



MetroWest+

Portishead Branch Line (MetroWest Phase 1)

TR040011

Applicant: North Somerset District Council

6.6, Environmental Statement, Volume 2, Chapter 3 Scheme Development and Alternatives Considered

The Infrastructure Planning (Applications: Prescribed Forms and Procedure)

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CHAPTER 3

Scheme Development and Alternatives Considered

3.1 Introduction

- 3.1.1 This chapter describes how the Portishead Branch Line (MetroWest Phase 1) Development Consent Order Scheme (“the DCO Scheme”) was identified, the development of the design, and the alternatives considered for the preferred transport mode, transport corridors, level of service and for elements of the DCO Scheme.
- 3.1.2 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 as amended (“the EIA Regulations”) state at Regulation 14(2)(d) that an Environmental Statement (“ES”) must include *"a description of the reasonable alternatives studied by the applicant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment"*. The ES should also include any additional information specified in Schedule 4 that is relevant to the specific characteristics of the particular development or type of development and to the environmental features likely to be significantly affected. Schedule 4 provides that the ES should include *"A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects"*.
- 3.1.3 The Portishead Branch Line was closed to passenger services in 1964 and to freight services in 1981. Plans for its re-instatement and use were first proposed in 1986. This Chapter records the background to the DCO Scheme, which is described in Chapter 4 Description of the Proposed Works (DCO Document Reference 6.7). The options appraisals undertaken are recorded. In the absence of reasonable alternatives to the proposed route, this Chapter describes alternatives within the DCO Scheme, outlines the iterative development of the DCO Scheme and explains how environmental and other factors have influenced the DCO Scheme.

3.2 Background to the Development of the DCO Scheme

The MetroWest Programme

- 3.2.1 The West of England (“WoE”) Authorities comprising the West of England Combined Authority (“WECA”), North Somerset District Council (“NSDC”), Bath & North East Somerset Council (“B&NES”), Bristol City Council (“BCC”), and South Gloucestershire Council (“SGC”) are progressing plans to invest in the local rail network over the next ten years through the MetroWest programme. The MetroWest programme comprises:

- The MetroWest Phase 1 project;
 - The MetroWest Phase 2 project;
 - A range of station re-opening / new station projects, subject to separate business cases; and
 - Smaller scale enhancements projects for the WoE local rail network.
- 3.2.2 These projects range from relatively large major schemes, entailing both infrastructure and service enhancement, to smaller scale projects. Formal and informal consultation during the iterative design process for the DCO Scheme demonstrated that it enjoys wide support and backing from business, local cross-party politicians and community stakeholders. The DCO Scheme has very high levels of support with 95% of respondents supporting the proposals entirely or mainly (see the Stage 2 consultation report TravelWest website at <https://travelwest.info/projects/metrowest/metrowest-phase-1>).
- 3.2.3 The MetroWest programme is being jointly promoted and developed by the five WoE Authorities – B&NES, BCC, NSDC, SGC and WECA – working alongside Network Rail, Great Western Railways and the wider rail industry. WECA has responsibility for strategic and transport planning together with B&NES, BCC, NSDC and SGC. Each project has a lead authority, MetroWest Phase 1 is being led by NSDC and WECA, while MetroWest Phase 2 is being led by SGC and WECA.
- 3.2.4 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 subregion comprising:
- improvements to existing rail corridors feeding into Bristol and reopening the disused line between Portishead and Pill;
 - increased service frequency;
 - cross-Bristol service patterns (eg Bath to Severn Beach); and
 - a Metro-type service appropriate for a city region with a population which exceeded 1 million in 2016.
- 3.2.5 The MetroWest programme will complement the investment being made by Network Rail and extend the benefits of projects such as the electrification of the Great Western main line. The programme is to be delivered over the next five to ten years during Network Rail Control Period 5 (2014 to 2019) and Control Period 6 (2019 to 2024).
- 3.2.6 The MetroWest programme will extend the benefits of strategic transport interventions that have been delivered recently by the WoE Authorities. 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 WofE.

- 3.2.7 The re-opening of the Portishead Branch Line as part of MetroWest Phase 1 is assumed as a committed scheme within the base case for the Joint Spatial Plan (“JSP”) that sets out sustainable regional growth for the region to 2036. The DCO Scheme was also assumed as part of the base case for the Joint Transport Study (“JTS”) which informed the JSP. For land use and transport planning purposes, the sub-region is effectively assuming that MetroWest Phase 1 and 2 will be delivered early in the planning horizon. MetroWest Phase 1 supports the delivery of existing and the future needs of 105,000 new homes and 82,500 new jobs, set out in the JSP. Without MetroWest Phase 1 there would be adverse impacts on these JSP outputs.
- 3.2.8 In the draft Joint Local Transport Plan 4, MetroWest Phase 1 is cited as an early investment scheme in progress (a committed project) and is cited under policy W1 *Provide more public transport options and improve service quality*. Without MetroWest Phase 1 fewer transport options would be available particularly for the residents of Portishead and Pill and improved service quality would not be delivered.

Brief History of the Project

- 3.2.9 A brief history of policy development, studies and actions to re-open the Portishead Branch Line as part of MetroWest Phase 1 is provided in Table 3.1.

Table 3.1: Brief history of the DCO Scheme

Year	Studies, Major Milestones and Formal Decisions
1964	Portishead Branch Line was closed to passenger services as part of the Beeching cuts.
1981	The Portishead Branch Line was closed to freight. The railway was not dismantled or formally mothballed.
1986	Advanced Transport for Avon promoted the re-opening of the Portishead Branch Line as a commercially led investment and secured powers to build and operate. However, the organisation subsequently went into liquidation with substantial debts.
1991	The Bristol Integrated Transport and Environmental Study (“BRITES”) looked at the possibility of Light Rail Transit (“LRT”) along the Portishead line (Avon County Council, 1991).
1992	Guided Light Transit (“GLT”), a type of guided bus system, was considered as an alternative to LRT along the Portishead line in <i>GLT BRITES</i> (Avon County Council, 1992).
1998	The <i>Transport and Development Modelling Study</i> (by the Joint Strategic Planning Transportation Unit of the four West of England Councils), Bristol North East and South West Sectors looked at a possible park and ride at Portbury.
1999	The <i>Portishead to Bristol Corridor Study Stage 1</i> (Scott Wilson, 1999) looked at light and heavy rail options for the route. It concluded that the passenger scheme was an incremental development of the rail freight scheme. Further testing was required during Stage 2.

Table 3.1: Brief history of the DCO Scheme

Year	Studies, Major Milestones and Formal Decisions
2001	<p>The <i>Portishead to Bristol Corridor Study Stage 2</i> (Scott Wilson, 2001) examined three heavy rail options versus a light rail option and five bus options. The study concluded:</p> <p>Bus versus heavy rail: it is not possible to achieve journey time between Portishead and Bristol equal to rail options, but buses have a considerable advantage in respect of route and frequency enhancements and in ‘penetration’ of Portishead and Bristol.</p> <p>Light rail versus heavy rail: Capital investment is higher for light rail than heavy rail, but only marginally more passengers will use the light rail scheme, so the cost benefit suggests a light rail scheme would not be commercially viable.</p>
2002	<p>Part of the Portishead Branch Line (as far as Pill) was re-opened for freight trains, along with a new half kilometre section of railway from Pill to Royal Portbury Dock.</p>
2004	<p>Quays Avenue in Portishead was built across the safeguarded rail alignment on the presumption that a rail level crossing would be acceptable and deliverable, should the railway scheme be taken forward. Quays Avenue was built to provide access for new housing developments off Phoenix Way to the external facing A369 corridor without going along Harbour Road and the town centre via Cabstand.</p>
2005	<p>Portishead Quays Masterplan (Barton Willmore, 2005) identified a new location for Portishead station at the rear of Waitrose supermarket off Harbour Road.</p>
2006	<p><i>Greater Bristol Strategic Transport Study</i> (W S Atkins, 2006) explored the potential for a rapid transit system that provided new public transport links to Portishead, with stops in the centre of Portishead and good penetration into Bristol. It also considered the introduction of a rail line, with the proposed rail station on the edge of Portishead. The outputs informed the <i>Joint Local Transport Plan 2</i>.</p>
2006	<p>The <i>Joint Local Transport Plan 2</i> published by the West of England Partnership made up of BCC, B&NES, NSDC and SGC (West of England Partnership 2006) provided a policy basis and stakeholder support for taking forward the project to open the Portishead Branch Line. The reintroduction of a Bristol to Portishead passenger rail service was identified as a long-term scheme as part of the Rail Action Plan to tackle congestion. Light rail or Bus Rapid Transit was not included for this corridor. The A369 was included as proposed Greater Bristol Bus Network key corridor 9, but this did not include significant infrastructure improvements.</p>
2007	<p>The <i>Greater Bristol Public Transport Corridor Options Study</i> (Steer Davies Gleave, 2007) considered Bus Rapid Transit on the operational rail line or via A4 Portway between Portishead and Avonmouth. It identified significant deliverability issues with both options. A fully segregated alignment along A4 Portway was also not considered feasible.</p>

Table 3.1: Brief history of the DCO Scheme

Year	Studies, Major Milestones and Formal Decisions
2007	The <i>North Somerset Adopted Replacement Local Plan</i> (North Somerset Council, 2007)) Policy T/1 safeguarded the disused railway alignment between Portishead and Pill while Policy T/3 safeguarded a site for Portishead Station at the rear of Waitrose, close to the former Station site in 1964.
2008	NSDC purchased the track-bed from Portishead to Portbury to safeguard the alignment for a transportation corridor.
2008	Portishead Branch Line Re-opening Project feasibility study by consultants Halcrow Group Ltd concluded that the scheme was feasible and suggested detailed discussion with Network Rail on taking the project forward.
2009	Portishead Branch Line Re-opening GRIP ¹ stages 1 Output Definition and 2 Feasibility study by Network Rail.
2010	Portishead Branch Line Re-opening GRIP stage 3 Option Selection by Network Rail (note this was less detailed GRIP stage 3 before the GRIP process was changed to include Approval in Principle design).
2010	Route Utilisation Strategy for the Great Western Line (Network Rail, 2010). This study tested various options for the Greater Bristol Metro (to upgrade the local rail network to provide a rail-based Metro).
2011	The <i>WoE Joint Local Transport Plan 3</i> provided a policy basis, programme prioritisation and stakeholder support for taking the Portishead rail project forward. WoE Rail Conference – Portishead Branch Line re-opening project was selected by over 70 delegates as the 2nd highest rail priority for delivery.

¹ The management and control process used by Network Rail for delivering projects to enhance or renew the operational railway is called Governance for Railway Investment Projects (“GRIP”). This is an eight-stage process from project identification, through several design stages to construction, commissioning and hand over.

Table 3.1: Brief history of the DCO Scheme

Year	Studies, Major Milestones and Formal Decisions
2012	<p>WoE Rail Area Studies by Halcrow Ltd recommended combining the Portishead Branch Line re-opening project into the Greater Bristol Metro project with delivery through a phased approach. The study recommended Phase 1 of Greater Bristol Metro should include the re-opening of the Portishead Branch Line and the enhancements for the Severn Beach and Bath to Bristol line, as upgrading these lines were identified as having a positive business case in the 2010 Route Utilisation Strategy and were considered a priority by the councils.</p> <p>WoE Joint Transport Executive Committee resolution accepted the 2011 Rail Study recommendations to combine the Portishead Branch Line re-opening project into the Greater Bristol Metro project with delivery through a phased approach. The Committee also endorsed a response to the Department for Transport (“DfT”) on the Great Western Franchise calling for the project to be included in franchise specification as a priced option. DfT confirmed the inclusion of Greater Bristol Metro Phase 1 as a priced option in the Great Western Franchise.</p>
2013	<p>WoE Joint Transport Executive Committee endorsed proposals by the four WoE Authorities to allocate resources to fully mobilise the Greater Bristol Metro Phase 1 project.</p> <p>The project is briefly renamed ‘Great West Phase 1’ project, then changed to ‘MetroWest Phase 1’.</p> <p>In February 2013, public consultation was undertaken on NSDC’s Sites and Policies Development Plan Document (Consultation Version) which included three options for the site of Portishead Station.</p>
2014	<p>Public consultation was undertaken on the location for Portishead rail Station.</p> <p>GRIP stages 1 and 2 were completed by Network Rail alongside the Preliminary Business Case by the Councils and reported to the Joint Transport Board (comprising both the Joint Transport Executive Committee and the Local Transport Body Board).</p> <p>Portishead Station Options Appraisal Report was submitted to the Office of Rail Regulation.</p> <p>Environmental baseline studies of the proposed DCO Scheme were undertaken.</p>
2015	<p>The Office of Rail Regulation letter states they would not contemplate a level crossing on Quays Avenue.</p> <p>Stage 1 Scheme Consultation undertaken on the DCO Scheme.</p> <p>Planning Inspectorate notified in June 2015 of NSDC’s intention to submit an ES on the DCO Scheme and requesting a Scoping Opinion, together with copies of the Environmental Scoping Report and Baseline Report.</p> <p>The Planning Inspectorate provided a Scoping Opinion in August 2015 (DCO Document Reference 6.1).</p>

Table 3.1: Brief history of the DCO Scheme

Year	Studies, Major Milestones and Formal Decisions
2015-2017	<p>GRIP stage 3 Option Selection Approval in Principle design (2 trains per hour scheme) completed by Network Rail early 2017.</p> <p>Micro consultation undertaken on Pill Station and Ashton Vale Road highway access early 2016.</p> <p>Strategic parcels of land were acquired mid-2016.</p> <p>Further round of micro consultation undertaken on Ashton Vale Road highway access in late 2016. Highways design and transportation modelling for Portishead, Pill and Ashton Vale Industrial Estate alternative access. Land assembly and Development Consent Order pre-application stage. Support from incumbent train operator Great Western Railways 2016-2017.</p> <p>Environmental Impact Assessment of the emerging DCO Scheme 2016-17.</p> <p>Joint Transport Board endorsed proposals in March 2017 to take a staged approach to the delivery of MetroWest Phase 1 in light of major and unexpected scheme cost increased arising from completion of GRIP stage 3. The proposals for the Severn Beach Line remained unchanged, while the proposals for the Portishead Branch Line were revised to provide an initial passenger train service (1 train per hour).</p> <p>A value engineering assessment completed by Network Rail in June 2017 reduced the scope of infrastructure and engineering requirements for delivering an initial passenger train service for the Portishead Line (1 train per hour), along with opportunities for wider cost reduction.</p> <p>Revised GRIP stage 3 Option Selection Approval in Principle design (reduced scope 1 train per hour for the Portishead Branch Line) completed by Network Rail late 2017.</p> <p>Outline Business Case (“OBC”) for the DCO Scheme was completed and endorsed by the WoE Joint Committee in November 2017 as part of a funding bid to the DfT (DCO Document Reference 8.4).</p>

Table 3.1: Brief history of the DCO Scheme

Year	Studies, Major Milestones and Formal Decisions
2018-2019	<p>The Secretary of State for Transport set out in a letter in October 2018, the circumstances in which he would consider further funding assistance for the delivery of the DCO Scheme. The letter directed the promoting authorities to consider ‘light rail and tram-train options’ for the Portishead Branch Line.</p> <p>The promoting authorities commissioned Network Rail in late 2018 to undertake a light rail / tram-train feasibility study of the Portishead Line. The study was completed in March 2019 using Network Rail’s recent expertise from the Sheffield to Rotherham tram-train project.</p> <p>The study concluded that the opportunity to descope infrastructure from the current heavy rail design was limited and where for instance lighter components could be used, the unit costs are generally higher and savings cannot be achieved. Furthermore, light rail / tram-train could not be delivered without a depot, stabling, power supply and traction and the West of England does not have any of this infrastructure. Consequently, the cost of delivering light rail / tram-train for the Portishead Branch Line would be considerably higher than the heavy rail project scope.</p>

3.3 Alternatives Considered for the Portishead Branch Line

3.3.1 The National Policy Statement for National Networks (“NPSNN”) notes that linear infrastructure such as rail development differs from some of the other types of infrastructure covered by the Planning Act 2008 for several reasons.

- These networks are designed to link together separate points. Consequently, benefits are heavily dependent on both the location of the network and the improvement to it.
- Linear infrastructure is connected to a wider network, and any impacts from the development will have an effect on pre-existing sections of the network.
- Improvements to infrastructure are often connected to pre-existing sections of the network. Where relevant, as in the case of the DCO Scheme, this may minimise the total impact of development, but may place some limits on the opportunity for alternatives.

3.3.2 NPSNN paragraph 4.27 states that: “Where projects have been subject to full options appraisal in achieving their status within Road or Rail Investment Strategies or other appropriate policies or investment plans, option testing need not be considered by the examining authority or the decision maker. For national road and rail schemes, proportionate option consideration of alternatives will have been undertaken as part of the investment decision making process. It is not necessary for the Examining Authority and the decision maker to reconsider this process, but they should be satisfied that this assessment has been undertaken.” The DCO Scheme has been subject to various studies to identify options for rail investment identified in Table

3.1. This sub-section discusses in more detail the options considered for transport modes between Portishead and Bristol, feasible transport corridors, levels of services and the “Do Nothing” scenario.

Transport Mode Options

- 3.3.3 The transport corridor between Portishead town centre and Bristol city centre is approximately 15 km long and the transport mode options along this corridor are limited compared with other corridors feeding into Bristol city centre. The options are:
- the A369 highway, which has a single lane in each direction and is dissected by Junction 19 on the M5 near Pill,
 - the Portbury Freight Line which is currently open to freight only, and
 - a cycle route National Cycle Network 26 (“NCN26”) much of which is unsurfaced, un-lit and difficult to cycle in winter. The section of the cycle route through the Avon Gorge is also part of the River Avon tow path and lies adjacent to the railway line.
- 3.3.4 As a result of the limited travel choices, the dominant mode of choice is the car, despite the significant congestion at peak times along the route, in particular at Junction 19 and at Ashton in Bristol. In addition, there are limited alternatives to this transport corridor when congestion or disruption occurs.
- 3.3.5 The strategic need for improvements in the Portishead Bristol transport corridor was first identified in 1986 and in the ensuing 20 years different mode options were considered. Following the Greater Bristol Public Transport Corridor Options Study in 2007, work on the technical feasibility of re-opening the branch line were undertaken. Subsequent local and sub-regional studies and plans followed and in 2012 it was resolved to accept the study recommendations and to proceed with the re-opening of the branch line to provide a railway service from Portishead to Bristol. This section identifies the features of the Portishead to Bristol transport corridor, the pressures that have built over recent decades, the imperatives that underpin the DCO Scheme, the work that has been undertaken on transport mode options and the selection of railway as the only feasible option for the Portishead to Bristol transport corridor explained.
- 3.3.6 The population along the corridor has dramatically increased over the last few decades. This, together with the projected scale of growth across the sub-region, raises serious transport challenges for the local authorities. For example, the population of Portishead in 1961 was 6,440, while today the population has increased to over 30,000. Further development in the town is proposed resulting in further projected population growth over the next few years. As demand on the transport corridor increases as a result of population and economic growth, further transport infrastructure investment is needed to ensure the corridor is sufficiently accessible and has sufficient capacity and resilience to continue to meet the needs of residents, businesses and visitors. 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 arising from increased mobility in particular for those without access to the private car.

- 3.3.7 The average speed by car from Portishead town centre to Bristol city centre is around 12 mph during the morning peak with a journey time of 50 minutes for the 9 miles (15 kilometre) distance. The A369 and surrounding highway network suffers from a lack of network resilience and, consequently, unreliable journey times. At the Portishead end, queuing onto and off the M5 at Junction 19, impedes traffic flow on the A369. At the Bristol end of the corridor, systemic levels of traffic congestion starting in Ashton/ Bower Ashton and continuing into the city centre result in very low average speeds and extended journey times.
- 3.3.8 In addition to the poor journey times by car, the corridor also has poor journey time reliability as a result of incidents and accidents on the M5, whereby motorists are diverted onto the A369 at Junction 19, causing widespread delays and disruption to the whole corridor. This fundamental lack of resilience of the strategic and local road network is reflected in traffic data published by Inrix showing that the West of England is the sixth most congested city region in the UK, after London, Edinburgh, Glasgow, Birmingham and Manchester. The West of England had a recorded 619 traffic hot spot incidents over 12 months with the worst recorded incident at Junction 20 on the M5 leading to a 15 hour delay which resulted in traffic problems up to 36 miles away.
- 3.3.9 The problems caused by:
- poor highway journey times,
 - poor journey time reliability,
 - continued worsening of traffic congestion and
 - limited travel choices on the corridor,
- impact on human health and public safety. The continued dependency on the car as the major mode of transport for the corridor will also continue to result in impacts on human health and public safety.
- 3.3.10 In addition the current problems also impact on the local economy. The impacts on business from the poor journey times, reliability and congestion spread into the labour market and place extra costs on business due to increased operating costs of vehicles, more non-productive time spent travelling and wider productivity impacts from the reduction in the potential for business clustering. The importance of journey times and journey time reliability to the local economy is reflected in the economic appraisal of major transport schemes through the DfT's WebTAG technical guidance. The MetroWest Phase 1 OBC December 2017 (DCO Document Reference 8.4) is fully WebTAG compliant and forms part of the development consent order ("DCO") application submission.
- 3.3.11 Initial technical feasibility studies to re-open the Portishead Branch Line identified that a journey time of between 17 to 23 minutes could be achieved by passenger train between Portishead and Bristol Temple Meads, depending on line speed and stopping pattern at local stations. This work informed the evolution of the engineering design and the GRIP 3 Single Option Selection design for the DCO Scheme resulted in a 23 minute journey time from Portishead and Bristol Temple Meads. This compares favourably to journey times of about 50 minutes by car and over an hour by bus during the morning peak.

- 3.3.12 This clearly demonstrates that highway based modes (car, bus, etc) are uncompetitive in terms of journey times compared with a passenger train service. The divergence between the highway based journey times and the passenger train was so substantial that there was no realistic prospect of delivering a highway based mode enhancement for the corridor that could achieve a journey time anywhere close to 23 minutes. This is because any highway based mode would have to overcome the strategic bottle necks at both ends of the corridor. With Junction 19 of the M5 at the Portishead end and systemic congestion at the Bristol city centre end of the corridor, the current average speed on the corridor would have to increase from 12 mph to around 25 mph. A further issue in the modal selection for the corridor was that passenger rail journey times do not tend to erode over time, in the context of a branch line feeding into Bristol. By comparison there has been a long term trend of highway journey times increasing across the sub-regional highway network, due to the continued growth in traffic volumes.
- 3.3.13 As the highway network has continued to become congested over the last few decades the volumes of demand for travel by passenger rail across the sub-region have also experienced long term growth. The Office of Rail and Road's published passenger trip figures show a 63% increase between 2006/07 to 2015/16. Furthermore, the annual West of England Rail Survey which counts all passengers, not just ticket sales, shows higher total growth at 93% across all local stations and average growth per annum of 6.9%. These long term trends supported strong messages received from residents and business about the need for more investment in the local railway network. In particular there is a need to address the limited geographic reach of the local rail network, the irregular/inadequate train service frequency on some corridors and train overcrowding problems. For further information refer to the MetroWest Phase 1 OBC, December 2017 (DCO Document Reference 8.4).²
- 3.3.14 The reopening of the Portishead Branch Line was initially considered in 1986, but the proposing organisation went into liquidation. During the early 1990s different modal options were looked at for the corridor, with heavy rail considered in 2001. A major part of the branch line was re-opened in 2001 to freight trains operating from Royal Portbury Dock (west of Pill village) to Bristol and beyond. The Greater Bristol Strategic Transport Study (2006) explored the potential for rapid transit and heavy rail with new stations at Pill and Portishead and the outputs of the study informed Joint Local Transport Plan 2 ("JLTP2"). JLTP 2 (2006) identified the re-opening of the Portishead Branch Line as the preferred for long-term scheme for the corridor.
- 3.3.15 In 2007 the Greater Bristol Public Transport Corridor Options Study considered Bus Rapid Transit on the operational rail line or via A4 Portway between Portishead and Avonmouth. It identified significant deliverability issues with both options. A fully segregated alignment along A4 Portway was also not considered feasible. Between 2008 and 2010 NSDC commenced a series of initial technical feasibility studies to re-open the Branch Line. In 2010 Network Rail undertook its Route Utilisation Strategy (Western Route), which tested the feasibility of various service

² <https://metrowestphase1.org/large-local-major-schemes-bid-for-construction-funding/>.

enhancements to the local rail network to establish a Greater Bristol Metro. In 2011 the Joint Local Transport Plan 3 (“JLTP3”) identified the re-opening of the Portishead Branch Line along with the delivery of the Greater Bristol Metro scheme as high priority schemes providing the policy basis and programme for taking forward both schemes. See <https://s3-eu-west-1.amazonaws.com/travelwest/wp-content/uploads/2015/05/2013-refresh-and-supplementary-documents.pdf>.

- 3.3.16 A sub-regional rail study was undertaken in 2011 by Halcrow Group Ltd to explore further the feasibility and deliverability of the various local rail schemes identified in JLTP3. The study recommended combining the re-opening of the Portishead Branch Line into the Greater Bristol Metro with delivery through a phased approach. The recommendation for Phase 1 was the re-opening of the Portishead Branch Line along with service enhancements to the Severn Beach and the Bath Spa to Bristol Line (local service). Following the West of England Rail Study (Halcrow, 2011), a formal decision was made by the West of England Joint Transport Board in 2012 to accept the study recommendations and to proceed with the scheme under the name; Great Western Metro Phase 1. The scheme was subsequently re-named MetroWest Phase 1 and the project team was mobilised in 2013. The case for intervention in the transport network is set out in detail in Chapter 1 - The Strategic Case of the OBC for MetroWest Phase 1, December 2017 (DCO Document Reference 8.4).
- 3.3.17 Further information on the modal option selection can be found in the MetroWest Phase 1 Option Assessment report at: <https://metrowestphase1.files.wordpress.com/2017/12/appendix-1-2-mw-ph1-option-assessment-report.pdf>
- 3.3.18 In summary, numerous studies and reports have concluded that re-opening of the Portishead Branch Line for heavy rail services is fully justified on the grounds of reducing congestion and increasing mobility. No feasible alternatives to a heavy rail railway as the transport mode have been identified. The Portishead Branch Line track bed is *in situ* and large parts are existing operational railway. There is no realistic alternative that will achieve the aims of promoting mobility, reducing congestion and thereby benefiting human health and the environment.

The Railway Alignment Selection

- 3.3.19 The Portishead Branch Line is a historic railway alignment that was built in the 1860s. The line closed to passenger trains in 1964 and to freight trains in 1981. In 2002 the part of the former Portishead Branch Line was re-opened between Parson Street Junction (Bristol) and Portbury Dock Junction (Pill) to freight trains serving Royal Portbury Dock. The major impacts arising from its construction including the substantial earthworks to create the railway alignment occurred in the 1860s.
- 3.3.20 There is evidence that an alternative alignment option was considered in the 1840s, further inland to the southwest of the Avon Gorge. A scheme promoted by Brunel secured Parliamentary powers. However, this alignment entailed a severely adverse gradient and long tunnel due to the surrounding topographical and landscape constraints and had technological constraints. Conventional steam trains did not have sufficient traction to traverse such an adverse gradient and an experimental ‘atmospheric’ form of traction was

proposed. However, this form of traction was shown to be flawed when introduced between Exeter and Torbay by Brunel. The proposals for this alternative alignment between Bristol and Portishead did not subsequently achieve sufficient financial backing and the powers were abandoned. The alignment via the Avon Gorge was then progressed, authorised and built pursuant to the Portishead Pier and Railway Act 1863, amended by a subsequent Act in 1866.

- 3.3.21 Today the railway (the Portbury Freight Line) is an underused strategic transport corridor, being used only for freight trains. The option to build an entirely new railway alignment would necessitate the significant dislocation of existing communities as a result of needing to acquire and demolish dwellings, business premises and infrastructure. Not only would there be a need for extensive demolition and land clearance, but alternative dwellings and business premises would need to be provided and infrastructure re-aligned. Significant earthworks would be needed to create a gradient meeting modern technical standards because the north of the DCO Scheme is bounded by the River Avon and the south of the DCO Scheme by a broad ridge of higher land that extends from Clevedon, along Tickenham Ridge and through Failand. The areas of habitation to be served by the DCO Scheme could not be served by rail as effectively as the DCO Scheme, not least because the pattern of housing and commercial development along the Portishead to Bristol transport corridor was substantially constructed around the alignment of the DCO Scheme. The sub region already faces the challenges of population growth and finite land capacity. The need to create a new railway alignment to serve populations that have grown up largely around existing alignment of the DCO Scheme would place considerable additional development pressure on the sub region as there would be a need to build additional houses and business premises to accommodate those displaced from any alternative railway alignment. Apart from the economic costs of such a different railway alignment, the socio-economic and environmental costs would be of such magnitude that no alternative alignment could be feasible.
- 3.3.22 The rough order costs of creating a new railway alignment are in the order of £25M to £50M per kilometre. Based on an alignment length of approximately 15 kilometres this would result in a scheme capital cost of between £375M to £750M and unknown environmental impacts. By contrast the estimated capital cost of the DCO Scheme is approximately £111M and has a benefit to cost ratio of 2.1:1, i.e. £2.10 of quantified benefits for every £1 invested to deliver the scheme. Benefit to cost ratios above 2:1 fall into the DfT's 'high value for money' category.
- 3.3.23 Taking the lower end of the estimated cost of a new railway alignment of £375M, the benefit to cost ratio would be around 0.62:1, i.e. the quantified benefits would be less than the estimated cost. Benefit to cost ratios of less than 1:1, fall into the DfT's 'poor value for money' category and this would mean there is no economic case for its delivery.
- 3.3.24 Notwithstanding the scale of the non-economic impacts, the costs of simply constructing a new railway alignment are prohibitive and do not provide an economic case for delivery.
- 3.3.25 In summary, for compelling geographic, topographical, technological, social, environmental and economic reasons, there is no viable alternative railway

alignment between Portishead and Bristol, that can be identified as a credible alternative solution to the DCO Scheme. The existing railway corridor for the DCO Scheme is the only feasible option because:

- NSDC and Network Rail between them own the land forming the former railway corridor and the permanent land-take required from third parties is relatively small;
- all the principal structures required for the railway are already in place;
- the railway is on a relatively straight alignment between Portishead and the connection to the existing rail network at Portbury Junction, thereby reducing the land potentially affected by the DCO Scheme;
- since the 1860s the physical presence of the railway corridor has influenced the pattern of development in Portishead and Pill, and
- the corridor has been reserved for transport proposals in the relevant planning policy documents.

Level of Service Provision

3.3.26 The route of the DCO Scheme having been established, the nature of the passenger service to be provided was the subject of evaluation and two options were considered for MetroWest Phase 1:

- an all day, half hourly service to Portishead and Pill; and
- a lower cost option to reopen the railway to passengers, with a less frequent service pattern.

3.3.27 Options for service frequencies were assessed in the Preliminary Business Case³ (West of England Partnership, September 2014) (DCO Document Reference 8.3). Half hourly and hourly services for the reopened Portishead Branch Line were considered. The economic assessment, based on the GRIP 2 costs, found an hourly off peak service frequency provided lower value for money than a half hourly option.

3.3.28 However, following the completion of the DCO Scheme's outline design including GRIP 3 (Option Selection) for two trains per hour in March 2017, along with an updated scheme capital cost estimate, the amount of works required for a half hourly hour service were considerably higher than estimates made at GRIP 2 (Feasibility Design). This makes the half hourly scheme presently unaffordable.

3.3.29 The key drivers for the cost increasing were:

- the amount of works required through the Avon Gorge in order to meet modern safety standards to deliver the necessary line speeds to achieve the two trains per hour aspiration, compounded by the poor access in the Avon Gorge, reducing construction productivity;
- the impact on the Ashton Vale Level crossing of two passenger trains per hour all day alongside existing freight services, resulting in the need to consider an alternative highway access from the A370 to the rear of the Ashton Vale Road Industrial Estate;

³ <https://travelwest.info/project/metrowest-phase-1-preliminary-business-case>

- the consequential impact from the above on the amount of land, DCO (planning) requirements and environmental mitigation needed for the scheme; and
 - the increased risks associated with the DCO Scheme following the expanded works and their constraints.
- 3.3.30 As a result the four WoE Authorities determined to take a staged approach to the delivery of the DCO Scheme:
- The proposals for the Severn Beach Line and Bath Spa to Bristol Line remain unchanged i.e. half hourly services and associated infrastructure.
 - For the Portishead Branch Line either an hourly or an hourly plus passenger train service is proposed. The difference between an hourly service and an hourly service plus is:
 - i) Hourly service – Passenger trains operating hourly all day between Portishead and Bristol Temple Meads, calling at Pill, Parson Street, and Bedminster, providing up to 18 trains in each direction per day (Monday to Saturday), and up to 10 trains on Sundays, utilising one train set all day.
 - ii) Hourly service plus – Passenger trains operating every 45 minutes during the am and pm peak and hourly off peak, between Portishead and Bristol Temple Meads, calling at Pill, Parson Street, and Bedminster. Providing up to 20 trains in each direction per day (Monday to Saturday), and up to 10 trains on Sundays, utilising one train set all day and an additional train set during the am and pm peak only.
- 3.3.31 Detailed train path modelling undertaken by Network Rail (using Railsys software) has concluded that there is no difference between the infrastructure required for the hourly service and the hourly service plus. The key difference between the two levels of service is the hourly service requires just one train set, while the hourly service plus requires two train sets, although one train set operates during the peak only.
- 3.3.32 In essence, the reduced scope of DCO Scheme (with an hourly or hourly service plus for the Portishead Branch Line) is in effect the delivery of the scheme lower cost option (revised version since the preliminary Business Case 2014 version).
- 3.3.33 It is envisaged that a second stage could be promoted separately at some point after the delivery of the initial hourly service or hourly service plus, to upgrade the infrastructure to operate a half hourly passenger train service for the Portishead Branch Line. This second stage would be a separate project as it would require separate statutory processes, business case and funding package and is not intended to be progressed until after the delivery of the initial stage. There is currently no estimated opening date for the second stage.
- 3.3.34 The Preliminary Business Case (September 2014) considered a lower cost option at a high level. The option comprised rebuilding a short section of the disused line from Pill to the M5 Junction 19, where a park and ride station could be built, rather than re-opening the disused line to Portishead. The main advantage of this option is cost savings. However, it does not fully address the scheme objectives. In essence the reduced scope of

MetroWest Phase 1 (with an hourly or hourly service plus for the Portishead Branch Line) is in effect the delivery of the scheme lower cost option (revised version since the preliminary Business Case 2014 version).

- 3.3.35 The former lower cost option would not connect Portishead town directly to the national rail network, thus not providing direct access to the rail network for an additional 50,000 people. This would mean the full range of social and economic advantages afforded by a direct rail connection for the residents, businesses and visitors of Portishead, would not be realised. Most users would have to interchange at the park and ride station, as the residential walking catchment near Junction 19 of the M5 would be almost non-existent. Access to the station at Junction 19 would be limited to car users and possibly feeder bus services. The scheme would result in some undesirable social distributional impacts. Given these fundamental disadvantages, this lower cost option was not developed further.

Do Nothing Scenario

- 3.3.36 For the purposes of the EIA, consideration is given to the “Do Nothing” scenario, so that the construction and operation of the DCO Scheme can be compared with the situation without the scheme.
- 3.3.37 The long term trend of traffic growth along the Portishead to Bristol corridor would continue into the future. As congestion increases journey times would also increase and journey time reliability would worsen. Given the lack of a major alternative mode to the car, increasing congestion would constrain access to employment, education and leisure for residents and business, leading to suppression of the sub-regional economy. The continued dependency on the car as the major mode of transport for the corridor would also affect human health and public safety.
- 3.3.38 As an indication of the effects of congestion on travel time, the average speed by car from Portishead town centre to Bristol city centre is around 12 mph during the morning peak with a journey time of 50 minutes for the 9 miles (15 kilometre) distance. This compares unfavourably with the proposed train journey of 23 minutes. The A369 and surrounding highway network suffers from a lack of network resilience and unreliable journey times caused by traffic congestion at both ends of the corridor, with Junction 19 of the M5 at the western end and Bristol city centre at the eastern end.
- 3.3.39 Without the DCO Scheme, alternative modes of travel would remain unavailable at times of disruption to the A369 as a result of incidents and accidents on the M5. Worsening journey time reliability would continue with consequent increased impacts on human health and public safety. Without the DCO Scheme the impacts on business would continue as a result of the poor journey times, reliability and congestion spread into the labour market and place extra costs on business due to increased operating costs of vehicles, more non-productive time spent travelling and wider productivity impacts from the reduction in the potential for business clustering.
- 3.3.40 Without the DCO Scheme none of the scheme benefits would be realised, for the Portishead Branch Line these include:
- Gross Value Added (“GVA”) to the local economy of £12.95M per year in the opening year, totalling £139M discounted GVA during the first 10 years plus a further £54.78M GVA during construction;

- 207 net new permanent jobs plus temporary jobs during construction;
- reduction of 294 car trips per day in the opening year, increasing to 415 fewer car trips per day by 2036;
- bringing an additional 50,000+ people within the immediate catchment of the rail network with new stations at Portishead and Pill;
- improved accessibility to sites for new homes and employment development in proximity to the rail corridors;
- improved train service provision for Parson Street and Bedminster Stations, due to an additional two trains per hour, which would support the regeneration of south Bristol and improve the viability of development proposals adjacent to Bedminster station;
- help to address deprivation by providing better linkages to education and training destinations such as Bristol University and provide wider access to jobs via improved journey times especially for people who do not have access to a car, such as young people;
- benefits for the elderly people and people with disabilities from increased mobility options presented by the re-opening of the Portishead Branch Line, providing enhanced opportunities for travel throughout the West of England;
- increasing the number of people living within 30 minutes travel time of key employment areas, such as Temple Quarter Enterprise Zone, potentially widening labour supply and demand catchments leading to higher labour participation and employment rates, improved productivity boosting local economic output, leading to increased investment and further job creation; and
- increasing land values and development viability along the corridor enabling further sustainable development and assist with unlocking development land.

3.3.41 In summary the Do Nothing scenario would result in adverse impacts in terms of increasing traffic congestion and journey times and worsening journey time reliability, leading to suppression of the sub-regional economy. The continued dependency on the car as the major mode of transport for the corridor would also continue to result in impacts on human health and public safety. The sub-region's strategy for the delivery of major housing development up to 2036 would also be adversely affected.

3.4 Alternatives for Specific Elements of the DCO Scheme

3.4.1 The DCO Scheme will re-use the existing railway corridor which was first laid out in the 1860s. This approach minimises the need for land-take. There are no realistic options for alternative routes for the railway outside the existing railway corridor, which in any event is safeguarded in NSDC's Local Plan.

3.4.2 Alternatives have been considered for the location and layout of features associated with the DCO Scheme and its operation. A summary of alternatives considered for specific elements of the DCO Scheme is

presented in Table 3.2 below. The iterative nature of the EIA process has enabled continuous design refinement, informed by the environmental assessments and consultations with stakeholders. As constraints and opportunities were identified these were fed into the design process. The Design and Access Statement (DCO Document Reference 8.1) provides further information about the design process.

Table 3.2: Summary of alternatives considered for specific scheme elements

Option Description	Option Consideration	Outcome
Portishead Station location	<p>A total of six options were considered for the station location. Some of the options required a level crossing at Quays Avenue but the Office of Rail and Road ruled this out. Three shortlisted options were included in the June 2014 consultation.</p> <p>The proposed sites for the stations lie largely within semi-natural habitats in the disused railway corridor which support protected species, for example Great Crested Newt. Mitigation would be required for all of these species regardless of the option chosen for the station and is not a material issue in selecting the preferred location.</p> <p>The station location could adversely affect residents living nearby due to disturbance and visual effects. The public consultation identified the lack of popularity of Option 3, the most easterly location surrounded by residential areas.</p> <p>Option 1 is located in the area designated in previous Local Plans. However, subsequent construction of Quays Avenue and the current presumption against opening new level crossings made this option unattractive on highway grounds.</p>	<p>Some of the three options had constraints including highway issues, or required demolition of buildings, or lacked space for station facilities and parking.</p> <p>The option with the greatest support, which also had the least constraints, was option 2B – the site straddling Quays Avenue. A summary of environmental issues raised by consultees is presented in Table 3.3. A decision to proceed with option 2B was made by the NSDC Executive in March 2015.</p>

Table 3.2: Summary of alternatives considered for specific scheme elements

Option Description	Option Consideration	Outcome
Portishead and Pill Station platform length	<p>The initial design brief was for a 105 m (4 train carriages) platform. Following technical engagement during the outline design (GRIP 3) in 2016 it was decided it would be appropriate to make provision for 5 coach trains.</p> <p>There are no environmental or planning designations on this land, except for the preservation of this corridor for the railway in previous Local Plans.</p> <p>Ecological surveys identified the presence of protected species, for example Great Crested Newts. However, suitable mitigation measures would have to be put in place regardless of the length of platform, and the presence of protected species would not materially affect the platform length option.</p> <p>In the future, longer trains could affect operational noise levels. This is taken into account in the noise impact assessment, as the opening year scenario assumes a three car train and the future year scenario assumes a five car train. With an acoustic barrier between Portishead Station and Trinity Primary School Bridge, the assessment concluded that there were no likely significant effects on noise during operations.</p>	<p>The outline (GRIP 3) design brief in 2016 was amended to include 130 m (5 train carriages) platforms. This will be retained for the revised proposals for the one train per hour service.</p>
Portishead Station design development	<p>The layout for Portishead Station is determined by the available footprint, with the station on the north side of the platform, with a small car park immediately to the north and a</p>	<p>The layout of the station encourages multi-modal connections for users of public and private transport as well as pedestrians and cyclists. The design has</p>

Table 3.2: Summary of alternatives considered for specific scheme elements

Option Description	Option Consideration	Outcome
	<p>larger car park along the disused corridor to the west of a re-aligned Quays Avenue and south of Harbour Road. The form and appearance of the station buildings evolved through consultation to reach a balance between affordability and good design.</p>	<p>considered people with mobility restrictions. Further explanation of the evolution of the design for the station and urban realm is described in the Design and Access Statement (DCO Document Reference 8.1).</p>
Trinity Primary School Bridge	<p>The existing permissive pedestrian/cycle crossing over the railway will have to be closed for safety reasons. The crossing is highly used and any diversion route via Quays Avenue (realigned) would increase the walking distance by about 600 m.</p> <p>The option to close the crossing and require pedestrians to use the footpaths around the station was not taken forward given the high usage of this crossing, primarily by school children.</p> <p>This site is unsuitable for a subway due to the poor ground conditions, high water levels, and utilities in the area. There were also concerns about public safety.</p> <p>A foot and cycle bridge is a feasible option. However, this does have landscape / visual impacts given the height of the structure and the long ramps to achieve a suitable gradient for equality groups.</p>	<p>A bridge is proposed and indicative details were set out in a non-statutory public consultation in June 2015. The footbridge has been designed with low gradient ramps for use by people with reduced mobility. The visual impact has been softened with landscaping.</p>
Cattle Creep Bridge	<p>The deck of the bridge needs to be strengthened to carry passenger trains. The railway is on an embankment and crosses Flood Zone 3. The bridge provides the only</p>	<p>The preferred option taken forward is Option 1. This option maintains the current status quo while providing an adequate engineering solution for the bridge. It has</p>

Table 3.2: Summary of alternatives considered for specific scheme elements

Option Description	Option Consideration	Outcome
	<p>access for the landowner to one field, an area of marshy grassland which is a local Wildlife Site. Two utilities are routed through the gap in the railway embankment, a high pressure gas main and a water main. Openreach cables are laid along the railway embankment.</p> <p>Two options were considered, Option 1 replacement of the bridge deck and Option 2 infilling the bridge combined with enlarging the culvert on the Easton-in-Gordano stream. There are no environmental constraints on Option 1. The Cattle Creep Bridge acts as informal flood by-pass for the Easton-in-Gordano stream during high flows. Option 2 has the benefit of reducing the flooding but this could then indirectly affect the marshy conditions of the Wildlife Site.</p>	<p>less effect on the services that pass through this area and maintains the accommodation access to the other side of the railway.</p>
<p>Pill Station</p>	<p>The feasibility design (GRIP 2) for Pill Station initially entailed a footbridge over the railway with a pedestrian entrance on Monmouth Road. During the outline design (GRIP 3) an alternative option came to light entailing the acquisition and demolition of No. 7 Station Road, Pill. The alternative option provided space for a station forecourt and did not require a footbridge. A micro consultation was undertaken in Pill in March 2016 on four options.</p> <p>There are no environmental or planning designations at this location.</p>	<p>A summary of environmental issues raised by consultees is presented in Table 3.4. There was very strong support for the option to demolish Pill station house and create a station forecourt with highway access entering via Sambourne Lane and exiting via Station Road. The site has now been purchased by NSDC.</p>

Table 3.2: Summary of alternatives considered for specific scheme elements

Option Description	Option Consideration	Outcome
<p>Location of the Principal Supply Point (“PSP”) building</p>	<p>A PSP building has to be located in the vicinity of Pill. The 2016 GRIP 3 process anticipated the PSP being located at the Pill Tunnel Eastern Portal Compound. However that location is in the Green Belt and lies in the non-designated Ham Green historical park and garden. For planning and construction reasons the site of Pill Station car park is now being considered as a location for the PSP.</p>	<p>Both options were included in the statutory consultation held in November-December 2017. The preferred location is to site the PSP at Pill Station car park.</p>
<p>Pill Tunnel Eastern Portal Compound</p>	<p>The initial design for this temporary construction compound and permanent access and maintenance compound, located the compound on the southern side of the railway. Following further technical assessment it became apparent that locating the compound on the northern side would provide a less constrained access for large vehicles. This location was used in 2001/02 for the work to re-open the Portbury Freight Line.</p> <p>Both sites lie in the Green Belt and the site to the north lies in the non-designated Ham Green historic park and garden. The site on the north side of the railway also lies on the western bank of Ham Green Lakes which are used for recreational fishing.</p> <p>Protected species known to be present in the area include dormouse, otter, and badger, but their presence is not material to the preferred location.</p>	<p>Following engagement with the landowner, the compound design has been taken forward on land north of the railway. The layout avoids mature hedgerows and incorporates a new access to the Ham Green Lakes.</p>

Table 3.2: Summary of alternatives considered for specific scheme elements

Option Description	Option Consideration	Outcome
Avon Gorge Line Speed	<p>Initial technical work identified a need for the line speed through the Avon Gorge to be increased from the existing 30 mph to 55 mph, in order to provide sufficient capacity to operate the half hourly passenger train service and accommodate the existing freight train operations. During GRIP 3 more detailed technical work identified that a lower line speed increase to 50 mph would be sufficient. Following the value engineering of the DCO Scheme in 2017, it has been decided to keep the speed to 30 mph, which results in the need for less engineering and hence lower costs.</p> <p>The environmental impact of the 30 mph scheme is less than the 50 mph lines speed, due to the reduced engineering works, particularly through the Avon Gorge to Ashton Junction.</p>	<p>The GRIP 3 engineering design drawings and deliverables are based on a 30 mph line speed through the Avon Gorge.</p>
Fencing in the Avon Gorge	<p>Network Rail’s fencing policy is based on health and safety risks. For the 55 mph design speed, the GRIP 3 design showed the existing fencing to be replaced with palisade fencing along both sides of the railway.</p> <p>For the hourly scheme and 30 mph line speed, the existing fencing will be replaced with paladin fencing.</p> <p>The replacement of fencing will result in the loss of vegetation 1 m either side of the fenceline regardless of fence type. The palisade</p>	<p>As the fencing strategy is based on the risk profile, the Network Rail standard is to erect paladin fencing.</p>

Table 3.2: Summary of alternatives considered for specific scheme elements

Option Description	Option Consideration	Outcome
Quarry Bridge No. 2	<p>fencing is more visually intrusive than paladin fencing.</p> <p>Quarry Bridge No. 2 on the operational railway north of Clifton Bridge No. 2 Tunnel is a masonry, single span, arch bridge. Inspections and assessment indicate that the bridge requires strengthening to accommodate the new passenger service.</p> <p>The bridge was built as part of the railway in the 1860s and is considered to be of low cultural heritage value.</p> <p>The bridge is located in the Avon Gorge Woodlands Special Area of Conservation (“SAC”)/Avon Gorge Site of Special Scientific Interest (“SSSI”) which is internationally important for its habitats, flora and fauna. Leigh Woods National Trust land adjoins the railway.</p> <p>Four options were considered for the works: (1) reinforce the underside of the bridge arch with a supportive lining, (2) rebuild the bridge deck, (3) a saddle reinforcement of the deck, (4) partial reconstruction of the bridge.</p> <p>Option 1: The first option would result in reduced headroom through the structure, which was opposed by National Trust who require access to the quarry for woodland management.</p> <p>Option 2: The second option would require a larger working area and more impact on flora, but the end result would</p>	<p>The preferred option to strengthen Quarry Bridge No. 2 is Option 4. Option 4 preserves the headroom under the bridge for National Trust access. The proposals are described in more detail in Chapter 4 Description of the Proposed Works (DCO Document Reference 6.7).</p>

Table 3.2: Summary of alternatives considered for specific scheme elements

Option Description	Option Consideration	Outcome
	<p>preserve the current headroom through the structure.</p> <p>Option 3: The saddle option had the benefit of maintaining the headroom through the bridge, while requiring a smaller construction footprint if the bridge were to be rebuilt. This requires extensive temporary works.</p> <p>Option 4: Partial dismantling and rebuilding of the bridge, approaches and temporary earthworks. This requires a new temporary earth ramp from the railway embankment to a small construction site on the west side of the bridge, and the partial dismantling of the bridge arch and side walls and replacement with pre-cast elements.</p>	
<p>Ashton Vale Road highway access</p>	<p>During the development of the outline design of the half hourly services, it became apparent that the traffic impact of the increased operation of the Ashton Vale Road highway level crossing would be severe, with the barriers being down for up to 20 minutes each hour. In March 2016, the DCO Scheme undertook a micro consultation entailing six options for alternative access to the neighbouring industrial estate. Further technical work was undertaken, and consultation on three options was carried out in November 2016. A pedestrian and cycle ramp was also proposed, to link Aston Vale Road with Aston Road, and providing alternative connecting pedestrian and cycle routes.</p>	<p>The November 2016 consultation resulted in support for two of the three highway options. However, these are not required for the revised scheme, so have been removed. The level crossing will remain operational. There will be no alterations to the level crossing.</p> <p>To reduce highway impacts from the more frequent barrier down times, the left-hand queuing lane from Winterstoke Road will be extended and the traffic signals optimised.</p> <p>The new pedestrian and cycle ramp remained as an option to provide an alternative route for non-motorised users when the level crossing is closed, but was removed from the</p>

Table 3.2: Summary of alternatives considered for specific scheme elements

Option Description	Option Consideration	Outcome
	<p>However, it has since been determined that for an hourly or hourly service plus, the level crossing can remain <i>in situ</i> as the barrier down time is unlikely to exceed 4 minutes, per cycle. Alternative highway access is no longer required.</p> <p>The railway is designated as green infrastructure by BCC. There are no other environmental or planning designations in the area.</p> <p>The main environmental impact of options is on the traffic circulation into and out of the Ashton Vale Industrial Estate.</p> <p>The new ramp is unlikely to have a significant effect on townscape in the context of the industrial setting between the railway, Brunel Way and Babcocks.</p>	DCO Scheme during the DCO examination.

3.4.3 Table 3.3 summarises the environmental issues raised by the public during the informal micro-consultation between 16 June and 28 July 2014 for the location of Portishead Station.

Table 3.3: Summary of environmental issues raised during the micro-consultation on options for the location of Portishead Station

Environmental Issue	Option A	Option B	Option C
Economic and social impact of locating station outside of town centre			X
Potential impact on habitats and wildlife due to the proximity to the Portbury Wharf Nature Reserve			X
Visual impact for nearby residents whilst landscape planting established	X	X	X

Table 3.3: Summary of environmental issues raised during the micro-consultation on options for the location of Portishead Station

Environmental Issue	Option A	Option B	Option C
Safety concerns regarding pedestrian access between car park and station	X		X
Potential decrease in availability of residents' parking in nearby streets.	X	X	X
Requirement for good disabled accessibility and parking provision	X	X	X
Traffic disruption during construction and as a result of closure of Quays Road		X	
Loss of commercial and residential (social housing) units			X

3.4.4 Table 3.4 summarises the environmental issues raised by the public during the informal micro-consultation between 22 February and 22 March 2016 on the options for Pill Station.

Table 3.4: Summary of environmental issues raised during the micro-consultation on options for the layout of Pill Station

Environmental Issue	Option 1	Option 2	Option 3	Option 4
Potential decrease in availability of residents' parking in vicinity of station, and increased traffic speeds and volumes through Pill (particularly along Monmouth Road) which could obstruct emergency vehicle access	X	X	X	X
Insufficient availability of disabled parking spaces	X	X	X	X
Light pollution impact on nearby residential properties	X	X	X	X

3.5 References

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3.6 Abbreviations

B&NES	Bath and North East Somerset Council
BCC	Bristol City Council
BRITES	Bristol Integrated Transport and Environmental Study
DCO	Development Consent Order
DfT	Department for Transport

EIA	Environmental Impact Assessment
ES	Environmental Statement
GLT	Guided Light Transit
GRIP	Governance for Railway Investment Projects
GVA	Gross Value Added
JLTP2	Joint Local Transport Plan 2
JLTP3	Joint Local Transport Plan 3
JSP	Joint Spatial Plan
JTS	Joint Transport Study
LRT	Light Rail Transit
NCN	National Cycle Network
NPSNN	National Policy Statement for National Networks
NSDC	North Somerset District Council
OBC	Outline Business Case
PSP	Principal Supply Point (for signalling equipment)
SAC	Special Area of Conservation
SGC	South Gloucestershire Council
SSSI	Site of Special Scientific Interest
WECA	West of England Combined Authority
WoE	West of England

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