		0		
User charges	-21,750	-21,750		0		
During construction & maintenance	-1,020,984	-204,197		-816,787		-816,787
Net (1a)	**134,343,169**	15,058,803	0	119,284,366	0	119,284,366
Non-business other benefits						
Travel time saving	35,661,020	0		35,661,020		35,661,020
Vehicle operating costs	0	0		0		
User charges	0	0		0		
During construction & maintenance	-1,020,984	-204,197		-816,787		-816,787
Net (1b)	**34,640,035**	-204,197	0	34,844,232	0	34,844,232
Business benefits						
Business user benefits						
Travel time saving	18,303,927	7,922,000		10,381,927		10,381,927
Vehicle operating costs	420,250	420,250		0		
User charges	-12,250	-12,250		0		
During construction & maintenance	-2,041,968	-408,394		-1,633,575		-1,633,575
Net (2)	**16,669,959**	7,921,606	0	8,748,352	0	8,748,352
Private sector provider impacts						
Revenue	121,748,346			121,748,346		121,748,346
Opcost	-170,622,970			-170,622,970	-15,655,614	-154,967,356
Investment cost	-49,007,239			-49,007,239	-49,007,239	
Grant/subsidy: CP5 Settlement	0			0	0	
Grant/subsidy: Network Rail private funding	0			0	0	
Grant/subsidy: Public funds - local government	49,007,239			49,007,239	49,007,239	
Revenue transfer (100% to government)	-121,748,346			-121,748,346		-121,748,346
Opcost transfer (100% to government)	170,622,970			170,622,970	15,655,614	154,967,356
Sub total (3)	**0**	0	0	0	0	0
Other business impacts						
Developer contribution (4)	**0**			0		
Net business impact (5 = 2+3+4)	**16,669,959**	7,921,606	0	8,748,352		
Total, PV of transport econ eff. benefits (6 = 1a+1b+5)	**185,653,163**	1(a), 1(b) and (5) flow into the AMCB table, not (6)				

TEE Table Scenario 5: Option 5b enhanced, 6 train sets (all values are presented in 2010 market prices)

	Total in 2010 price base £	Cars, LGVs & goods vehicles	Bus & Coach	Rail Total	Rail infra-structure - Network Rail	Rail passengers, TOCs
Non-business commuting benefits						
Travel time saving	152,760,081	8,775,750		143,984,331		143,984,331
Vehicle operating costs	6,509,000	6,509,000		0		
User charges	-21,750	-21,750		0		
During construction & maintenance	-1,020,984	-204,197		-816,787		-816,787
Net (1a)	**158,226,347**	15,058,803	0	143,167,544	0	143,167,544
Non-business other benefits						
Travel time saving	51,282,994	0		51,282,994		51,282,994
Vehicle operating costs	0	0		0		
User charges	0	0		0		
During construction & maintenance	-1,020,984	-204,197		-816,787		-816,787
Net (1b)	**50,262,010**	-204,197	0	50,466,207	0	50,466,207
Business benefits						
Business user benefits						
Travel time saving	21,369,551	7,922,000		13,447,551		13,447,551
Vehicle operating costs	420,250	420,250		0		
User charges	-12,250	-12,250		0		
During construction & maintenance	-2,041,968	-408,394		-1,633,575		-1,633,575
Net (2)	**19,735,583**	7,921,606	0	11,813,976	0	11,813,976
Private sector provider impacts						
Revenue	156,893,627			156,893,627		156,893,627
Opcost	-147,613,634			-147,613,634	-15,655,614	-131,958,020
Investment cost	-49,007,239			-49,007,239	-49,007,239	
Grant/subsidy: CP5 Settlement	0			0	0	
Grant/subsidy: Network Rail private funding	0			0	0	
Grant/subsidy: Public funds - local government	49,007,239			49,007,239	49,007,239	
Revenue transfer (100% to government)	-156,893,627			-156,893,627		-156,893,627
Opcost transfer (100% to government)	147,613,634			147,613,634	15,655,614	131,958,020
Sub total (3)	**0**	0	0	0	0	0
Other business impacts						
Developer contribution (4)	**0**			0		
Net business impact (5 = 2+3+4)	**19,735,583**	7,921,606	0	11,813,976		
Total, PV of transport econ eff. benefits (6 = 1a+1b+5)	**228,223,939**	1(a), 1(b) and (5) flow into the AMCB table, not (6)				

3.6.2 Reliability impacts on Business users

The reduction in congestion in the highway network sets out in Section 3.3 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

Wider impacts assessment was undertaken for MetroWest Phase 1. The assessment seeks to capture the following three types of wider impacts over a 60-year appraisal period from the scheme opening year 2019 to 2078:

- 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 suggest that, over the 60-year appraisal period, the agglomeration impact is approximately £49m with very minor difference between all options considered. The impact due to output change in imperfectly competitive markets is usually 10% of the business user benefits and is estimated to be approximately £2m across all options. Increase in tax revenues from labour supply effects as a result of the proposed MetroWest Phase 1 scheme is under £2m.

Overall, the total value of wider impacts is estimated to be in the order of £52m (2010 price base), of which agglomeration impacts account for over 90%. The distribution pattern was cross-checked against components of rail improvements in MetroWest Phase 1 and found to be consistent with where their impacts are anticipated. The methodology adopted for the assessment is in line with the latest WebTAG 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 J21 Enterprise Area (Weston-super-Mare) and Avonmouth Severnside Enterprise Area.

3.7 Environment impacts

An overview of environmental issues is presented in this section. The data used to inform this work includes desktop surveys using local and national datasets, and site visits by environmental specialists using relevant guidance documents and adherence to international, national and local policy. This technical work is being developed to support the scheme Environmental Impact Assessment. The work to date considered the impact in the area surrounding the construction elements of the scheme as well as the "cumulative impacts" of the overall MetroWest Phase 1 scheme.

Further field work and assessments are required to define the level of impact for each environmental criterion. The envisaged level of impact, based on the information available, is presented in this section. When the scheme impact is fully understood, work will be undertaken to consider the need for mitigation measures.

WebTAG states:

"It is usually not appropriate to consider environmental impacts during, or as a result, of construction. However, there may be circumstances when these impacts are relevant and should be taken into consideration."

It was envisaged that there would be interest in the impact of construction. This is referenced in the following sections, where appropriate, but not included in the appraisal summary table.

3.7.1 Noise

In order to assess the noise impact of the scheme a desktop survey, a site visit and noise measurements have been undertaken at locations in areas likely to be affected during construction and operational phases of the project. This process has allowed the production of baseline data.

The area surrounding the M5 motorway is also covered by noise maps produced by Defra as a responsibility under the *Environmental Noise Directive 2002/49/EC*. The maps indicate that noise from the M5 motorway is audible throughout Portishead and Pill. In addition, there are several areas alongside the M5 that are classed as *Important Areas*, indicating that there are sensitive receptors close to the M5 that are experiencing high levels of noise.

The area surrounding the proposed stations varies from commercial to residential. In urban areas, the dominant noise source is from local roads with some noise generated from industrial and commercial premises. In residential locations the noise level is lower. In the evening and early morning these locations have a low ambient noise level where the distant M5 motorway is the only obvious noise source.

In the area between Portishead and Pill, the proposed rail line passes through a more rural area with isolated dwellings nearby. The background noise at these locations is still from traffic using the M5 and, also to some extent, the A369. However, the local noise climate can be influenced by other sources such as work in fields, aircraft or local traffic.

As the proposed line approaches the M5 and Pill, the motorway becomes the dominant noise source. Within Pill, and at the proposed station location, the M5 is still audible but the noise climate also contains contributions from local traffic and general activities from a small town.

At all locations along the route, there is occasional noise from aircraft using Bristol Airport, approximately 7 miles to the south.

There is likely to be both positive and adverse noise impacts from both construction and operational activity of the line and stations. Construction activities, associated with building the stations, line and related road infrastructure, are likely to increase noise levels temporarily. Noise from operational activities will increase noise by the additional rail traffic, operations of new stations including announcements, idling trains, fixed plant and additional road traffic generated by the stations. However, a potential reduction in traffic (particularly into Bristol) will have a positive impact on noise.

Although the benefits of a reduction in road traffic should not be ignored, on balance these benefits may be overshadowed by the noise impacts to residents that live directly next to the line. This will be particularly noticeable in new developments to the east of Portishead that did not exist when the line was operational previously.

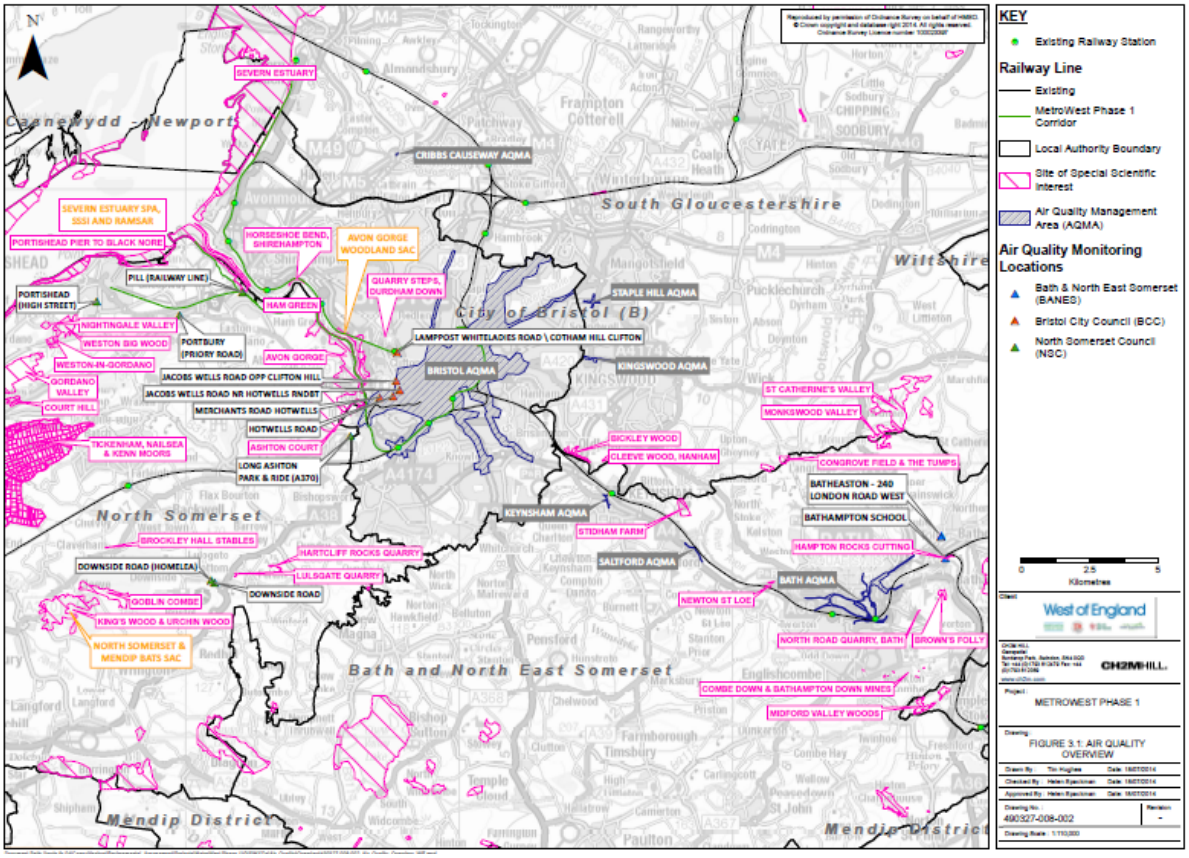
There could be slight benefits in operational terms from reduced traffic but moderate adverse impacts from increased rail traffic along the reinstated line. **Overall it is envisaged that the scheme will have a moderate adverse noise impact.**

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 NO_2 concentration is greater than 25 ug/m^3. 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 on route to the Severn Beach Line. 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, and do not require further consideration.

North Somerset Council (NSC) has not declared any Air Quality Management Areas (AQMAs), and its air quality monitoring indicates that pollutant concentrations meet air quality objectives within the vicinity of the Portishead to Pill line. The AQMAs in Bath and Bristol are in areas which are expected to experience reductions in highway traffic as a result of the scheme, but the impacts on these AQMAs required further analysis to confirm impacts. See Figure 3.1 for location details.

Figure 3.1: Map showing AQMAs



The scheme has the potential to affect air quality during the construction and operational phase. The site clearance and construction phase will involve activities, such as earthworks, which are likely to generate dust, potentially leading to complaints through surface soiling. Materials used during construction will also have an embodied carbon impact. Studies of dust impacts from quarrying, waste disposal and construction operations indicate rapid fall-off in downwind dust concentrations with increasing distance from the source due to particle dispersion and deposition. Following DMRB guidance, sensitive receptors (for example, houses, schools, hospitals, designated sites) would be identified within 200 m of construction activities, so that mitigation measures to suppress dust emissions could be applied.

The operational phase of the scheme has the potential to affect air quality due to a modal shift from road vehicles to rail, leading to a change in vehicle journeys and traffic distribution on the road network. The scheme would be expected to lead to an overall reduction in vehicular emissions of pollutants, although there is likely to be an increase in emissions on roads surrounding rail stations. There will also be emissions associated with the Portishead to Pill line and with the increased services along the Portbury freight line, Severn Beach and Bristol to Bath Spa, if diesel locomotives are introduced.

The operational air quality impacts associated with changes in road traffic and with proposed changes to road alignment surrounding rail stations, would be assessed by identifying affected roads. These roads would be identified, based on the following DMRB criteria:

- Road alignment will change by 5 m or more
- Daily traffic flows will change by 1,000 Annual Average Daily Traffic (AADT) flow or more

- Heavy Duty Vehicle (HDV) flows will change by 200 AADT or more
- Daily average speed will change by 10 kph or more
- Peak hour speed will change by 20 kph or more
- Air quality impacts would be assessed at sensitive receptors within 200 m of affected roads using the dispersion model ADMS-Roads
- Modelling would be undertaken for the base year and for the scheme opening year, with and without the scheme. The air quality model would be compared and verified against base year monitoring data, in line with Defra (2009) guidance
- The significance of the predicted change in air quality between the without and with scheme scenario would be defined according to EPUK (environmental protection UK) (2010) guidance

There are two designated sites located within 1 km of the Portishead to Pill line: Severn Estuary SSSI located and Weston Big Wood SSSI. These designated sites could be sensitive to change in nitrogen deposition associated with the scheme.

The potential benefits to air quality from reduced road traffic and congestion are evident. However, there are possible disadvantages for those that live directly on the line between Portishead and Pill, particularly those residing in the new developments to the east of Portishead which were not in existence when the line was previously operational.

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. On balance, it is envisaged that the scheme will have a **slight beneficial or neutral air quality impact.**

3.7.3 Greenhouse gases

A desk-based exercise (using readily available information) is being undertaken for the EIA scoping work.

On average, the carbon emissions for all North Somerset, Bristol City and Bath and North East Somerset authorities was estimated at 7 Kt for diesel railways (0.003 per cent of total CO_2 emissions), with road transport accounting for ~516 Kt (25 per cent of total CO_2 emissions). Rail transport is more energy-efficient than road transport as a transport mode, by virtue of greater scale, lower rolling resistance and lower wind resistance. As a consequence, it gives rise to less pollution per passenger kilometre than road transport.

The rail alignment between Portishead and Pill is not in operational use and, therefore, any existing use of materials or waste generation is likely to be negligible. The use of material resources and the generation of waste during the operation of the existing live freight line near Pill is also likely to be negligible.

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

The operational phase of the scheme has the potential to affect carbon due to a modal shift from road vehicles to rail, leading to a change in vehicle journeys and traffic distribution on the road network. The scheme would be expected to lead to an overall reduction in vehicular emissions of carbon. There will also be emissions associated with the Portishead to Pill line and the increased services along the Portbury freight line, Severn Beach and Bristol to Bath Spa, if diesel locomotives are introduced.

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

The transport modelling work undertaken using the GBATS3 models show the following carbon benefits:

- Change in non-traded carbon over 60 year (CO_2e)-30,731
- Change in traded carbon over 60 year (CO_2e)-118

3.7.4 Landscape

The existing data available has been drawn from a mixture of desktop studies, using relevant national and local policy (NPPF, National Character Areas by Natural England and local character assessments from local plans and policy documents and maps), and a field survey to obtain site specific character analysis, through consideration of landform, vegetation, human influence (built form & culture) and nature of views and broadly identifying visual receptors and views.

Currently there are a number of designations relevant to the study area including Scheduled Ancient Monuments (SAMs), forest and woodland areas, National Nature Reserves, Green Belt, listed buildings, conservation areas, parks and gardens, coastal zones, local green space, common land, town and village greens. Key types of receptors include commercial and residential buildings, listed buildings, cycle routes and public bridleways, major and local roads including lanes and private tracks, farmsteads, parks and gardens (registered and unregistered), and nature reserves.

Given the numerous designations and receptors the impact during the construction phase will be influenced by the extent of change of the existing landscape features, in particular the loss of existing vegetation. Also the location of site compounds, extent of works including construction traffic management plan, construction methods and type of plant, programme and phasing of works, and working hours. However, the potential negative impacts on the visual amenity, although temporary, could be significant. Much of the work will require heavy plant to lay tracks, build stations and major earth works as well as site compounds to store machinery and materials.

Operational activities will impact on the landscape and visual setting with the loss of planting / landscaping which cannot be replaced, replacement planting which will mature over time, new tracks, trains, stations and vertical elements such as lighting columns, signals and fencing.

At this stage, without further work to identify locations of infrastructure and therefore construction activity, it is difficult to ascertain what type of designation and receptor will be affected. However, given the number of designations and receptors, it is envisaged to have a **moderate adverse landscape impact.**

3.7.5 Townscape

At this stage, as the station locations or designs have not been established, it is not appropriate to consider the impact on townscape. However, it is envisaged that the design of the station and surrounding public realm would have a positive or neutral impact on the townscape.

3.7.6 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 (such as issues related to visual and historic settings) impacts and effects to both resources are considered. Data has been gathered from Local Plan policy documents.

There are no designations (World heritage sites, registered battlefields, conservation areas or registered historic parks and gardens) within the scheme construction ‘footprint’, along the line of the scheme or in the 500 m study area. There are 12 listed buildings within 500 m of the study area and one scheduled monument (Conygar Hill) lies just outside the line of the scheme. There are six non-designated archaeological sites along the line of the Portishead to Pill line. These include the line of the railway itself, in addition to associated infrastructure such as former station platforms, the historic road bridges over the line, the signals, signal boxes, junction boxes, drainage ditches and sidings. There are nine remaining non-designated archaeological sites of interest in the wider 50 m study area.

The construction phase of the scheme, particularly construction of Portishead Station and associated access infrastructure, 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.

The operational impacts include the potential adverse impacts on designated buildings due to rolling stock but there will not be any adverse impacts to the extant historic railway infrastructure as these will have been removed during enabling works at the outset of construction.

The construction impact constitutes a slight adverse impact dues to possible disturbance of buried archaeology due to the new station 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 **will have neutral heritage impact.**

3.7.7 Biodiversity

A desktop study has been conducted to gather information on ecology and biodiversity for the Portishead to Pill line. 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. The *Action for Nature North Somerset Biodiversity Action Plan* (2005) (NSBAP) and *Bristol Biodiversity Action Plan* (BBAP) 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). The priorities and targets of Biodiversity 2020 the NSBAP and BBAP will be used to inform the assessment.

Portishead to Pill line

The proposed new Portishead to Pill railway is located predominantly within the Natural England defined Severn and Avon Vales Natural Area (number 56). This is an area of undulating low-lying land where the river floodplains flood regularly in winter and there are relict wetland sites and features, such as old pollards, wet pastures, ditches and tall hedgerows. The desk study identified no nationally or internationally designated sites for nature conservation within the site boundary (ie the current soft estate boundary of the disused section of railway from Portishead to Pill). The internationally designated sites within a 5 km radius of the site are:

- The Severn Estuary Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar site, which is located just within 1 km of the western end of the study area and as close as 80 m to the eastern end
- Avon Gorge Woodlands SAC, which is located approximately 2.8 km east of the study area.

SPAs and SACs are also designated as Sites of Special Scientific Interest (SSSI). The only Site of Special Scientific Interest (SSSI) within 2 km is the Severn Estuary SSSI.

Habitats identified along the Portishead to Pill railway are: scrub, woodland and trees, semi-improved and amenity grassland, tall ruderal, reedbed, open water (watercourses and ponds) and structures. There is potential for bats, amphibians including great crested newt, water vole, reptiles, badgers, breeding birds and invertebrates. Surveys for these species were undertaken in 2011.

Portbury freight line

The Portbury freight line falls within the Bristol, Avon Valleys and Ridges Natural Area (Number 62) characterised by alternating ridges and broad valleys with some steep wooded slopes and open rolling farmland. The urban expanse of Bristol and the limestone Avon Gorge dominate the central part.

The desk study identified the Avon Gorge Woodlands SSSI and SAC within the Portbury freight line site for approximately 3.8 km. The Severn Estuary SAC, SPA and Ramsar site, is located approximately 80 m from the northern end of the Portbury freight line site. SSSIs within 2 km of the study area are:

- Ham Green SSSI is within the site.
- Ashton Court SSSI is 80 m to the west.
- Horseshoe Bend SSSI is 780 m to the north.
- Quarry Steps, Durdham Down SSSI is 1.3 km to the north-east.

Habitats identified along the Portbury Freight Line are: woodland and trees, scrub, semi-improved grassland, ephemeral/short perennial, tall ruderal, open water (watercourses) and structures. Woodland dominates in the Avon Gorge section with scrub more dominant in the urban areas. There is very little grassland habitat within the railway corridor, including some sections of railway ballast noted as potentially species-rich, although none of the rare plants found within the Avon Gorge Woodland SAC were noted present.

The River Avon runs parallel to this line for much of its length and a small tributary stream runs under the site from Oak Wood. No ponds or standing water are within the site, although Ham Green Lakes (fishing lakes) partially run under the site and are likely to be connected to the River Avon during high tide and flooding. A number of tunnels, over-bridges, under-passes and viaducts run across and under the site. There are features with potential to be affected by the proposed scheme that provide suitable habitat opportunities for bats, amphibians including the great crested newt, dormice, reptiles, badgers, breeding birds and invertebrates.

Bathampton Turn-back

There is one internationally designated site within a 5 km radius of the site, the Bath and Bradford on Avon bats SAC. This has several locations, with its nearest point to Bathampton turn-back approximately 950 m away.

There are four SSSI within a 2 km of the site: Hampton Rocks cutting SSSI, approximately 650 m; Combe Down and Bathampton Down Mines SSSI (covered by the SAC designations), approximately 950 m; North Road Quarry, Bath SSSI approximately 1.5 km; and Brown's Folly SSSI approximately 2 km.

There is one SNCI located immediately adjacent to the site, the Kennet and Avon Canal (part of Kennet and Avon Canal SNCI). Other SNCI sites within the 0.5 km are: River Avon; Kensington Meadows; fields by the canal and railway (Hampton Row); a section of Bathwick slopes (part of Bathampton Down and Woodlands SNCI); and Bathampton Down and Woodlands SNCI.

Bathampton turn-back comprises scrub habitat which includes bramble, willow saplings and butterfly-bush with narrow areas of semi-improved grassland. To the south, there is a line of mature pedunculate oak and sycamore trees. There is an area of species-poor, semi-improved grassland but this habitat is narrow and relatively small in extent.

The following potential for protected species has been identified:

- A tree with potential for bats
- Two water bodies with potential to support the great crested newt (within 120 m of the site boundary)
- Badgers on good foraging habitat where setts may be located
- Features with potential to support breeding birds

Although further investigation and survey work are required, the construction and operational impacts could include:

- Loss and damage to habitats and habitat connectivity during construction and operation
- Disturbance to animal populations from noise and vibration during the construction phase
- Disruption to habitats and populations within receiving range of dust and other materials during the construction phase
- Disturbance and damage to designated sites and habitats during the operation phase
- Disturbance to species populations during the operation phase
- Cumulative effects from other developments within the zone of influence

The scheme is considered likely to have a **slight adverse biodiversity impact.** However, this is very much dependent on findings from surveys. 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.

3.7.8 Water environment

The environmental baseline has been established through a review of existing literature and reports. The main features of the surface water environment include the River Avon and several watercourses and drains which form tributaries of the Avon. Between Portishead and Pill, the watercourses include Portbury Drain, New Cut Drain, Drove Rhyne Drain, Easton-in-Gordano Stream, Markham Brook and unnamed tributaries of these watercourses. Flood risk from the Avon and its tributaries will be covered in a baseline Flood Risk Assessment (FRA). The proposed railway route between Pill and Portishead passes across the floodplains of a number of these tributary watercourses. Whilst the provision of new rail services along this existing route may not impact significantly on flood risk at present, the effects of climate change must to be considered as flood risk is projected to increase in the future. Assessment will include the flood risk impact of any revisions to surface water drainage beneath the railway and the nature of flood risk to the railway itself. The Environment Agency's views on the management of flood risk are awaited.

Downstream of Pill, the River Avon forms part of the Severn Estuary SAC, SPA, Ramsar and SSSI. The tidal nature of the River Avon in this location, along with its size and capacity to provide dilution of pollutants, is such that any pollution event is unlikely to cause a significant adverse effect. Similarly, changes to the drainage regime of the tributaries of the River Avon are likely to be negligible compared to the flows in the tidal River Avon. Thus impacts of water quality changes on the River Avon have been scoped out of further assessment.

With respect to groundwater, the bedrock within the study area ranges from principal aquifer to Secondary B, as classified by the Environment Agency. The bedrock underlying the study area between Portishead and Pill is classified as a Secondary B aquifer with the superficial deposits (where they occur) classified as Secondary A and Secondary undifferentiated. There are no groundwater Source Protection Zones (SPZ) within the study area.

In terms of the operational impacts, some sections of watercourses will need to be diverted permanently and works may be required to improve watercourse crossings (for example, works on culverts). This could result in physical effects on water features. Both these physical effects and climate change could bring about changes in flood risk. Conversely, there may be opportunities for enhancement measures to existing features, the creation of water features or improved management of flood risk. There is also the potential for new drainage discharges to surface and groundwater which may contain railway-derived pollutants that may impact upon water quality. Measures are available to manage these discharges including, for example, the adoption of Sustainable Drainage Systems (SUDS).

Overall, it is envisaged that the **scheme will have slight adverse water environment 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. Transport has an increasing role to play in promoting active lifestyles. Individuals that walk and cycle frequently reduce the relative risk of all-cause mortality.

Rail travel quite often involves a walk or cycle at either end (or both) of the primary mode. This is particularly the case when good quality infrastructure is provided (safe and secure cycle parking and cycle hire or where parking is limited or expensive).

Encouraging physical activity can improve health and reduce short-term absenteeism from work resulting in improved productivity of the workforce. The increase in walking and cycling will also have longer-term benefits associated with the reduced mortality.

The scheme is, 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. As the scheme involves additional services on a mode currently unavailable, there are likely to be positive and negative impacts. Journey quality impacts can subdivided into three main categories:

3.8.3.1 Traveller Care

Given that new stations will be required, these will be built to modern standards and will conform to Equality Act, 2010. Toilet facilities and the provision of information will be as expected at a small urban railway stations.

The rolling stock will be an appropriate standard with adequate seating and storage space, adding to traveller comfort. Train journeys generally provide a smooth ride with forecasts currently not identifying overcrowding issues. Digital displays and public announcements will inform the traveller of destinations and delays.

3.8.3.2 Traveller Views

The reinstatement of the old railway line will provide travellers with unhindered views of the townscape and countryside previously not experienced on existing modes.

3.8.3.3 Traveller stress

Journey time reliability is achieved on railways due to 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 provides excellent route certainty with timetables accessible at stations and on the internet (on the move). This information is generally 'static' save for infrequent events such as engineering works.

3.8.3.4 Overview

The increase in rail use in the West of England 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, particularly at stations where large numbers of people converge and there is potential for personal. However, this will be covered in Section 3.8.5. For this reason, and relative to existing highway network options, the scheme is likely to have a **moderate beneficial impact to journey quality.**

3.8.4 Accidents

The new rail link would result in a reduction of vehicle-kms travelled on the highway network and therefore reduce the number of accidents. However, more traffic could be expected in the vicinity of the new stations which could result in more collisions, albeit less severe given the low speed environments.

Pedestrian safety is impacted by access and egress at the new railway stations. However, the design will take into account safe movement of pedestrians (and cyclists) to create a safe environment for all modes in this constrained area where activity will be high.

The new rail line will operate on a wholly segregated alignment and will not conflict with other modes. The scheme will be compliant with HMRI (Her Majesty's Rail Inspectorate) safety standards to ensure the highest possible operational safety so, in comparison to transport alternatives, it is envisaged to 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.

Although rail travel is generally more expensive than bus travel, depending on route length, it still has a financial benefit over car ownership when the true and full costs are taken into account. A bus service does already operate between Portishead and Bristol, diminishing the benefits of rail travel on affordability. However, compared to bus and car travel, the journey time savings by rail (Portishead to Bristol) are considerable. This can have 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 is 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 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 Somerset 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

Staffing (it is currently envisaged that Portishead station will be manned during the peak periods and Pill will be unmanned) and passenger help points will also be provided on trains to improve passenger security during the journey.

New rail stations will 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 is therefore envisaged to have a **neutral impact on security.**

3.8.7 Access to services

Individuals without access to a car are reliant on public transport, walking and cycling to access jobs, services, education and health. Outside major cities, many services are not available within acceptable walking and cycling distance and, in the absence of good quality public transport, people can be classified as 'transport excluded'. This can lead to social exclusion.

From Portishead, there is a large amount of out-commuting to nearby centres, particularly Bristol, for work. There is only one main road (A369) out of Portishead, linking to the M5 at junction 19. At peak times, the A369, M5 junction 19, and the Bristol end of the A369 all become very congested.

A frequent, reliable and fast train service between Portishead and Bristol would provide access to jobs and services on offer in the city. This would be particularly beneficial to those that need to access jobs and education but cannot afford personal transport, particularly young and deprived people. Although train travel is expensive, relative to other public transport modes, season tickets are often cheaper than running a car (with all told expenses) or for those who only travel occasionally.

Reopening the Portishead line would connect Portishead's 27,000 residents to the railway network and open up more opportunities to access jobs and services. These improvements would also benefit Pill village and its surroundings. This major improvement to the transport network, which would offer a genuine alternative, is likely to have a **moderate beneficial impact to accessibility.**

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.

The disused railway line from Pill to Portishead has been well protected since it closed in 1964. As such, no registered public footpaths, bridleways or byways cross the railway on the level, according to North Somerset Council's definitive map.

Moor Lane at Portishead is regarded as a byway on railway records and previously served the council's tip. Rights to the crossing are held by the Corporation of Bristol. The Drove at Portbury is being claimed as a byway by a rights of way group. The claim is contested by North Somerset Council.

Several private rights of way exist over this railway; some appear to be severed due to adjacent housing or port developments. From examination of records, three occupation crossings are considered active:

- Elm Tree Farm access negotiations are ongoing between North Somerset Council and the land owner, with a view to closing the crossing and providing alternative access via the A369.
- Sheepway Gate Farm access negotiations are ongoing between North Somerset Council and the land owners, with alternative access arrangements being proposed.
- Lodway Farm access negotiations are to be progressed by both Network Rail and North Somerset Council to pursue deeds of release so that the occupational crossing can be closed.

In addition to the authorised level crossings, there have been a number of instances of trespass. Shortcuts have been created across the railway line, one (now) permissive and one informal. It will be necessary to close these crossings but, as one provides direct pedestrian access to Trinity Anglican Primary School, a fully accessible bridge is planned. The informal route at Moor Lane – formerly an access road - is unsurfaced, not fully accessible, bounded by vegetation and with poor natural surveillance. It appears to be used mainly by dog walkers. Due to a recent housing development, it is not possible to install a fully compliant DDA footbridge at this location. Therefore, the intention is to provide a crossing close to the Trinity Anglican School access point (between Tansy Lane and Galingale Way) to cater for the majority of movements.

Since the closure of the Portishead line, new development (Portishead Vale and Village Quarter) has been built with an access road across the railway (Quays Avenue). The Office of Rail Regulation ORR policy position is that they do not favour new level crossings, due to safety reasons. In 2013, North Somerset Council sought specific advice from the ORR as to whether a level crossing would be acceptable at Quays Avenue. The response was *"…the risk arising from a new level crossing would be high, even at the train speeds prevailing 450 metres from the terminal. ORR would not authorise a new crossing at this point.*" Subsequently, the ORR have stated they will consider a level crossing if a case can be made for exceptional circumstances, under ten criteria. The project team will compile a submission to the ORR for exceptional circumstances during the early stages of preparation of the Outline Business Case.

The remainder of the line from Bristol to Royal Portbury Dock is an existing active railway line used for freight.

Due to the strict controls on movement on and across the railway line within the scheme area, the impacts of severance will be limited. However, it is envisaged one informal pedestrian route would be closed, causing inconvenience for a small number of people. For this reason, the scheme is likely to have a **slight adverse impact on severance.**

3.8.9 Option Values

As the appraised scheme will introduce passenger train services to an area not currently served by this mode, option and non-use option values should be accounted for. The scheme will substantially change the availability of transport services in the study area.

The reopened railway line will provide certainty to travel options when other (or usual) modes are not available. It has been predicted that the scheme will connect approximately 35,000 additional people to the railway network.

Although a full assessment has not been undertaken, given the number of people that could possibly benefit from the scheme, regardless of any possible future use, the option and non-use values are likely to have a **large beneficial impact**. 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

Information about the distribution of different social groups are set out in Figures 3.2 – 3.10.

Figure 3.2 – Population under 16

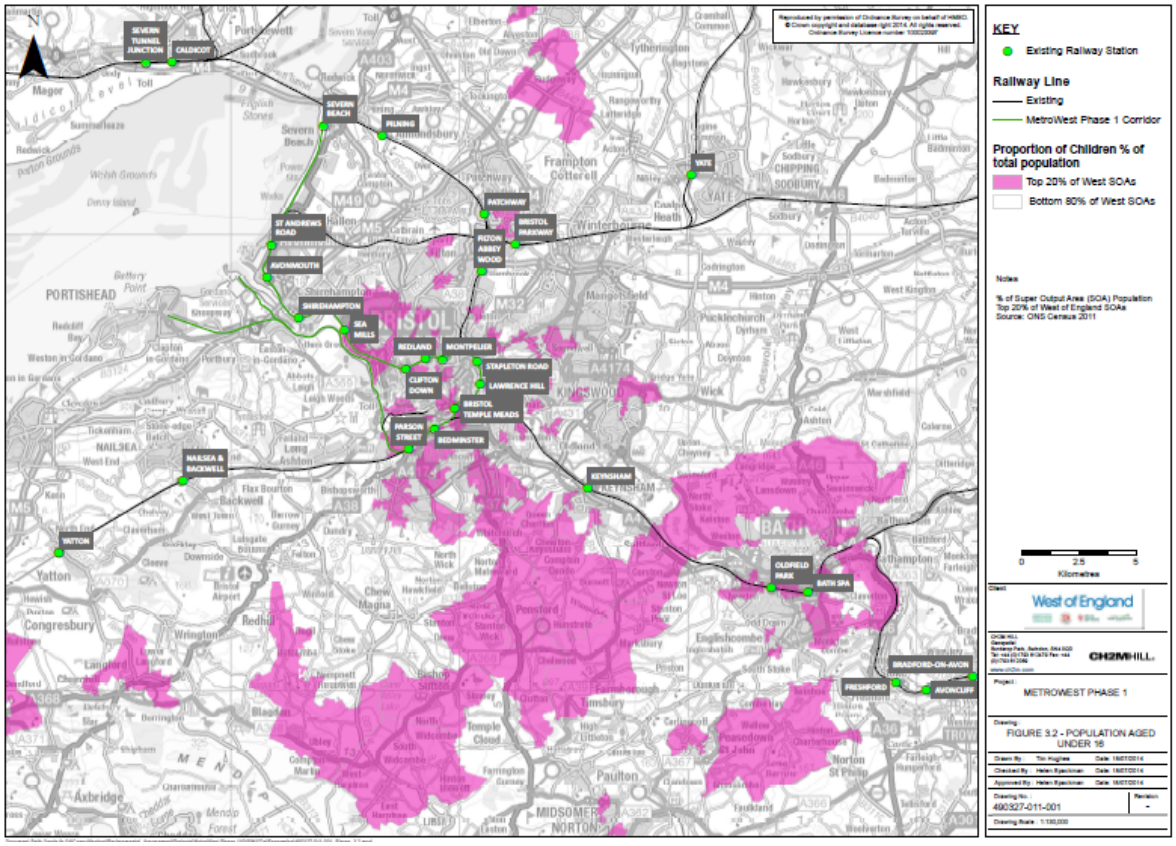


Figure 3.3 – Population 16-25

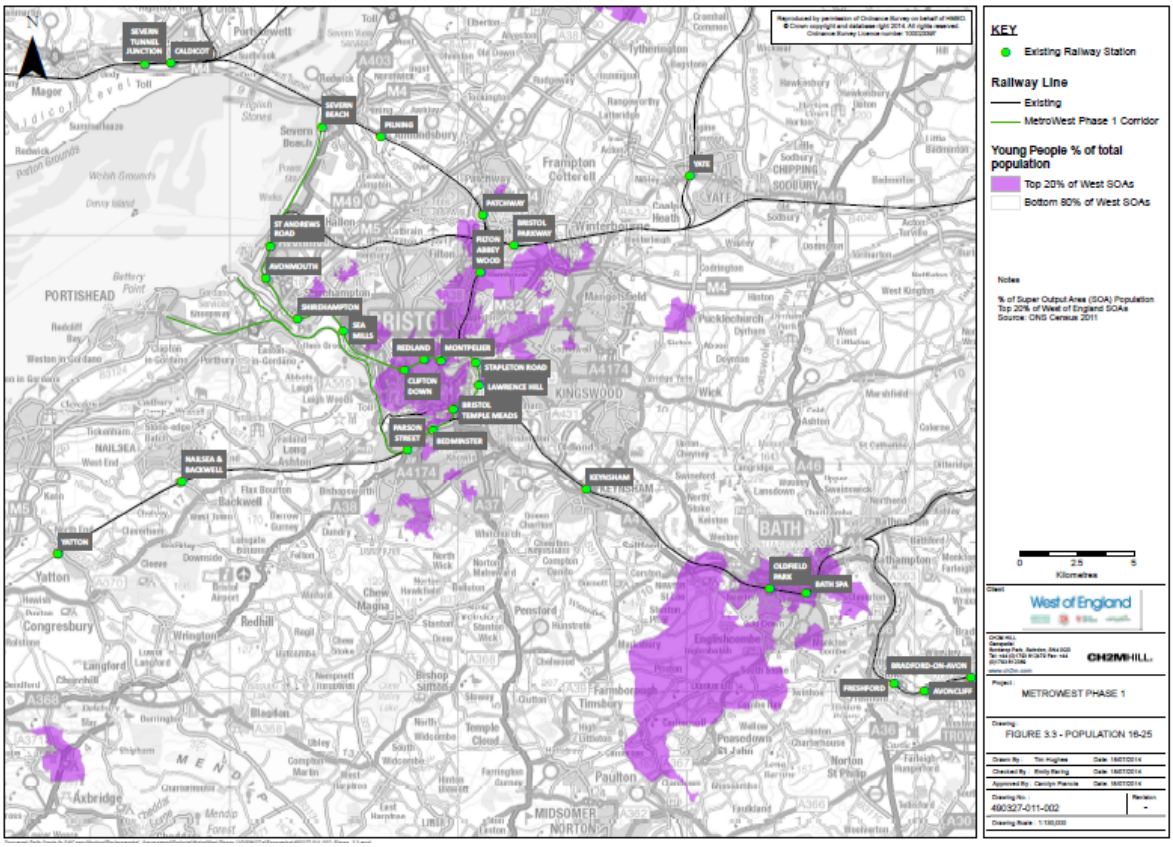


Figure 3.4 – Population over 70

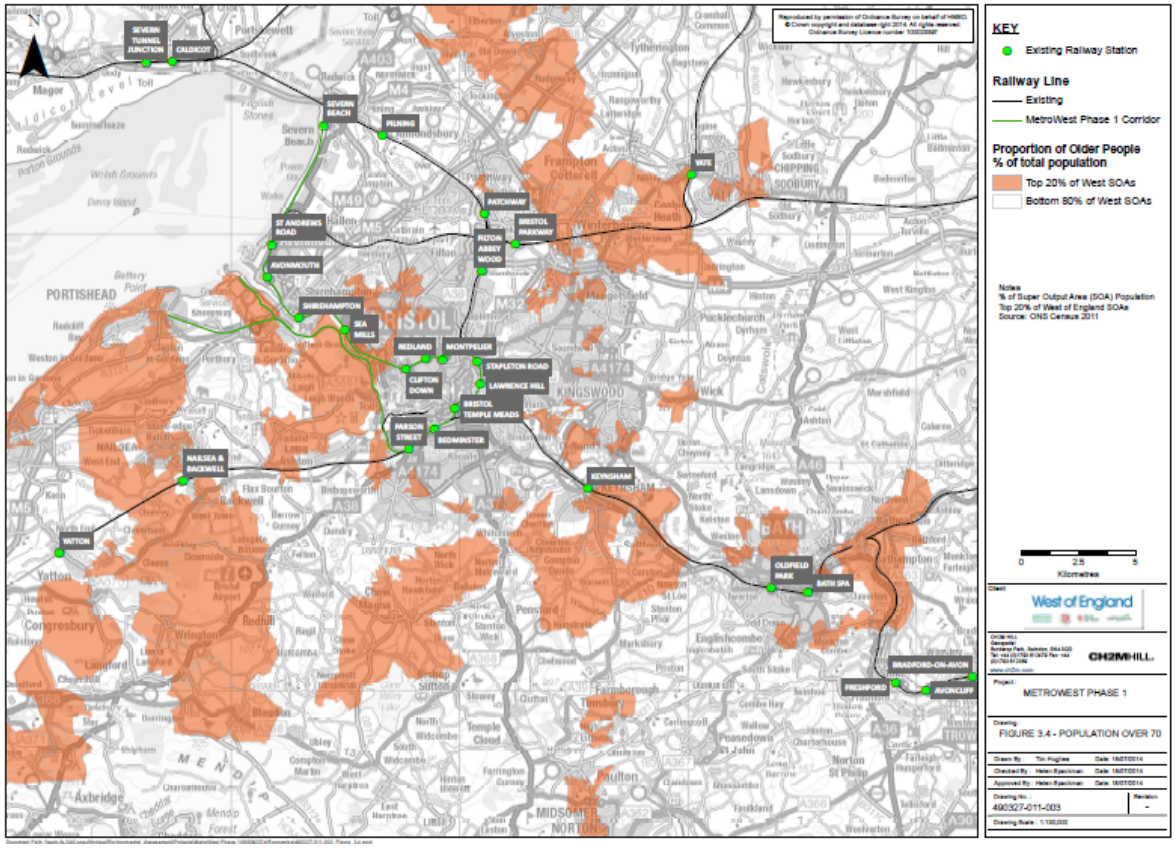


Figure 3.5 – Population claiming Disability Living Allowance

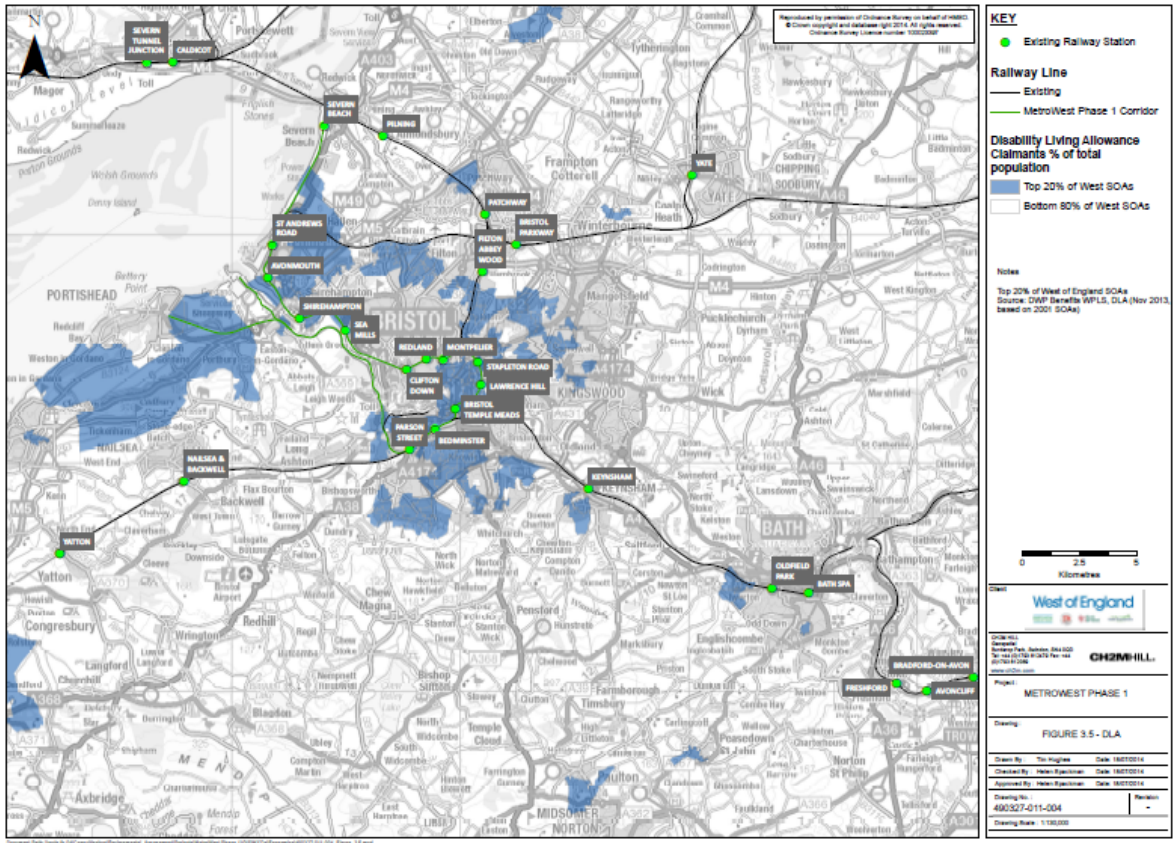


Figure 3.6 – Population claiming Job Seekers Allowance

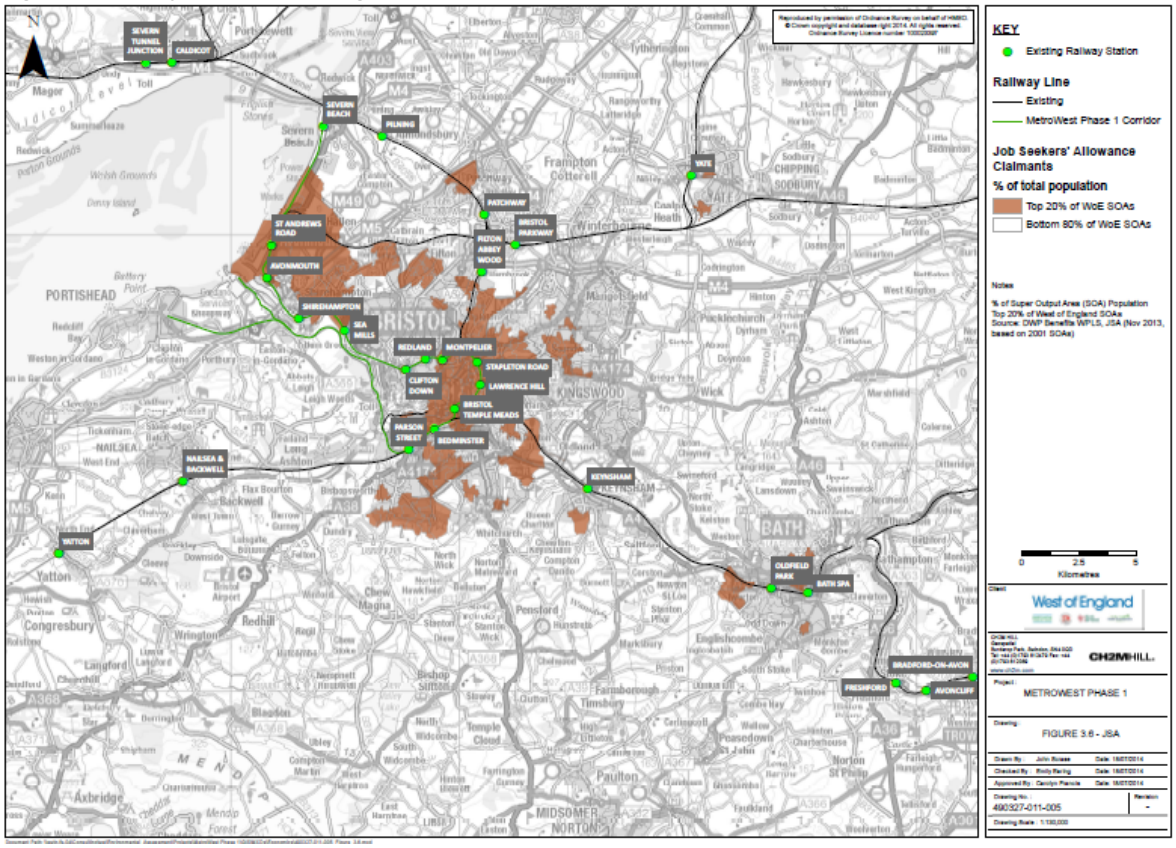


Figure 3.7 – Black & Minority Ethnic Population

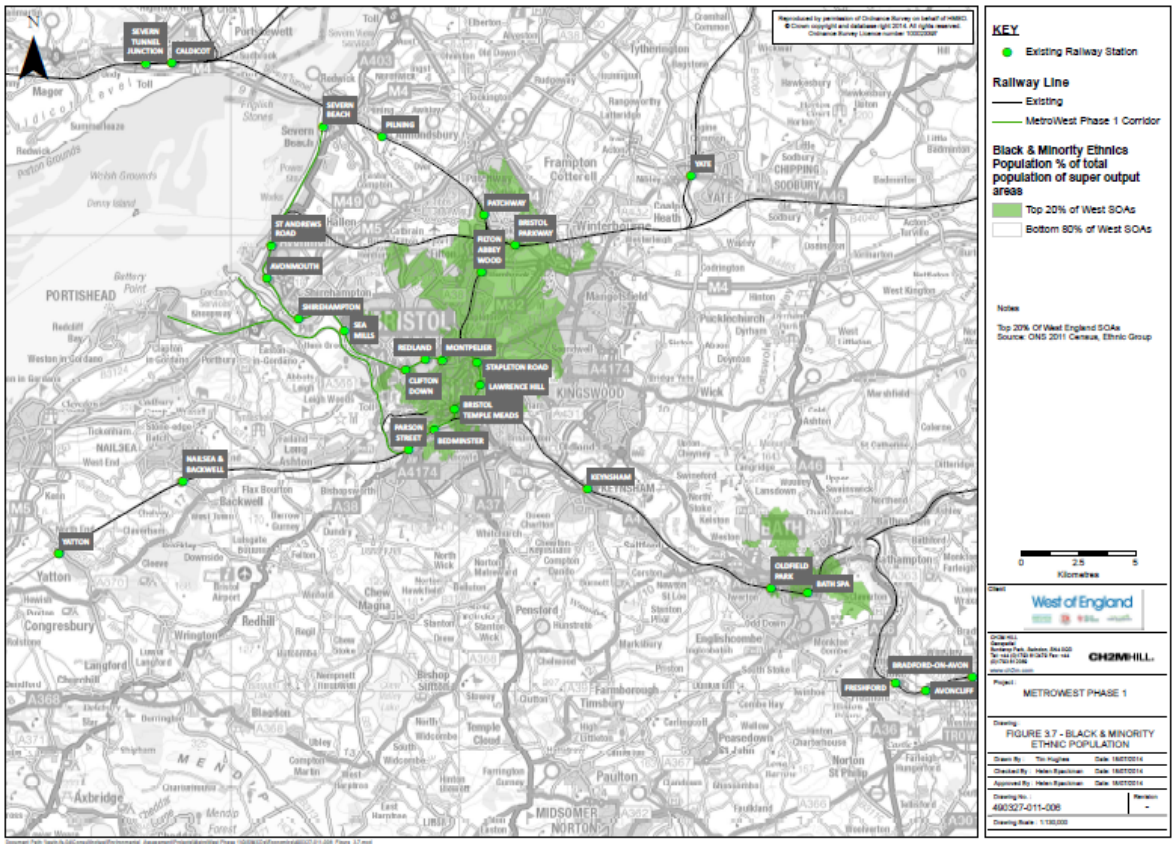


Figure 3.8 Households with no car

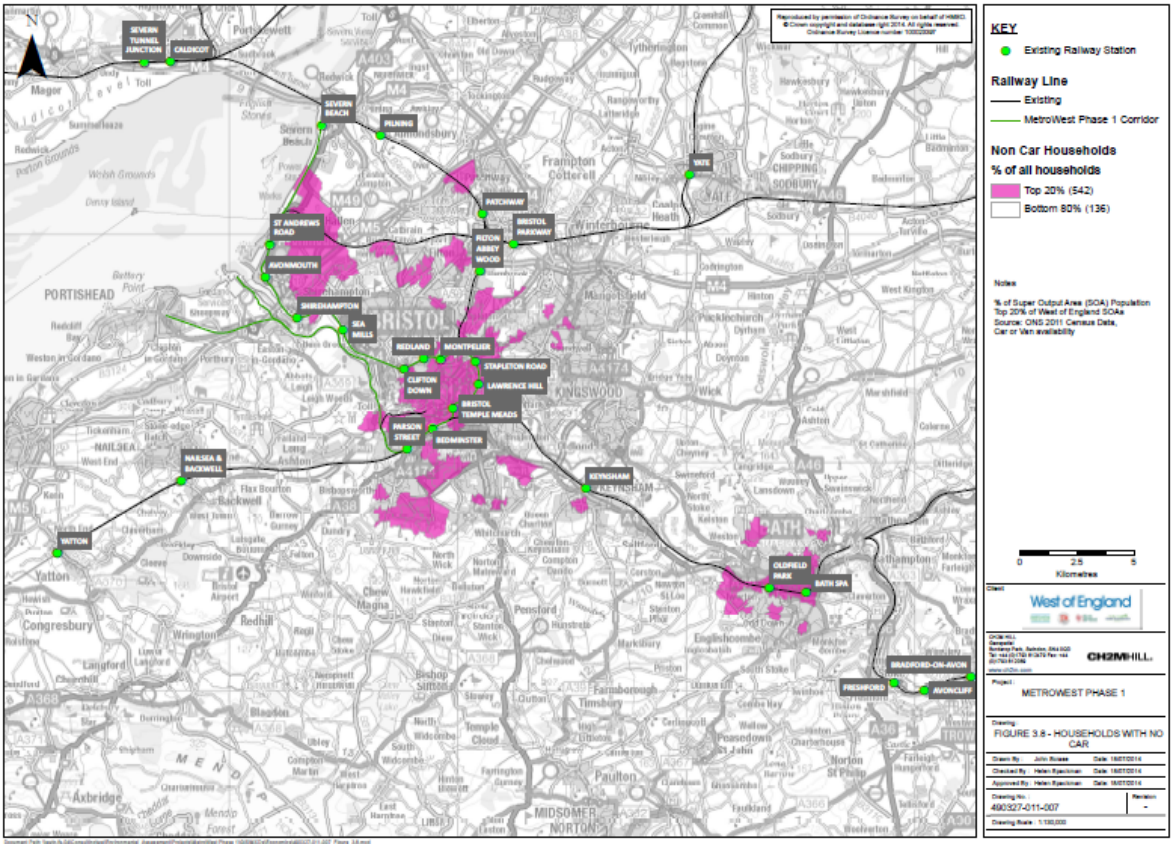


Figure 3.9 - Index of Income deprivation

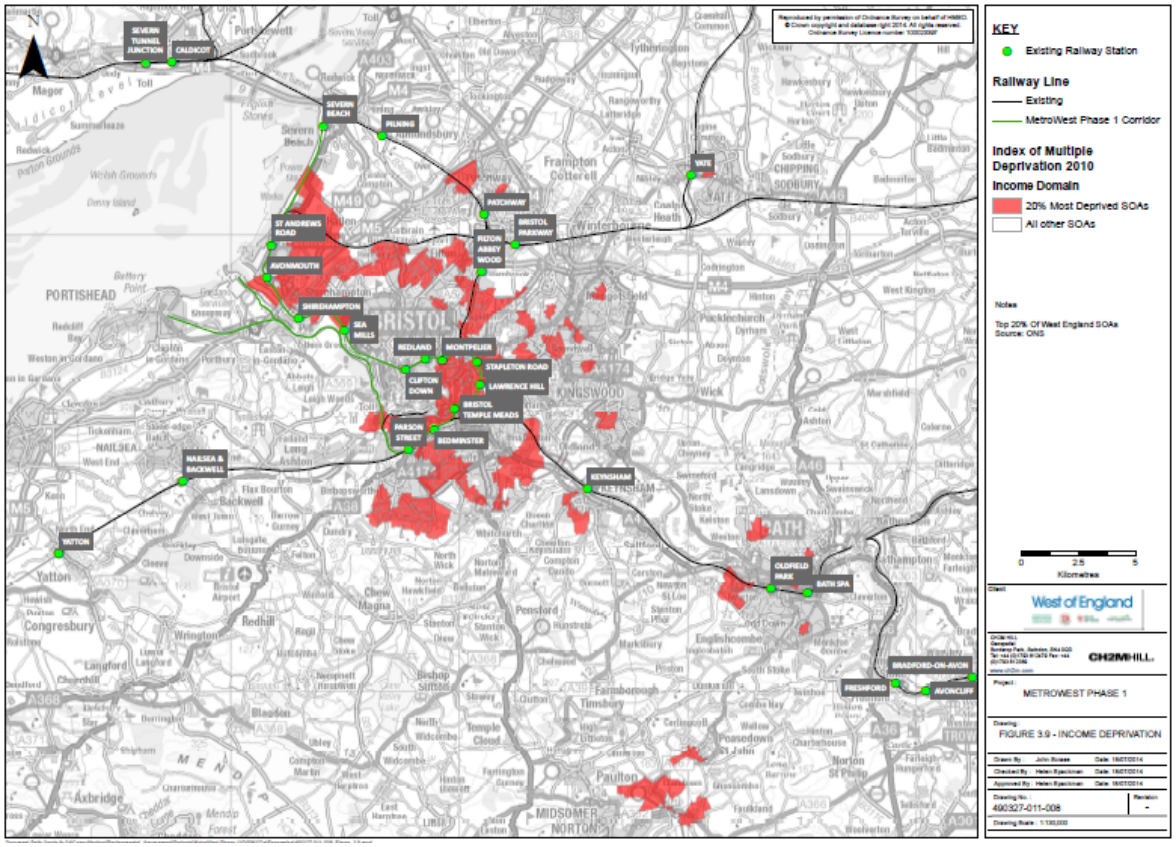
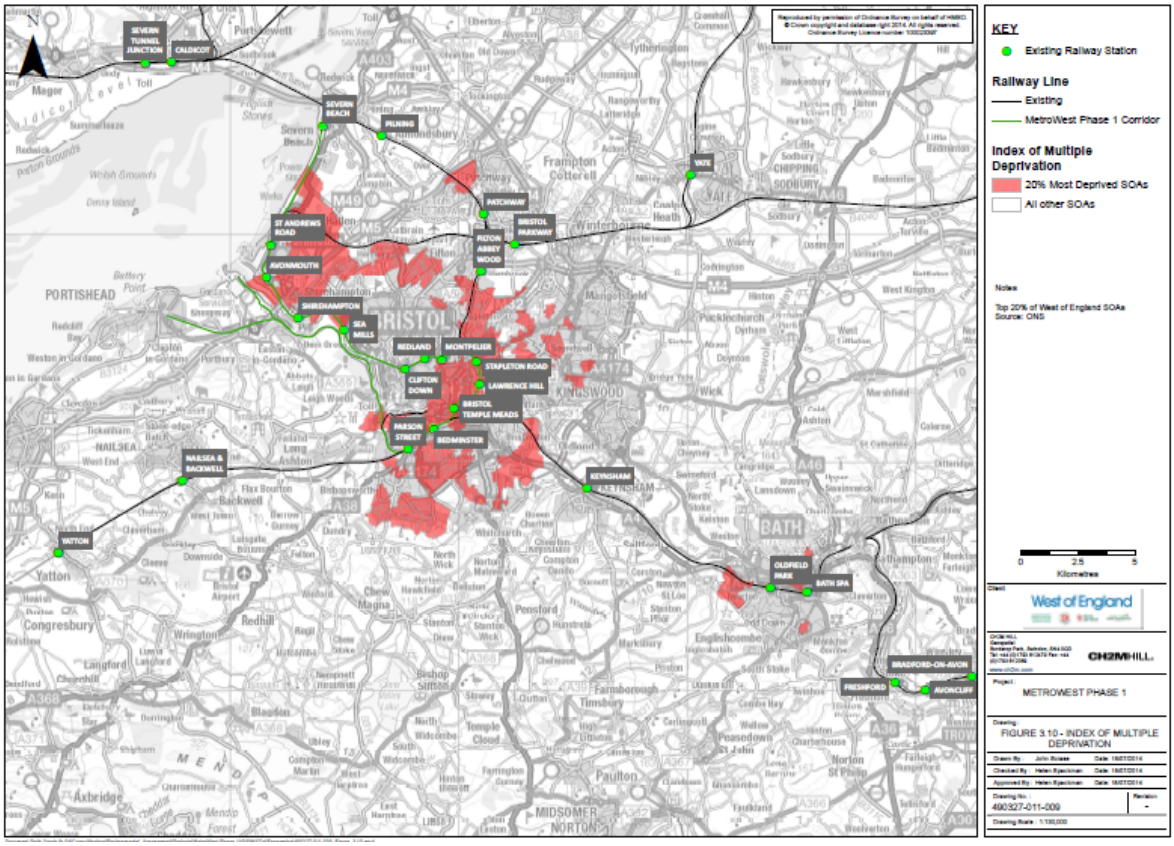


Figure 3.10 – Index of Multiple Deprivation



Distributional impacts (DIs) consider the impact of transport interventions across different social groups. The following categories will be assessed: User Benefits; Noise; Air Quality; Accidents; Security; Accessibility; Affordability; and Severance.

At this early stage only an 'intuitive' account of impacts have been established. Of the above criteria, the Preliminary Business Case work indicates the following impacts:

- User Benefits - Large beneficial impact
- Noise - Moderate adverse impact
- Air Quality – Neutral or slight beneficial impact
- Accidents - Slight beneficial impact
- Security - Neutral impact
- Accessibility - Moderate beneficial impact
- Affordability – Slight beneficial impact
- Severance – Slight adverse impact

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 distribution
- Noise – Effected social group(s) are income distribution and children under 16
- Accessibility - Moderate beneficial impact – Effected social group(s) are income distribution, 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

3.9 Public Accounts impacts

3.9.1 Broad Transport Budget

Table 3.6 shows the Public Accounts (PA) tables.

TABLE 3.6

Public Accounts (PA) table Scenario 4: Option 6b, 7 train sets (all values are presented in 2010 market prices)

	All Modes Total	Road Infrastructure	Bus & Coach	Rail
Local Government funding				
Revenue	0			
Operating costs	0			
Investment costs*	0			
Grant/subsidy: Public funds - local government	49,007,239			49,007,239
Revenue transfer	0			
Net (7)	**49,007,239**	0	0	49,007,239
General Government funding: transport				
Revenue	0			
Operating costs	0			
Investment costs*	8,251,650			8,251,650
Grant/subsidy: CP5 Settlement	0			0
Revenue transfer (100% to government)	-121,748,346			-121,748,346
Opcost transfer (100% to government)	170,622,970			170,622,970
Infrastructure cost savings	-454,848	-454,848		
Net (8)	**56,671,427**	-454,848	0	57,126,275
General Government funding: non-transport				
Indirect Tax Revenues (9)	**4,215,000**	4,215,000		0
Totals				
Broad transport budget (10=7+8)	**105,678,666**	* These costs exclude developer contributions		
Wider public finances (11=9)	**4,215,000**			

Public Accounts (PA) table Scenario 5: Option 5b enhanced, 6 train sets (all values are presented in 2010 market prices)

Table 2 Public Accounts (costs should be recorded as a positive number, surpluses as a negative one)	All Modes Total	Road Infrastructure	Bus & Coach	Rail
Local Government funding				
Revenue	0			
Operating costs	0			
Investment costs*	0			
Grant/subsidy: Public funds - local government	49,007,239			49,007,239
Revenue transfer	0			
Net (7)	**49,007,239**	0	0	49,007,239
General Government funding: transport				
Revenue	0			
Operating costs	0			
Investment costs*	8,251,650			8,251,650
Grant/subsidy: CP5 Settlement	0			0
Revenue transfer (100% to government)	-156,893,627			-156,893,627
Opcost transfer (100% to government)	147,613,634			147,613,634
Infrastructure cost savings	-517,753	-517,753		
Net (8)	**-1,546,095**	-517,753	0	-1,028,343
General Government funding: non-transport				
Indirect Tax Revenues (9)	**4,215,000**	4,215,000		0
Totals				
Broad transport budget (10=7+8)	**47,461,144**	* These costs exclude developer contributions		
Wider public finances (11=9)	**4,215,000**			

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 WebTAG and are presented in the Public Accounts tables in Table 3.6.

3.10 Performance of option variants

Table 3.7 provides an overview of the economic performance of all the scheme options, which are:

- Scenario 1: Option 5b with 6 train sets[6]
- Scenario 2: Option 5b with 7 train sets [7]
- Scenario 3: Option 6b with 6 train sets
- Scenario 4: Option 6b with 7 train sets
- Scenario 5: Option 5b enhanced with 6 train sets
- Scenario 6: Option 5b enhanced with 7 train sets
- Scenario 7: Option 6b enhanced with 6 train sets
- Scenario 8: Option 6b enhanced with 7 train sets

[6] An additional 4 train sets to the 2 train sets used to provide current services on the Severn Beach line, ditto subsequent options

[7] An additional 5 train sets to the 2 train sets used to provide current services on the Severn Beach line, ditto subsequent options

TABLE 3.7
Overview of economic performance of all scheme options

Indicator	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8
Assessment without Wider Economic Benefits								
PVB	225.60	225.60	188.44	188.44	231.78	231.78	193.85	193.85
PVC	48.43	71.65	82.46	105.68	47.46	70.68	82.23	105.45
NPV	177.17	153.95	105.98	82.76	184.32	161.10	111.62	88.40
BCR	4.66	3.15	2.29	1.78	4.88	3.28	2.36	1.84
Assessment with Wider Economic Benefits								
PVB	278.12	278.12	240.70	240.70	284.49	284.49	246.30	246.30
PVC	48.43	71.65	82.46	105.68	47.46	70.68	82.23	105.45
NPV	229.69	206.47	158.24	135.02	237.03	213.81	164.07	140.85
BCR	5.74	3.88	2.92	2.28	5.99	4.03	3.00	2.34

Note:

Details of the calculation of Wider Economic Benefits are set out in Section 3.6.3

The best performing scenario in terms of economic performance is scenario 5 (Option 5b enhanced). This has a BCR of 4.88 and NPV of £184.32 million. The worst performing scenario in terms of economic performance is scenario 4 (Option 6b). This has a BCR of 1.78 and NPV of £82.76 million. With WEBs included, the BCR for scenario 5 increases to 5.99.

3.11 Summary of impacts

3.11.1 Value for Money Statement

Table 3.8 sets out the Value for Money Statement for the MetroWest Phase 1 scheme.

TABLE 3.8
Value for Money Statement

Criteria	**MetroWest Phase 1**
Value for Money	Scenario 4: Option 6b with 7 train sets offers Medium Value for Money Scenario 5: Option 5b enhanced with 6 train sets offers High Value for Money
NPV	Scenario 4: Option 6b with 7 train sets has a NPV of £83m Scenario 5: Option 5b enhanced with 6 train sets has a NPV of £184m
Initial BCR	Scenario 4: Option 6b with 7 train sets has an initial BCR of 1.78 Scenario 5: Option 5b enhanced with 6 train sets an initial BCR of 4.88
Adjusted BCR (With WEBs)	Scenario 4: Option 6b with 7 train sets has an adjusted BCR of 2.28 Scenario 5: Option 5b enhanced with 6 train sets an adjusted BCR of 5.99
Summary of the benefits and costs	Benefits • Rail transport user benefits (around 70% of the total benefits) • Highway transport user benefits • Wider Economic Benefits • Other benefits The most significant project costs driving the economic case are the operating costs.
Significant non-monetised impacts	Option values

TABLE 3.8
Value for Money Statement

Criteria	MetroWest Phase 1
Key risks, sensitivities and uncertainties underlying the appraisal	• Operation costs assumptions, in particular the limited knowledge at present for the scope for synergies with the existing services in providing staffing and maintenance (expected to reduce 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 is currently being revalidated and GBATS4 will be used for the Outline Business Case)
Significant social or distributional impacts	Not assessed

In summary, the modelling and appraisal work undertaken for the economic case shows that the best performing scheme options offer very high value for money. The assessment work has highlighted that the case is sensitive to the assumptions associated with the operational costs and revenues. The work undertaken to support the Outline Business Case will enable these assumptions to be refined.

3.11.2 Analysis of Monetised Costs and Benefits (AMCB) Tables

Table 3.9 shows the analysis of Monetised Costs and Benefits (AMCB) Tables

TABLE 3.9

AMCB Table: Scenario 4: Option 6b, 7 train sets (all values are presented in 2010 market prices)

Noise	0	
Local air quality	0	
Greenhouse gases	1,453,500	
Journey ambience (inc. station amenity and crowding benefits)	0	
Accidents (incl. safety)	5,551,727	
Consumer users (sub-total 1a+1b, Table 1)	168,983,204	
Business users and providers (sub-total 5, Table 1)	16,669,959	
Reliability (including performance)	0	
Option values	0	
Wider public finances (indirect taxation revenues) (sub-total 11)	-4,215,000	Sign changed from Table 2
PV of Benefits (a = sum of all benefits)	**188,443,390**	
Broad transport budget (sub-total 10)	**105,678,666**	From Table 2
PV of Costs (b = 10)	**105,678,666**	
Overall impacts		
NPV (a-b)	**82,764,724**	
BCR (a/b)	**1.78**	

AMCB Table: Scenario 5: Option 5b enhanced, 6 train sets (all values are presented in 2010 market prices)

Noise	0	
Local air quality	0	
Greenhouse gases	1,453,500	
Journey ambience (inc. station amenity and crowding benefits)	0	
Accidents (incl. safety)	6,319,522	
Consumer users (sub-total 1a+1b, Table 1)	208,488,357	
Business users and providers (sub-total 5, Table 1)	19,735,583	
Reliability (including performance)	0	
Option values	0	
Wider public finances (indirect taxation revenues) (sub-total 11)	-4,215,000	Sign changed from Table 2
PV of Benefits (a = sum of all benefits)	**231,781,961**	
Broad transport budget (sub-total 10)	**47,461,144**	From Table 2
PV of Costs (b = 10)	**47,461,144**	
Overall impacts		
NPV (a-b)	**184,320,817**	
BCR (a/b)	**4.88**	

3.11.3 Appraisal Summary Table (AST)

The ASTs for Scenarios 4 and 5 are shown in Table 3.10.

TABLE 3.10

Appraisal Summary Table		Date produced:	03/09/2014	Contact:	
Name of scheme:	MetroWest Phase 1 - Option 6b (7 Train Sets)			Name	James Willcock
Description of scheme:	MetroWest Phase 1 provides half-hourly local service for the Severn Beach line, Bath to Bristol line and a reopened Portishead line with stations at Portishead and Pill			Organisation	NSC
				Role	Project Manager

Impacts		Summary of key impacts	Assessment					
			Quantitative			Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp
Economy	Business users & transport providers	Journey time savings are significant in georgraphical areas where impacts from the proposed scheme are anticipated. This covers savings for public transport users as a result of the new station at Portishead and frequency improvement, and for highway users as a result of decongestion in the highway network where modal shift to rail occurs.	Value of journey time changes(£)			Large Benefiical	£16,669,959	Not assessed
			Net journey time changes (£)					
			0 to 2min	2 to 5min	> 5min			
			£7,942,750 highway only, PT not available	-£17,750 highway only, PT not available	-£3,000 highway only, PT not available			
	Reliability impact on Business users	The reduction in congestion in the highway network will result in imrpoved journey time reliability.	Not assessed			Likely to be Slight Beneficial	Not assessed	
	Regeneration	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 J21 Enterprise Area (Weston-super-Mare and Avonmouth Severnside Enterprise Area.	Not assessed			Moderate Benefical	Not assessed	
	Wider Impacts	The scheme improves productivity of local economy through improving transport provision, bringing businesses closer to each other and to the labour market.				Large Benefiical	£52,257,887	
Environmental	Noise	Some dwellings in Portishead will be exposed to higher noise levels due to the opening of the railway line. Dwellings in Pill will be subject to an increase in noise although these are already exposed to noise from rail traffic. Some hours of the night-time period will be subjected to an increase in noise level.	Not assessed			Likely to be 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 neutral or	Not assessed	Not assessed
	Greenhouse gases	The operational phase of the scheme has the potential to affect carbon due to a modal shift from road vehicles to rail, leading to a change in vehicle journeys and traffic distribution on the road network. The scheme would be expected to lead to an overall reduction in vehicular emissions of carbon. There will also be emissions associated with the Portishead to Pill line and the increased services along the Portbury freight line, Severn Beach and Bristol to Bath Spa, if diesel locomotives are introduced.	Change in non-traded carbon over 60y (CO2e)		-30731	Likely to be Beneficial	£1,453,500	
			Change in traded carbon over 60y (CO2e)		-118			
	Landscape	Loss of existing vegetation which cannot be replaced, impacts during construction with large scale machinery (some in close proximity to visual receptors. Opportunity for enhancement with good quality design of new stations.	Not applicable			Likely to be Moderate Adverse	Not applicable	
	Townscape	It is not appropriate to consider the impact on townscape at this stage as the station locations or designs have not been established. However, it is envisaged that the design of the station and surrounding public realm would have a positive or neutral impact on the townscape.	Not applicable			Not assessed	Not applicable	
	Historic Environment	Removal of old, derelict but historic railway infrastructure. Possible effects on the setting of listed buildings within the visual envelope of the scheme. The proposed new station at Portishead might also have an adverse effect on unknown buried archaeology. However, the reinstatement of an historic railway line to its original purpose can be seen as a beneficial effect	Not applicable			Neutral	Not applicable	
	Biodiversity	Any works within or adajcent to designated sites will incorporate appropriate mitigation measures in consultation with relevant bodies (e.g Natural England). Impacts to protected species (such as bats and water vole) will be mitigated in accordance with legal requirements. There will be some loss of habitat and potential reduction in the value of the wildlife coridor function currently provided by the disused railway line (Portishead to Pill).	Not applicable			Likely to be Slight adverse	Not applicable	
	Water Environment	There is potential for drainage from the railway to impact on water quality in some tributaries of the River Avon and other small water courses, however with mitigation (such as the use of SUDS) these are likely to represent neutral to slight adverse impact. The construction of the railway may lead to permanent alteration of water courses, including (for example) new or revised culverts and other water crossings. These may impact on flood risk both to and from the railway. A Flood Risk Assessment is yet to be carried out, subject to recomendations of the Environment Agency, though pending the results of this flood risk assessment, impacts are likely to be neutral or slight adverse.	Not applicable			Likely to be Slight Adverse	Not applicable	
Social	Commuting and Other users	The scheme reduces travel time for travellers by public transport and also brings noticeable benefits to highway users as a result of decongestion attributed to modal shift from highway to rail.	Value of journey time changes(£)			Large Benefiical	£168,983,204	Not assessed
			Net journey time changes (£)					
			0 to 2min	2 to 5min	> 5min			
			£8,797,750 highway only, PT not available	-£7,500 highway only, PT not available	-£15,000 highway only, PT not available			
	Reliability impact on Commuting and Other users	The reduction in congestion in the highway network will result in imrpoved 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	Enhancement to journey quality by improving Traveller Care, Stress and Views whilst also having a positive impact on car users, as the highway network will be less congested so journeys will be less stressful. The main disbenefits to journey quality could be said to affect security, in particular, at stations where large numbers of people converge and the potential exists for personal theft etc.	Not applicable			Likely to be Moderate Beneficial	Not assessd	
	Accidents	The new rail link would result in a reduction of vehicles-kms travelled on the highway network and therefore reduce the number of accidents. However, more traffic could be expected in the vicinity of the new stations which could result in more collisions, albeit less severe given the low speed environments. For this reason, the benefits outweigh the disbenefits	Proportion of user benefits assumed			Likely to be Slight Beneficial	£5,551,727	Not assessed
	Security	Although the addition of rail stations can enhance security of an area by providing formal and natural surveillance these benefits are tempered by the reality that rail stations can also attract criminality regardless of the measures to prevent this.	Not applicable			Likely to be Neutral	Not applicable	Not assessed
	Access to services	This major improvement to the transport network in the West of England could connect an additional 35,000 people to the railway network, helping to provide access to jobs, education and health by providing real transport choice.	Not assessed			Likely to be Moderate Beneficial	Not applicable	Not assessed
	Affordability	In comparison to car ownership, rail travel has the potential to make mobility more affordable particular for those who only travel (longer distances) occasionally or outside of peak times with advanced tickets. Coupled with value attached to time, the scheme has the potential to make travelling more affordable. However, an existing bus service operates between Portishead and Bristol so these gains could potentially be marginal.	Not applicable			Likely to be Slight Beneficial	Not applicable	Not assessed
	Severance	Although no registered public rights of way (PROW) exist on the Portishead to Pill line, three private rights of way are active. Negotiations are ongoing to provide alternatives. There are a three 'informal' access points across the railway; two will need to be closed and one replaced by a fully accessible bridge. The closure of the two routes only impacts on an estimated small number of people with the most popular and well used route being replaced. For this reason the disbenefits will be limited.	Not applicable			Likely to be Slight Adverse	Not applicable	Not assessed
	Option and non-use values	As the appraised scheme will introduce passenger train services to an area not currently served by this mode. Given the level of growth in Portishead and Pill, approximately 35,000 will be connected to the railway network by 2026 improving the option and non-option values.	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.					-£105,678,666	
	Indirect Tax Revenues	The impact on tax and fuel duty loss as a result of reduction in fuel consumption					-£4,215,000	

Appraisal Summary Table		Date produced:	03/09/2014	Contact:	
Name of scheme:	MetroWest Phase 1 - Option 5b Enhanced (6 Train Sets)			Name	James Willcock
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				Role	Project Manager

Impacts		Summary of key impacts	Assessment				
			Quantitative			Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp
Economy	Business users & transport providers	Journey time savings are significant in georgraphical areas where impacts from the proposed scheme are anticipated. This covers savings for public transport users as a result of the new station at Portishead and frequency improvement, and for highway users as a result of decongestion in the highway network where modal shift to rail occurs.	Value of journey time changes(£)			Large Benefiial	£19,735,583	Not assessed
			Net journey time changes (£)					
			0 to 2min	2 to 5min	> 5min			
			£7,942,750 highway only, PT not available	-£17,750 highway only, PT not available	-£3,000 highway only, PT not available			
	Reliability impact on Business users	The reduction in congestion in the highway network will result in imrpoved journey time reliability.	Not assessed			Likely to be Slight Beneficial	Not assessed	
	Regeneration	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 J21 Enterprise Area (Weston-super-Mare and Avonmouth Severnside Enterprise Area.	Not assessed			Moderate Benefical	Not assessed	
	Wider Impacts	The scheme improves productivity of local economy through improving transport provision, bringing businesses closer to each other and to the labour market.				Large Benefiial	£52,713,115	
Environmental	Noise	Some dwellings in Portishead will be exposed to higher noise levels due to the opening of the railway line. Dwellings in Pill will be subject to an increase in noise although these are already exposed to noise from rail traffic. Some hours of the night-time period will be subjected to an increase in noise level.	Not assessed			Likely to be 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 neutral or	Not assessed	Not assessed
	Greenhouse gases	The operational phase of the scheme has the potential to affect carbon due to a modal shift from road vehicles to rail, leading to a change in vehicle journeys and traffic distribution on the road network. The scheme would be expected to lead to an overall reduction in vehicular emissions of carbon. There will also be emissions associated with the Portishead to Pill line and the increased services along the Portbury freight line, Severn Beach and Bristol to Bath Spa, if diesel locomotives are introduced.	Change in non-traded carbon over 60y (CO2e)		-30731	Likely to be Beneficial	£1,453,500	
			Change in traded carbon over 60y (CO2e)		-118			
	Landscape	Loss of existing vegetation which cannot be replaced, impacts during construction with large scale machinery (some in close proximity to visual receptors. Opportunity for enhancement with good quality design of new stations.	Not applicable			Likely to be Moderate Adverse	Not applicable	
	Townscape	It is not appropriate to consider the impact on townscape at this stage as the station locations or designs have not been established. However, it is envisaged that the design of the station and surrounding public realm would have a positive or neutral impact on the townscape.	Not applicable			Not assessed	Not applicable	
	Historic Environment	Removal of old, derelict but historic railway infrastructure. Possible effects on the setting of listed buildings within the visual envelope of the scheme. The proposed new station at Portishead might also have an adverse effect on unknown buried archaeology. However, the reinstatement of an historic railway line to its original purpose can be seen as a beneficial effect	Not applicable			Neutral	Not applicable	
	Biodiversity	Any works within or adajcent to designated sites will incorporate appropriate mitigation measures in consultation with relevant bodies (e.g Natural England). Impacts to protected species (such as bats and water vole) will be mitigated in accordance with legal requirements. There will be some loss of habitat and potential reduction in the value of the wildlife coridor function currently provided by the disused railway line (Portishead to Pill).	Not applicable			Likely to be Slight adverse	Not applicable	
	Water Environment	There is potential for drainage from the railway to impact on water quality in some tributaries of the River Avon and other small water courses, however with mitigation (such as the use of SUDS) these are likely to represent neutral to slight adverse impact. The construction of the railway may lead to permanent alteration of water courses, including (for example) new or revised culverts and other water crossings. These may impact on flood risk both to and from the railway. A Flood Risk Assessment is yet to be carried out, subject to recomendations of the Environment Agency, though pending the results of this flood risk assessment, impacts are likely to be neutral or slight adverse.	Not applicable			Likely to be Slight Adverse	Not applicable	
Social	Commuting and Other users	The scheme reduces travel time for travellers by public transport and also brings noticeable benefits to highway users as a result of decongestion attributed to modal shift from highway to rail.	Value of journey time changes(£)			Large Benefiial	£208,488,357	Not assessed
			Net journey time changes (£)					
			0 to 2min	2 to 5min	> 5min			
			£8,797,750 highway only, PT not available	-£7,500 highway only, PT not available	-£15,000 highway only, PT not available			
	Reliability impact on Commuting and Other users	The reduction in congestion in the highway network will result in imrpoved 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	Enhancement to journey quality by improving Traveller Care, Stress and Views whilst also having a positive impact on car users, as the highway network will be less congested so journeys will be less stressful. The main disbenefits to journey quality could be said to affect security, in particular, at stations where large numbers of people converge and the potential exists for personal theft etc.	Not applicable			Likely to be Moderate Beneficial	Not assessd	
	Accidents	The new rail link would result in a reduction of vehicles-kms travelled on the highway network and therefore reduce the number of accidents. However, more traffic could be expected in the vicinity of the new stations which could result in more collisions, albeit less severe given the low speed environments. For this reason, the benefits outweigh the disbenefits	Proportion of user benefits assumed			Likely to be Slight Beneficial	£6,319,522	Not assessed
	Security	Although the addition of rail stations can enhance security of an area by providing formal and natural surveillance these benefits are tempered by the reality that rail stations can also attract criminality regardless of the measures to prevent this.	Not applicable			Likely to be Neutral	Not applicable	Not assessed
	Access to services	This major improvement to the transport network in the West of England could connect an additional 35,000 people to the railway network, helping to provide access to jobs, education and health by providing real transport choice.	Not assessed			Likely to be Moderate Beneficial	Not applicable	Not assessed
	Affordability	In comparison to car ownership, rail travel has the potential to make mobility more affordable particular for those who only travel (longer distances) occasionally or outside of peak times with advanced tickets. Coupled with value attached to time, the scheme has the potential to make travelling more affordable. However, an existing bus service operates between Portishead and Bristol so these gains could potentially be marginal.	Not applicable			Likely to be Slight Beneficial	Not applicable	Not assessed
	Severance	Although no registered public rights of way (PROW) exist on the Portishead to Pill line, three private rights of way are active. Negotiations are ongoing to provide alternatives. There are a three 'informal' access points across the railway; two will need to be closed and one replaced by a fully accessible bridge. The closure of the two routes only impacts on an estimated small number of people with the most popular and well used route being replaced. For this reason the disbenefits will be limited.	Not applicable			Likely to be Slight Adverse	Not applicable	Not assessed
	Option and non-use values	As the appraised scheme will introduce passenger train services to an area not currently served by this mode. Given the level of growth in Portishead and Pill, approximately 35,000 will be connected to the railway network by 2026 improving the option and non-option values.	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.					-£47,461,144	
	Indirect Tax Revenues	The impact on tax and fuel duty loss as a result of reduction in fuel consumption					-£4,215,000	

4 Commercial case

4.1 Introduction

From the early scheme concept and throughout the scheme feasibility stage, MetroWest Phase 1 has been grounded on sound commercial principals, which are reflected in the defined scope of the scheme. Rail schemes and particularly local rail schemes tend to generate a great deal of local interest from stakeholders and the public. As a result local expectations can often increase to point which is beyond commercial viability or commercial realities, therefore scheme promoters need to make sure their scheme is grounded on a sound commercial footing.

At the simplest level, our strategy is to deliver MetroWest through a staged approach, over a ten year period. This has involved prioritising MetroWest projects within the MetroWest programme and being clear about the scope of each project. MetroWest Phase 1 is the foundation on which the MetroWest programme is developed and delivered, it is therefore the councils number one MetroWest priority. Furthermore the West of England funding body (West of England Local Transport Body Board) have determined that MetroWest Phase 1 is its top priority for devolved DfT funding, followed by MetroWest Phase 2 which is to augment part of the MetroWest Phase 1 service.

In developing the scope for MetroWest Phase 1 the councils approach has been to:

- Seek a balance between enhancing existing local lines and re-opening discussed lines
- Ensure new / enhanced train services do not compromise existing train services
- Only include new stations which have a very clear case, particularly in terms of passenger demand and deliverability
- Prioritise minimising rolling stock requirements (the number of train units), above minimising infrastructure requirements, ie optioneering is operationally led, such that OPEX is minimised through CAPEX investment to enhance infrastructure capacity
- Make passive design provision for future additional stations, which could be delivered through separate business cases, in the future e.g. Ashton Gate station and Saltford station

This approach was taken forward with Network Rail and the TOC's in developing the capacity (Railsys) modelling from summer 2013 to summer 2014. The yearlong modelling work stream was undertaken collaboratively and iteratively, starting with value management workshops, and progressing with structured meetings, analysis of technical outputs, teleconferences and formal reports. The result of this major work stream is confirmation by Network Rail of two viable train service options (5B & 6B), which in Network Rail's words *"……..both scenarios involve using six units extremely efficiently….."* extract from Capability Analysis MetroWest Phase 1 Addendum Report July 2014 (See appendix A GRIP 2 Deliverables).

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

- Increases the level of buy-in from the TOC's and increases the credibility of the 'MetroWest Mission' of phased enhancement to the local rail network
- 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 TOC's as part of their overall business strategy for passenger growth, over the medium to long term

This collaborative and considered approach is the starting point for the delivery of the 'MetroWest Mission' through a staged approach over the next five to ten years. While this approach has great potential for future expansion and saleability, the opportunities for down scaling the scope of the scheme are limited.

4.2 Output based specification

Table 4.1 sets out an overview of the project output specification

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, autumn 2014	Completion of GRIP 3 & 4 deliverables feeding into completion of Outline Business Case and submission of Development Consent Order application
	Modelling & Appraisal – CH2M Hill Framework, on-going	Completion deliverables for WebTAG compliant Outline Business Case and Full Business Case
	Environmental Assessment – CH2M Hill Framework, on-going	Completion of evidence base for Environmental Impact Assessment and Environmental Statement
	Project Management Support (DCO & Business Case) – CH2M Hill Framework, on-going	Provision of sufficient project management capacity, reflecting the dimensions of the scheme
	DCO Legal Team – Competitive Procurement – summer/autumn 2014	Provision of specialist legal support for the 6 stage DCO process
	Communications – WoE communications Team and Project Management Team led, on-going	Provision of support for Stakeholder management and in connection with the formal DCO communications requirements
	Land / Property / Agricultural Agent – NSC in-house resources, on-going	Provision of support for land negotiation, referencing and assembly
	Rail Operations – Parallel dialogue between incumbent operator (FGW) and DfT Rail – Project Management Team led, on-going	Operational arrangements confirmed in respect of, securing, stabling, and maintenance of rolling stock. Also operational requirements for the new stations. Recruitment of train crews, associated arrangements and safety case
	Commercial – Project Management Team led, on-going	Approach for procurement of construction and operation of scheme, is set out below
	Highway Design – NSC in-house managed design, on-going	Completion of highway design deliverables
Construction	Highway Construction – Build only contract, competitive procurement Work Packages including : i) Highway alterations (pending station option) ii) Portishead station car park and shared use footpath link iii) Pill station car park iv) Highway upgrade works to improve access to Pill tunnel (if confirmed) v) re-instatement of permissive cycle paths under Royal Portbury Dock Road, Marsh Lane	Single contractor appointed to deliver highway works. Works completed in accordance with programme

TABLE 4.1
Overview of Output Specification

Stage of scheme development	Work Stream	Output
	and M5 bridge. Note cycle paths will be deconstructed during rail construction works	
	Rail Construction – single combined GRIP 5-8 Design and Build contract competitive procurement led by Network Rail, with a separate 'Delivery Agreement' between the councils and Network Rail Potential configuration of Work Packages: i) Portishead to Pill (works outside operational railway), ii) Pill to Parson Street Junction (work to freight line), iii) Parsons Street Junction enhancement and partial reinstatement of Down Relief Line, iv) Bathamption Turnback and Avonmouth signalling enhancement	Single contractor appointed to deliver railway works and 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
Operations	Train Operator and Train Service – three available options as follows: Option a) train service specification is written into the GW franchise as a base franchise commitment. Supplementary agreement between the councils, train operating company (TOC) and DfT Rail for the train service subsidy liability. Option b) train service specification is procured as a 'priced option' through the franchise process. Option c) train service specification is procured through an 'open market' competitive procurement, subject to agreement of ORR.	Train operator is procured and train service commences in accordance with programme

4.3 Procurement strategy

4.3.1 Proposed procurement packages, options and approach

4.3.1.1 Preparation

Table 4.1 sets out ten major workstreams, eight of which are either being resourced internally or have been procured via the CH2M Hill framework, leaving two workstreams to be procured. These two workstreams are GRIP 3 & 4 and the DCO Legal Team.

GRIP 3 & 4 is to be a direct procurement with Network Rail in autumn 2014, with the Network Rail contractors and internal team commencing work in Feb 2015. A direct procurement with Network Rail was undertaken for GRIP 1-2 and is appropriate for GRIP 3-4 for the following reasons:

- The degree of technical interaction required across multiple teams within Network Rail (over a wide range of technical disciplines and areas of responsibility), is a major requirement for the production of GRIP deliverables. In practical terms the degree of this iterative technical engagement cannot be effected to the same extent where this engagement is between organisations (Network Rail and external consultants) where no direct contractual relationship is in place, ie where the external consultants are commissioned by the councils, not Network Rail.

- Network Rail have competitive procurement arrangements in place for all GRIP stages which includes meeting all relevant EU procurement requirements, and
- All rail enhancement works have to be signed off by Network Rail (at each GRIP stage) in order for a project to be accepted into the national rail network, in due course,
- No advantage could be gained by the Councils undertaking its own competitive process.

Procuring GRIP 3 & 4 as a combined procurement will yield efficiencies and save time compared with procuring them separately. The procurement process starts with preparation of a customer brief, which is assessed and costed by Network Rail. Internal authority is then sought within Network Rail to deploy resources. Following authorisation, Network Rail undertakes a competitive procurement process via a list of pre-qualified contractors (professional services). The whole process from customer brief, through the procurement process, to appointment of Network Rail contractor typically takes up to 6 months. This approach is also well aligned with the emerging scheme consenting strategy and the DCO process. A DCO application is usually submitted on the basis of completion of GRIP 3 deliverables, however this can cause some issues in that the scope to modify scheme design is currently limited by the existing legislation, which can cause delivery issues later on. There may be some potential to submit the DCO application based on completion of GRIP 4 deliverables, to reduce this risk, however the impact of this on the programme hasn't been fully assessed. Alternatively, the Infrastructure Bill currently undergoing the parliamentary process includes proposals to enable changes to be made scheme before schemes conclude final design while going through the 6 stage DCO process. At this stage there is some uncertainly as to whether these legislation proposals will be implemented within the MetroWest Phase 1 timescales.

The procurement of the DCO Legal Team is to commence summer 2014 with appointment of the law firm in autumn 2014. From early 2014 the project management team have sought legal advice and have engaged with Network Rail on detailed aspects informing the emerging consenting strategy. The scheme involves both works within the existing operational railway and works outside the operational railway. Furthermore, the scheme context has a number of complexities and variables, which require consideration by Network Rail as the owner and operator of the national rail network. To aid this Network Rail held a MetroWest Phase 1 consenting workshop with internal teams and its panel lawyers in July 2014. Network Rail has undertaken to issue a position statement to the councils, which is expected imminently (late July 2014), on its considered view on the consenting approach for MetroWest Phase 1. This will enable the project team to advance the emerging consenting strategy, clarify the consenting approach for each the four potential construction work packages set out in table 4.1 and to commence the procurement of the DCO Legal Team.

4.3.1.2 Construction

Table 4.1 sets out two major work streams; highway construction and rail construction, both of which are to be subject to a competitive procurement.

Highway construction is to be a build only contract (based on a NSC managed design) comprising of up to five work packages. The value of works fall below the EU public procurement directive threshold, however the provisions of NSC contract standing orders, necessitate a competitive procurement process.

Rail construction is to be a single combined GRIP 5-8 Design and Build contract through a competitive procurement led by Network Rail. This will be alongside a separate 'Delivery Agreement' between the councils and Network Rail.

An alternative approach has been considered involving splitting the construction works into two major work packages, i) the dis-used railway and ii) the operational railway, whereby the councils directly procure the construction works for the dis-used railway and Network Rail procure the construction works for the operational railway. Table 4.2 set out the advantages and dis-advantages of both options.

TABLE 4.2
Options for the Procurement of Rail Construction

Procurement Approach	Advantages	Dis-advantages
Single combined GRIP 5-8 design & build contract procured by Network Rail, with separate delivery agreement between the councils and Network Rail	Integrated approach, providing clear programme management in the context how the scheme fits alongside the wider CP5 programme. Greater certainty that design and construction will be accepted by Network Rail into the national rail network. Procurement and construction led by those who are best placed to lead it, i.e. Network Rail's core business is rail, which is not the case for the councils. Allows better management of risks, particularly in relation to management of exposure to cost increase and liabilities.	Possibility of Network Rail over specifying the engineering design requirements, leading to higher costs, driven by desire to minimise future infrastructure maintenance cost. However, this issue will need to be managed regardless of the procurement approach because Network Rail authorisation is required for GRIP sign off through the design, construction and hand over stages.
Two separate GRIP 5-8 design & build contracts: i) the dis-used railway, and ii) the operational railway where i) is procured directly by the councils and ii) is procured by Network Rail	Some potential for reduced construction cost through contactor innovation. However, the experience elsewhere has been that while the headline construction costs can be lower, additional costs can be incurred later (GRIP 7 & 8) if issues arise regarding the acceptance of the infrastructure into the national rail network. The overall risk of cost increase to councils, could be extenuated further if GRIP 7 & 8 results in delay completing and opening the scheme. However, it must be stressed that under the single procurement approach (top half of the table) contractors have an opportunity for innovation in any case, through the D&B approach	Fragmented approach and less efficient due to two procurements. Considerable potential for accountability issues and contractual dis-agreement. Increased risk to client as i) is a one off procurement due to work being outside the client's core business – no incentive for contractor to perform to heighten reputation and secure further contracts from client. Acceptance issues by NR at GRIP 7 & 8, resulting in remedial works and additional cost to the councils.

It has been concluded that there is a compelling case for the single combined GRIP 5-8 design & build contract procured via Network Rail, given the breadth of the advantages set out above and the risks associated with the alternative approach via two separate contracts.

4.3.1.3 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.

Table 4.1 sets out three options for the procurement of the train operator. Essentially these are: a) procurement via DfT Rail, TOC and base franchise specification, b) procurement via a 'priced option' and c) procurement via an open market approach subject to ORR agreement.

The councils preferred option is a) procurement via DfT Rail and base franchise specification. There is a strong case for MetroWest Phase 1 to be included in the proposed direct award GW franchise covering the period September 2015 to September 2020, given the following:

- MetroWest Phase 1 technical feasibility has been confirmed through the recently completed GRIP 2 and the comprehensive range of deliverables which arguably go further than usual for GRIP 2,
- This Preliminary Business Case setting out the five transport cases, confirms; why MetroWest Phase 1 is needed, that is gives high value for money, that it is grounded on a sound commercial foundation, that is affordable and that it is deliverable by 2019.
- MetroWest Phase 1 extends the benefits of CP5 projects including electrification of the GW main line and provides an opportunity to deliver a tangibly integrated approach to the public for enhancement of the rail network within the West of England and between the West of England and the capital.
- There is overwhelming support from the public, stakeholders, business, local decision makers and the rail industry to rectify the 'under developed' West of England local rail network through the delivery of MetroWest Phase 1, followed by MetroWest Phase 2 during early CP6.
- The councils would be willing to enter into a funding arrangement direct with DfT Rail whereby the councils cover the train service subsidy liability during the first three years of operation of MetroWest Phase 1, subject to negotiated terms.
- Network Rail's emerging Western Route Study work (June, 2014), as part of the Long Term Planning Process, has identified the need for MetroWest Phase 1 to provide sufficient capacity by 2023 to meet the demand on services travelling into Bristol.

The MetroWest Phase 1 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, over the next 15 months (to October 2015).

4.4 Summary of commercial case

The procurement strategy set out above will be developed further as the scheme progresses and opportunities for further efficiency an innovation will be explored and presented in the Outline Business Case which is scheduled to be submitted to the Joint Transport Board in October 2015.

The scheme preparation stage involves ten major work streams, two of which need to be procured via a competitive process over the coming months. The scheme construction stage involves two major work streams, one entailing a build only procurement (highway works) and the other entailing a single combined GRIP 5-8 design & build contract procured by Network Rail. The scheme operations stage involves three options for the procurement of the train operator and train service. The preferred option is procurement via DfT Rail, the TOC and the base franchise specification. There is a strong case for MetroWest Phase 1 to be included in the proposed direct award GW franchise covering the period September 2015 to September 2020, given the high degree of alignment with the wider CP5 programme, its state of readiness for delivery, the extent of support for the scheme and the opportunity for integrated delivery.

5 Financial case

5.1 Introduction

The estimated scheme capital out-turn cost is £55,398,473 central case, in additional an estimated £2,760,895 of feasibility costs will be incurred, resulting in a total cost excluding operational costs of £58,159,368. The overall net capital funding position is 98% of the scheme capital out-turn cost is funded. In respect of operational costs the councils are yet to secure the operational funding, which predominantly comprise of train service subsidy during the first three years operation. The preparation of the Outline Business Case will confirm both the capital and operational costs of the scheme and the four councils are in continual dialog about the scheme costs and bridging the remaining funding gap.

5.2 Scheme Costs

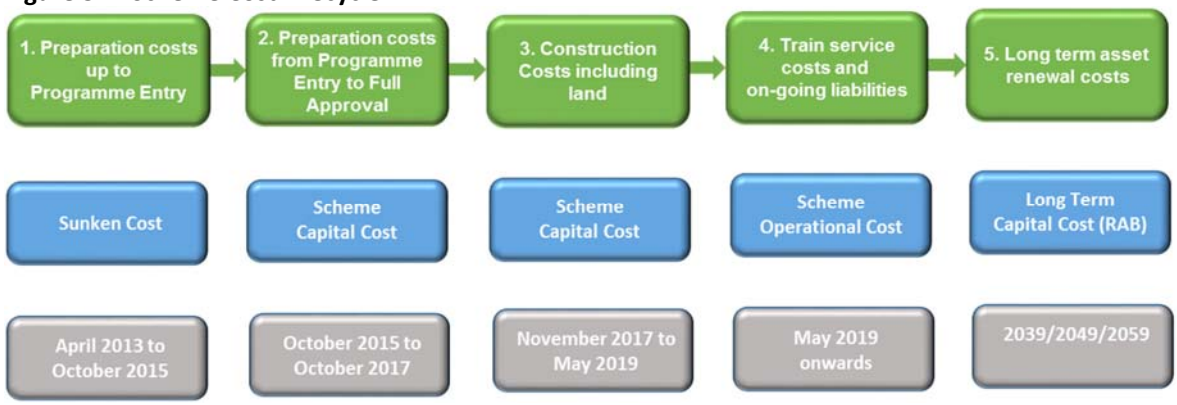
The delivery and operation of the scheme entails a five stage cost lifecycle, as follows:

1. Feasibility costs up to Programme Entry
2. Preparation costs from Programme Entry to Full Approval
3. Construction Costs
4. Train service costs and on-going liabilities including highways maintenance costs, scheme monitoring and evaluation, bus service reconfiguration costs
5. Long term asset renewal costs e.g. track renewal costs, train replacement costs and any medium term train service subsidy costs

Figure 5.1 below shows the composition of costs fall into three broad categories; sunken costs, capital costs and operational costs, along with timescales. All the costs are to be met by the councils, with the exception of the long term asset renewal costs, and medium term train service subsidy costs. The Councils are committed to funding the train service subsidy during the first three years of operation, after which any residual subsidy requirement will be met by DfT (subject to agreement).

Items 1 to 3 will be met from council resources, DfT Devolved funding and Local Growth Fund, see Tables 5.4, 5.5 and 5.6 for further information. Item 4 includes train service subsidy costs for the first three years of operation which is to be met by the councils. In addition to this are modest highway maintenance costs, scheme monitoring and evaluation costs and bus service reconfiguration costs, including adaption of service X2 / X3 service and provision of a station shuttle service. There is potential for these costs to be off-set if the councils opt for car parking charges at Portishead and Pill station. After the first three years of train service subsidy, the DfT would (subject to value for money, affordability and considerations of degradations to the local train network), meet the cost thereon, through the franchise process. Item 5 includes long term industry costs of renewing track and infrastructure (in year 20, 30 & 40) and train replacement costs (year 30). Both of these costs will fall upon the public sector, via Network Rail in respect of track renewal and DfT (directly or indirectly) in respect of train replacement costs. These long term costs will need to be a considered alongside the expected long term revenue performance of the scheme and the long term benefits arising from the scheme. The long term implications of the scheme will be considered further in the Outline Business Case.

Figure 5.1: Scheme Cost Lifecycle

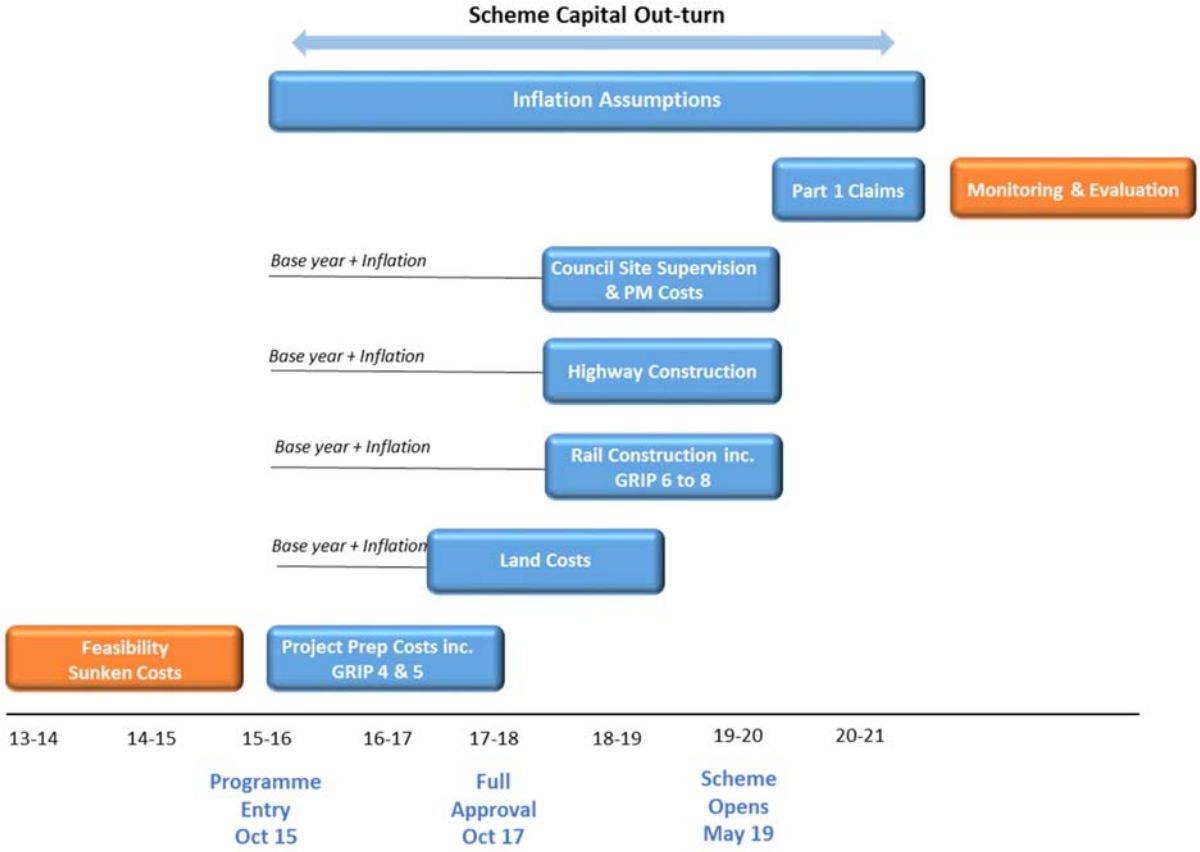


5.3 Capital Costs

The estimated scheme capital out-turn (£55,398,473 central case) comprises of prep costs, construction costs, contingency / risk and allowance for future inflation leading up to the opening of the project. The construction costs comprise both railway and highway costs, the railway costs have been assessed to GRIP stage 2 and a detailed cost estimate has been produced by Network Rail. The highway costs are based on preliminary design drawings and Bill of Quantities. The estimated scheme capital outturn cost is the capital cost of the scheme from Programme Entry to one year after the scheme has opened (capital costs from Oct 2015 to May 2020). In line with previous DfT guidance, the West of England Assurance Framework treats all costs prior to Programme Entry as sunken costs. This is because all the work prior to Programme Entry is effectively feasibility work, during which elements of the scope of the scheme undergo assessment and are not confirmed. Following further work over the next year, including completion of GRIP stage 3, an Outline Business Case will be produced which will confirm the detailed scope, cost and timescales for delivery of the scheme. The Outline Business Case is scheduled to be submitted in October 2015. The cost of the feasibility stage (sunken costs) which includes costs from April 2013 to October 2015 is estimated at £2,760m.

Figure 5.2 below sets out the component parts that comprise the Scheme Capital Out-turn Cost.

Figure 5.2: Composition of Scheme Capital Out-turn Cost



- Feasibility Costs (Sunken Costs) – These are costs borne by the councils from April 13 to Oct 15 when the Outline Business Case is to be submitted to the funding body for Programme Entry approval.
- Project Prep Costs including GRIP – These are costs borne by the councils from Programme Entry to Full Approval. They include project management, design, environment, planning and legal costs. In this case they include both highway design costs and rail design costs, (GRIP 4 & 5).
- Land Costs – These are costs incurred by the councils and could be borne prior to Full Approval.
- Rail Construction Costs including GRIP 6 to 8 – These are the estimated rail construction costs in a base year (2014-15) adjusted to allow for inflation up to the start and during construction. These costs also include cost of project handover and close down GRIP 7 & 8. These costs include provision for NR supervision of the construction phase.
- Highway Construction Costs – These are the estimated highway construction costs in a base year (2014-15) adjusted to allow for inflation up to the start and during construction.
- Council Site Supervision & Project Management Costs – These are costs incurred by councils to oversee the construction phase and manage the councils interests.
- Part 1 Claims – These costs are borne by the councils from 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 – These costs are incurred by the councils to monitor the effectiveness of the project against KPI's and delivery of the project objectives. These costs effectively form part of the scheme operational costs.

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 20% 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 etc. Given that the scheme previously achieved GRIP stage 3 (Portishead Rail Re-opening), that some ground investigation has been carried out and that a large proportion of the construction is work is outside the existing operational railway and therefore is subject to less risk than other rail schemes, it is considered that a contingency of 40% is not justified. A qualitative risk assessment was undertaken as part of GRIP stage 2, this together with the GRIP stage 2 report and comprehensive deliverables are attached in Appendix A.

In respect of inflation, two main inflation scenarios have been considered at this stage. These are a rate equivalent to 3.4% pa compound using the BCIS inflation indices and a slightly lower rate of 3.2% pa compound using the ROSSI inflation indices. Both scenarios provide an inflation uplift over the period from second quarter of 2014 to third quarter of 2018, and assume all spend is within the third quarter of 2018. The actual spend during construction will be spread from the third quarter of 2017 to the first quarter of 2019. A more detailed inflation profile will be undertaken for the Outline Business Case, however at this stage, using the third quarter of 2018 for construction spend, provides a sound starting position. Both the contingency % provision and the inflation scenarios are reported in the following sensitivity table.

TABLE 5.1
Estimated Scheme Capital Out-turn Sensitivity Table

		Railway Contingency	
	40% Contingency	**30% Contingency**	**25% Contingency**
Inflation Assumption A) BCIS 3.4% pa = 14.25% total uplift	£59.267m	£55.759m	£54.005m
Inflation Assumption B) ROSSI 3.2% pa = 13.42% total uplift	£58.880m	£55.398m	£53.656m

The sensitivity table shows a range of £53.658m to £59.267m for the estimated scheme capital out-turn. At this stage of an equivalent highway scheme a contingency of 30% is usually applied. As set out in a contingency of 40% is not justified because the scheme previously achieved GRIP stage 3 (Portishead Rail Re-opening), some ground investigation has been carried out and that a large proportion of the construction is work is outside the existing operational railway. A contingency of 30% would provide a closer reflection of the scheme risks at this stage. In respect of the inflation assumptions, the Office for Budgetary Responsibility ROSSI Inflation forecast is 3.1% up to first quarter of 2016, then 3.2% from second quarter 2016 onwards. The ROSSI indices is defined as the retail price index excluding mortgage interest payments, council tax, housing depreciation and rents. For simplicity inflation assumption B) shown in the table above assumes 3.2% pa inflation throughout the four year period. At this stage it is suggested the ROSSI indices is used and reviewed prior to the Outline Business Case. Based on a contingency of 30% for railway costs and highway costs and using the ROSSI inflation indices of 3.2% pa, the central case scheme capital out-turn cost is £55.398m. Table 5.2 below sets out a summary of the composition of capital costs.

TABLE 5.2
Estimated Scheme Capital Out-turn Central Case – Cost Summary

Cost type	Cost
Preparation * - Council costs Programme Entry to Full Approval excl GRIP 4&5	£2,419,817
Preparation * - Railway costs GRIP 4&5 incl Industry Fee @7%	£3,660,988
Construction - Highway costs inc land	£2,320,065
Construction - Railway cost inc land	£29,006,962
Site Supervision	£145,600
Contingency - Highway construction @30%	£696,020
Contingency - Railway construction @30%	£8,699,689
Total Base Cost	**£46,953,140**
Inflation - Highway construction @3.2% pa using ROSSI	£404,759
Inflation - Railway construction @3.2% pa using ROSSI	£5,059,159
Inflation – Site Supervision @3.2% pa using ROSSI	£19,540
Rail Industry Fee GRIP 6-8 @7%	£2,961,877
Out-turn cost	**£55,398,474**

* Preparation costs include allowance for inflation

The above table excludes feasibility costs incurred prior to Programme Entry scheduled for Oct 2015 and costs incurred post May 2019 for scheme monitoring and evaluation, as these do not form part of the Scheme Capital Out-turn cost.

5.4 Operational costs

A total of eight train service options have been assessed through the economic appraisal, as set out in Section 3 Economic Case. These options are based on two train service configurations referred to as option 5B and option 6B. These options have been assessed with two train timetable scenarios (base and enhanced) and two train formation requirement scenarios (six train sets / seven train sets). Option 5B scenarios have the best performing Benefit to Cost Ratio and operating revenue (requiring less subsidy than option 6B). However more detailed assessment of both options will be required for the Outline Business Case, before a final decision can be made on the preferred option.

The scheme will augment the existing Severn Beach line service, which is currently operated using two train sets. The operational costs of the scheme are the incremental costs of enhancing the existing Severn Beach line service, such that the net train set resource requirement is four / five train sets, plus associated staffing and other operating costs. The central assumption included in the economic appraisal, in regard to staffing is each train shift will require two train drivers and two train managers in order to have sufficient staff cover to roster a seven day a week service, 52 weeks a year. Whilst this relatively coarse approach to quantify staff resources is appropriate at this business case stage, a more detailed approach is required to support the Outline Business Case. The train operator (First Great Western) has advised there will be opportunities to refine the staffing assumptions through a re-roistering exercise of the whole Bristol depot when a detailed operational timetable for MetroWest Phase 1 train services becomes available.

Based on the staffing assumption set out above each train set will operate three shifts per day, each broadly six hours, for an 18 hour day operation. Therefore the assumption is each train set requires six drivers and six train managers. Based on a net requirement of four train sets, the total staffing

requirement is 24 train drivers and 24 train managers with an annual cost of £2.04m in 2013 prices. Based on a net requirement of five train sets, the total staffing requirement is 30 train drivers and 30 train managers with an annual cost of £2.55m in 2013 prices. Other operating costs include Network Rail infrastructure maintenance costs, train unit leasing costs, train unit operational costs and new stations operational costs. Table 5.3 sets out total train service operating costs.

Given the issues noted above, a sensitivity test has been undertaken on operating costs and is reported in Table 5.9.

TABLE 5.3
Total Train Service Operating Costs per annum

	Scenario 1 Option 5b, 6 train sets	Scenario 2 Option 5b, 7 train sets	Scenario 3 Option 6b, 6 train sets	Scenario 4 Option 6b, 7 train sets	Scenario 5 Option 5b enhanced, 6 train sets	Scenario 6 Option 5b enhanced, 7 train sets	Scenario 7 Option 6b enhanced, 6 train sets	Scenario 8 Option 6b enhanced, 7 train sets
NR opex cost	562,100	562,100	562,100	562,100	562,100	562,100	562,100	562,100
TOC staff cost	2,329,576	2,911,970	2,329,576	2,911,970	2,329,576	2,911,970	2,329,576	2,911,970
TOC vehicle leasing cost	1,141,949	1,427,436	1,141,949	1,427,436	1,141,949	1,427,436	1,141,949	1,427,436
TOC vehicle opex cost	1,172,954	1,172,954	1,299,937	1,299,937	1,308,923	1,308,923	1,435,906	1,435,906
TOC opex costs (other)	283,094	283,094	283,094	283,094	283,094	283,094	283,094	283,094
Total	**5,489,673**	**6,357,554**	**5,616,656**	**6,484,537**	**5,625,642**	**6,493,523**	**5,752,625**	**6,620,507**

[a] Notes

Costs are shown as positive;

Costs are in 2014 factor prices, at GRIP stage 2 and refer to the first full year of benefits; they are undiscounted and exclude optimism bias.

Costs are relative to the Base Case.

5.5 Budgets & Funding Position

5.5.1 Funding of Feasibility Costs

Prior to the achieving Programme Entry (programmed Oct 2015) the scheme will incur feasibility costs of £2,760,895 which are treated as sunken costs. As set out in section 5.3 feasibility costs include costs incurred between April 2013 and October 2015, prior to award of Programme Entry. Table 5.4 sets out the feasibility cost spend profile. Of the total £2,760,895 feasibility costs, £2,075,000 has been secured from council resources, leaving £685,895 to be identified, by the councils for April to Sept 2015.

TABLE 5.4
Feasibility Cost Spend Profile

	2013-14	2014-15	2015-16 Apr-Sept	Total
NSC	£152,315	£485,034	£743,098	**£1,380,447**
BCC	£91,389	£291,021	£445,859	**£828,268**
B&NES	£45,695	£145,510	£222,929	**£414,134**
SGC	£15,232	£48,503	£74,310	**£138,045**
Total	**£304,630**	**£970,068**	**£1,486,196**	**£2,760,895**
Pre Programme Entry Feasibility Costs – (Sunken Costs)				

5.5.2 Funding of Scheme Capital Out-turn Cost

The estimated capital out-turn cost of the project totalling £55,398,473, comprises of £6,092,805 of preparation costs and £49,305,669 of construction costs. Table 5.5 sets out the Scheme Capital Out-turn Cost Profile.

TABLE 5.5
Scheme Capital Out-turn Cost Profile

	2015-16 Oct - Mar	2016-17	2017-18	2018-19	2019-20	Totals
Preparation Costs						
NSC	£751,868	£0	£0	£0	£0	£751,868
BCC	£451,121	£0	£0	£0	£0	£451,121
B&NES	£225,560	£0	£0	£0	£0	£225,560
SGC	£75,187	£0	£0	£0	£0	£75,187
Devolved funding	£0.000	£2,529,579	£2,059,489	£0	£0	£4,589,068
sub-total	**£1,503,736**	**£2,529,579**	**£2,059,489**	**£0**	**£0**	**£6,092,805**
Construction Costs					-	
NSC	£0	£0	£247,372	£0	£0	£247,372
BCC	£0	£0	£148,423	£0	£0	£148,423
B&NES	£0	£0	£74,212	£0	£0	£74,212
SGC	£0	£0	£24,737	£0	£0	£24,737
Local Growth Fund	£0	£0	£4,250,000	£4,250,000	£0	£8,500,000
Devolved funding	£0	£0	£7,883,152	£29,933,328	£2,494,444	£40,310,924
sub-total	£0	£0	£12,627,896	£34,183,328	£2,494,444	£49,305,668
Total	**£1,503,736**	**£2,529,579**	**£14,687,385**	**£34,183,328**	**£2,494,444**	**£55,398,473**

Of the £6,092,805 preparation costs a total of £4,589,068 of Local Growth Fund has been identified by the councils, leaving £1,503,736 to be funded by the councils for 2015-16. Table 5.5 assumes of the £8.5 million provisional Devolved Funding for the scheme a sum of £2.529 million could be made available from April 2016 to fund preparation costs prior to full funding approval scheduled for Oct 2017.

5.5.3 Funding of Scheme Feasibility and Capital Out-turn Cost

Table 5.6 below sets out the share of Feasibility, Preparation and Construction costs between the councils.

TABLE 5.6
Feasibility, Preparation and Construction Costs to be met by the Councils

	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	sub-total
	Feasibility Cost	Feasibility Cost	Feasibility / Prep Cost	Prep Cost *	Prep / Construc-tion Cost	Construc-tion Cost	Construc-tion Cost	Feasibility/ Prep & Construction Cost
NSC	£152,315	£485,035	£1,494,966	£0	£247,372	£0	£0	£2,379,688
BCC	£91,389	£291,021	£896,980	£0	£148,423	£0	£0	£1,427,813
B&NES	£45,695	£145,510	£448,490	£0	£74,212	£0	£0	£713,906
SGC	£15,232	£48,503	£149,497	£0	£24,737	£0	£0	£237,969
Total	**£304,630**	**£970,070**	**£2,989,933**	**£0**	**£494,744**	**£0**	**£0**	**£4,759,376**

* The assumption is Devolved Funding will be available from April 2016 towards Prep Costs prior to full funding approval scheduled for Oct 2017, if this is not possible, it would result in an increased financial burden to the councils

Table 5.7 below sets out the extent of funding the councils have secured for Feasibility, Preparation and Construction Costs. It can be seen that of the £4,759,376, the councils have secured £3,489,256, leaving a further £1,270,120 to be secured.

TABLE 5.7
Committed Funding Allocations by the Councils

	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	sub-total
	Feasibility Cost	Feasibility Cost	Feasibility / Prep Cost	Prep Cost *	Prep / Construc-tion Cost	Construc-tion Cost	Construc-tion Cost	Feasibility/ Prep & Construction Cost
NSC	£152,315	£485,035	£1,494,966	£0	tbc	£0	£0	£2,132,316
BCC	£91,389	£291,021	£719,590	£0	tbc	£0	£0	£1,102,000
B&NES	£45,695	£145,510	tbc	£0	tbc	£0	£0	£191,205
SGC	£15,232	£48,503	tbc	£0	tbc	£0	£0	£63,735
Total	**£304,630**	**£970,070**	**£2,214,556**	**£0**	**tbc**	**£0**	**£0**	**£3,489,256**

* The assumption is Local Growth Funding will be available from April 2016 towards Prep Costs, if this is not possible, it would result in an increased financial burden to the councils

BCC have committed £719.590 of the £896.980, leaving a further £177.390 to fund in 2015-16

5.5.4 Scheme Residual Capital Funding Gap

The Feasibility, Preparation and Construction costs total £58,159,368, comprising £55,398,473 and £2,760,895. The scheme is to be funded through three major sources:

- Devolved DfT major scheme funding of £44,899,992
- Provisional Local Growth Fund of £ 8,500,000
- Council funding of £4,759,376 of which £3,489,256 has been identified.

The overall position is £56,889,248 has been identified, leaving a residual funding gap of £1,270,120 for Feasibility, Preparation and Construction costs. However there is a risk that should Local Growth Funding not be available in 2016-17, the councils would have an additional cashflow pressure of £2,529,579 to manage, until the scheme achieves Full Funding Approval (programmed for Oct 2017), when preparation costs will be reimbursed retrospectively.

5.5.5 Funding the Operational Costs

In addition to the above capital funding gap, the councils are yet to secure the funding for the operational costs of MetroWest Phase 1, which are set out in section 5.4 and comprise mainly of train service subsidy during the first three years operation. The preparation of the Outline Business Case will confirm both the capital and operational costs of the scheme and the four councils are in continual dialog about the scheme costs and bridging the remaining funding gap. The headline train service subsidy position is set out in Table 5.8.

TABLE 5.8

Operational Profile – Operational Cost vs Operational Revenue (without Wider Factors): Option 5B, Enhanced, 6 train sets

Outturn Cost	19/20	20/21	21/22	3 year total
Total Forecast Revenue	£4,971,196	£5,354,562	£5,745,990	£16,071,747
Total Operating Costs	£6,825,409	£7,123,123	£7,419,865	£21,368,397
Residual Train Service Subsidy Requirement	£1,854,213	£1,768,562	£1,673,875	£5,296,649

The forecast revenue set out in table 5.8 takes a standard WebTAG approach and makes no account of the following:

- Proposed fare revisions to the Severn Beach Line
- Additional passenger demand and revenue arising from the Temple Quarter Enterprise Zone, Bristol arena and wider economic benefits
- Additional passenger demand and revenue arising from Bristol City residents parking scheme

All of these are committed proposals and will be fully delivered prior to the opening of MetroWest Phase 1 in 2019, therefore Table 5.8 under estimates revenue and overstates the residual train service subsidy. Further analysis of the above proposals will be undertaken as further information becomes available for the Outline Business Case. The forecast revenue is also based on an average fare yield of 20 pence per mile for Portishead and Pill passengers, which takes account of concessions such as season tickets, child fares, senior citizen fares etc. However the 20 pence per mile rate is based on local stations without direct links to London in the West of England. This rate is potentially too low and is likely to understate the fare yield from these stations.

The estimated operating costs set out in Table 5.8 have utilised particularly cautious assumptions relation to TOC staffing costs. The cost estimate is based on a ratio of 2 staff resources (ie 2 drivers and 2 train managers) for every shift. Anecdotal evidence suggests that a ratio of 1.75 is used by some train operators to resource a seven day a week, 52 week a year operation. Further analysis of staff resources will be undertaken in preparation of the Outline Business Case and this will include assessment of opportunities for resource efficiencies and potential for re-rostering the incumbent operators local Bristol depot.

The use of pessimistic assumptions on both the revenue side and cost side, has had the effect of understating revenue and overstating operational costs, resulting in a net train service subsidy requirement of £1,854,213 in the opening year. In order take achieve a more balanced view of revenue and costs, a range of sensitivity tests have been undertaken. Table 5.9 reports two of these tests, based on +5% revenue and -5% operational costs and -10% revenue and -10% costs. Based on the factors set out above, **the +5% revenue and -5% operating costs sensitivity test provides the best overall assessment of the likely subsidy requirement** in the opening year and subsequent second and third year, during which the councils will have the liability before it transfers to DfT in year four (subject to agreement).

TABLE 5.9

Operational Profile – Illustrative Sensitivity Tests for Scenario 5: Option 5B, Enhanced, 6 train sets

Residual train service subsidy requirement

Cost	19/20	20/21	21/22	3 year total
Baseline Subsidy Requirement	£1,854,213	£1,768,562	£1,673,875	£5,296,649
Revenue +5% and Operating Cost -5%	£1,264,383	£1,144,677	£1,015,582	£3,424,642
Revenue +10% and Operating Cost -10%	£664,552	£520,793	£357,289	£1,552,634

In additional to the train service subsidy, it will be necessary to take account of other operational costs such as highway maintenance costs, bus service costs and scheme monitoring and evaluation costs. There is potential for these costs to be off-set if the councils opt for car parking charges at Portishead and Pill station. The methodology being developed for the apportionment of the operational costs will need to take account of a number of variables, including the spread of the deployment of trains across the three rail lines. Consideration will be given to establishing an appropriate level of contingency to apply to the operating costs as part of preparation of the Outline Business Case.

5.6 Summary of financial case

5.6.1 Overview

In addition to offering high value for money, the scheme provides a balanced investment of capital and operational resources, typically required for a local rail scheme. This section (the Finance Case) establishes at this early stage in the development of the scheme, the majority of the funding has been identified. Further information will become available, particularly in respect of operating costs and forecast revenue as the scheme progresses to the Outline Business Case by October 2015. The Outline Business Case will support statutory processes including the Development Consent Order. Following the confirmation of all consents and conclusion of the scheme procurement, the Full Business Case will be produced in October 2017 and the scheme will proceed to the construction phase in December 2017.

5.6.2 Overall Funding Position

The overall financial position is that there is a funding gap of £1,270,120 in respect of Feasibility, Preparation and Construction costs. In addition the estimated operational cost based on a sensitivity test entailing a 5% increase in revenue and a 5% reduction in operating costs (which is considered to be the best overall assessment of the likely subsidy) as set out in Table 5.9, is £3,424,642 over three years (2019 to 2022, when the councils have liability), excluding operational cost contingency. The total funding gap to deliver the scheme is therefore £4,694,762 (up to 2022, when the council have liability), based on the assumptions set out in this Finance Case, including the assumption that Local Growth Funding will be available from April 2016. Going forward consideration is needed for establishing an operational cost contingency as part of the Outline Business Case assessment and further work is needed to determine the methodology for the apportionment of operational costs between the councils.

The councils and the funding body (West of England of England Local Transport Body Board which meets as part of the West of England Joint Transport Board) now need to consider the detail set out in this Preliminary Business Case and determine whether the project should continue to the Outline Business Case stage.

6 Management Case

6.1 Introduction

This section sets out how the West of England authorities propose to deliver MetroWest Phase 1. 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 1 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 feasibility

The GRIP 1/2 report set out in Appendix A contains details of the engineering feasibility of the scheme. The report conclusions and recommendations are set out below.

The work undertaken by this study provides technical information to support the re-opening of the Portishead line for passenger services and provide an enhanced level of passenger service for the Seven Beach and Bath to Bristol lines. The study looked at the frequency and service patterns of connecting passenger rail services between Portishead, Bath Spa and Severn Beach. The conclusion is that two options (5b & 6b) can be taken forward for further development in GRIP 3. Both options require the following infrastructure to deliver the timetable (in addition to the infrastructure identified through the previous GRIP 3 study to re-open the Portishead line), namely:

- *Parson Street Junction doubling*
- *Intermediate signalling on the Portishead branch*
- *Signalling adjustments at Avonmouth for Option 6b and north of Avonmouth for Option 5b*
- *A new crossover at Bathampton to facilitate turning trains back to Bath Spa*

The timetable modelling work undertaken has paid due cognisance to maintaining the existing freight path agreements.

The old track (rail & sleepers) is still in place for virtually the whole of the three mile disused section of line. A substantial quantity of vegetation clearance will be required before the old track can be removed and a new stabilised track formation can be built. Trackbed Investigation has identified contaminates in

the trackbed of the old railway line; additional ground investigation work will be necessary in GRIP 3 to fully understand the level and extent of contamination.

The study has shown that by slewing the track and installing suitable fencing the existing cycle way can be accommodated under the bridge structures.

Two options (A & B) were explored for the terminus Station with car parking facilities in the vicinity of Quays Avenue, Portishead, with both options proving feasible. Option A will require passengers to cross Quays Avenue between the car park and the Station whereas Option B offers an integrated solution with the car park and Station on connecting land. However Option B will require partial realignment of Quays Avenue. Other options for Portishead station were considered by North Somerset Council, in their 'Portishead Station Options Appraisal Report'.

In the interest of safety the accommodation and footpath crossings are to be closed; the disused section of line has ten such crossings, some of which are historic crossings and not in active use. The study has considered alternative arrangements at two of the crossing locations, Portishead (Trinity School area) and Sheepway Farm.

- *Portishead – Provision of a footbridge between Tansy Lane and Galingale Way for access to Trinity School. Two conceptual design options have been proposed and should a footbridge be the selected solution either bridge can be built at this location.*
- *Sheepway Farm - To replace two existing user accommodation crossings a new farm bridge for livestock and light vehicular access is proposed. The bridge would be located approximately midway between the two existing crossings.*

Further consideration was given to the viability of widening Avon Road underbridge; the study concluded that with repairs a new precast concrete deck unit could be installed adjacent to the existing bridge. The embankment will need to be extended to support the new bridge deck; the earthworks can be accommodated within the Network Rail boundary. As part of GRIP 3 surveys of both the bridge and embankment will be necessary together with ground investigation work to provide suitable information to progress design.

Whilst vegetation has encroached over the down platform at Pill Station the study shows that with clearance and work to the cutting slope a footbridge can be installed, accessed from Monmouth Road and refurbishment of the platform is possible. An area for car parking at Pill has been identified but is subject to further consideration by North Somerset Council.

As part of GRIP 3 a comprehensive survey and alignment design will be required to convert the existing freight line from Parson Street to Portbury Dock Junction to passenger status. The study has shown that the double tracking can be restored through Ashton Level Crossing within the existing railway boundary, with the crossing deck widened, barriers and road signals moved. The footpath crossing at Barons Close (known as Container path crossing) will be closed as part of this scheme. The Bus Rapid Transit (BRT) will cross the railway in the vicinity of Ashton Gate Level Crossing by means of an over-bridge the superstructure of which will be within 2.5m of the proposed twin track. Close liaison between the rail and roadway designs will be required.

The study has shown that should a requirement be confirmed at GRIP 3 to provide facilities to regulate freight trains travelling in the down direction, extension of the Carriage Line to a point just west of Bedminster Station to form a Down Relief is possible.

It is recommended that the Bristol Area Signalling Renewal project and other CP5 track renewal or enhancement projects, consider the requirements of this project and identify opportunities to design / deliver infrastructure through a holistic approach. A key issue is the siting for the crossover to re-double Parson Street junction to enable a Down Portishead service to diverge to the Up Main, whilst enabling a parallel move with an Up Portishead service. In respect of Bathampton turnback it is recommended that the dialogue with the GW electrification team is maintained to optimise the design and deliverability of this facility.

A Hazard Identification (HAZID) workshop is to be undertaken at GRIP 3 to identify potential hazards and threats to the Maintainer, Operations, Train Operators and others who may be affected by the change in status and infrastructure to provide input to design and development decisions.

Existing structures will need to be assessed for structural capacity (where applicable) and the condition evaluated for the proposed trains. Interoperability and safe access for examination and maintenance activities should also be determined. Early discussions with the Civils Network Rail Asset Manager are recommended, to determine requirements for acceptance of redundant assets back into operation and the maintenance regime required, and acceptance for increased loadings over operational assets.

The Civils Network Rail Asset Manager will also need to clear any proposed significant track renewals over, under or adjacent to any structures, as well as any track raising or lowering over and under any structures respectively.

The Risks associated with these factors include: overloading of structures, increasing lateral pressure on retaining/ballast walls/arch faces and removal of passive resistance to sliding /undermining the foundations of retaining/abutment walls. A key Project risk is that significant strengthening or repair works above the initial scoped works may be required. These risks are to be evaluated and identified by the Project in the Hazard Log.

In conclusion the report demonstrates that the proposed services and infrastructure changes are feasible and recommends the project progresses to GRIP 3.

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:

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

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 schemes[8]. Recent schemes relevant to the MetroWest Phase 1 scheme are:

- **Bath Transportation Package** – recently secured the planning consent and work is in progress on the expansion of Newbridge Park and Ride. This remains on track for completion by July 2015.
- **MetroBus - Ashton Vale to Temple Meads.** Recent works include obtaining the Transport & Works Act Order in January 2014 with no challenges. Design and build tenders have been released.

[8] Details of the major schemes can be found at http://www.travelwest.info/projects

- **MetroBus - South Bristol Link Scheme.** Successful planning application and publication of the Compulsory Purchase Order and Side Road Orders. Ongoing liaison with Network Rail regarding a new underbridge.
- **MetroBus - North Fringe to Hengrove Package.** Progression of planning application, Compulsory Purchase Order and Side Road Order. Development of procurement strategy.
- **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 1 project, combined with established working arrangements with its term transport consultant, CH2M Hill.

6.4 Project dependencies

The MetroWest Phase 1 project complements the strategic investments being made by the rail industry through Control Period 5 (2014 to 2019). Of the CP5 schemes, MetroWest Phase 1 is only dependent on Filton Bank four tracking scheme. However the CP5 schemes listed in Table 6.1 are planned for delivery before MetroWest Phase 1 and will assist operational robustness.

MetroWest Phase 1 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 1

Project	Timetable/key dates	Extent to which MetroWest Phase 1 is dependent on this project
Committed CP5 Network Rail projects		
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 (especially between Bath and BTM)
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 1 extension and station environment improvements	2017/18	**Related** – Platform capacity enhancements will help operational robustness and provide greater timetable flexibility
Additional platform at Bristol Parkway	TBC	**Related** - Additional platform width will help operational robustness
Filton Bank four-tracking	2017/18	**Dependent** - Without four-tracking, there is insufficient capacity for the additional MetroWest Phase 1 trains
Bristol East junction renewal	2017/18	**Related –** this scheme will yield additional capacity which will help operational robustness

TABLE 6.1
Project dependencies – projects which interface with MetroWest Phase 1

Project	Timetable/key dates	Extent to which MetroWest Phase 1 is dependent on this project
Line speed improvements between Bristol Temple Meads and Taunton	TBC	**Related –** this scheme will yield additional capacity which will help operational robustness
Western Route rail franchise		
Franchise replacement	2015 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 franchise specification
Other Rail Schemes		
Portway platform	2016	**Related** – Portway platform is being promoted by Bristol City Council and is planned to be opened before MetroWest Phase 1 opens

A number of additional rail projects are dependent on or programmed after MetroWest Phase 1, as shown in Table 6.2.

TABLE 6.2
Other rail projects dependent on MetroWest Phase 1

Project	Timetable/key dates	Extent to which the project is dependent on MetroWest Phase 1
MetroWest Phase 2	Opening 2021	Dependent - MetroWest Phase 2 is programmed to be delivered within two years of the opening of MetroWest Phase 1; it would build on the Phase 1 improvements for the Severn Beach line
Ashton Gate station	Unknown	Dependent - This scheme would be dependent on MetroWest Phase 1 as, without the reopening of the Portishead line, there would be no train service
Saltford station	Unknown	Dependent - This scheme would be dependent on MetroWest Phase 1, to provide a half-hourly train service

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

6.5 Governance, organisational structure and roles

MetroWest Phase 1 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 1 scheme is dependent on successful relationships between the West of England authorities and the rail industry. The substantive recent GRIP 1-2 workstream has involved high levels technical interaction, particularly with Network Rail and the TOCs, 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 July 2014, the following agreements have been put in place:

- Basic Services Agreement
- Basic Asset Protection Agreement
- Development Services Agreement

The approach developed for the GRIP 1-2 workstream commenced with regular Pre GRIP meetings, between MetroWest Phase 1 Project Team and the NR 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 GRIP 1-2 are reflection of the comprehensiveness of the GRIP 1-2 deliverables produced (see Appendix A).

6.5.2 Programme-level governance

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 has been combined with the Joint Transport Executive Committee for the West of England 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, Alistair Cox, 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 1. 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 1 is Colin Medus from North Somerset Council. His 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 LTBB, 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 1 **Project Manager**, James Willcock, is also from North Somerset 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 Local Transport Body Board, Joint Transport Executive Committee, Joint Scrutiny, directors, the Department for Transport (DfT) and the Local Enterprise Partnership

The **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 (CH2M Hill).

The 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)
- CH2M Hill (modelling and appraisal, environmental assessment, technical support, development consent order)
- Specialist planning, legal support and agents (development consent order team, QC for Public Inquiry, agricultural agent)

Figure 6.1 MetroWest Programme Organogram

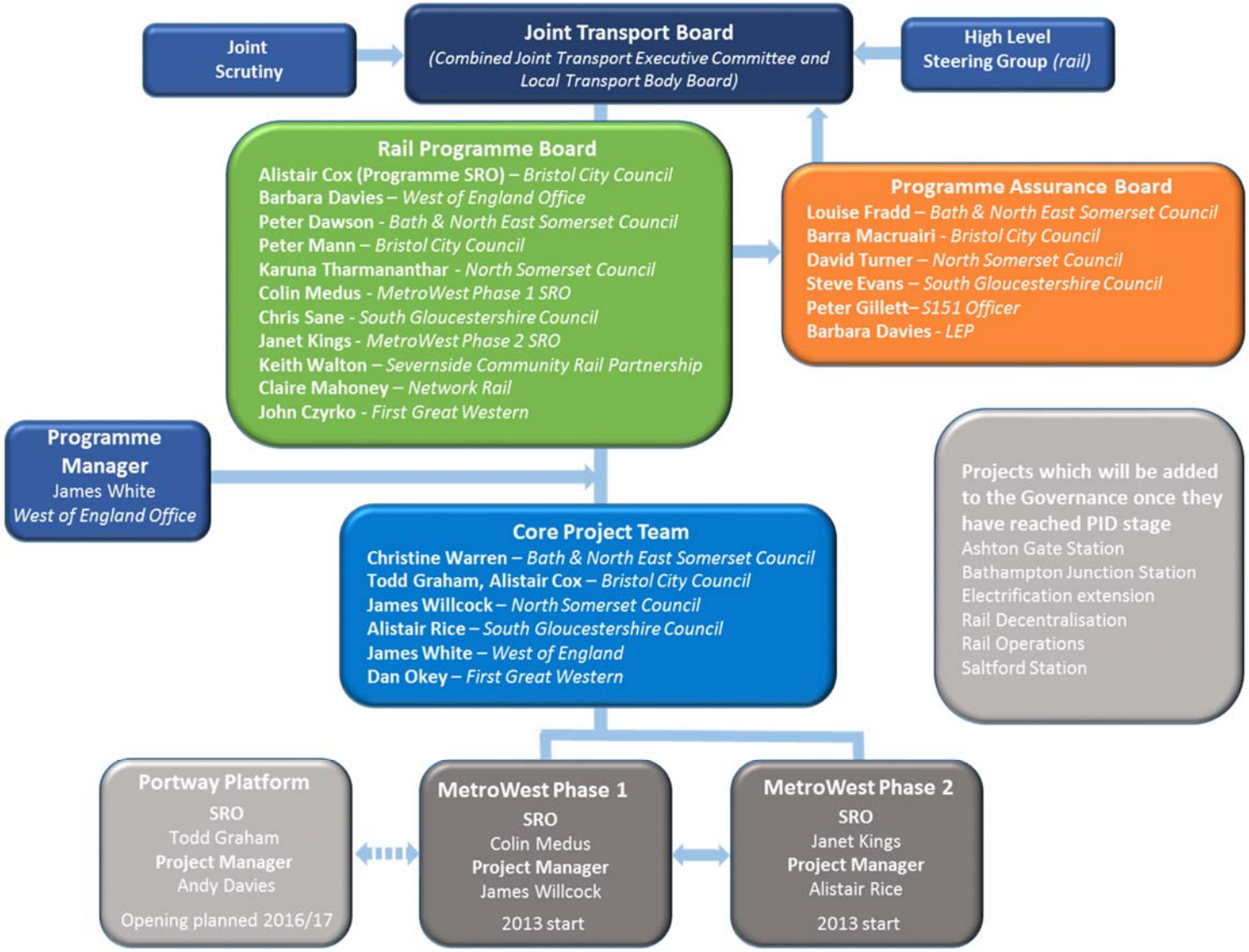
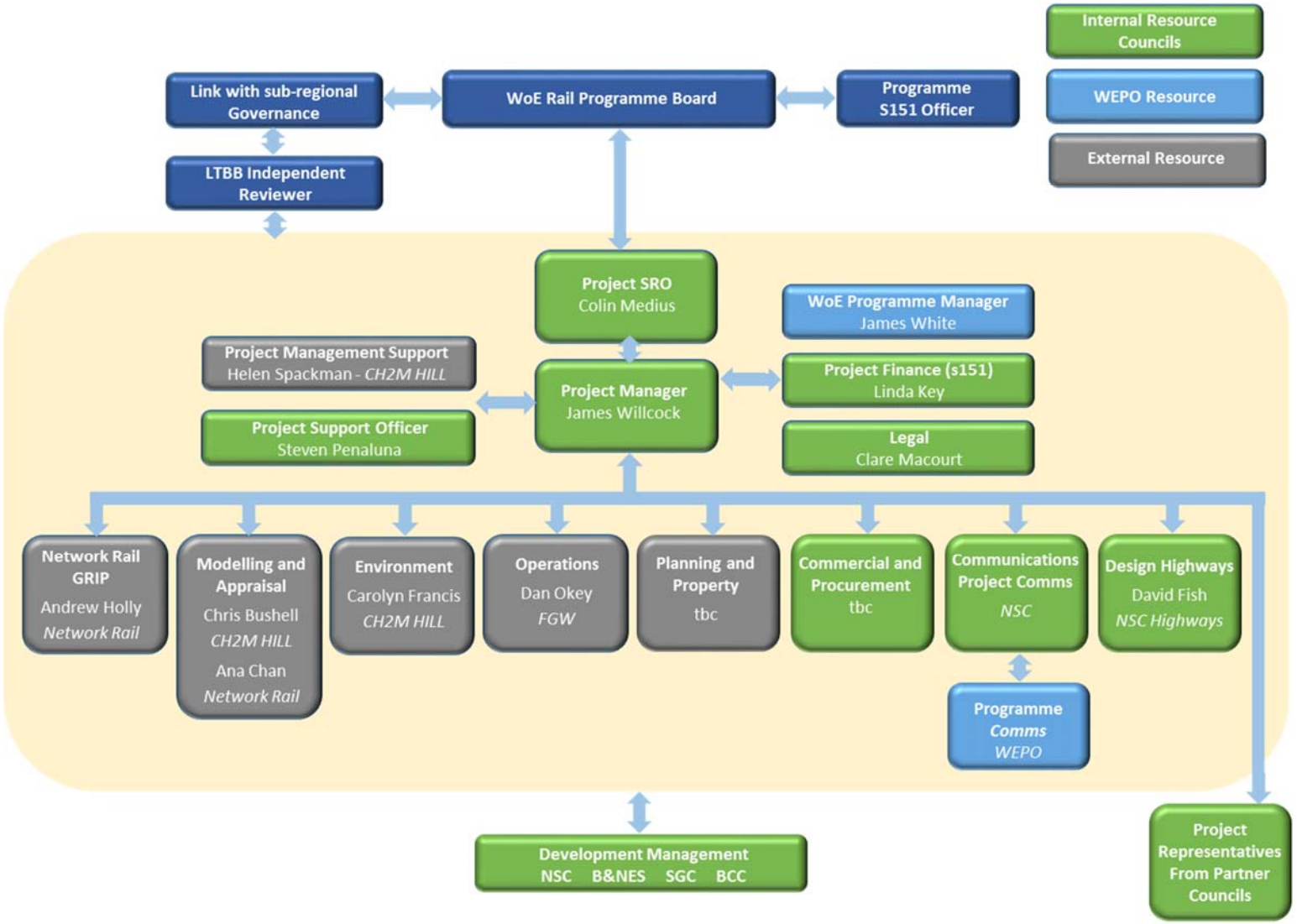


Figure 6.2: MetroWest Phase 1 Project Organogram for Stage 2 & 3 – Project Case / Powers / Procurement Oct 14 to Oct 17



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 1 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 (taken from presentation to NR), as shown in Table 6.3

TABLE 6.3
Project timetable

Project Stage	Stage Description	Indicative Timescales
Stage 1	Feasibility (including GRIP 1-2)	Summer 2013 to Summer 2014
Stage 2	Option development and scheme case (including GRIP 3)	Autumn 2014 to Winter 2015/16
Stage 3	Planning powers and procurement (including GRIP 4-5)	Winter 2015/16 to Autumn 2017
Stage 4	Construction and opening (including GRIP 6-8)	Autumn 2017 to Spring 2019

6.6.2 Project milestones

Key milestones are outlined in Table 6.4.

TABLE 6.4
Project Milestones

Major Milestone	Timescale	Project Phase
Completion of Railsys and GRIP 1-2	Summer 2014	Stage 1 –Feasibility
Completion of preliminary business case	Summer 2014	Stage 1 – Feasibility
Procurement of legal team for DCO	Summer 2014	Stage 1 – Feasibility
Preliminary business case approved by JTB	Summer 2014	Stage 1 – Feasibility
Commencement of DCO work stream	Autumn 2014	Stage 2 -– Option development & scheme case
Completion of GRIP 3 (single option)	Autumn 2015	Stage 2 -– Option development & scheme case
Commencement of formal procurement	Autumn 2015	Stage 2 -– Option development & scheme case
Submit draft DCO planning application	Winter 2015/16	Stage 2 -– Option development & scheme case
Completion of GRIP 4 (Ref Design)	Spring 2016	Stage 3 -Planning powers and procurement
DCO public inquiry	Autumn 2016	Stage 3 -Planning powers and procurement
Train service tender prices received	Winter 2016/17	Stage 3 -Planning powers and procurement
Construction tender prices received (GRIP 5 to 8 - likely to be D&B contract)	Spring 2017	Stage 3 -Planning powers and procurement
Completion of GRIP 5 (final signalling)	Summer 2017	Stage 3 -Planning powers and procurement
DCO received	Summer 2017	Stage 3 -Planning powers and procurement
Full funding approval by JTB and councils	Autumn 2017	Stage 4 - construction and opening

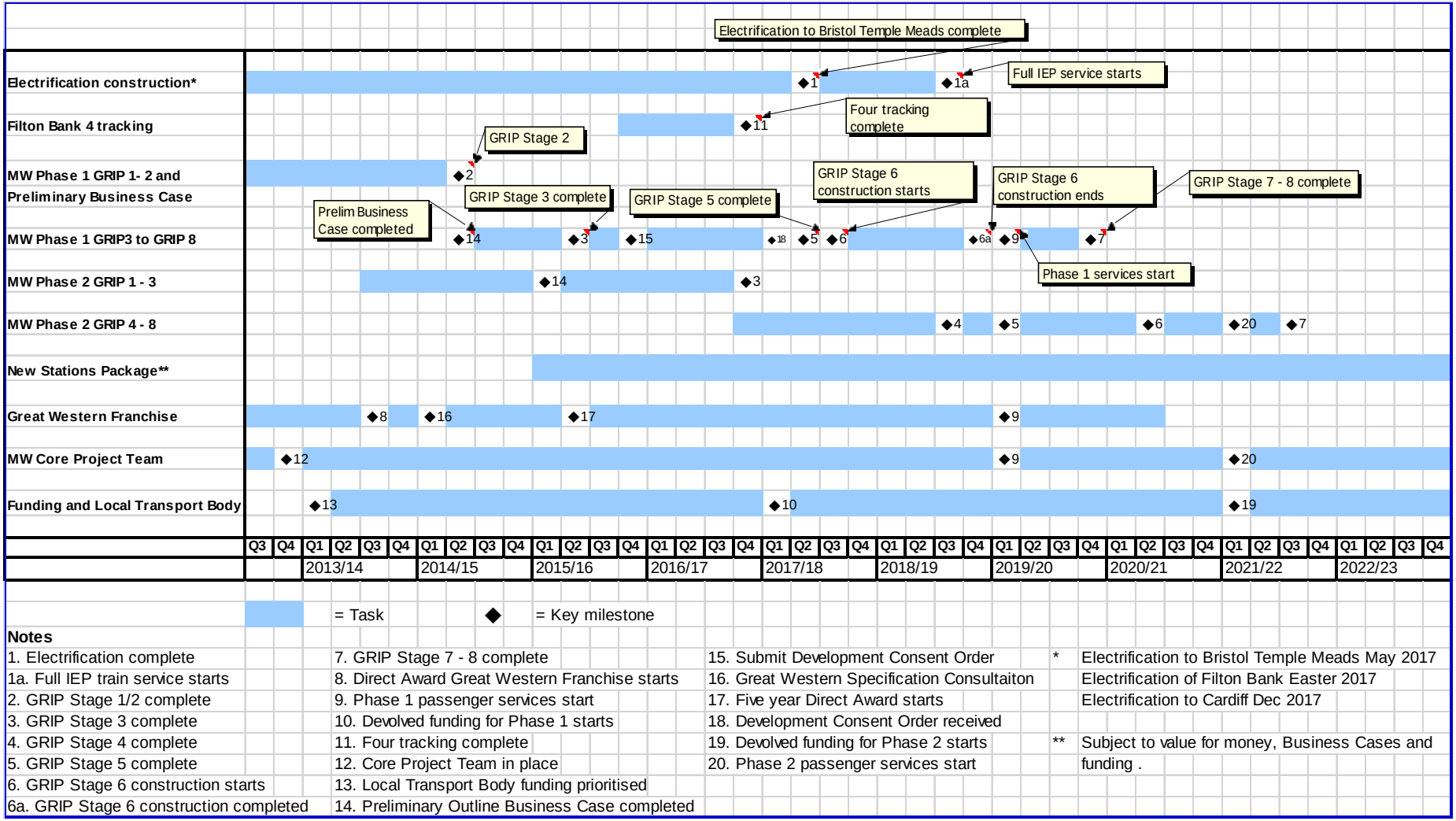
TABLE 6.4
Project Milestones

Major Milestone	Timescale	Project Phase
Commencement of construction GRIP 6	Autumn 2017	Stage 4 - Construction and opening
Completion of construction	April 2019	Stage 4 - Construction and opening
Commencement of passenger trains	May 2019	Stage 4 - Construction and opening
Project handover and close GRIP 7 and 8	June 2020	Stage 4 - Construction and opening

Key tasks on the critical path include:

- Completion of key dependent projects
- Completion of GRIP design work
- Completion of business cases
- Submission of the DCO
- DCO hearing

Figure 6.3: Programme Gantt Chart



Notes

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

Figure 6.4: Project Gantt Chart

	MetroWest Phase 1	2013				2014				2015				2016				2017				2018				2019				2020				2021				2022
	May 2014	2013/4				2014/5				2015/6				2016/7				2017/8				2018/9				2019/20				2020/21				2021/22				
	Quarter # & Month Start	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
	Endorsed Version	Apr	Jul	Oct	Jan	Apr	Jul	Oct	Jan	Apr	Jul	Oct	Jan	Apr	Jul	Oct	Jan	Apr	Jul	Oct	Jan	Apr	Jul	Oct	Jan	Apr	Jul	Oct	Jan	Apr	Jul	Oct	Jan	Apr	Jul	Oct	Jan	
		CSR 2010 to 2014				CSR 2010 to 2014				CSR 2015 to 2021				CSR 2015 to 2021				CSR 2015 to 2021				CSR 2015 to 2021				CSR 2015 to 2021				CSR 2015 to 2021				CSR 2022 to 2027				
	Item	Control Period 4				Control Period 5				Control Period 5				Control Period 5				Control Period 5				Control Period 5				Control Period 6				Control Period 6				Control Period 6				
Pre-GRIP	Basic Services Agreement																																					
	NR Capacity & Demand Analysis																																					
	Scoping GRIP 1-2																																					
	Customer Brief & DSA for G 1-2																																					
	NR Authority for G1-2																																					
	Initial Working Agreement (between Councils)																																					
GRIP 1-2	GRIP1-2 Feasibility																																					
	Environment work stream and Modelling & Appraisal work stream																																					
	Prepare Preliminary Business Case																																					
	Railsys modelling (Phase 1 & Phase 2), based on CRI5																																					
	Informal Stakeholder engagement/consultation																																					
	Independent Review of Preliminary Business Case																																					
	Preliminary Business Case to LTBB & Option for G3 (Sept 14)																																					
	Environmental surveys (Habitat & listed species) surveys																																					
	EIA and TA screening/scoping																																					
	Customer Brief & DSA for G3																																					
	NR Authority for G3																																					
	Preliminary BC, Option for GRIP3 and JPA authorised by Councils (Oct / Nov 14)																																					
GRIP 3	GRIP3 Option Selection																																					
	Procurement of Legal Team for DCO																																					
	Prepare Outline Business Case																																					
	Fully Validated Railsys timetable																																					
	Procurement Strategy																																					
	DCO Pre-app & EIA / TA																																					
	Train Operations Strategy																																					
	General & local elections (May 15)																																					
	Stakeholder engagement/consultation																																					
	Draft GRIP 3 report (July 15)																																					
	Assemble DCO evidence base inc Environmental Statement																																					
	Complete and sign off GRIP 3 (Sept 15)																																					
	Formal Procurement Process (Construction & Train Service)																																					
	Independent Review of Outline Business Case																																					
	Outline Business Case to LTBB (Oct 15)																																					
	Outline BC, Train Service Liabilities and Resources authorised by Councils (Nov / Dec 15)																																					
	Submit DCO (Feb 2016)																																					
	Customer Brief & DSA for G4																																					
	NR Authority for G4																																					
GRIP 4 - 5	GRIP 4 Single Option Development																																					
	Stakeholder engagement/consultation																																					
	Early Contractor Engagement (construction)																																					
	DCO Hearing (Nov 16)																																					
	Full Business Case																																					
	Customer Brief & DSA for G5																																					
	Engagement with Prefered Train Operator																																					
	NR Authority for G5																																					
	GRIP5 Detailed Design																																					
	Stakeholder engagement/consultation																																					
	Development Consent Order Received (Sept 17)																																					
	Independent Review of Full Business Case																																					
	Full Business Case to LTBB (Oct 17)																																					
	Councils discharge DCO locally																																					
	Full BC, Final Train Service Liabilities & Final Resources authorised by Councils (Nov 2017)																																					
	Customer Brief & CA for G6-8																																					
	NR Authority for G6-8																																					
	Full Vegetation Clearance																																					
GRIP 6-8	GRIP 6 - Construction, Testing, Commissioning																																					
	Award of Construction Contract																																					
	Award of Train Service Contract / Trigger Franchising Provisions (Nov 2017)																																					
	Construction (commencing Dec 17)																																					
	Testing & Commissioning																																					
	Commencement of Passenger Train Services (May 19)																																					
	GRIP 7 & 8 (project hand-back & close-out)																																					
	Evaluation Plan																																					
		2013/4				2014/5				2015/6				2016/7				2017/8				2018/9				2019/20				2020/21				2021/22				
	GW Electrification Construction																?																					
	Filton Bank 4 tracking Construction																?																					
Other	GW Franchise – Consultation							?																														
	IEP Train Services Start																				?																	
	Full IEP timetable starts																												?									
	New First Great Western Contract(s)																																					
	GW Competed Management Contract																																?					
	GW franchise 2020+																																					

6.6.3 Stage 1 – Feasibility

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

The Strategic deliverables include:

- Emerging Scheme Consenting Strategy, which is discussed in Chapter 4
- Portishead Station Options Appraisal (Appendix F)

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

- GRIP 1-2 Feasibility Report
- Alignment Engineering Drawings and General Arrangement Engineering Drawings
- Qualitative Cost Risk Assessment
- Capacity Analysis (Railsys) Report
- Environmental Assessment
- Signalling Appraisal
- Track Bed Investigation
- Visualisation of proposed bridges

The **Highway deliverables include (see Appendix G):**

- Concept Engineering Design Drawings for Portishead station and related highway works
- High Level Bill of Quantities for Portishead station and related highway works

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.

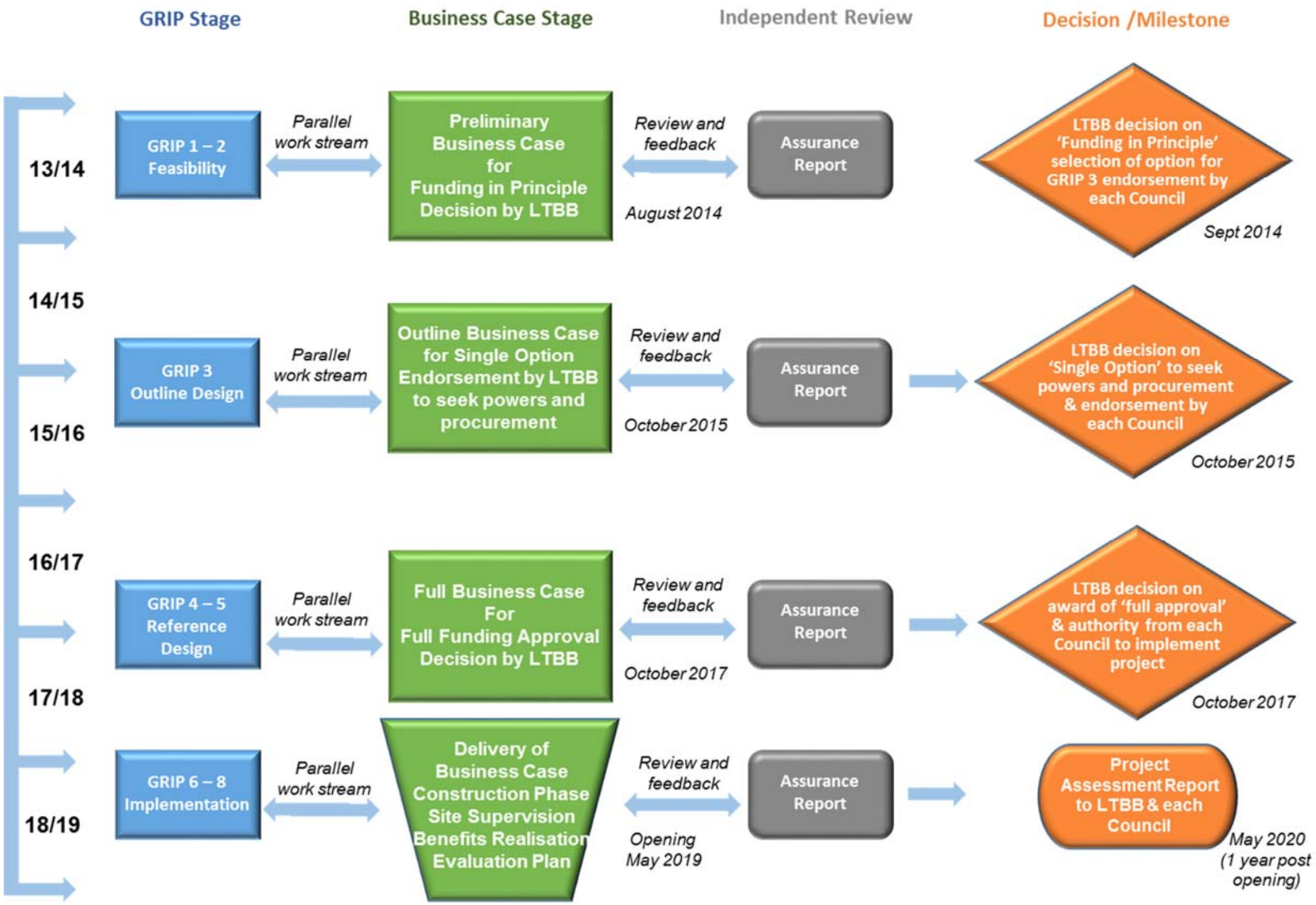
Internal and rail industry processes:

- 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:

- The DCO process - providing 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 1 was approved by the LTBB as the 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 as 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 LTB will require an independent review of documentation. It will be developed in accordance with DfT's WebTAG.

6.7.2 The GRIP process

The MetroWest Phase 1 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 LTBB process of review and approval.

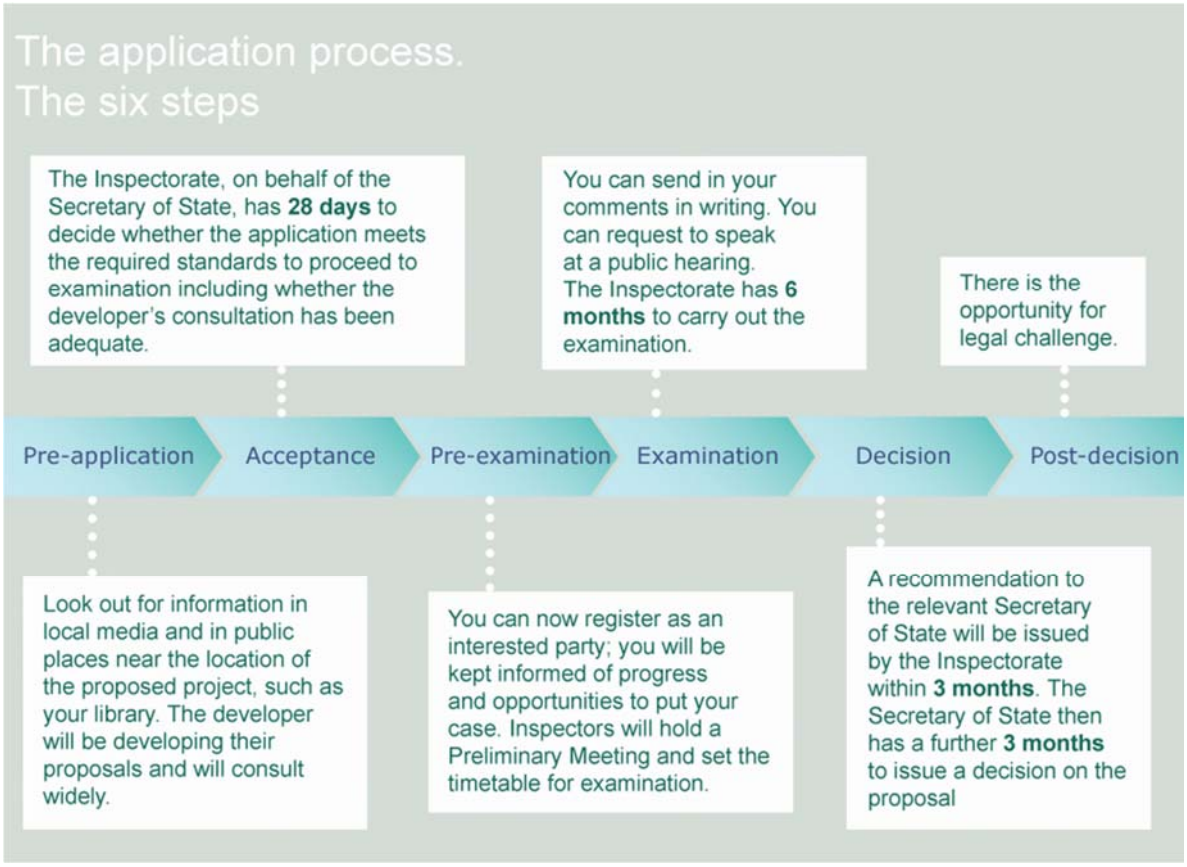
6.7.3 The Development Consent Order process

MetroWest Phase 1 is deemed to be a Nationally Significant Infrastructure Project (NSIP) and will, therefore, require a Development Consent Order (DCO). The government has delegated responsibility for overseeing the DCO process to the Planning Inspectorate (PINS). The DCO process is a six-stage process entailing:

- Pre-application
- Acceptance
- Pre-examination
- Examination
- Decision
- Post-decision.

An integral part of the process is the engagement of public and stakeholders throughout the process, as illustrated in Figure 6.7.

Figure 6.7- Public scrutiny of Development Consent Orders



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, where appropriate - 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:

o Establishing a review team

o Agreed scope and timescale

o Agreed list of documentation for the Programme SRO to provide in advance

o 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:

o Preliminary business case

o Outline business case

o Full business case

o 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:

o GRIP 1-2 Output definition/feasibility report

o GRIP 3 Option selection report

o GRIP 4 Single option development report

o GRIP 5 Detailed design report

o 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 JTB progress and status related to the DCO process including:

o Application form

o Plans/drawings/sections

o Draft development consent order

o Compulsory acquisition information (including 'statement of reasons', 'funding statement' and 'book of reference')

o Consultation report

o Environmental impact assessment

o Transport assessment (and supporting modelling information)

o Flood risk assessment report

o Environmental protection information

o Details of other consents and licences

- Reporting to the Rail Programme Board and the JTB the overall management of the **project/programme**.

o Highlights reports

o Exception reporting

o Project risk register

o Issue log

6.8 Communications and Stakeholder Management

6.8.1 Communications with stakeholders and the public

In general terms, the MetroWest Phase 1 scheme has a good level of public support. Indeed, the West of England Rail Conference on 4 November 2011 established the top three priorities for rail as the Greater Bristol Metro, the Portishead line and additional rolling stock. In addition, the Greater Bristol Rail website has galvanised stakeholder support for MetroWest with over 34,000 hits since its launch in February 2012.

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 local and national train operators including First Great Western, CrossCountry and South West trains. 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. Their priorities were MetroWest Phase 1 first and then MetroWest Phase 2. 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 Portishead Railway Group, 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.

Informal public consultation was undertaken in 2013 and June/July 2014 about the location of Portishead station location.

6.8.2.4 Portishead Station Public Consultation June to July 2014

A public consultation was undertaken from 16th June to 28th July 2014 on the location of Portishead rail station. The consultation set out three viable station locations together with information on other options which considered through an Options Appraisal report. A consultation postcard was mailed to every property (residential and commercial) with 400 metres for rail line in Portishead. Two public consultation exhibitions were held (24th and 28th June) in Portishead, and 366 people these over the two days.

A total of 407 responses to the consultation were received. All respondents supported the reopening of the Portishead railway line and the construction of a new station. Positive and negative comments were made about the closeness of all options to both the town centre and nearby residents. People were concerned about the amount of parking that would be available on each option and its possible impact on nearby residential streets.

Some people were concerned that because some options require the acquisition of third party land that this would create an extra delay and cost to the project. A number of people favoured more than one option in their comments. In response to the question “On the basis that one of the three station locations is selected, would you use the station?”; the following responses were received:

- Of the 407 respondents, 374 gave some answer to this question
- 340 people said they would use the station at the three sites
- Only 34 people said they would not use the station

In summary 91% of the responses said they would use the station on the basis that one of the three locations is selected.

6.8.2.5 MetroWest information brochures

In Spring 2014, an eight-page consultation brochure was prepared and distributed. This provided information on MetroWest Phase 1.

An overview leaflet covering both MetroWest Phase 1 and 2 and other rail projects was published in early summer 2014."

6.8.2.6 TravelWest stakeholder event - 13 October 2013

Around 70 delegates attended the TravelWest stakeholder event at BAWA Healthcare and Leisure on 13th 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.

6.8.2.7 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 and reopening the Portishead Line (now combined under MetroWest) were included in the final JLTP3, published in March 2011.

6.8.2.8 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.

6.8.2.9 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

6.8.2.10 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'.

6.8.2.11 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.

6.8.3 Consultation and the DCO process

Consultation will be ongoing throughout the development of the scheme. Importantly, consultation is a statutory requirement at a key part of the DCO process.

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 1 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:

- Scope creep arising from stakeholder expectations or revisions to political priorities, causing delay to programme
- Train service revenue support costs not affordable or councils not willing to commit, causing delay to programme
- Infrastructure requirements of the project are more than initially scoped by Network Rail and increase the capital costs of the project which increase the funding gap and weaken the business case, causing delay to programme

A risk management workshop was held as part of the GRIP 1/2 work in May 2014. The resultant risk register is presented in Appendix C of the GRIP 1/2 report (Appendix A of this report).

This analysis shows that the top ten project risks are:

- More works might be required at Avon Road, such as embankment works and reconstruction of the asset, leading to costs above the provision in the estimate.
- The freight operating company might request additional scope at Bristol.
- Additional requirement for signalling leading to extra works.
- Identification of additional works during the DCO process.
- Additional works at Portishead station.
- Construction road access restrictions (Bristol port negotiations, unknown scope).

- Rail possession access at double junction and freight line access agreement.
- Inflation assumptions underestimate costs.
- Additional deliverables at detailed design.

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 requirements
- Plan management details

6.10.2 Monitoring and evaluation

Monitoring and evaluation, both during delivery of the project and post-completion, will be vital to assess the benefits' realisation. The assurance framework requires this in line with DfT guidance. Evaluation will be useful to improve performance throughout and to provide lessons learnt for other projects and programmes by the authorities, DfT and others.

Responsibility for evaluation and monitoring needs to sit outside of the Rail Programme Board. The results of the monitoring and evaluation will be independently reviewed and published.

Data collected to demonstrate a robust evaluation process will include:

- Direct indicators – such as patronage, reliability, and passenger satisfaction, as well as mode shift from the private car
- Indirect indicators – including traffic congestion and vehicle mileage, use of complementary modes (such as cycling), air quality, carbon emissions and road safety
- Complementary indicators – including impacts on economic performance

Performance against indicators will be reported to JTB, the Programme Assurance Board and Rail Programme Board. All partners will be obliged to provide and support the data collection activities agreed in the Monitoring and Evaluation Plan. The Rail Programme Board will have the discretion to commission additional monitoring and evaluation throughout the project using the exception reporting and change control procedures.

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 1 is being led by North Somerset Council on behalf of the West of England councils. North Somerset Council have established and proven project management protocols which are aligned with PRINCE2 principles.

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

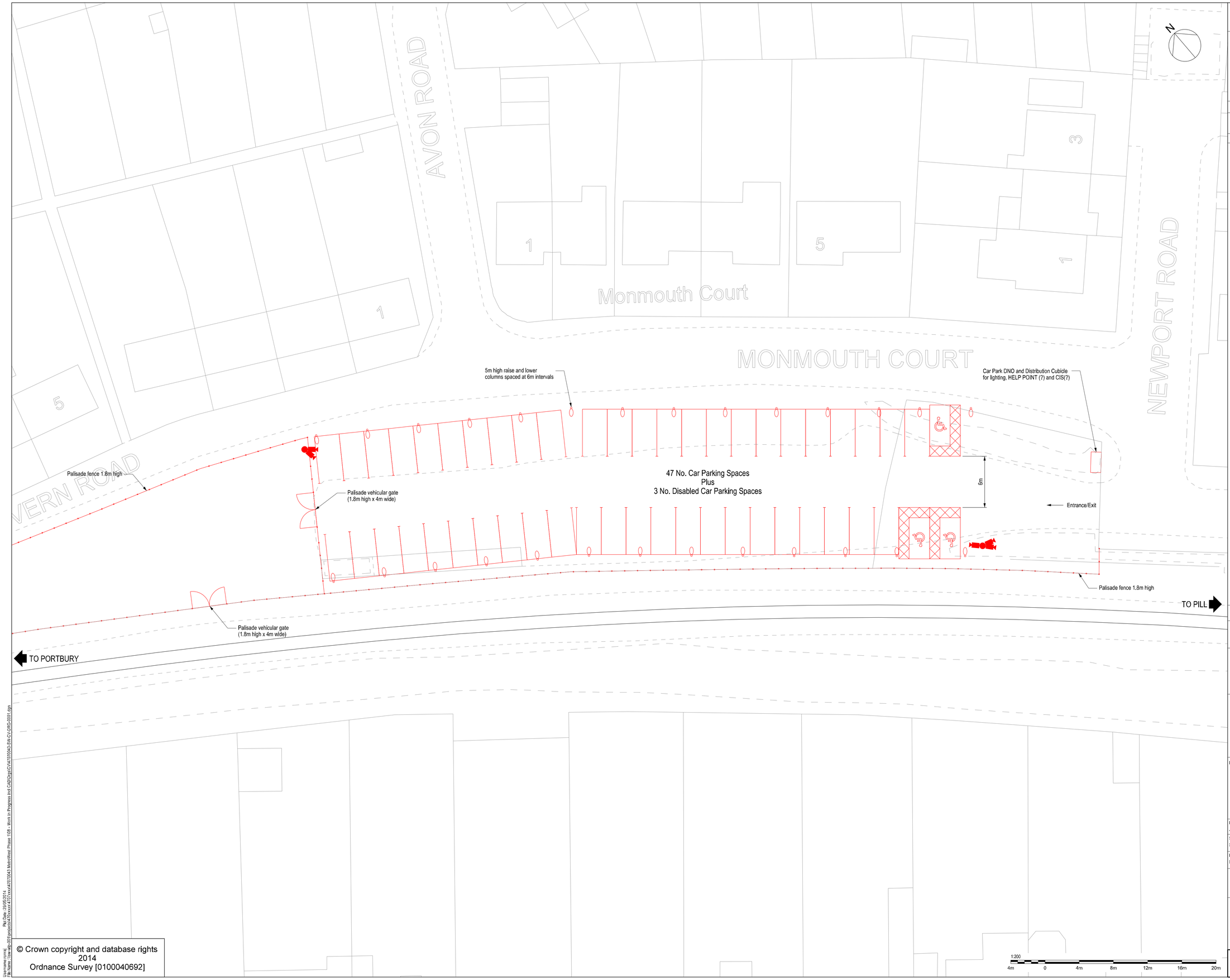
- Learn from experience
- Defined roles and responsibilities
- Manage by stages
- Manage by exception
- Focus on products
- Tailor to suit the project environment

In summary the councils have deployed proven project management principals and have the capability and capacity to successfully deliver MetroWest Phase 1.

6.12 Summary of management case

In summary:

- 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 1 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 a developed 'intelligent client' capability and 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 1 scheme from its inception
- There is considerable public support for the scheme



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Construction Risks	Maintenance/cleaning Risks	Demolition/adaptation Risks

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SAFETY HEALTH AND ENVIRONMENTAL INFORMATION BOX

NOTES

1. 47 No. car parking spaces to be 2.9m x 5.5m.
2. 3 No. Disabled car parking spaces.

LEGEND:

- CCTV Camera
- Camera Column

Revision Details	By	Chkd	Appd	Checked Date	Suffix

Purpose of Issue: GRIP 2

Client: Network Rail

Project Title: UID 140569 METROWEST PHASE 1

Drawing Title: PROPOSED PILL STATION CAR PARK PLAN

Designed	Drawn	Checked	Approved	Date
J. Coram	M. Fairchild	S. Turner	M. Summerfield	27/05/2014

Suitability	URS Internal Project No.	Project Manager
S1	47070043	Karl Hatala karl.hatala@urs.com +44 (0)1793 508787
ELR / Mileage	Scale @ A1	
POD 126m 20ch	1:200	

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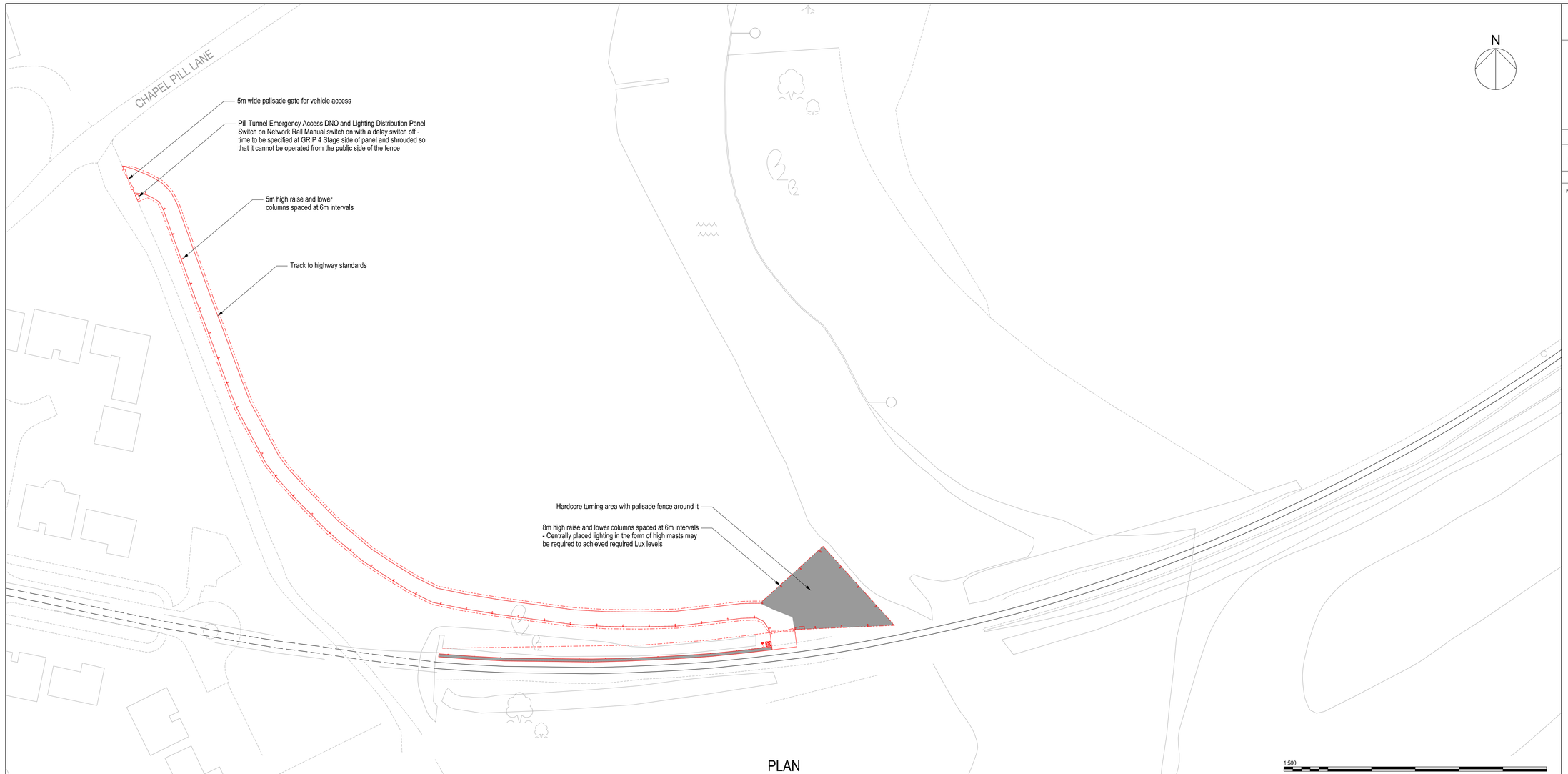
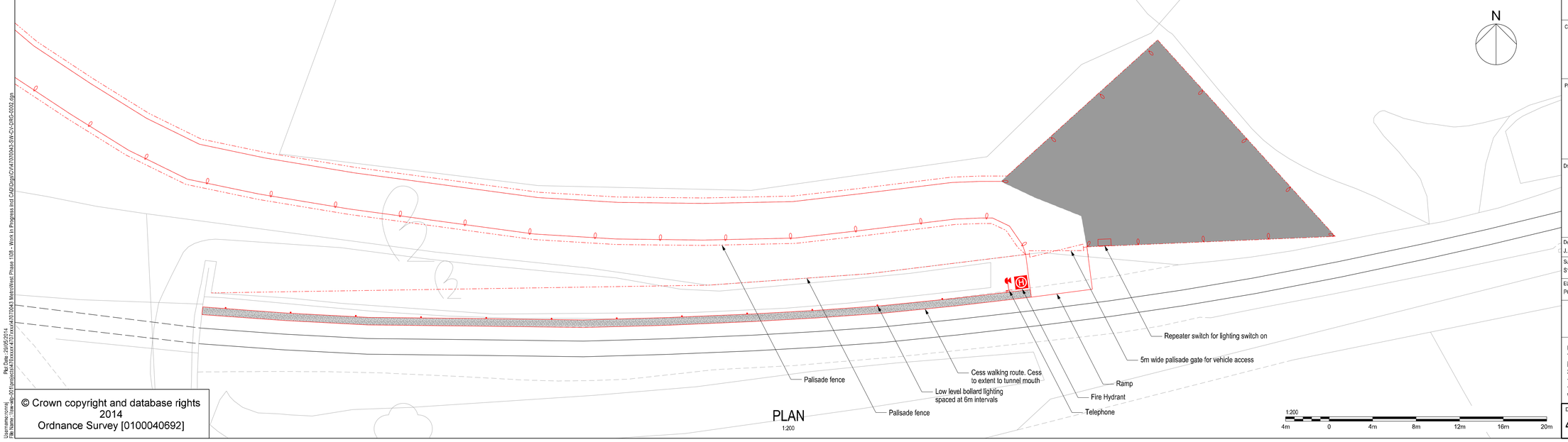
Drawing Number	Rev
47070043-SW-CV-DRG-0001	P01

Plot Date: 29/05/2014
Username: ronnij
File Name: \\ew-file-001\projects\47070043\Drawings\CIVIL\47070043-SW-CV-DRG-0001.dgn



PLAN
1:500



PLAN
1:200

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Plot Date: 29/05/2014
User name: chrisfairchild
File Name: I:\network\47070043 MetroWest Phase 1\08 - Work in Progress\Civil\CAD\Dwg\SC\47070043-SW-CV-DRG-0002.dgn

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Construction Risks	Maintenance/cleaning Risks	Demolition/adaptation Risks

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SAFETY HEALTH AND ENVIRONMENTAL INFORMATION BOX

NOTES

Revision Details	By	Chkd	Appd	Checked Date	Suffix

Purpose of Issue: GRIP 2

Client: Network Rail

Project Title: UID 140569 METROWEST PHASE 1

Drawing Title: PILL TUNNEL EVACUATION ROUTE PLAN

Designed	Drawn	Checked	Approved	Date
J. Coram	M. Fairchild	S. Turner	M. Summerfield	27/05/2014

Suitability	URS Internal Project No.	Project Manager
S1	47070043	Karl Hatala karl.hatala@urs.com +44 (0)1793 508787
ELR / Mileage POD 125m 63ch	Scale @ A1 As Shown	

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Drawing Number	Rev
47070043-SW-CV-DRG-0002	P01

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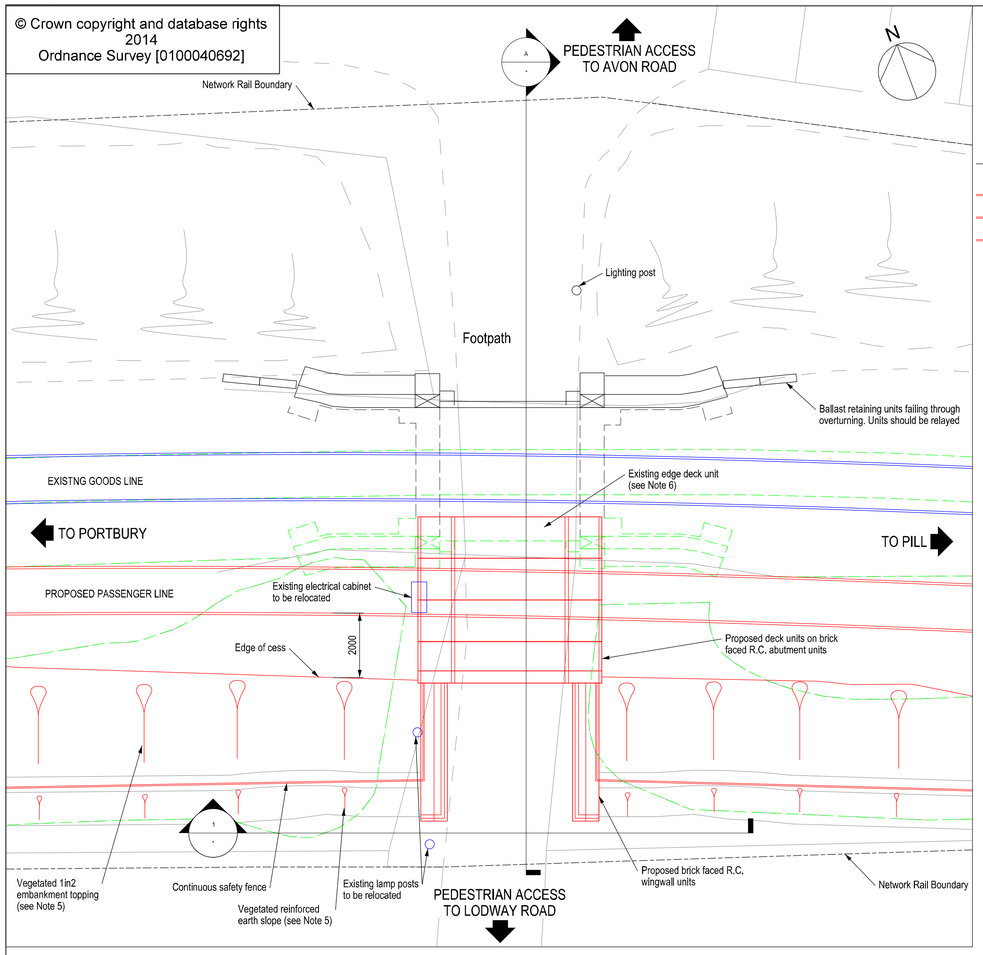
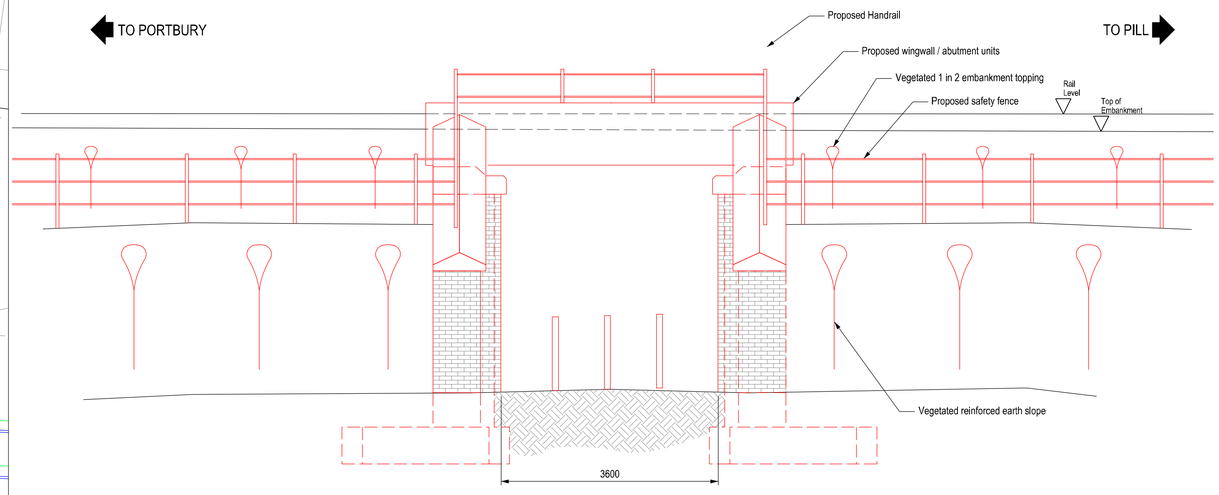


PLAN
1:100



ELEVATION 1
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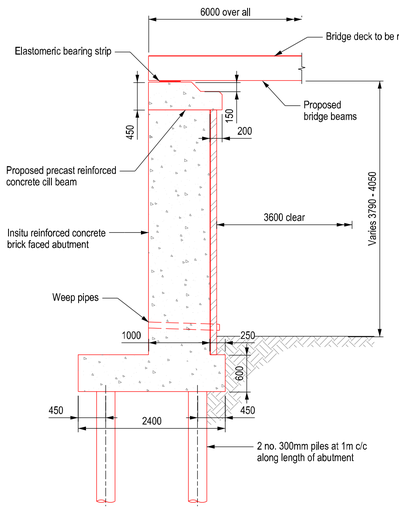

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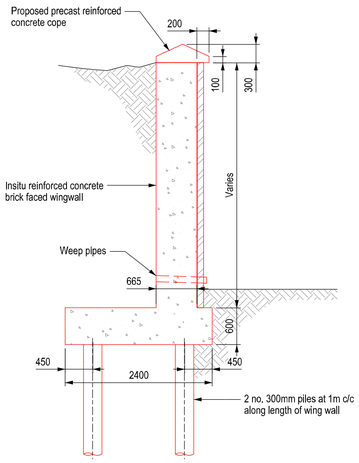
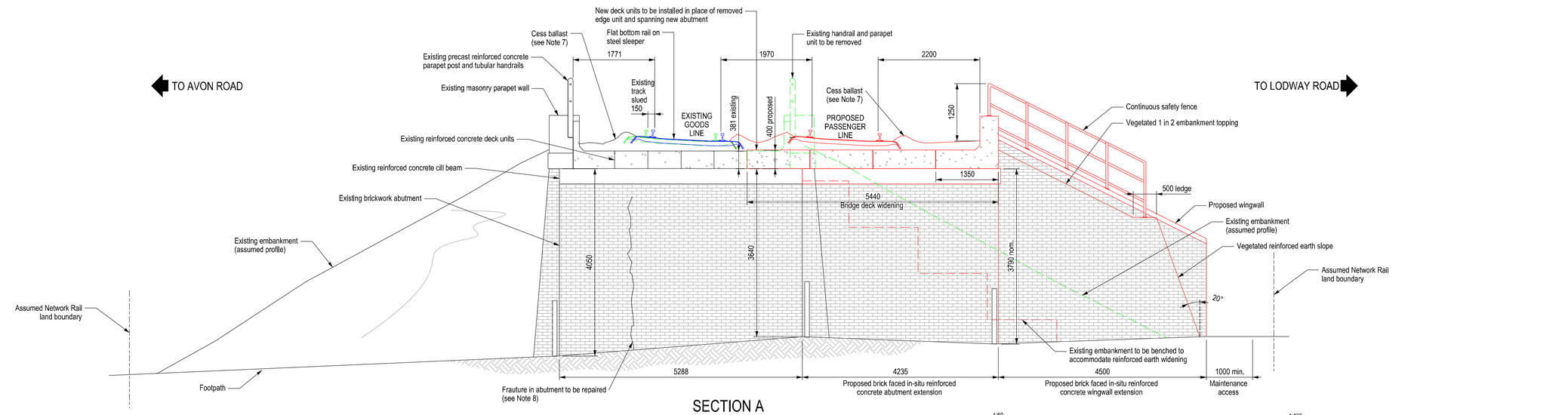


PROPOSED WINGWALL SECTION
1:50



SECTION A
1:50

1:50 — 1m 0 1m 2m 3m 4m 5m
1:100 — 2m 0 2m 4m 6m 8m 10m

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Construction Risks	Maintenance/cleaning Risks	Demolition/adaptation Risks

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SAFETY HEALTH AND ENVIRONMENTAL INFORMATION BOX

NOTES

1. This drawing is to be read in conjunction with all other relevant documentation.
2. Do not scale from this drawing, use only printed dimensions.
3. All dimensions in millimetres, all chainages, levels and coordinates are in metres unless defined otherwise.
4. This drawing is to be read in conjunction with the project Health & Safety file for any identified potential risks.
5. Extent of new reinforced earth slope and embankment extension to be determined.
6. Existing edge deck units to be removed, return wing wall to be broken out 1m below sleeper level.
7. Ballast depths across bridge to be determined. Possible track lift required to ensure minimum 150mm depth.
8. The vertical fracture on both the upside and downside abutment should be repaired.
9. Pedestrian lighting to be installed on the underside of the bridge.
10. Proposals shown should be verified at detailed design stage with a topographical survey and ground investigation.

Colour Key
- New/Proposed Works
- Existing Works to be Removed
- Existing Works
- Existing Works to be Modified

Revision Details	By	Chkd	Appd	Checked Date	Suffix

Purpose of Issue
GRIP 2

Client
Network Rail

Project Title
UID 140569
METROWEST
PHASE 1

Drawing Title
PROPOSED
GENERAL ARRANGEMENT
UNDERBRIDGE @ 126m 29.5ch

Designed	Drawn	Checked	Approved	Date
J. Coram	R. Raj	S. Turner	M. Summerfield	27/05/2014

Suitability	URS Internal Project No.	Project Manager
S1	47070043	Karl Hatala karl.hatala@urs.com +44 (0)1793 508787
ELR / Mileage	Scale @ A1	
POD 126m 29.5ch	As Shown	

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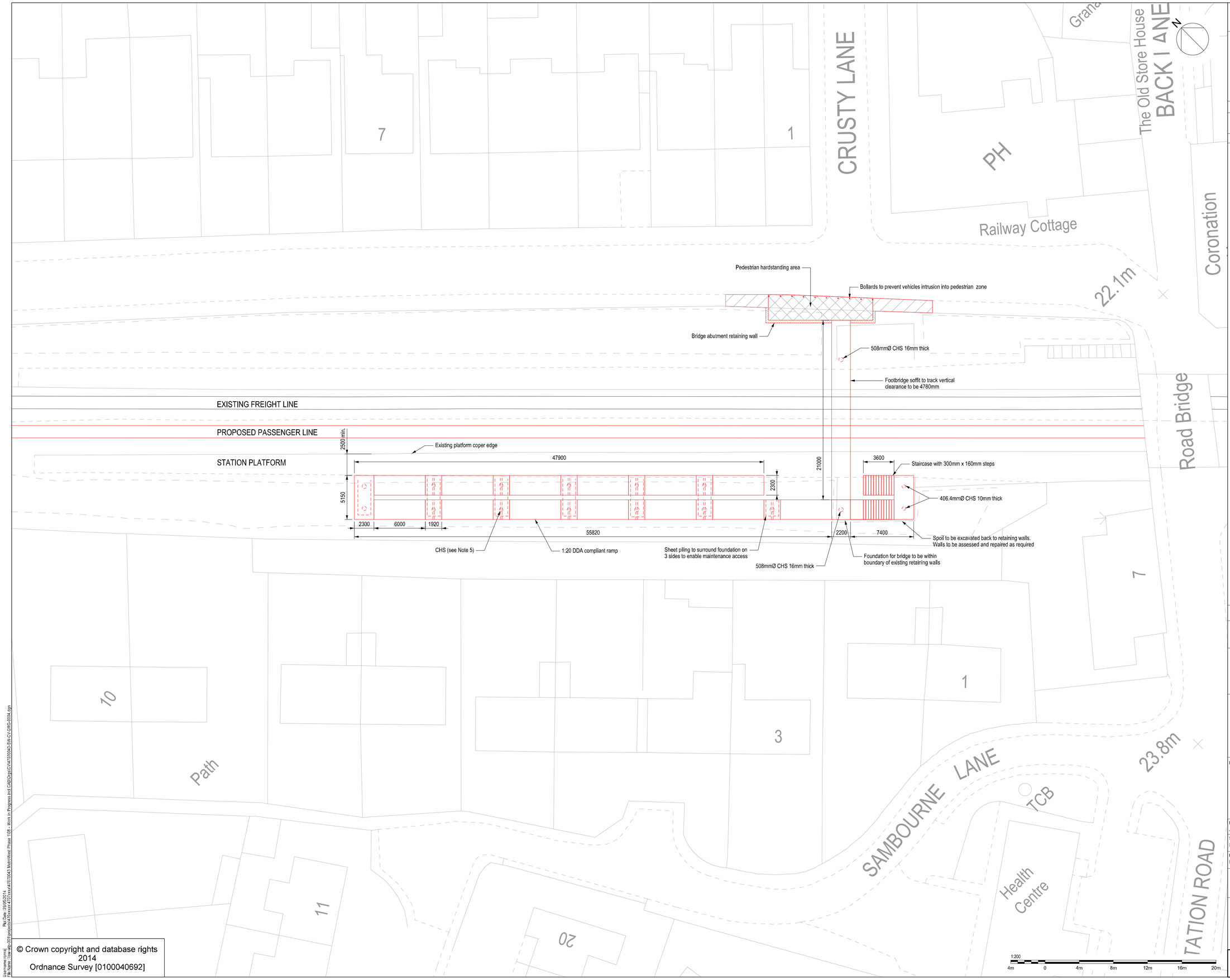
Drawing Number
47070043-SW-CV-DRG-0003

Rev
P01

Plot Date: 29/05/2014
Username:rcorraj
File Name: \\ww-file-001\projects\47070043 MetroWest Phase 1\05 - Work In Progress\cad\Digital\47070043-SW-CV-DRG-0003.dgn



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Construction Risks	Maintenance/cleaning Risks	Demolition/adaptation Risks

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It is assumed that all works on this drawing will be carried out by a competent contractor working, where appropriate, to an appropriate method statement.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION BOX

NOTES

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3. All dimensions in millimetres, all chainages, levels and coordinates are in metres unless defined otherwise.
4. This drawing is to be read in conjunction with the project Health & Safety file for any identified potential risks.
5. Where ramp supports >3.25m, 508mmØ, CHS 10mm thick to be used, where <3.25mm then 406.4mmØ 10mm thick to be used.

Revision Details	By	Chkd	Appd	Checked Date	Suffix

Purpose of Issue
GRIP 2

Client
Network Rail

Project Title
UID 140569
METROWEST
PHASE 1

Drawing Title
PILL STATION
PROPOSED FOOTBRIDGE
OPTION 1

Designed	Drawn	Checked	Approved	Date
J. Coram	R. Raj	S. Turner	M. Summerfield	27/05/2014

Suitability	URS Internal Project No.	Project Manager
S1	47070043	Karl Hatala karl.hatala@urs.com +44 (0)1793 508787
ELR / Mileage POD 126m 10.25ch	Scale @ A1 1:200	

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Rev
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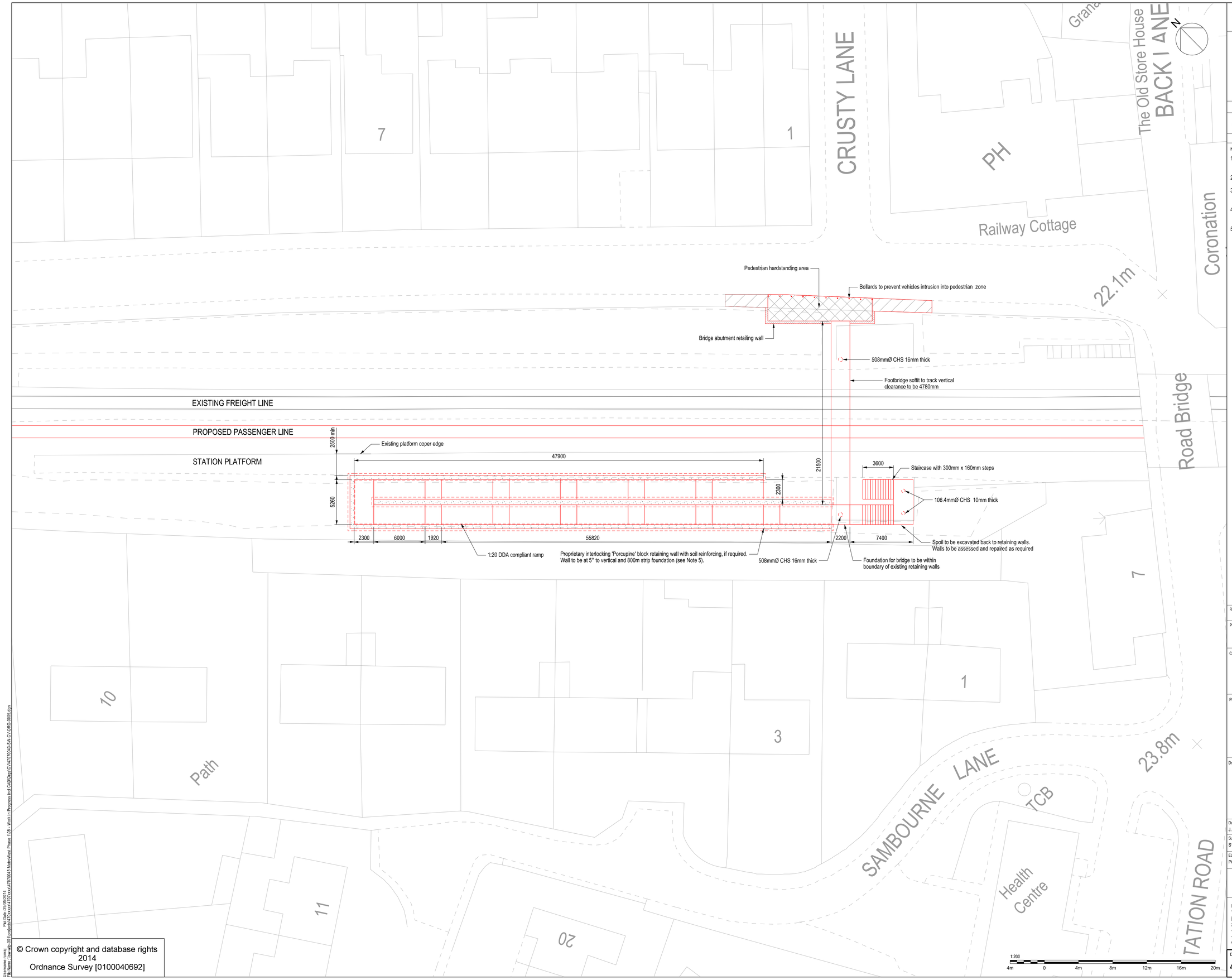

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SAFETY HEALTH AND ENVIRONMENTAL INFORMATION BOX

NOTES

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3. All dimensions in millimetres, all chainages, levels and coordinates are in metres unless defined otherwise.
4. This drawing is to be read in conjunction with the project Health & Safety file for any identified potential risks.
5. Height of retaining wall to vary depending on location in embankment and is to be determined at detailed design following a topo survey at the next GRIP stage.

Revision Details	By	Chkd	Appd	Checked Date	Suffix

Purpose of Issue
GRIP 2

Client
Network Rail

Project Title
UID 140569
METROWEST
PHASE 1

Drawing Title
PILL STATION
PROPOSED FOOTBRIDGE
OPTION 2

Designed	Drawn	Checked	Approved	Date
J. Coram	R. Raj	S. Turner	M. Summerfield	27/05/2014

Suitability	URS Internal Project No.	Project Manager
S1	47070043	Karl Hatala karl.hatala@urs.com +44 (0)1793 508787
ELR / Mileage POD 126m 10.25ch	Scale @ A1 1:200	

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Drawing Number
47070043-SW-CV-DRG-0005

Rev
P01

PLAYGROUND

TANSY LANE

MP 129.25

Pedestrian link connection with Portishead Station

Cable trunking or conduit around the bridge is to be considered during the GRIP 3 stage of the project to enable lights on bridge to be wired as well as providing a cable route from one side of the railway to the other.

Double sided DNO and Distribution Cubicle in the fenceline

8m columns may be required along this side of the bridge depending on the bridge side wall construction to over come shadow effects. Alternatively a flat glass light on frame above bridge deck so a minimum 3m headroom is achieved could be installed

Flat glass light on frame above bridge deck so a minimum 3m headroom is achieved

8m columns may be required along this side of the bridge depending on the bridge side wall construction to over come shadow effects. Alternatively a flat glass light on frame above bridge deck so a minimum 3m headroom is achieved could be installed

2200

3300 Typ.

1000

2200

1920 Typ.

6000 Typ.

8m high raise and lower columns spaced at 10m intervals

Pedestrian link

Pedestrian link/cycleway

6

1:200

4m 0 4m 8m 12m 16m 20m

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Construction Risks	Maintenance/cleaning Risks	Demolition/adaptation Risks

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SAFETY HEALTH AND ENVIRONMENTAL INFORMATION BOX

NOTES

1. Former crossing

Revision Details	By	Chkd	Appd	Checked Date	Suffix

Purpose of Issue: GRIP 2

Client: Network Rail

Project Title: UID 140569 METROWEST PHASE 1

Drawing Title: GALINGALE WAY FOOTBRIDGE OPTION 1 PLAN

Designed	Drawn	Checked	Approved	Date
J. Coram	M. Fairchild	S. Turner	M. Summerfield	27/05/2014

Suitability	URS Internal Project No.	Project Manager
S1	47070043	Karl Hatala
ELR / Mileage	Scale @ A1	karl.hatala@urs.com
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Drawing Number: 47070043-SW-CV-DRG-0011

Rev: P01

Username:corma
Use Notes: Manager
Plot Date: 28/05/2014
File Name: J:\projects\47070043 MetroWest Phase 1\08 - Work in Progress Incl CAD\Drg\CIV\47070043-SW-CV-DRG-0011.dgn

PLAYGROUND

TANSY LANE

N

Cable trunking or conduit around the bridge is to be considered during the GRIP 3 stage of the project to enable lights on bridge to be wired as well as providing a cable route from one side of the railway to the other.

Pedestrian link connection with Portishead Station

MP 129.25

Double sided DNO and Distribution Cubicle in the fenceline

Flat glass light on frame above bridge deck so a minimum 3m headroom is achieved

8m columns are the most cost effective way to light the bridge but depending on the side wall construction alternative lighting such as the frames to sit above the deck or low level lighting as part of the bridge construction may be necessary to over come shadow effects.

2200 Typ.

3300 Typ.

1000 Typ.

Pedestrian link/cycleway

Pedestrian link

2200 Typ.

1920 Typ.

6000 Typ.

6

1:200

4m 0 4m 8m 12m 16m 20m

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SAFETY HEALTH AND ENVIRONMENTAL INFORMATION BOX

NOTES

1. Former crossing

Revision Details	By	Chkd	Appd	Checked Date	Suffix

Purpose of Issue: GRIP 2

Client: Network Rail

Project Title:
UID 140569
METROWEST
PHASE 1

Drawing Title:
GALINGALE WAY FOOTBRIDGE
OPTION 2
PLAN

Designed	Drawn	Checked	Approved	Date
J. Coram	M. Fairchild	S. Turner	M. Summerfield	27/05/2014

Suitability	URS Internal Project No.	Project Manager
S1	47070043	Karl Hatala
ELR / Mileage	Scale @ A1	karl.hatala@urs.com
POD 129m 06ch	1:200	+44 (0)1793 508787

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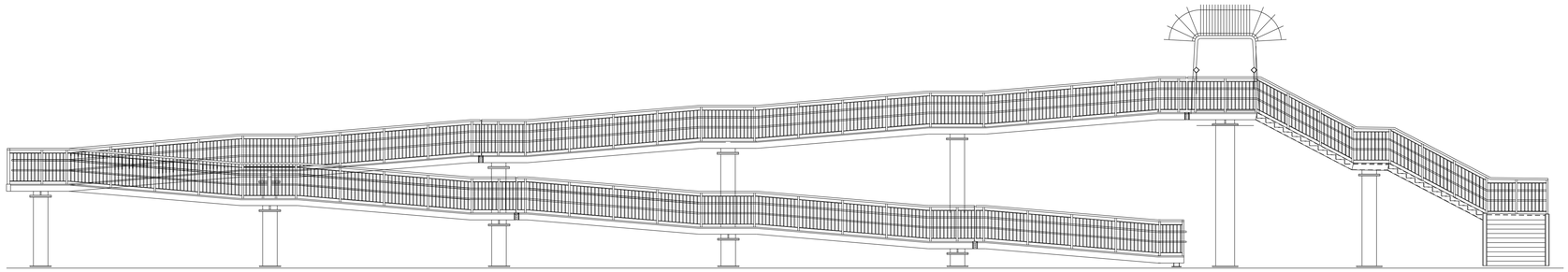
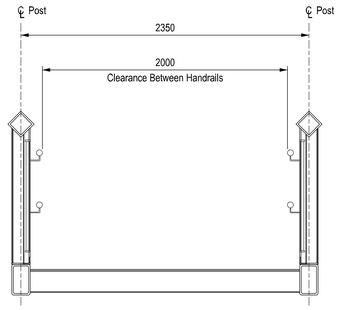
Drawing Number	Rev
47070043-SW-CV-DRG-0012	P01

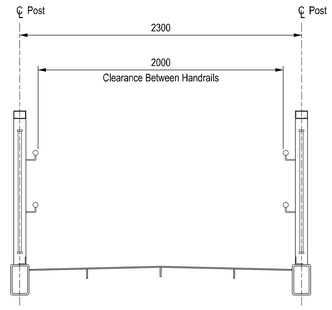
Plot Date: 29/05/2014
Username:corra
File Name: \\ukrdc001\projects\47070043 MetroWest Phase 1\08 - Work in Progress Incl CAD\Drg\CIV\47070043-SW-CV-DRG-0012.dgn



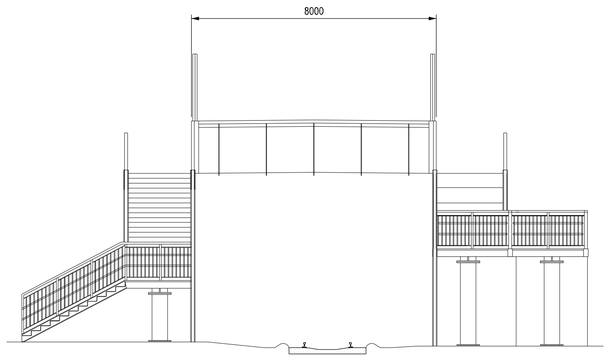
ELEVATION A
1:100



TYPICAL SECTION THROUGH STAIR LANDING
1:25



TYPICAL SECTION THROUGH RAMP
1:25



ELEVATION B
1:100

1:25
0.5m 0 0.5m 1m 1.5m 2m 2.5m

1:100
2m 0 2m 4m 6m 8m 10m

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Construction Risks	Maintenance/cleaning Risks	Demolition/adaptation Risks

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SAFETY HEALTH AND ENVIRONMENTAL INFORMATION BOX

NOTES

Revision Details	By	Chkd	Appd	Checked Date	Suffix

Purpose of Issue
GRIP 2

Client
Network Rail

Project Title
UID 140569
METROWEST
PHASE 1

Drawing Title
GALINGALE WAY FOOTBRIDGE
OPTION 1
ELEVATIONS AND SECTIONS

Designed	Drawn	Checked	Approved	Date
J. Coram	M. Fairchild	S. Turner	M. Summerfield	27/05/2014

Suitability	URS Internal Project No.	Project Manager
S1	47070043	Karl Hatala karl.hatala@urs.com +44 (0)1793 508787
ELR / Mileage	Scale @ A1	
POD 129m 06ch	As Shown	

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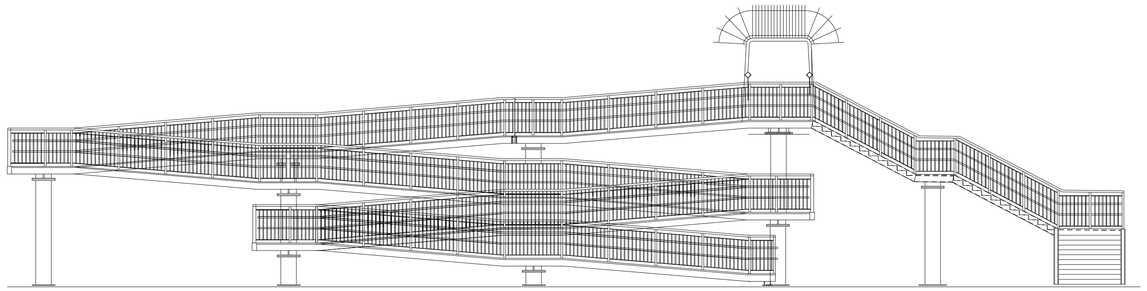
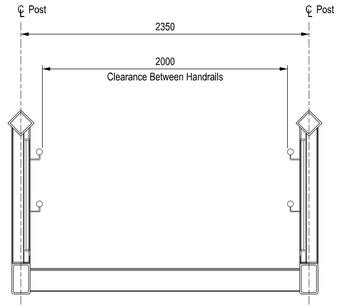
URS

Drawing Number	Rev
47070043-SW-CV-DRG-0013	P01

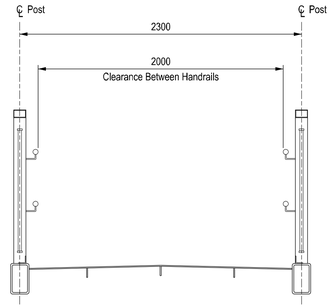
Username:nonrail
Plot Date : 29/05/2014
File Name : \\swwp-001\projects\470xxxx\4707xxxx\47070043 MetroWest Phase 1\08 - Work in Progress Incl CAD\Drgs\CV\47070043-SW-CV-DRG-0013.dgn



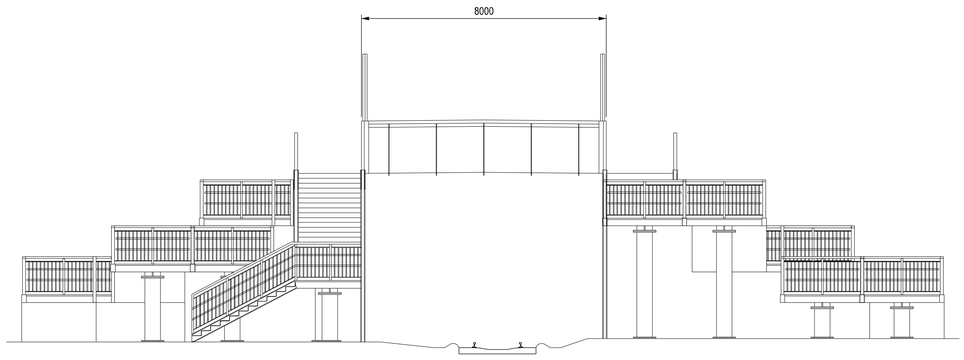
ELEVATION A
1:100



TYPICAL SECTION THROUGH STAIR LANDING
1:25



TYPICAL SECTION THROUGH RAMP
1:25



ELEVATION B
1:100

1:25
0.5m 0 0.5m 1m 1.5m 2m 2.5m

1:100
2m 0 2m 4m 6m 8m 10m

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Construction Risks	Maintenance/cleaning Risks	Demolition/adaptation Risks

In addition to the hazard/risks normally associated with the types of work detailed on this drawing take note of above.
It is assumed that all works on this drawing will be carried out by a competent contractor working, where appropriate, to an appropriate method statement.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION BOX

NOTES

Revision Details	By	Chkd	Appd	Checked Date	Suffix

Purpose of Issue
GRIP 2

Client
Network Rail

Project Title
UID 140569
METROWEST
PHASE 1

Drawing Title
GALINGALE WAY FOOTBRIDGE
OPTION 2
ELEVATIONS AND SECTIONS

Designed	Drawn	Checked	Approved	Date
J. Coram	M. Fairchild	S. Turner	M. Summerfield	27/05/2014

Suitability	URS Internal Project No.	Project Manager
S1	47070043	Karl Hatala karl.hatala@urs.com +44 (0)1793 508787
ELR / Mileage	Scale @ A1	
POD 129m 06ch	As Shown	

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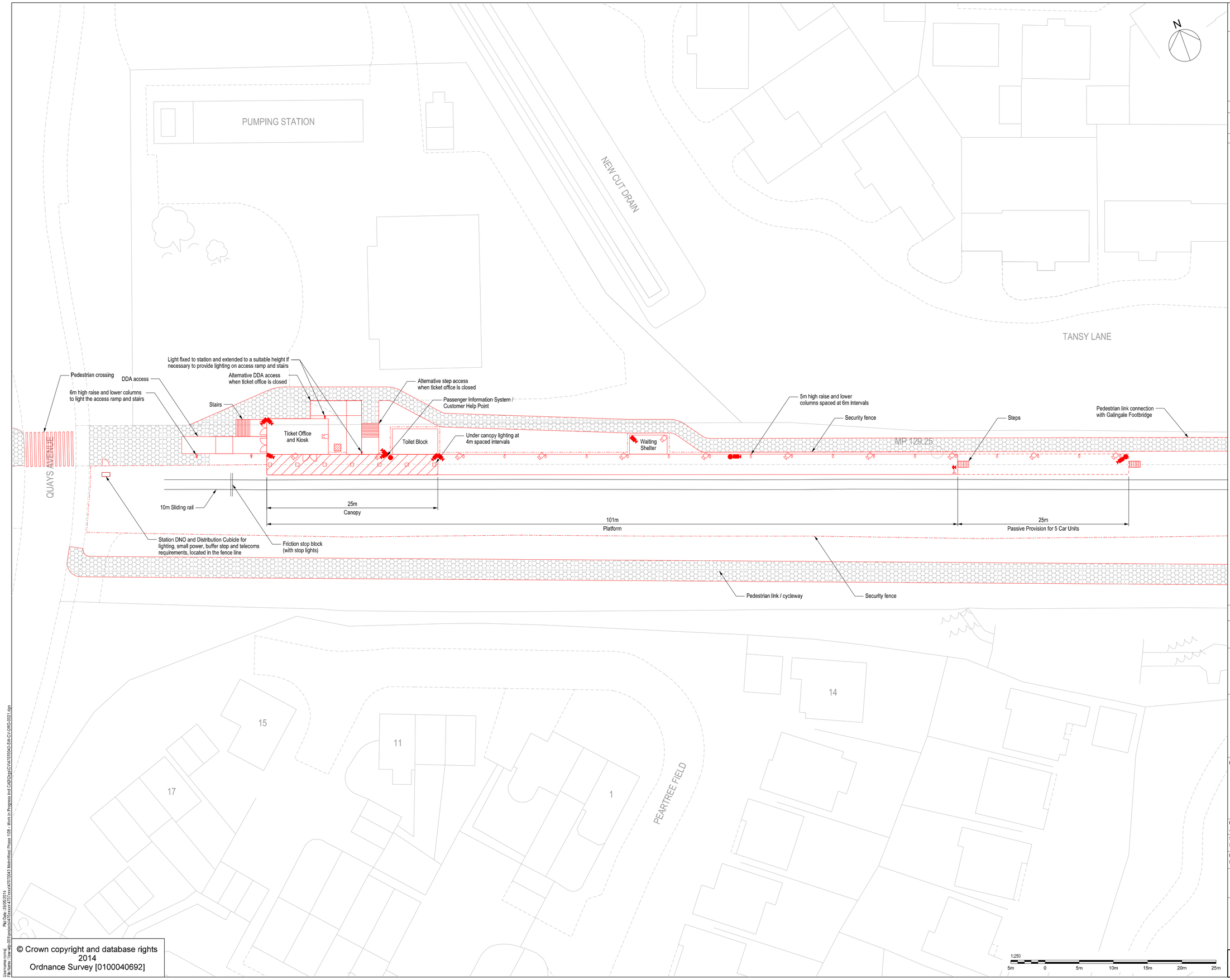
Drawing Number	Rev
47070043-SW-CV-DRG-0014	P01

Plot Date: 29/05/2014
Username: correj
File Name: J:\live-jobs\2011\emj\jobs\47070043 MetroWest Phase 1\08 - Work in Progress Ind CAD\Dgns\CV\47070043-SW-CV-DRG-0014.dgn



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Construction Risks	Maintenance/cleaning Risks	Demolition/adaptation Risks

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SAFETY HEALTH AND ENVIRONMENTAL INFORMATION BOX

LEGEND:

- PA Speaker
- CCTV Camera
- Camera Column
- Telecoms Cabinet
- Platform Telephone

Revision Details	By	Chkd	Appd	Checked Date	Suffix

Purpose of Issue
GRIP 2

Client
Network Rail

Project Title
UID 140569
METROWEST
PHASE 1

Drawing Title
PORTISHEAD STATION
OPTION 2A
PLAN

Designed	Drawn	Checked	Approved	Date
J. Coram	M. Fairchild	S. Turner	M. Summerfield	27/05/2014

Suitability	URS Internal Project No.	Project Manager
S1	47070043	Karl Hatala karl.hatala@urs.com +44 (0)1793 508787
ELR / Mileage POD / TBC	Scale @ A1 1:250	

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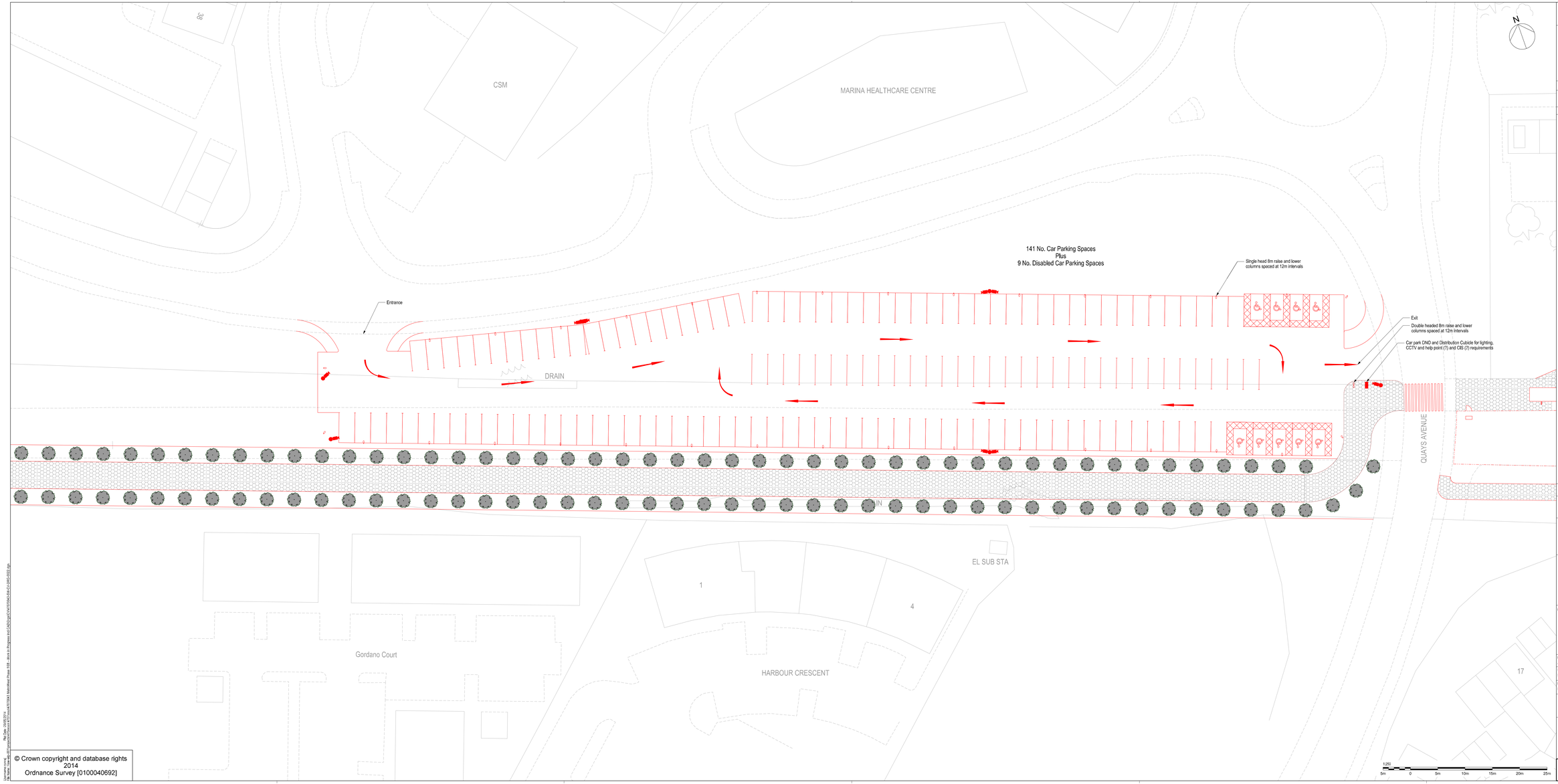
Drawing Number
47070043-SW-CV-DRG-0021

Rev
P01

Plot Date : 29/05/2014
File Name : \\aw-wip-001\projects\470xxxx\47070043 MetroWest Phase 1\08 - Work in Progress Incl CAD\Dgs\CV\47070043-SW-CV-DRG-0021.dgn
Username: ronraj



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Construction Risks	Maintenance/cleaning Risks	Demolition/adaptation Risks

In addition to the hazard/risks normally associated with the types of work detailed on this drawing take note of above.
It is assumed that all works on this drawing will be carried out by a competent contractor working, where appropriate, to an appropriate method statement.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION BOX

NOTES

1. 141 No. car parking spaces to be 2.9m x 5.5m.
2. 9 No. Disabled car parking spaces.

LEGEND:

- CCTV Camera
- Camera Column
- Single Head Lighting Column
- Double Headed Lighting Column

Revision Details	By	Chkd	Appd	Checked Date	Suffix

Purpose of Issue

GRIP 2

Client

Network Rail

Project Title

UID 140569
METROWEST
PHASE 1

Drawing Title

PORTISHEAD STATION
CAR PARK - OPTION 2A
PLAN

Designed	Drawn	Checked	Approved	Date
J. Coram	M. Fairchild	S. Turner	M. Summerfield	27/05/2014

Suitability	URS Internal Project No.	Project Manager
S1	47070043	Karl Hatala
ELR - Mileage	Scale	karl.hatala@urs.com
POO / TBC	1:250	+44 (0)1793 508787

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Drawing Number	Rev
47070043-SW-CV-DRG-0022	P01

1:250
5m 0 5m 10m 15m 20m 25m

Username:corama
Date Time:27/05/2014 09:07
Plot Date: 23/05/2014
N:\Projects\47070043 Metrowest Phase 1\05 - Work In Progress\4 CAD\Civil\Drawings\47070043-SW-CV-DRG-0022.dgn

NURSING HOME

MARINA HEALTHCARE CENTRE

PUMPING STATION

NEW CUT DRAIN

DRAIN

EL SUB STA

QUAYS AVENUE

Pedestrian crossing

Single head 8m raise and lower columns spaced at 12m intervals

88 No. Car Parking Spaces
Plus
5 No. Disabled Car Parking Spaces

Double headed 8m raise and lower columns spaced at 12m intervals

Single head 8m raise and lower columns spaced at 12m intervals

Light fixed to station and extended to a suitable height if necessary to provide lighting on access ramp and stairs

Double headed 8m column to provide light to the access ramps and stairs

Station DNO and Distribution Cubicle for lighting, small power, buffer stop and telecoms requirements, located in the fence line

Alternative DDA access when ticket office is closed

Alternative step access when ticket office is closed

Taxi Rank

DDA access

6m high raise and lower columns to light the access ramp and stairs

Stairs

Ticket Office and Kiosk

Toilet Block

Passenger Information System / Customer Help Point

Under canopy lighting at 4m spaced intervals

Waiting Shelter

5m high raise and lower columns spaced at 6m intervals

Security fence

Steps

Pedestrian link connected to Galingale Footbridge

10m Sliding rail

Friction stop block (with stop lights)

25m
Canopy

3000

101m
Platform

25m
Passive Provision for 5 Car Units

Pedestrian crossing

Area to be landscaped

Access track 3.5m wide

Security Fence

Pedestrian link/cycleway

Palisade vehicular access double gate 7m wide

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15

1:250
5m 0 5m 10m 15m 20m 25m

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Construction Risks	Maintenance/cleaning Risks	Demolition/adaptation Risks

In addition to the hazard/risks normally associated with the types of work detailed on this drawing take note of above.
It is assumed that all works on this drawing will be carried out by a competent contractor working, where appropriate, to an appropriate method statement.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION BOX

NOTES

1. 88 No. car parking spaces to be 2.9m x 5.5m.
2. 5 No. Disabled car parking spaces.

LEGEND:

- PA Speaker
- CCTV Camera
- Camera Column
- Platform Telephone

Revision Details	By	Chkd	Appd	Checked Date	Suffix

Purpose of Issue: GRIP 2

Client: Network Rail

Project Title: UID 140569 METROWEST PHASE 1

Drawing Title: PORTISHEAD STATION OPTION 2B PLAN

Designed	Drawn	Checked	Approved	Date
J. Coram	M. Fairchild	S. Turner	M. Summerfield	27/06/2014

Suitability	URS Internal Project No.	Project Manager
S1	47070043	Karl Hatala karl.hatala@urs.com +44 (0)1793 508787
ELR / Mileage	Scale @ A1	
POD / TBC	1:250	

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Drawing Number	Rev
47070043-SW-CV-DRG-0023	P01

Plot Date: 28/05/2014
File Name: \\urs-eu-pri01\projects\Shared Files\47070043 MetroWest Phase 1\08 - Work In Progress\Incl CAD\Dgn\CIV\47070043-SW-CV-DRG-0023.dgn
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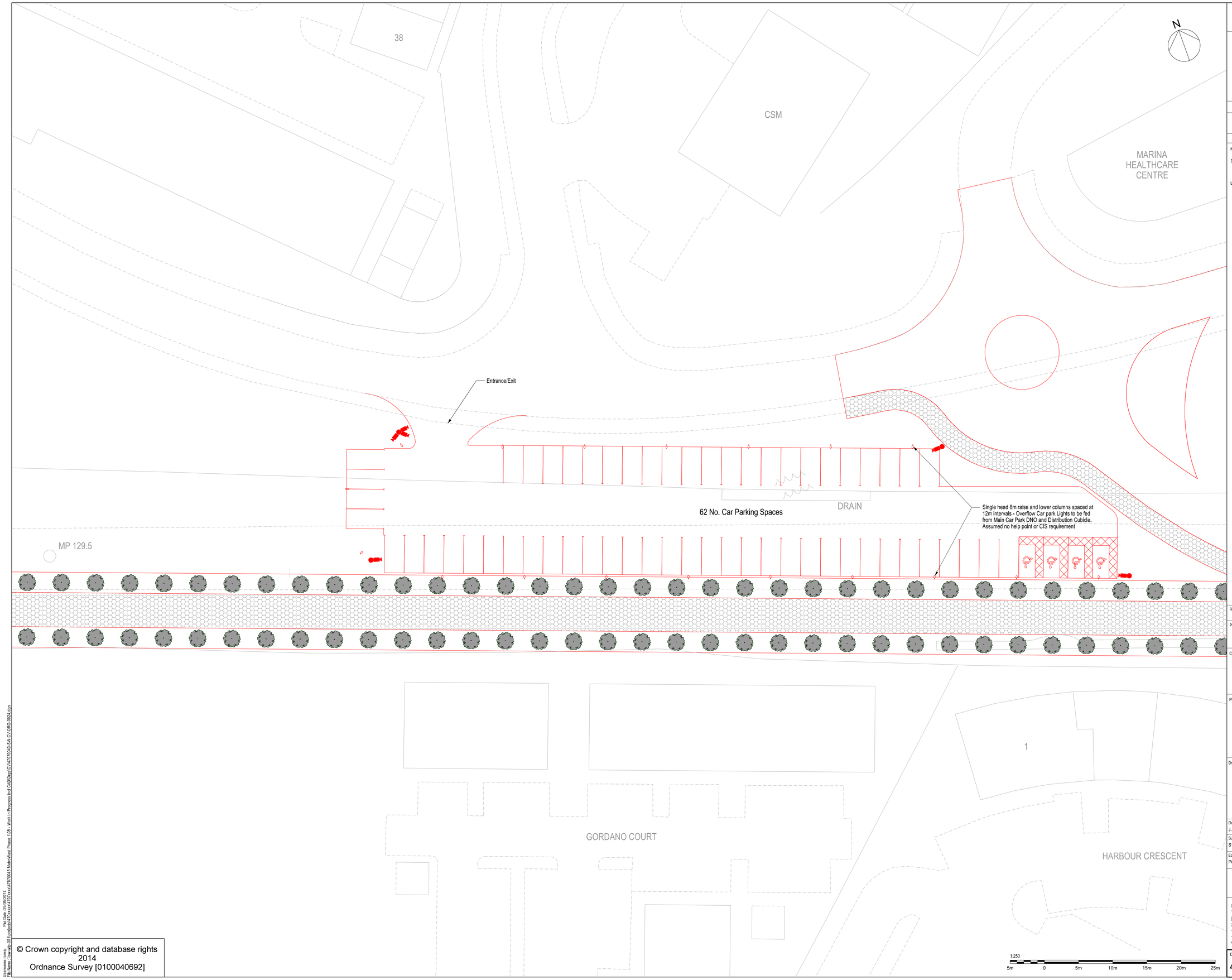

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Construction Risks	Maintenance/cleaning Risks	Demolition/adaptation Risks

In addition to the hazard/risks normally associated with the types of work detailed on this drawing take note of above.
It is assumed that all works on this drawing will be carried out by a competent contractor working, where appropriate, to an appropriate method statement.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION BOX

NOTES

1. 62 No. car parking spaces to be 2.9m x 5.5m.

LEGEND:

- CCTV Camera
- Camera Column

Revision Details	By	Chkd	Appd	Checked Date	Suffix

Purpose of Issue
GRIP 2

Client
Network Rail

Project Title
UID 140569
METROWEST
PHASE 1

Drawing Title
PORTISHEAD STATION
OVERFLOW CAR PARK
OPTION 2B
PLAN

Designed	Drawn	Checked	Approved	Date
J. Coram	M. Fairchild	S. Turner	M. Summerfield	27/05/2014

Suitability	URS Internal Project No.	Project Manager
S1	47070043	Karl Hatala karl.hatala@urs.com +44 (0)1793 508787
ELR / Mileage POD / TBC	Scale @ A1 1:250	

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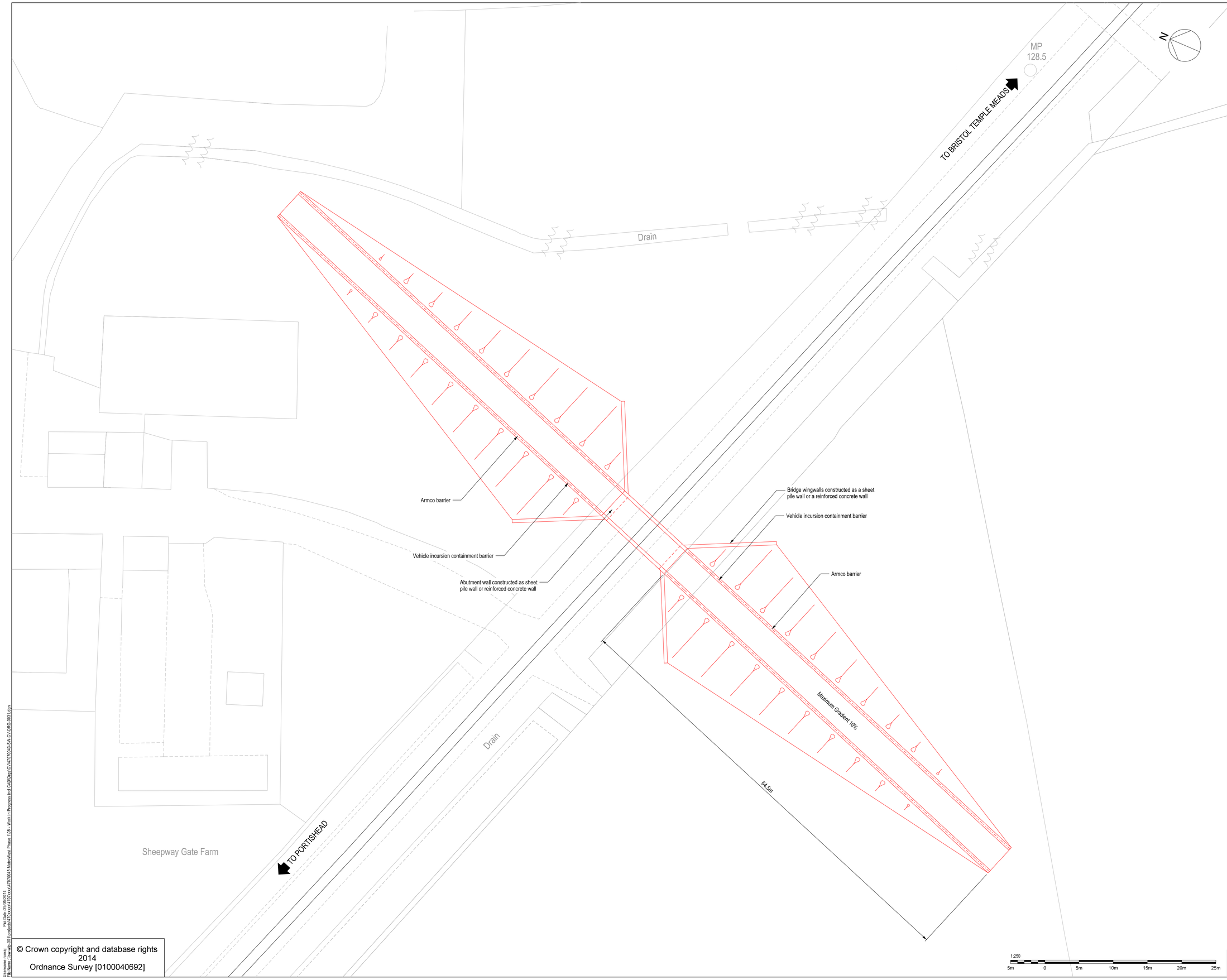
Drawing Number
47070043-SW-CV-DRG-0024

Rev
P01

Plot Date : 29/05/2014
File Name : \\sw-wip-001\projects\47070xxxx\47070043 MetroWest Phase 1\08 - Work in Progress Incl CAD\Drgs\CV\47070043-SW-CV-DRG-0024.dgn
Username:ronraj



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Construction Risks	Maintenance/cleaning Risks	Demolition/adaptation Risks

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SAFETY HEALTH AND ENVIRONMENTAL INFORMATION BOX

NOTES

1. Approach ramps proposed at 1:10 gradient for farm traffic only.
2. Ramps shown constructed from 1:2 embankment slopes. Alternative solutions exist to steepen slopes by the use of reinforced soils.
3. Subject to geotechnical design, approach ramp may require supporting on stone column piles. For this GRIP stage a grid of stone column piles should be allowed for - on a 4x4m grid - 5m deep.

Revision Details	By	Chkd	Appd	Checked Date	Suffix

Purpose of Issue: GRIP 2

Client: Network Rail

Project Title: UID 140569 METROWEST PHASE 1

Drawing Title: SHEEPWAY GATE BRIDGE PLAN

Designed	Drawn	Checked	Approved	Date
J. Coram	M. Fairchild	S. Turner	M. Summerfield	27/05/2014

Suitability	URS Internal Project No.	Project Manager
S1	47070043	Karl Hatala
ELR / Mileage	Scale @ A1	karl.hatala@urs.com
POD 128m 46ch	1:250	+44 (0)1793 508787

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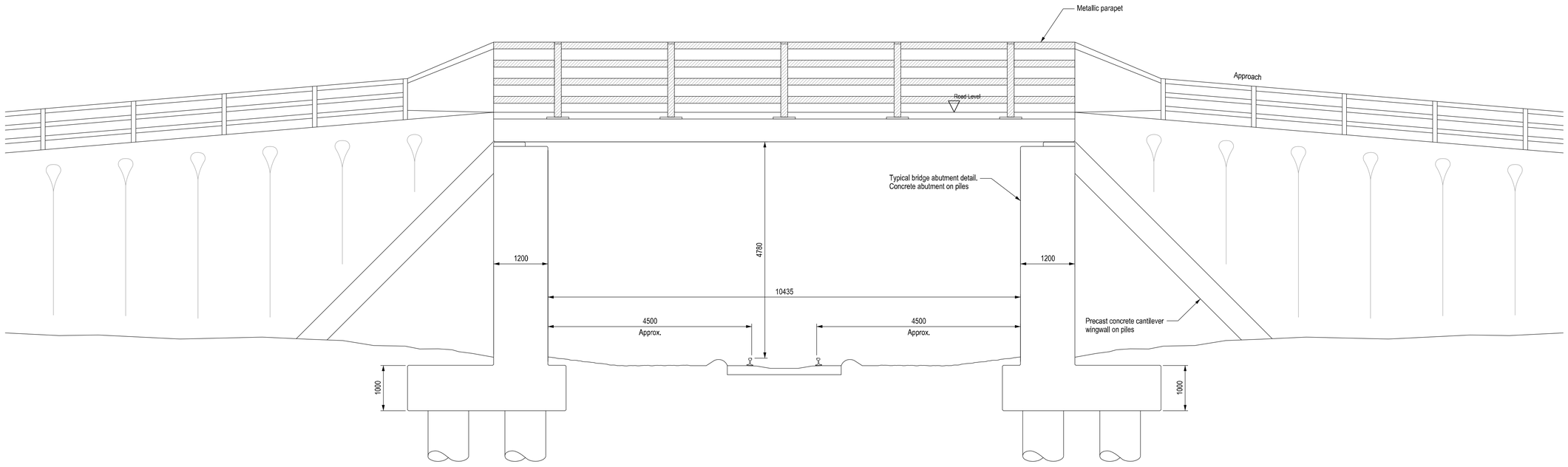
Drawing Number: 47070043-SW-CV-DRG-0031

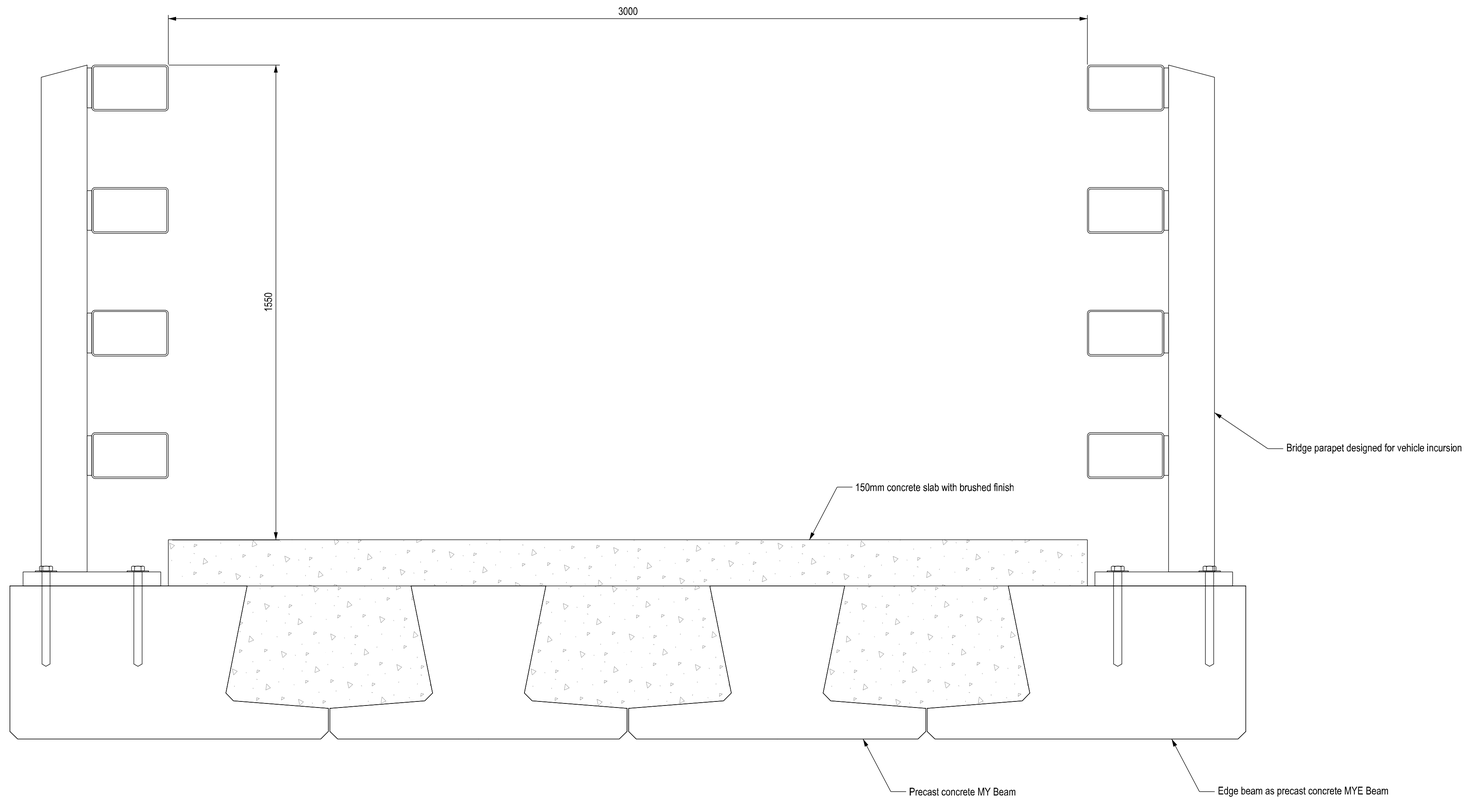
Rev: P01

Plot Date: 29/05/2014
Username:rcorral
File Name: I:\Network Rail\Projects\47070043 MetroWest Phase 1\05 - Work In Progress\rcorral CAD\Dgn\CV\47070043-SW-CV-DRG-0031.dgn



ELEVATION ON BRIDGE

1:50



CROSS SECTION THROUGH BRIDGE DECK

1:10

1:10 200mm 0 200mm 400mm 600mm 800mm 1000mm

1:50 1m 0 1m 2m 3m 4m 5m

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Construction Risks	Maintenance/cleaning Risks	Demolition/adaptation Risks

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SAFETY HEALTH AND ENVIRONMENTAL INFORMATION BOX

NOTES

1. Precast beams are standard MY and MYE beams for the edge beam.
2. Pile design subject to detailed design. For pricing purposes allow six 900mm diameter piles per abutment and 12m in depth.
3. For wingwalls allow six 900mm piles per wingwall and 12m in depth.

Revision Details	By	Chkd	Appd	Checked Date	Suffix

Purpose of Issue

GRIP 2

Client

Network Rail

Project Title

UID 140569
METROWEST
PHASE 1

Drawing Title

SHEEPWAY GATE BRIDGE
ELEVATION AND SECTION
OPTION 1

Designed	Drawn	Checked	Approved	Date
J. Coram	M. Fairchild	S. Turner	M. Summerfield	27/05/2014

Suitability	URS Internal Project No.	Project Manager
S1	47070043	Karl Hatala karl.hatala@urs.com +44 (0)1793 508787
ELR / Mileage	Scale @ A1	
POD 128m 46ch	As Shown	

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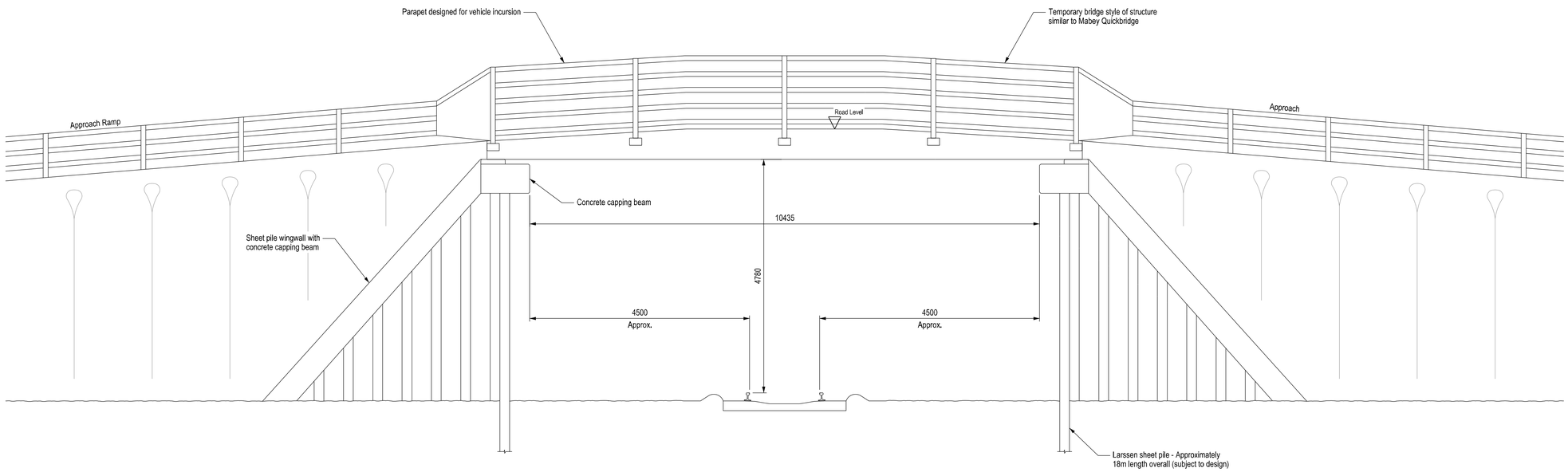
Drawing Number: 47070043-SW-CV-DRG-0032

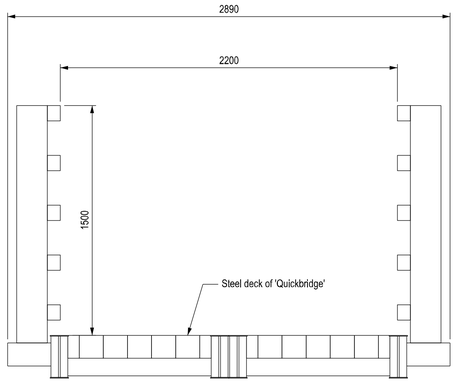
Rev: P01

Username: ronraj
Plot Date: 29/05/2014
File Name: \\sw-wp-001\projects\470\xxxx\47070043 MetroWest Phase 1\08 - Work in Progress Incl CAD\Dgn\CV\47070043-SW-CV-DRG-0032.dgn



ELEVATION ON BRIDGE

1:50



CROSS SECTION THROUGH BRIDGE DECK

1:20

1:20 400mm 0 400mm 800mm 1200mm 1600mm 2000mm

1:50 1m 0 1m 2m 3m 4m 5m

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Construction Risks	Maintenance/cleaning Risks	Demolition/adaptation Risks

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SAFETY HEALTH AND ENVIRONMENTAL INFORMATION BOX

NOTES

1. Steel sheet pile walls (abutment and wingwalls) subject to detailed design and geotechnical investigation to confirm adequacy of the solution.
2. Quickbridge is supplied in panels of standard width. Next GRIP stage to evaluate 'Quickbridge' option or specialist design of a narrower structure.
3. Design of 'Lightweight' structure comprising steel bridge deck and sheet pile abutment walls is subject to agreement of reduced loading/access for vehicles.
4. Measures to be taken to restrict vehicle speed.
5. Width of bridge to be further developed during GRIP 3 design.
6. Bridge to have a capacity limit of 5 Tonnes.

Revision Details	By	Chkd	Appd	Checked Date	Suffix

Purpose of Issue

GRIP 2

Client

Network Rail

Project Title

UID 140569
METROWEST
PHASE 1

Drawing Title

SHEEPWAY GATE BRIDGE
ELEVATION AND SECTION
OPTION 2

Designed	Drawn	Checked	Approved	Date
J. Coram	M. Fairchild	S. Turner	M. Summerfield	27/05/2014

Suitability	URS Internal Project No.	Project Manager
S1	47070043	Karl Hatala karl.hatala@urs.com +44 (0)1793 508787
ELR / Mileage	Scale @ A1	
POD 128m 46ch	As Shown	

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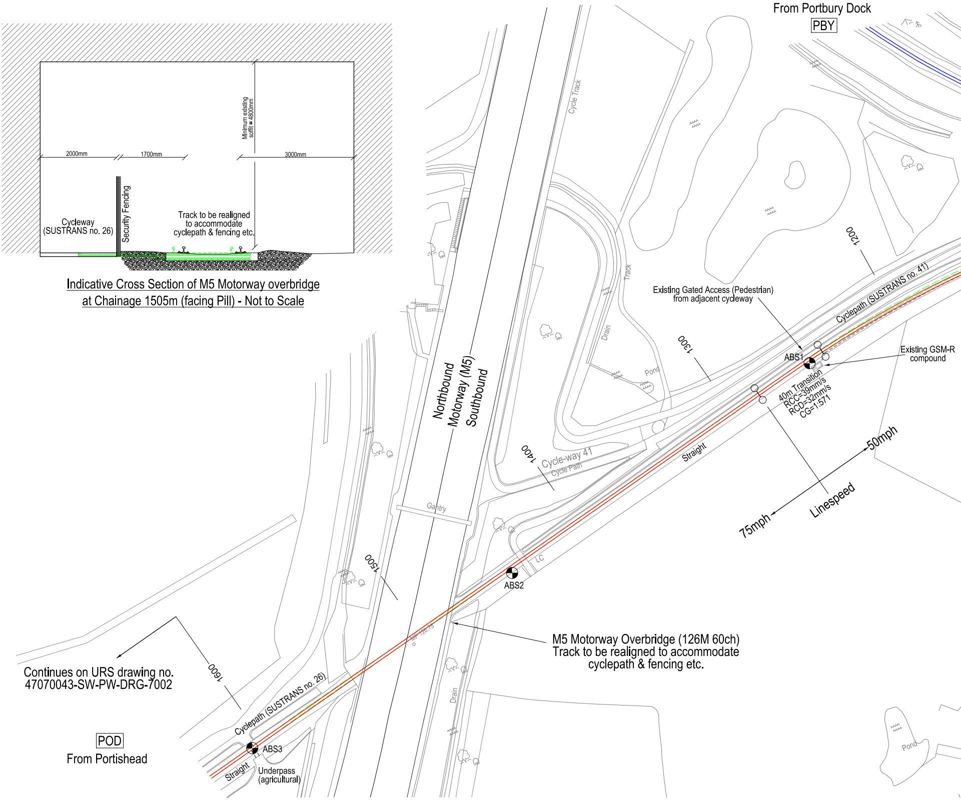
Drawing Number: 47070043-SW-CV-DRG-0033

Rev: P01

Username:nonraj
Plot Date: 29/05/2014
File Name: \\swwp-001\projects\470xxxx\47070043 MetroWest Phase 1\06 - Work in Progress Incl CAD\Dgs\CV\47070043-SW-CV-DRG-0033.dgn


Minimum existing soffit = 4800mm
2000mm
1700mm
3000mm
Security Fencing
Cycleway (SUSTRANS no. 26)
Track to be realigned to accommodate cyclepath & fencing etc.

Indicative Cross Section of M5 Motorway overbridge at Chainage 1505m (facing Pill) - Not to Scale

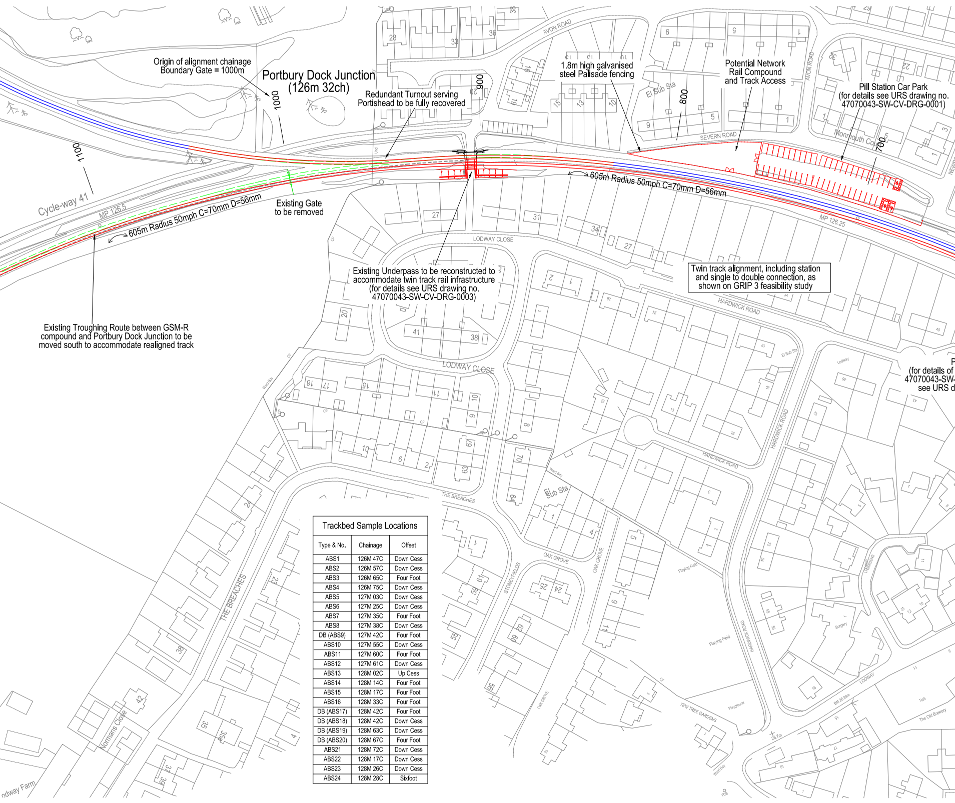
From Portbury Dock
PBY
Cycle Track
Track
Drain
Pond
1200
1300
1400
1500
1600
Existing Gated Access (Pedestrian) from adjacent cycleway
Cyclepath (SUSTRANS no. 41)
ABS1
Existing GSM-R compound
40m Transition
RCC=39mm/s
RCD=32mm/s
CG=1:571
Northbound
Motorway (M5)
Southbound
Cycle-way 41
Cycle Path
Straight
50mph
Linespeed
75mph
Gantry
LC
ABS2
MP 126.75
Drain
Cyclepath (SUSTRANS no. 26)
ABS3
Straight
Underpass (agricultural)
Pond

M5 Motorway Overbridge (126M 60ch)
Track to be realigned to accommodate
cyclepath & fencing etc.

Continues on URS drawing no.
47070043-SW-PW-DRG-7002

POD
From Portishead

Username: jonb Plot Date : 29/05/2014
File Name : \\sw-wip-001\projects\470xxxxx\4707xxxx\47070043 MetroWest Phase 1\08 - Work in Progress incl CAD\Drgs\PW\47070043-SW-PW-DRG-7001.dgn


1000
1100
900
800
700
Cycle-way 41
MP 126.5
MP 126.25
AVON ROAD
AVON ROAD
SEVERN ROAD
El Sub Sta
Monmouth Court
LODWAY CLOSE
LODWAY CLOSE
HARDWICK ROAD
HARDWICK ROAD
HARDWICK ROAD
HARDWICK ROAD
THE BREACHES
THE BREACHES
Sub Sta
OAK GROVE
OAK GROVE
OAK GROVE
STONEYFIELDS
YEW TREE GARDENS
Playing Field
Playing Field
Playground
Surgery
LODWAY
The Old Brewery
Normans Close
odway Farm

Origin of alignment chainage
Boundary Gate = 1000m

Portbury Dock Junction
(126m 32ch)

Redundant Turnout serving
Portishead to be fully recovered

1.8m high galvanised
steel Palisade fencing

Potential Network
Rail Compound
and Track Access

Pill Station Car Park
(for details see URS drawing no.
47070043-SW-CV-DRG-0001)

605m Radius 50mph C=70mm D=56mm

605m Radius 50mph C=70mm D=56mm

Existing Gate
to be removed

Existing Underpass to be reconstructed to
accommodate twin track rail infrastructure
(for details see URS drawing no.
47070043-SW-CV-DRG-0003)

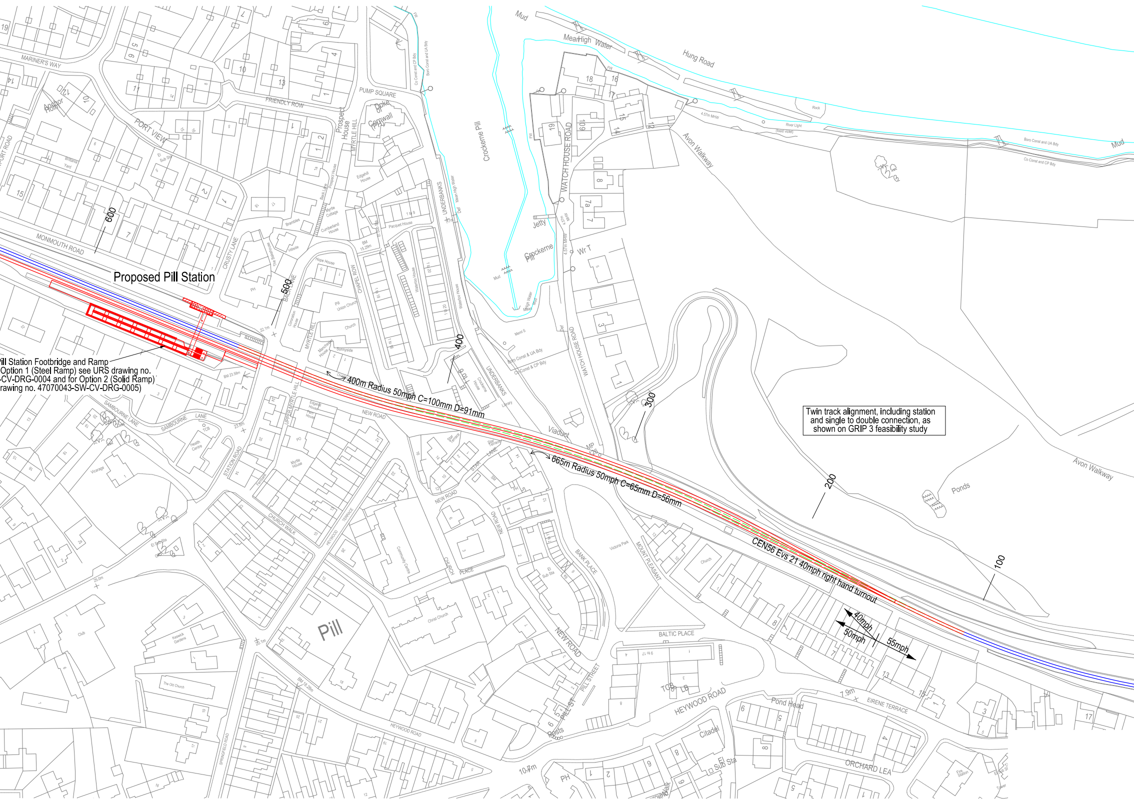
Twin track alignment, including station
and single to double connection, as
shown on GRIP 3 feasibility study

Existing Troughing Route between GSM-R
compound and Portbury Dock Junction to be
moved south to accommodate realigned track

P
(for details of
47070043-SW-
see URS d

Trackbed Sample Locations

Type & No.	Chainage	Offset
ABS1	126M 47C	Down Cess
ABS2	126M 57C	Down Cess
ABS3	126M 65C	Four Foot
ABS4	126M 75C	Down Cess
ABS5	127M 03C	Down Cess
ABS6	127M 25C	Down Cess
ABS7	127M 35C	Four Foot
ABS8	127M 38C	Down Cess
DB (ABS9)	127M 42C	Four Foot
ABS10	127M 55C	Down Cess
ABS11	127M 60C	Four Foot
ABS12	127M 61C	Down Cess
ABS13	128M 02C	Up Cess
ABS14	128M 14C	Four Foot
ABS15	128M 17C	Four Foot
ABS16	128M 33C	Four Foot
DB (ABS17)	128M 42C	Four Foot
DB (ABS18)	128M 42C	Down Cess
DB (ABS19)	128M 63C	Down Cess
DB (ABS20)	128M 67C	Four Foot
ABS21	128M 72C	Down Cess
ABS22	128M 17C	Down Cess
ABS23	128M 26C	Down Cess
ABS24	128M 28C	Sixfoot



Proposed Pill Station

Pill Station Footbridge and Ramp
Option 1 (Steel Ramp) see URS drawing no.
-CV-DRG-0004 and for Option 2 (Solid Ramp)
drawing no. 47070043-SW-CV-DRG-0005)

400m Radius 50mph C=100mm D=91mm

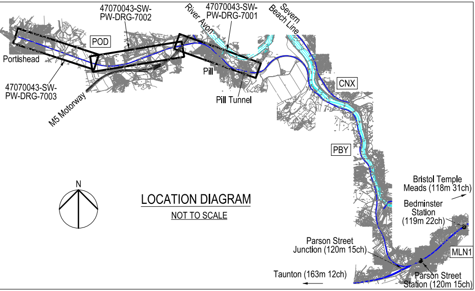
665m Radius 50mph C=65mm D=56mm

CEN56 Evs 21 40mph right hand turnout

Twin track alignment, including station
and single to double connection, as
shown on GRIP 3 feasibility study

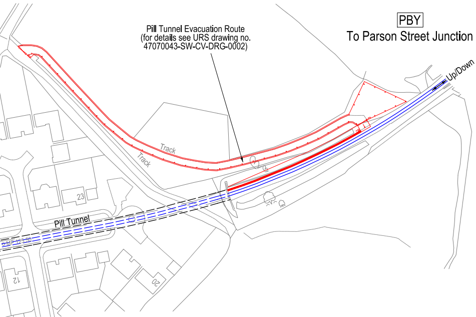
600
500
400
300
200
100
40mph
50mph
55mph
MARINER'S WAY
PORT VIEW
MONMOUTH ROAD
CRUSTY LANE
FRIENDLY ROW
PUMP SQUARE
MYRTLE HILL
CHAPEL ROW
UNDERBANKS
Crockerne Pill
Mud
Mean High Water
Hung Road
Avon Walkway
WATCH HOUSE ROAD
Jetty
Crockerne
Viaduct
NEW ROAD
SAMBOURNE LANE
STATION ROAD
UPPER MYRTLE HILL
CHURCH WALK
HEYWOOD TERRACE
STAR LANE
CHURCH PLACE
BANK PLACE
MOUNT PLEASANT
Victoria Park
BALTIC PLACE
HEYWOOD ROAD
PILL STREET
EIRENE TERRACE
Pond Head
ORCHARD LEA
Citadel
Ponds
Pill
Rock
Duke of Cornwall (PH)
Anchor Holm
Health Centre
Community Centre
Christ Church
Club
Church
Sub Sta

Mud
River Avon
Hung Road
Mean High Water
4.57m MHW
The Folly
Pipe Line
El Sub Sta
Pipe Line
87
Somerset Lodge
69to71
El Sub Sta
80
76
72 to 74
Eden Office Park
Bristol Cancer Help Centre
68
67
MACRAE ROAD
64to66
65
Stone
Ham Green
Orchard View
PERRETT WAY
El Sub Sta
10
1to2
The Sanctuary
1to9
10to16
17to22
23to28
6
1
Stone
4
2
1
6
THE GREEN
THE GREEN
29.9m
LB
HART CLOSE
Tunnel
2
Pill Tunnel
MP 125.75
Tunnel
Ham Green
MACRAE ROAD
38to48
36
50
52
37
21
26
Playground
39
27
15
11
23
10
4
El Sub Sta
14
1
Cricket Ground
N


47070043-SW-PW-DRG-7002
47070043-SW-PW-DRG-7001
River Avon
Severn Beach Line
Portishead
POD
Pill
Pill Tunnel
47070043-SW-PW-DRG-7003
M5 Motorway
CNX
PBY
N
Bristol Temple Meads (118m 31ch)
Bedminster Station (119m 22ch)
Parson Street Junction (120m 15ch)
MLN1
Taunton (163m 12ch)
Parson Street Station (120m 15ch)

LOCATION DIAGRAM

NOT TO SCALE


Pill Tunnel Evacuation Route
(for details see URS drawing no.
47070043-SW-CV-DRG-0002)
PBY
To Parson Street Junction
Up/Down
Track
Track
23
Pill Tunnel
MP 125.50
12
20

KEY:

- 🟥 Proposed Trackwork
- 🟩 Existing Redundant Trackwork
- ◑ ABS Location
- ▚ DP Location

1:1000

20m 0 20m 40m 60m 80m 100m

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Ordnance Survey [0100040692]

Revision Details	By	Chkd	Appd	Checked Date	Suffix
Avon Road underpass and Station Ramp details added.	JB	PH	JH	May 2014	P03
Sundry Annotation added	JB	PH	JH	May 2014	P02

Purpose of Issue

PRELIMINARY (GRIP STAGE 2)

Client

Network Rail

Project Title

UID 140569
METROWEST
PHASE 1

Drawing Title

METRO WEST PHASE 1
PILL TO PORTISHEAD
Outline Alignment Plans
Eastern Section - Sheet 1 of 3

Designed	Drawn	Checked	Approved	Date
J Barry	J Barry	P. Hillier	J. Hawkes	April 2014

Suitability Suitability	URS Internal Project No. 47070043	Project Manager Karl Hatala karl.hatala@urs.com +44 (0)1793 508787
ELR / Mileage POD, PBY / 126 MP - 127 MP	Scale 1:1000	

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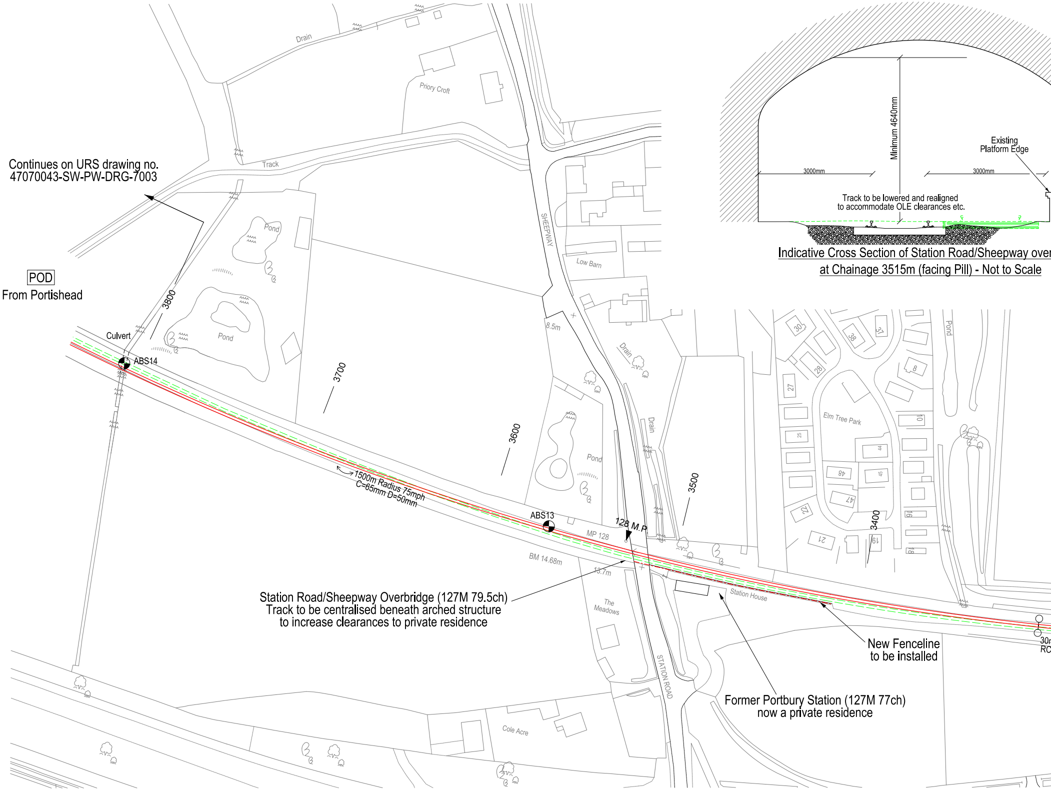
Drawing Number	Rev
47070043-SW-PW-DRG-7001	P03



Continues on URS drawing no.
47070043-SW-PW-DRG-7003

Station Road/Sheepway Overbridge (127M 79.5ch)
Track to be centralised beneath arched structure
to increase clearances to private residence

Former Portbury Station (127M 77ch)
now a private residence

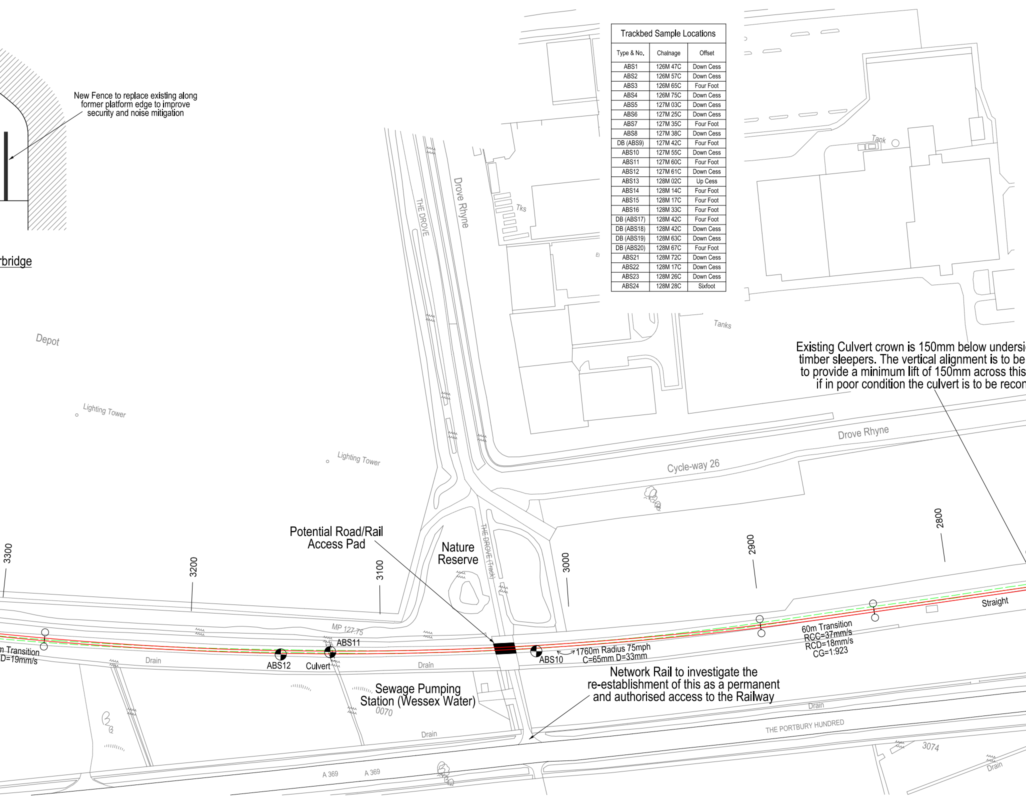
New Fenceline
to be installed

Track to be lowered and realigned
to accommodate OLE clearances etc.

Indicative Cross Section of Station Road/Sheepway over

at Chainage 3515m (facing Pill) - Not to Scale

POD
From Portishead
Culvert
ABS14
ABS13
3800
3700
3600
3500
3400
1500m Radius 75mph
C=65mm D=50mm
128 M.P.
MP 128
BM 14.68m
13.7m
8.5m
Drain
Track
Priory Croft
Pond
Pond
Pond
Pond
SHEEPWAY
Low Barn
Drain
Drain
Elm Tree Park
30
38
37
28
8
27
10
25
44
48
45
47
22
21
19
16
18
The Meadows
Station House
STATION ROAD
Cole Acre
30r
RC
Minimum 4640mm
Existing
Platform Edge
3000mm
3000mm



New Fence to replace existing along former platform edge to improve security and noise mitigation

Potential Road/Rail Access Pad

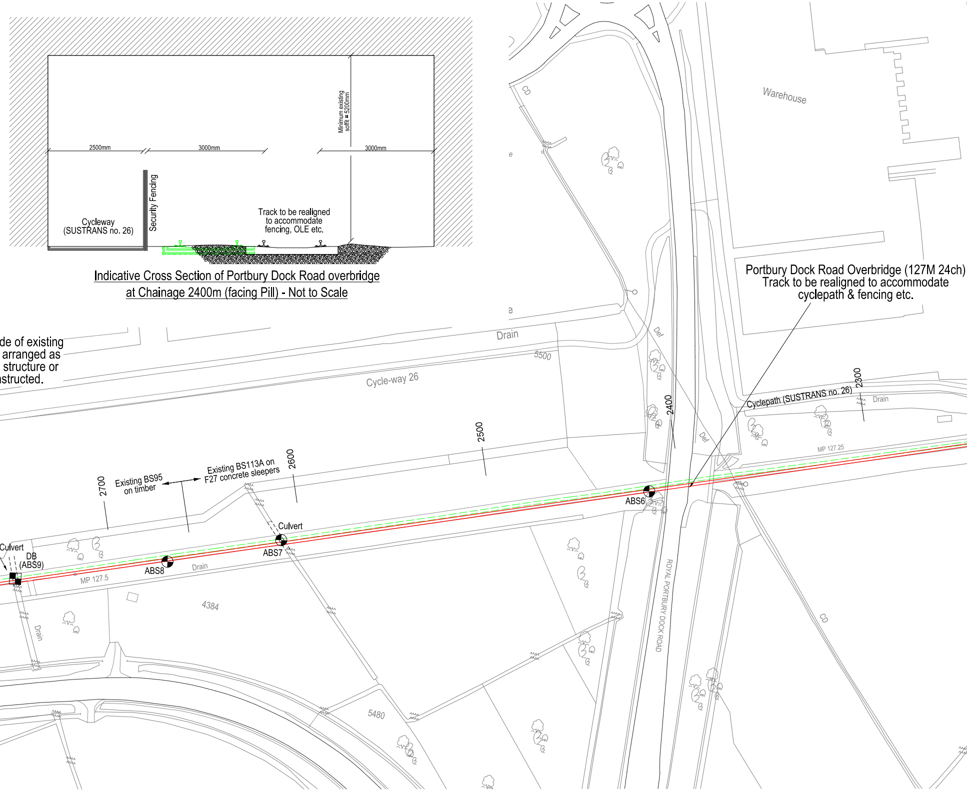
Network Rail to investigate the re-establishment of this as a permanent and authorised access to the Railway

Existing Culvert crown is 150mm below undersi
timber sleepers. The vertical alignment is to be
to provide a minimum lift of 150mm across this
if in poor condition the culvert is to be recon

rbridge
Depot
Lighting Tower
Lighting Tower
THE DROVE
Drove Rhyne
Tks
Tank
Tanks
Drove Rhyne
Cycle-way 26
Nature Reserve
THE DROVE (Track)
3300
3200
3100
3000
2900
2800
MP 127.75
ABS11
ABS12
Culvert
ABS10
Drain
Drain
Drain
Drain
Drain
n Transition
D=19mm/s
1760m Radius 75mph
C=65mm D=33mm
60m Transition
RCC=37mm/s
RCD=18mm/s
CG=1:923
Straight
Sewage Pumping Station (Wessex Water)
0070
THE PORTBURY HUNDRED
3074
A 369
A 369

Trackbed Sample Locations

Type & No.	Chainage	Offset
ABS1	126M 47C	Down Cess
ABS2	126M 57C	Down Cess
ABS3	126M 65C	Four Foot
ABS4	126M 75C	Down Cess
ABS5	127M 03C	Down Cess
ABS6	127M 25C	Down Cess
ABS7	127M 35C	Four Foot
ABS8	127M 38C	Down Cess
DB (ABS9)	127M 42C	Four Foot
ABS10	127M 55C	Down Cess
ABS11	127M 60C	Four Foot
ABS12	127M 61C	Down Cess
ABS13	128M 02C	Up Cess
ABS14	128M 14C	Four Foot
ABS15	128M 17C	Four Foot
ABS16	128M 33C	Four Foot
DB (ABS17)	128M 42C	Four Foot
DB (ABS18)	128M 42C	Down Cess
DB (ABS19)	128M 63C	Down Cess
DB (ABS20)	128M 67C	Four Foot
ABS21	128M 72C	Down Cess
ABS22	128M 17C	Down Cess
ABS23	128M 26C	Down Cess
ABS24	128M 28C	Sixfoot

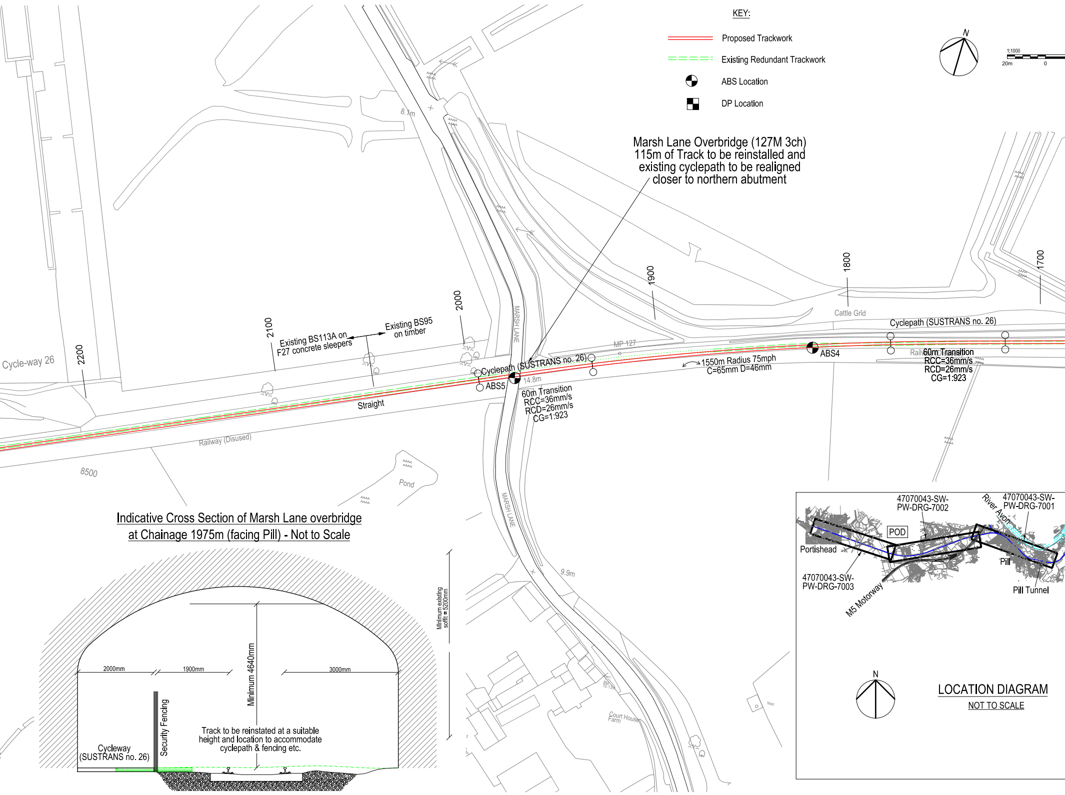


Indicative Cross Section of Portbury Dock Road overbridge at Chainage 2400m (facing Pill) - Not to Scale

2500mm
3000mm
3000mm
Minimum existing soffit = 5200mm
Security Fencing
Cycleway (SUSTRANS no. 26)
Track to be realigned to accommodate fencing, OLE etc.
Portbury Dock Road Overbridge (127M 24ch)
Track to be realigned to accommodate cyclepath & fencing etc.
de of existing
arranged as
structure or
structed.
Warehouse
CD
e
e
Drain
5500
Cycle-way 26
Def
Def
2400
2300
2500
2600
2700
Cyclepath (SUSTRANS no. 26)
Drain
MP 127.25
Existing BS113A on F27 concrete sleepers
Existing BS95 on timber
ABS6
ABS7
ABS8
Culvert
Culvert
DB (ABS9)
MP 127.5
Drain
Drain
4384
5480
ROYAL PORTBURY DOCK ROAD
CD

KEY:

🟥	Proposed Trackwork
🟩	Existing Redundant Trackwork
◐	ABS Location
▚	DP Location


N
1:1000
20m
0
Marsh Lane Overbridge (127M 3ch)
115m of Track to be reinstalled and
existing cyclepath to be realigned
closer to northern abutment
8.1m
MARSH LANE
2200
2100
2000
1900
1800
1700
Cycle-way 26
Existing BS113A on
F27 concrete sleepers
Existing BS95
on timber
Straight
Railway (Disused)
8500
Pond
Cyclepath (SUSTRANS no. 26)
ABS5
14.8m
60m Transition
RCC=36mm/s
RCD=26mm/s
CG=1:923
MP 127
1550m Radius 75mph
C=65mm D=46mm
ABS4
Cattle Grid
Cyclepath (SUSTRANS no. 26)
60m Transition
RCC=36mm/s
RCD=26mm/s
CG=1:923
9.9m
Court House
Farm
Mast
Minimum existing
soffit = 5200mm
2000mm
1900mm
3000mm
Minimum 4640mm
Security Fencing
Cycleway
(SUSTRANS no. 26)
Track to be reinstated at a suitable
height and location to accommodate
cyclepath & fencing etc.
47070043-SW-
PW-DRG-7002
47070043-SW-
PW-DRG-7001
River Avon
POD
Portishead
Pill
47070043-SW-
PW-DRG-7003
M5 Motorway
Pill Tunnel
N

Indicative Cross Section of Marsh Lane overbridge
at Chainage 1975m (facing Pill) - Not to Scale

LOCATION DIAGRAM

NOT TO SCALE

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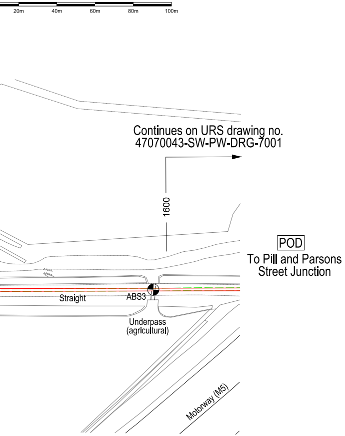
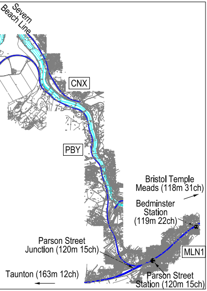


20m
40m
60m
80m
100m
Continues on URS drawing no. 47070043-SW-PW-DRG-7001
1600
POD
To Pill and Parsons Street Junction
Straight
ABS3
Underpass (agricultural)
Motorway (M5)



Severn Beach Line
CNX
PBY
Bristol Temple Meads (118m 31ch)
Bedminster Station (119m 22ch)
Parson Street Junction (120m 15ch)
MLN1
Taunton (163m 12ch)
Parson Street Station (120m 15ch)

Sundry Annotation added	JB	PH	JH	May 2014	P02
Revision Details	By	Chkd	Appd	Checked Date	Suffix

Purpose of Issue

PRELIMINARY (GRIP STAGE 2)

Client

Network Rail

Project Title

UID 140569
METROWEST
PHASE 1

Drawing Title

METRO WEST PHASE 1
PILL TO PORTISHEAD
Outline Alignment Plans
Central Section - Sheet 2 of 3

Designed	Drawn	Checked	Approved	Date
J Barry	J Barry	P. Hillier	J. Hawkes	April 2014

Suitability Suitability	URS Internal Project No. 47070043	Project Manager Karl Hatala karl.hatala@urs.com +44 (0)1793 508787
ELR / Mileage POD / 127.75 MP - 128.25 MP	Scale 1:1000	

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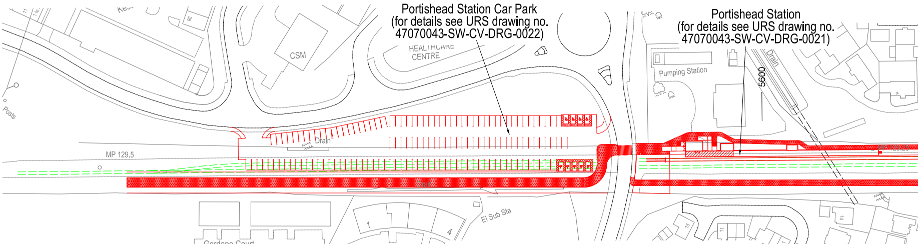
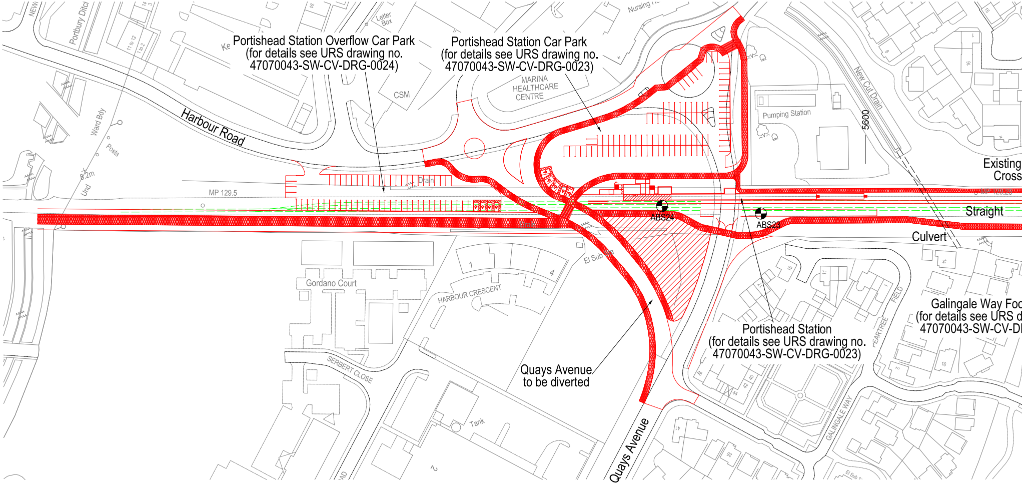


Portishead Station Car Park
(for details see URS drawing no.
47070043-SW-CV-DRG-0022)

Portishead Station
(for details see URS drawing no.
47070043-SW-CV-DRG-0021)

CSM
HEALTHCARE
CENTRE
Pumping Station
Drain
5600
Posts
Drain
MP 129.5
Gordano Court
HARBOUR CRESCENT
El Sub Sta
FIELD

Detail showing alternative arrangements for Portishead Station layout (Option 2A) and Galingale Footbridge configuration



Portishead Station Overflow Car Park
(for details see URS drawing no.
47070043-SW-CV-DRG-0024)

Portishead Station Car Park
(for details see URS drawing no.
47070043-SW-CV-DRG-0023)

Portishead Station
(for details see URS drawing no.
47070043-SW-CV-DRG-0023)

Galingale Way Foo
(for details see URS d
47070043-SW-CV-DI

Quays Avenue
to be diverted

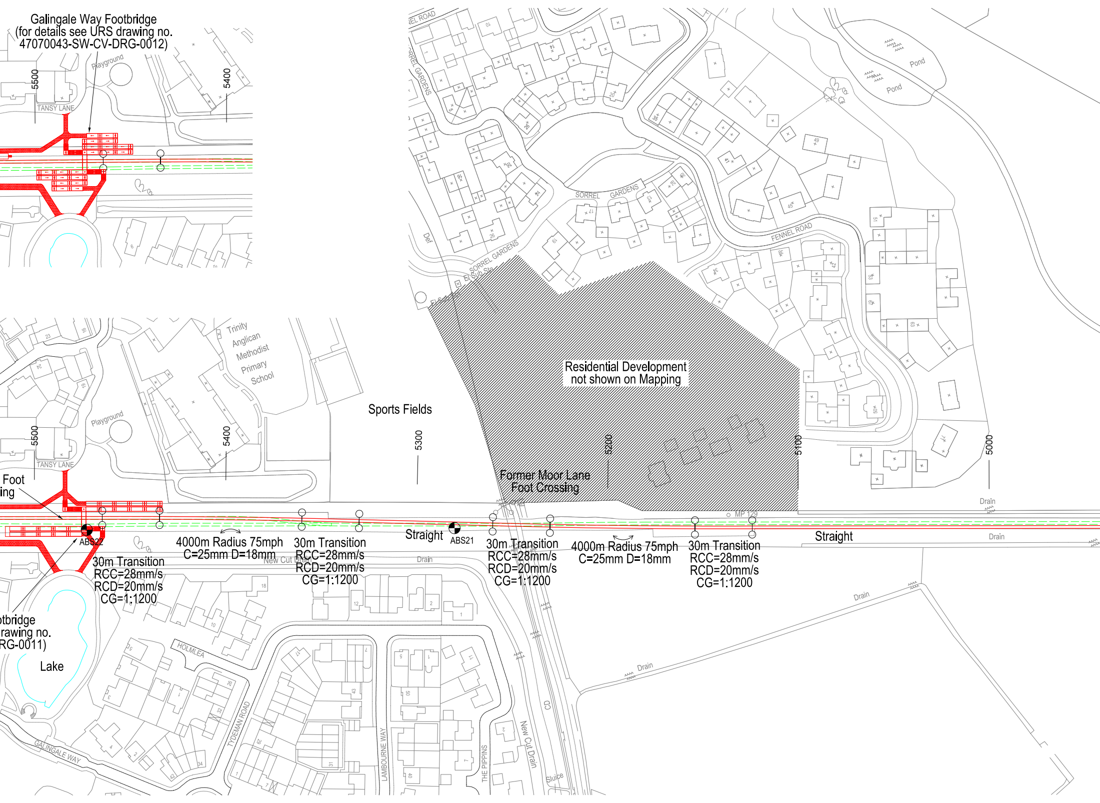
Existing
Cross

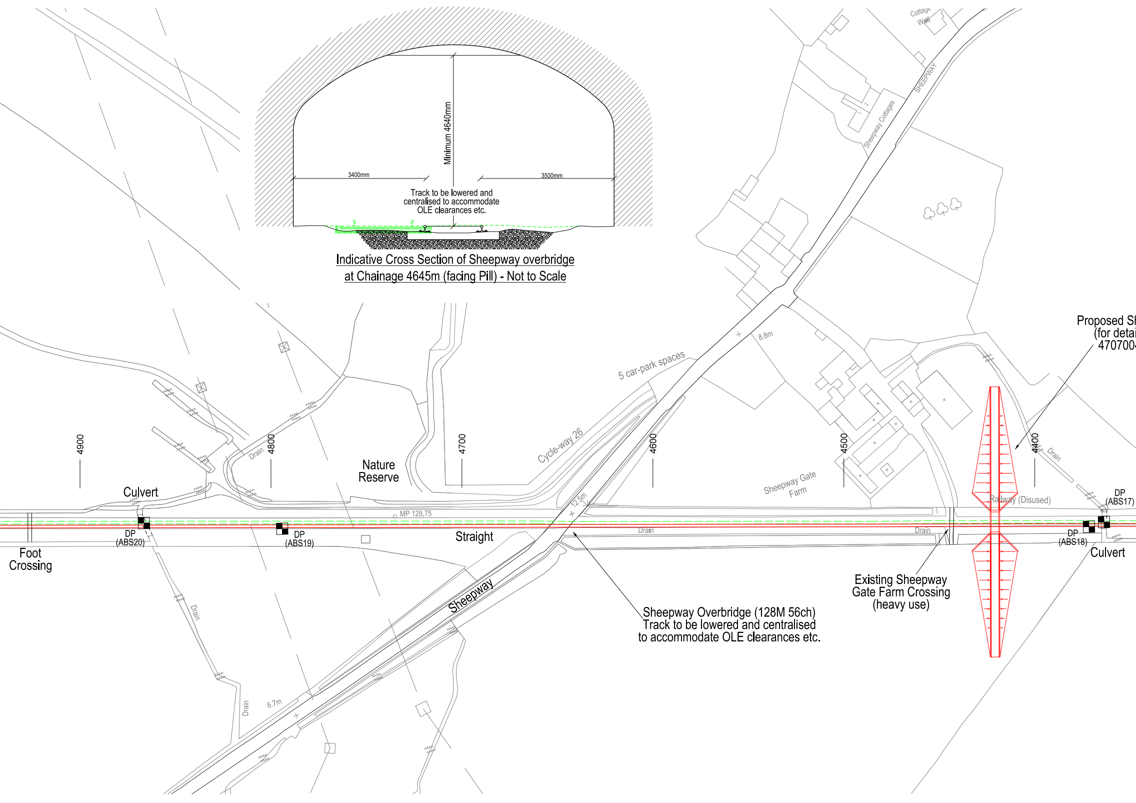
Straight

Culvert

Portbury Ditch
Letter Box
Nursing
Harbour Road
MARINA
HEALTHCARE
CENTRE
CSM
Pumping Station
New Cut Drain
5600
Ward Bdy
Posts
8.2m
Und
Drain
MP 129.5
ABS24
ABS23
Gordano Court
HARBOUR CRESCENT
El Sub Sta
SERBERT CLOSE
Tank
Quays Avenue
FIELD
PEARTREE
GALINGALE WAY

Username:jonb Plot Date : 12/05/2014
File Name : \\sw-wip-001\projects\470xxxxx\4707xxxx\47070043 MetroWest Phase 1\08 - Work in Progress incl CAD\Drgs\PW\47070043-SW-PW-DRG-7003.dgn


Galingale Way Footbridge
(for details see URS drawing no.
47070043-SW-CV-DRG-0012)
5500
5400
Playground
TANSY LANE
Trinity
Anglican
Methodist
Primary
School
Sports Fields
5300
5200
5100
5000
Residential Development
not shown on Mapping
Former Moor Lane
Foot Crossing
SORREL GARDENS
FENNEL ROAD
Pond
Pond
Foot
ing
otbridge
rawing no.
RG-0011)
Lake
ABS22
ABS21
30m Transition
RCC=28mm/s
RCD=20mm/s
CG=1:1200
4000m Radius 75mph
C=25mm D=18mm
30m Transition
RCC=28mm/s
RCD=20mm/s
CG=1:1200
Straight
30m Transition
RCC=28mm/s
RCD=20mm/s
CG=1:1200
4000m Radius 75mph
C=25mm D=18mm
30m Transition
RCC=28mm/s
RCD=20mm/s
CG=1:1200
Straight
MP 129
Drain
Drain
Drain
Drain
Drain
New Cut Drain
New Cut Drain
Sluice
CD
HOLMLEA
TYDEMAN ROAD
LAMBOURNE WAY
THE PIPPINS
GALINGALE WAY
Def
El Sub Sta

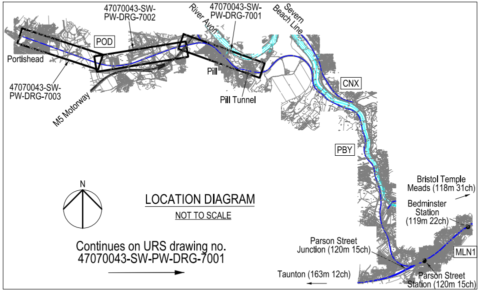


Indicative Cross Section of Sheepway overbridge at Chainage 4645m (facing Pill) - Not to Scale

Minimum 4640mm
3400mm
3500mm
Track to be lowered and centralised to accommodate OLE clearances etc.
Cottage
Well
SHEEPWAY
1
2
Sheepway Cottages
Proposed Sl
(for detai
470700
8.8m
5 car-park spaces
Cycle-way 26
12.5m
4900
4800
4700
4600
4500
4400
Drain
Nature Reserve
Culvert
MP 128.75
Sheepway Gate Farm
Railway (Disused)
DP (ABS17)
DP (ABS18)
DP (ABS19)
DP (ABS20)
Foot Crossing
Straight
Drain
Drain
Culvert
Sheepway
Sheepway Overbridge (128M 56ch)
Track to be lowered and centralised to accommodate OLE clearances etc.
Existing Sheepway Gate Farm Crossing (heavy use)
Drain
6.7m
Drain

Trackbed Sample Locations

Type & No.	Chainage	Offset
ABS1	126M 47C	Down Cess
ABS2	126M 57C	Down Cess
ABS3	126M 65C	Four Foot
ABS4	126M 75C	Down Cess
ABS5	127M 03C	Down Cess
ABS6	127M 25C	Down Cess
ABS7	127M 35C	Four Foot
ABS8	127M 38C	Down Cess
DB (ABS9)	127M 42C	Four Foot
ABS10	127M 55C	Down Cess
ABS11	127M 60C	Four Foot
ABS12	127M 61C	Down Cess
ABS13	128M 02C	Up Cess
ABS14	128M 14C	Four Foot
ABS15	128M 17C	Four Foot
ABS16	128M 33C	Four Foot
DB (ABS17)	128M 42C	Four Foot
DB (ABS18)	128M 42C	Down Cess
DB (ABS19)	128M 63C	Down Cess
DB (ABS20)	128M 67C	Four Foot
ABS21	128M 72C	Down Cess
ABS22	128M 17C	Down Cess
ABS23	128M 26C	Down Cess
ABS24	128M 28C	Sixfoot


47070043-SW-
PW-DRG-7002
River Avon
47070043-SW-
PW-DRG-7001
Severn
Beach Line
POD
Portishead
47070043-SW-
PW-DRG-7003
M5 Motorway
Pill
Pill Tunnel
CNX
PBY
N
LOCATION DIAGRAM
NOT TO SCALE
Continues on URS drawing no.
47070043-SW-PW-DRG-7001
Bristol Temple
Meads (118m 31ch)
Bedminster
Station
(119m 22ch)
Parson Street
Junction (120m 15ch)
MLN1
Taunton (163m 12ch)
Parson Street
Station (120m 15ch)

heepway Gate Farm Bridge
ils see URS drawing no.
43-SW-CV-DRG-0031)
Pond
Continues on URS drawing no.
47070043-SW-PW-DRG-7002
POD
To Pill and Parsons
Street Junction
Pond
4300
4200
4100
4000
3900
3800
T
MP
128.5
MP 128.25
Culvert
Culvert
ABS16
ABS15
ABS14
SP
Straight
60m Transition
RCC=36mm/s
RCD=28mm/s
CG=1:923
1500m Radius 75mph
C=65mm D=50mm
Existing Farm
Crossing
(light use)
Oil Pipe UTX
(6m Exclusion Zone)
Elm Tree Farm
Occupation Crossing
(light use)
KEY:
Proposed Trackwork
Existing Redundant Trackwork
ABS Location
DP Location
N
1:1000
20m
0
20m
40m
60m
80m
100m

POD

To Pill and Parsons
Street Junction

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Revision Details	By	Chkd	Appd	Checked Date	Suffix
Sundry Annotation added	JB	PH	JH	May 2014	P02

Purpose of Issue

PRELIMINARY (GRIP STAGE 2)

Client

Network Rail

Project Title

UID 140569
METROWEST
PHASE 1

Drawing Title

METRO WEST PHASE 1
PILL TO PORTISHEAD
Outline Alignment Plans
Western Section - Sheet 3 of 3

Designed	Drawn	Checked	Approved	Date
J Barry	J Barry	P. Hillier	J. Hawkes	April 2014

Suitability	URS Internal Project No. 47070043	Project Manager Karl Hatala karl.hatala@urs.com +44 (0)1793 508787
ELR / Mileage POD / 128.25 MP - 129.5 MP	Scale 1:1000	

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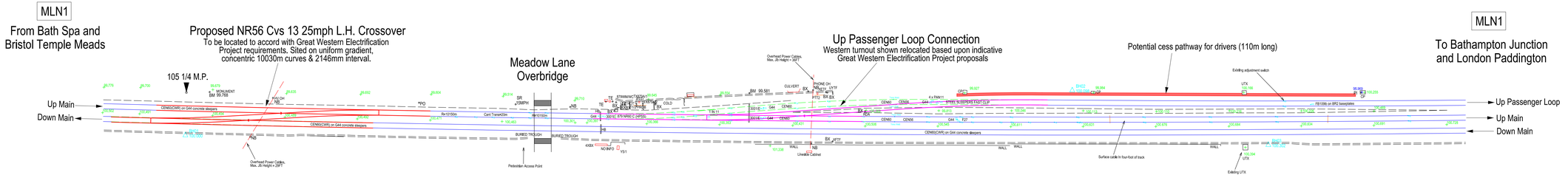
URS

Drawing Number	Rev
47070043-SW-PW-DRG-7003	P02



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Revision Details	By	Chkd	Appd	Checked Date	Suffix
S&C amended from NR60 to NR56	JB	PH	JH	May	P02

Purpose of Issue
PRELIMINARY (GRIP STAGE 2)

Client
Network Rail

Project Title
UID 140569
METROWEST
PHASE 1

Drawing Title
METRO WEST PHASE 1
Bathampton - Proposed Turnback Facility on Existing Up Passenger Loop for Portishead Services

Designed	Drawn	Checked	Approved	Date
J Barry	J Barry	P. Hiller	J. Hawkes	April 2014

Suitability	URS Internal Project No.	Project Manager
Suitability	47070043	Karl Hattala
		karl.hattala@urs.com
ELR / Mileage	Scale	+44 (0)1793 508787
MLN1 / 105 1/4 MP	1:500	

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Drawing Number	Rev
47070043-SW-PW-DRG-7004	P02

Username:jjoob
File Name: \\sw-wip-001\projects\47xxxx\47070043 MetroWest Phase 1\05 - Work in Progress\Incl CAD\Dgn\PW\47070043-SW-PW-DRG-7004.dgn
Plot Date: 07/03/2014

TO PORTBURY

UP PORTBURY

DOWN PORTBURY

FROM NAILSEA
& BACKWELL

PARSON STREET STATION
(120M 15c)

BEDMINSTER STATION
(119M 22c)

TO BRISTOL
TEMPLE MEADS

WEST CARRIAGE SIDINGS

5mph

WEST DEPOT SIDING 1

25mph

30mph

60mph

40mph

25mph

15mph

UP RELIEF

UP RELIEF

60mph

25mph

25mph

UP MAIN

UP MAIN

UP MAIN

100mph

90mph

90mph

40mph

25mph

90mph

40mph

25mph

25mph

DOWN MAIN

DOWN MAIN

DOWN MAIN

100mph

90mph

90mph

90mph

25mph

25mph

PARSON STREET JUNCTION
(120M 28c)

40mph

DOWN RELIEF

CARRIAGE LINE/DOWN THROUGH

40mph

40mph

25mph

CARRIAGE WASHER SIDING

10mph

Partial Reinstatement of Down Relief Line to
provide refuge for 100 SLU+ Freight Trains

Username:jonb
File Name :\\sw-wip-001\projects\470xxxxx\47070043 MetroWest Phase 1\08 - Work in Progress incl CAD\Drgs\PW\47070043-SW-PW-DRG-7005.dgn
Plot Date : 22/05/2014

Revision Details	By	Chkd	Appd	Checked Date	Suffix

Project Title
UID 140569
METROWEST
PHASE 1

Client
Network Rail

Drawing Title
METROWEST PHASE 1
PORTISHEAD REOPENING
Potential Reinstatement of part
of former Down Relief Line

Designed	Drawn	Checked	Approved	Date
	J Barry	P Hillier	J Hawkes	May 2014

Scale @ A3
N.T.S.

Suitability

ELR / Mileage
MLN1 / 119M - 120.5M

URS Internal Project No.
47070043

Project Manager
Karl Hatala
karl.hatala@urs.com
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Drawing Number
47070043-SW-PW-DRG-7005

Rev
P01

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NOTES:

TPWS ARRANGEMENTS AND OVERLAP LENGTHS TO BE CONSIDERED AS PART OF GRIP 4 DESIGN PACKAGE.

REVIEW OF PROTECTION OF LEVEL CROSSINGS IN THE SECTION WHERE LINE SPEEDS ARE INCREASED TO BE MADE SEPERATLY.

REVIEW OF REQUIREMENT FOR TRAIN DETECTION ON SINGLE LINE TO PORTISHEAD IF UWC'S REMIAN TO BE MADE SEPERATELY.

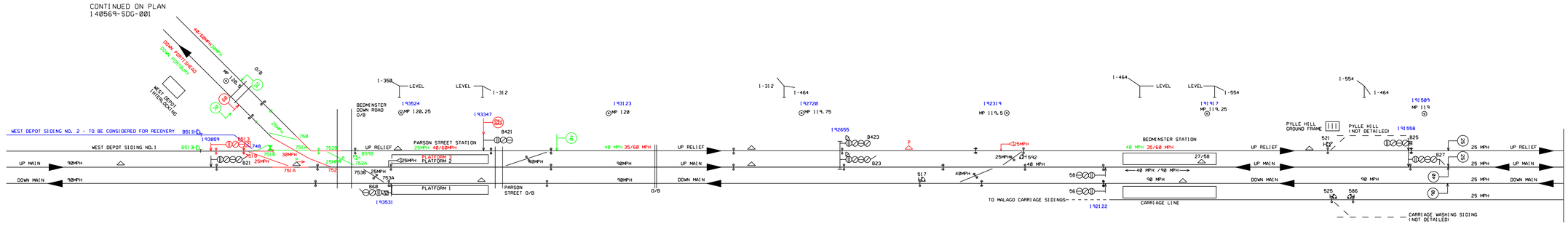
ALL SIGNALS & SIGNS SUBJECT TO SIGNAL SIGHTING.

Produced	**Network Records Group**	**Network Rail**
Checked	BRISTOL S.B.	Drawing No 140569-SDG-001
Issued 08/05/2014	PORTISHEAD BRISTOL METROWEST PHASE 1 SCHEME SKETCH 1 OF 2	Last Full Correlation / Date / Version Current Version 0.02

NOTES:

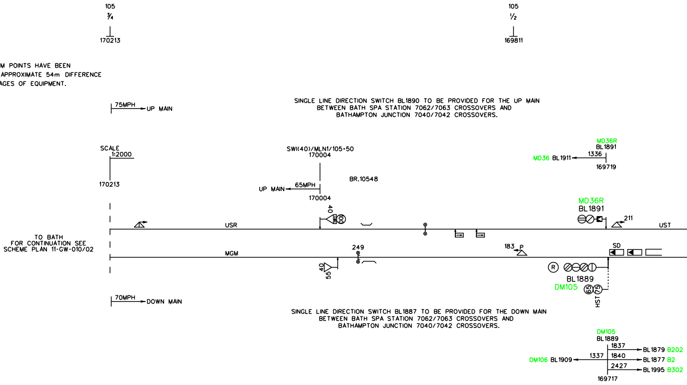
AT PARSON STREET STATION, PLATFORM 3 BROUGHT BACK INTO USE.

ALL NEW AND AFFECTED SIGNALS/SIGNS SUBJECT TO SIGNAL SIGHTING.



			Network Records Group	Network Rail Drawing No
			BRISTOL S.B.	1 40569-SDG-002
Produced			PORTISHEAD	Last Full Correction
Checked			BRISTOL MEROWEST PHASE 1	Date
Issued	22/04/2014		SCHEME SKETCH 2 OF 2	Correction Version
				Version 0.01

MAINTAIN ON CAD

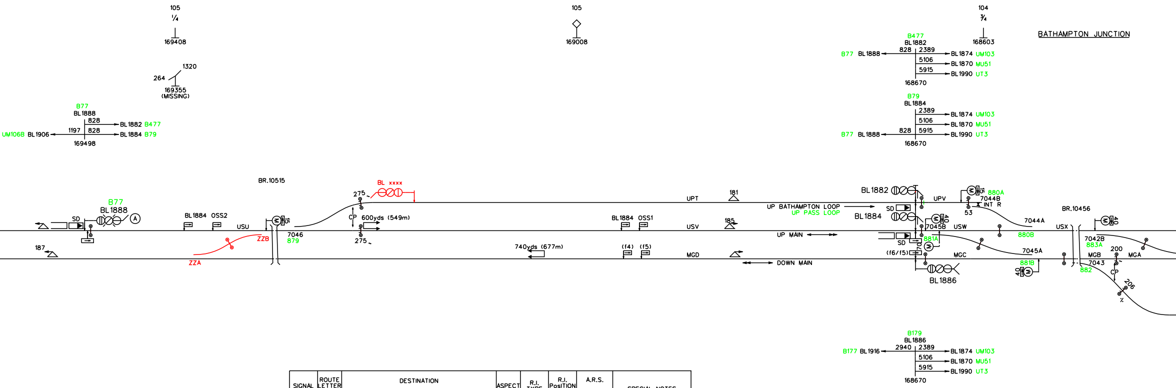

105
¾
170213
105
½
169811
75MPH
UP MAIN
SCALE
1:2000
170213
SWI(40)/MLN1/105·50
170004
UP MAIN
65MPH
170004
BR.10548
MD36R
BL1891
MD36 BL1911
1336
169719
TO BATH
FOR CONTINUATION SEE
SCHEME PLAN 11-GW-010/02
USR
40
100
MGM
249
40
55
183
P
MD36R
BL1891
211
UST
SD
R
BL1889
DM105
65
75
HST
70MPH
DOWN MAIN
DM105
BL1889
1837
1840
2427
1337
DM106 BL1909
BL1879 B202
BL1877 B2
BL1995 B302
169717

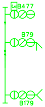
AS DIFFERENT DATUM POINTS HAVE BEEN USED THERE IS AN APPROXIMATE 54m DIFFERENCE IN ASSIGNED METREAGES OF EQUIPMENT.

SINGLE LINE DIRECTION SWITCH BL1890 TO BE PROVIDED FOR THE UP MAIN BETWEEN BATH SPA STATION 7062/7063 CROSSOVERS AND BATHAMPTON JUNCTION 7040/7042 CROSSOVERS.

SINGLE LINE DIRECTION SWITCH BL1887 TO BE PROVIDED FOR THE DOWN MAIN BETWEEN BATH SPA STATION 7062/7063 CROSSOVERS AND BATHAMPTON JUNCTION 7040/7042 CROSSOVERS.

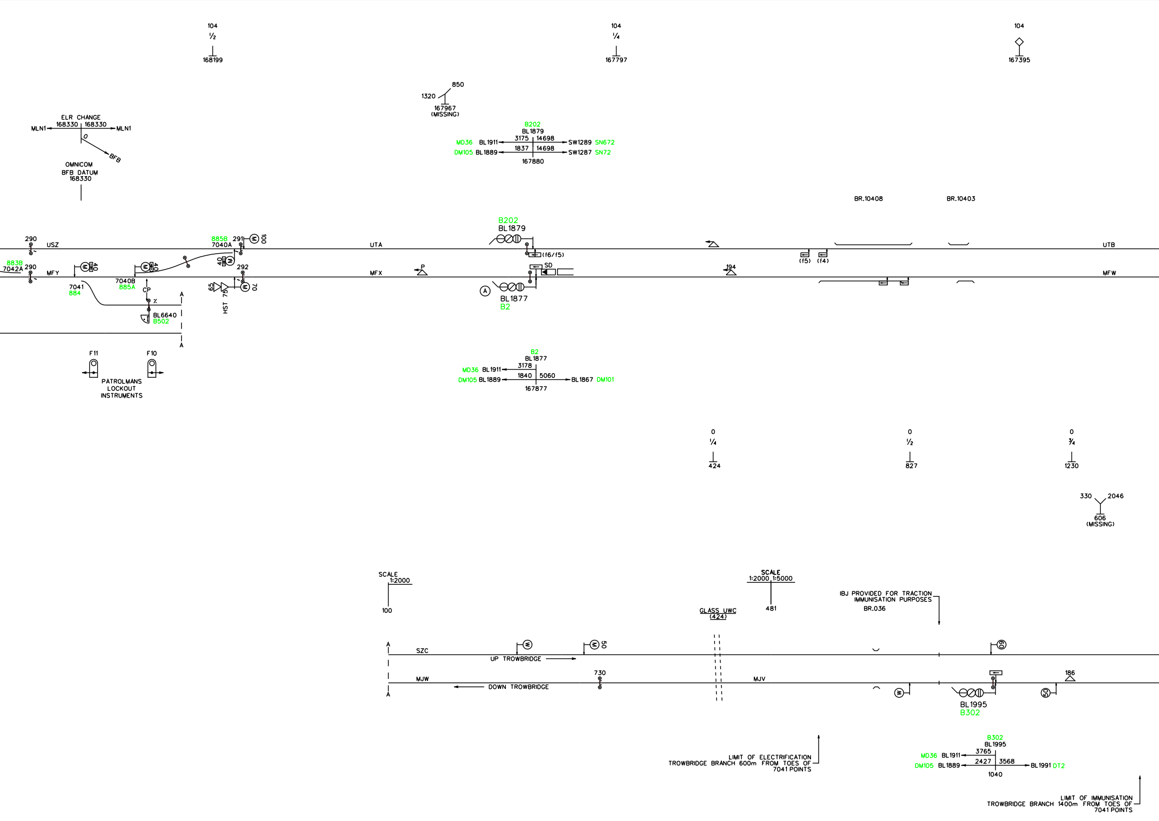
BATHAMPTON JUNCTION

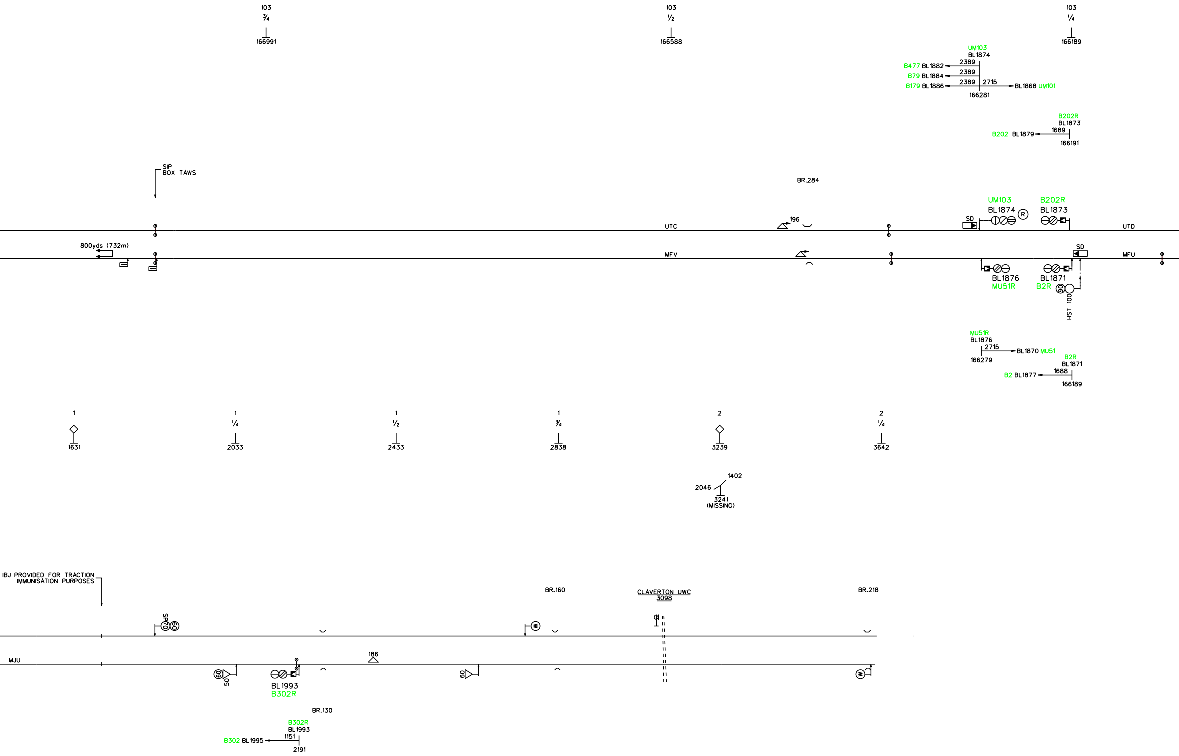

105
¼
169408
105
169008
104
¾
168603
264
1320
169355
(MISSING)
B477
BL1882
828
2389
5106
5915
B77 BL1888
BL1874 UM103
BL1870 MU51
BL1990 UT3
168670
B79
BL1884
B77
BL1888
828
1197
UM106B BL1906
BL1882 B477
BL1884 B79
169498
BR.10515
BL xxxx
275
CP
600yds (549m)
B77
BL1888
SD
Ⓐ
BL1884 OSS2
USU
ZZB
ZZA
7046
879
187
740yds (677m)
BL1884 OSS1
(f4) (f5)
UPT
USV
MGD
181
185
UP BATHAMPTON LOOP
UP PASS LOOP
UP MAIN
DOWN MAIN
BL1882
BL1884
SD
UPV
880A
7044B
INT R
53
7045B
USW
7044A
880B
881A
(f6/f5)
MGC
7045A
881B
BL1886
BR.10456
USX
7042B
883A
MGB
200
MGA
7043
882
CP
206
B179
BL1886
2940
B177 BL1916
168670

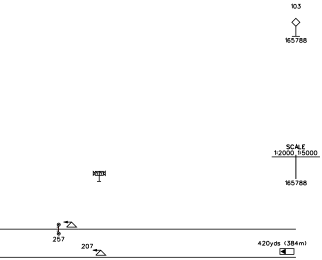

B477
B79
B179

SIGNAL NUMBER	ROUTE LETTER & CLASS	DESTINATION		ASPECT TYPE	R.I. TYPE JI/SI/MI	R.I. PosITION OR LEGEND	A.R.S.		SPECIAL NOTES
		LINE NAME	SIGNAL				Y/N	SUB AREA	
BL1877 B2	A(M)	DOWN MAIN DM105	BL1889	M	-	-	Y	-	Ⓐ
	B(M)	UP MAIN MD36	BL1911	M	JI	Pos4	N	-	MAR
BL1879 B202	A(M)	DOWN MAIN DM105	BL1889	M	JI	Pos1	N	-	MAR
	B(M)	UP MAIN MD36	BL1911	M	-	-	N	-	-
BL1882 B477	A(M)	UP MAIN UM103	BL1874	M	-	-	Y	-	•2
	B(M)	DOWN MAIN MU51	BL1870	M	JI	Pos4	N	-	•2
	C(M)	UP TROWBRIDGE UT3	BL1990	M	JI	Pos5	Y	-	•2
BL1884 B79	A(M)	UP MAIN UM103	BL1874	M	-	-	Y	-	-
	B(M)	DOWN MAIN MU51	BL1870	M	JI	Pos4	N	-	MAY-FA
	C(M)	UP TROWBRIDGE UT3	BL1990	M	JI	Pos5	N	-	MAY-FA
BL1995 B302	A(M)	DOWN MAIN DM105	BL1889	M	-	-	Y	-	-
	B(M)	UP MAIN MD36	BL1911	M	JI	Pos4	N	-	MAR
B502 BL6640	A(S)	DOWN MAIN DM105	BL1889	PL	-	-	N	-	•1
BL1886 B179	A(M)	UP MAIN UM103	BL1874	M	JI	Pos1	N	-	MAR
	B(M)	DOWN MAIN MU51	BL1870	M	-	-	N	-	-
	C(M)	UP TROWBRIDGE UT3	BL1990	M	JI	Pos4	N	-	MAR
BL1888 B77	A(M)	UP BATHAMPTON LOOP UP PASS LOOP B477	BL1882	M	JI	Pos1	Y	-	MAR
	B(M)	UP MAIN B79	BL1884	M	-	-	Y	-	Ⓐ
BLxxxx	A(M)	DOWN MAIN DM105	BL1889	M	JI	Pos1	Y	-	-
	B(M)	UP MAIN MD36	BL1911	M	-	-	N	-	-

•1 - REQUIRES DELAYED REPLACEMENT.
•2 - DELAYED ASPECT, LOOP TRACK(S) REQUIRED OCCUPIED.


104
½
168199
104
¼
167797
104
167395
1320
850
167967
(MISSING)
ELR CHANGE
MLN1
168330
168330
MLN1
0
BFB
OMNICOM
BFB DATUM
168330
B202
BL1879
MD36
BL1911
3175
14698
SW1289
SN672
DM105
BL1889
1837
14698
SW1287
SN72
167880
BR.10408
BR.10403
B202
BL1879
290
USZ
885B
7040A
291
100
UTA
UTB
883B
7042A
290
MFY
40
40
40
292
MFX
P
SD
(f6/f5)
194
(f5)
(f4)
MFW
7041
884
7040B
885A
CP
%
A
65
75
HST
70
A
BL1877
B2
BL6640
B502
A
F11
F10
PATROLMANS
LOCKOUT
INSTRUMENTS
B2
BL1877
MD36
BL1911
3178
DM105
BL1889
1840
5060
BL1867
DM101
167877
0
¼
424
0
½
827
0
¾
1230
330
2046
606
(MISSING)
SCALE
1:2000
100
SCALE
1:2000
1:5000
481
GLASS UWC
(424)
IBJ PROVIDED FOR TRACTION
IMMUNISATION PURPOSES
BR.036
A
SZC
UP TROWBRIDGE
50
50
MJW
DOWN TROWBRIDGE
730
MJV
186
A
50
BL1995
B302
B302
BL1995
MD36
BL1911
3765
DM105
BL1889
2427
3568
BL1991
DT2
1040
LIMIT OF ELECTRIFICATION
TROWBRIDGE BRANCH 600m FROM TOES OF
7041 POINTS
LIMIT OF IMMUNISATION
TROWBRIDGE BRANCH 1400m FROM TOES OF
7041 POINTS


103
¾
166991
103
½
166588
103
¼
166189
UM103
BL1874
2389
B477 BL1882
2389
B79 BL1884
2389
2715
B179 BL1886
BL1868 UM101
166281
B202R
BL1873
1689
B202 BL1879
166191
SIP
BOX TAWS
BR.284
UM103
BL1874
R
B202R
BL1873
196
SD
UTC
UTD
800yds (732m)
MFV
SD
MFU
BL1876
MU51R
BL1871
B2R
90
100
HST
MU51R
BL1876
2715
BL1870 MU51
166279
B2R
BL1871
1688
B2 BL1877
166189
1
1631
1
¼
2033
1
½
2433
1
¾
2838
2
3239
2
¼
3642
1402
2046
3241
(MISSING)
IBJ PROVIDED FOR TRACTION
IMMUNISATION PURPOSES
BR.160
CLAVERTON UWC
3098
BR.218
SP
70
60
W
MJU
186
60
50
BL1993
B302R
60
W
BR.130
B302R
BL1993
1151
B302 BL1995
2191


103
165788
SCALE
1:2000 1:5000
165788
257
207
420yds (384m)

Version	Description of Amendment	Source Record Amended		
		Date	Prod.	Check

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NetworkRail

National Records Group

140569-SDG-003.dgn

Produced			
Checked			
Issued	22/04/2014		

BRISTOL METROWEST PHASE 1
BATHAMPTON
SCHEME SKETCH 1 OF 1

Drawing No
140569-SDG-003

Last Full Correlation	Date	
	Ver.	

Current Version 0.01

CAD Produced

MAINTAIN ON CAD

Version	Description of Amendment	Source Date	Record Prod.	Amended Check

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Network Rail

140569-SDG-004.dgn	National Records Group	Drawing No 140569-SDG-004
Produced	BRISTOL METROWEST PHASE 1	Last Full Correlation: Date / Ver.
Checked	AVONMOUTH	
Issued 22/04/2014	SCHEME SKETCH 1 OF 1	Current Version 0.01

CAD Produced