MetroWest

Portishead Branch Line (MetroWest Phase 1)

TR040011

Applicant: North Somerset District Council
6.7, Environmental Statement, Volume 2, Chapter 4 Description of the Proposed Works
The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009, regulation 5(2)(a)
Planning Act 2008

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Notice

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01	07/11/19	Application Issue
02	12/03/21	Removal of minor works no longer part of the DCO Scheme: new ponds for ecological mitigation, flood compensation at Easton-in-Gordano, pedestrian and cycle ramp between Ashton Vale Road and Ashton Road.

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CHAPTER 4

Description of the Proposed Works

4.1 Introduction

Structure of this Chapter

4.1.1 This chapter describes:

- the existing railway and highway infrastructure (Section 4.2);
- the principal features of the Portishead Branch Line (MetroWest Phase 1) Development Consent Order Scheme ("the DCO Scheme") (Section 4.3);
- the nationally significant infrastructure project ("NSIP") (Section 4.4);
- the associated development (Section 4.5);
- construction management (Section 4.6;
- the environmental mitigation strategy (Section 4.7);
- operational activities (Section 4.8);
- institutional arrangements (Section 4.9);
- the decommissioning phase (Section 4.10)
- references (Section 4.11), and
- abbreviations (Section 4.12).

4.1.2 This Chapter is supported by eight appendices. Environmental Statement ("ES") Appendix 4.1 Code of Construction Practice ("CoCP") (DCO Document Reference 8.15) sets out the over-arching framework for environmental mitigation, which is presented in more detail in ES Appendix 4.2 Construction Environmental Management Plan ("CEMP") (DCO Document Reference 8.14). A full list of environmental mitigation proposals is presented in ES Appendix 4.3 Schedule of Mitigation (DCO Document Reference 6.31). ES Appendix 4.4 Summary of Works in the Avon Gorge Special Area of Conservation ("SAC") (DCO Document Reference 6.25) brings together all the construction activities in this European designated site. ES Appendix 4.5 Major Accidents (DCO Document Reference 6.25) assesses the potential impact of the construction and operation of the DCO Scheme on people and the environment and the vulnerability of the DCO Scheme to natural hazards and accidents. ES Appendices 4.6, 4.7 and 4.8 provide information on the working train timetable, the network change notification, and the network change establishment.

4.1.3 This Chapter should be read in conjunction with the Transport Assessment which is presented in the ES Appendix 16.1 (DCO Document Reference 6.25), including the Construction Traffic Management Plan ("CTMP" in Appendix K to the Transport Assessment, DCO Document Reference 8.13).

The plans referenced in this Chapter are presented in Part 2 of the DCO Application. Location

4.1.4 Figure 4.1 below shows the location of the DCO Scheme. A more detailed version of the scheme elements and indicative red line boundary at 1:2,500 (A3) is provided in the DCO Document Reference 2.4 General Arrangement Plans Sheets 1 to 17.

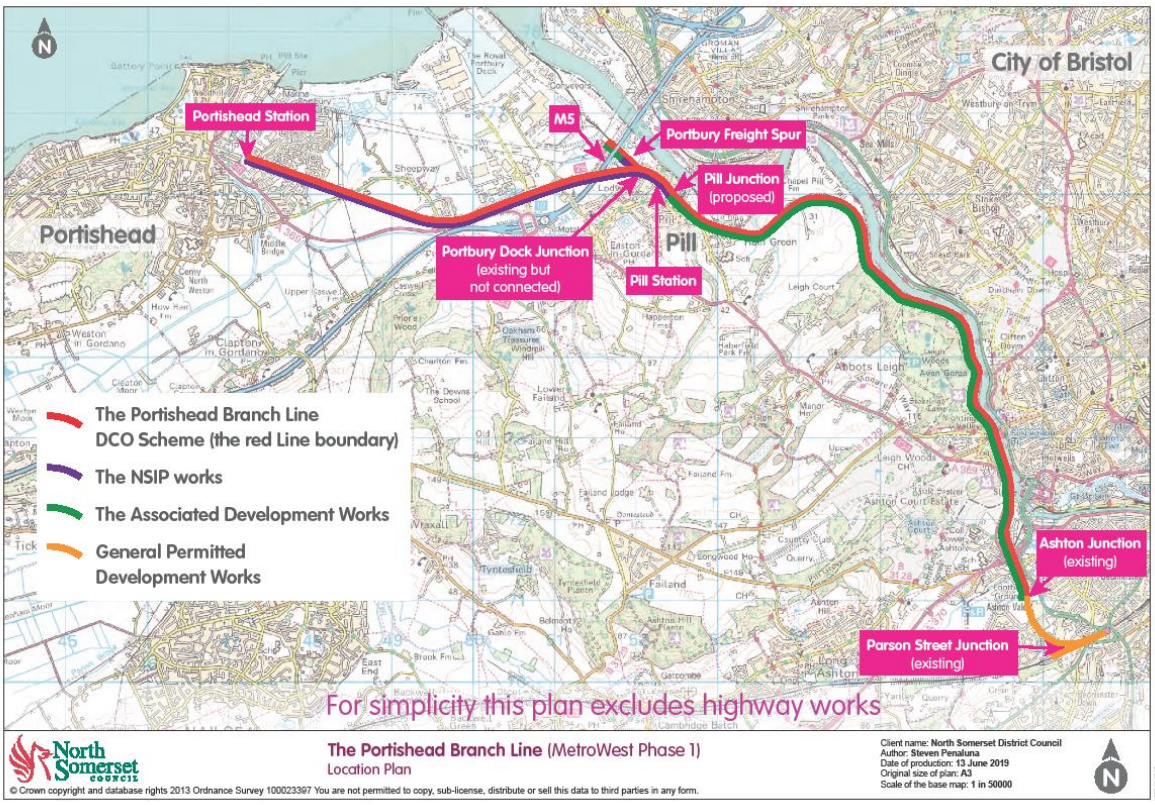

Figure 4.1: Location Plan

The Nationally Significant Infrastructure Project and Associated Development

4.1.5 The Portishead Branch Line DCO Scheme comprises the NSIP and its associated development. The reconstruction of the disused section of the railway line between Portishead and Pill falls within the definition of a NSIP for the purposes of Section 25 of the Planning Act 2008, being the construction of a railway over 2 km in length. Other works required for the DCO Scheme, such as the new stations, works to the highway at Portishead and the alterations to the railway between Pill and Ashton Junction are Associated Development as defined by Section 114 of the Planning Act 2008.

4.1.6 In addition, certain works on the national rail network will be carried out under Network Rail Infrastructure Limited's ("Network Rail") permitted development ("PD") rights, which will also facilitate MetroWest Phase 1. These are also described in this chapter.

Purpose of this Chapter

4.1.7 The description of the DCO Scheme presented explains its likely construction and operation aspects, to enable an assessment of those elements of the DCO Scheme which could potentially have a significant effect on people and the environment.

4.1.8 The description of the DCO Scheme has been prepared in compliance with the requirements in the infrastructure Planning (Environmental Impact Assessment) Regulations 2017 ("EIA Regulations"), Schedule 4, Part 1; Advice Notes provided by The Planning Inspectorate; and the Scoping Opinion[1] paragraphs 2.39 to 2.52.

4.1.9 The description of the DCO Scheme is presented on the basis of the design and construction strategy developed to date. Where options remain or flexibility on the location or nature of the design or construction method is required, these are described and the environmental assessment in the subsequent chapters is based on the worst case anticipated.

4.1.10 Consideration has also been given to the decommissioning phase at the request of the Planning Inspectorate (see paragraph 2.63 in the Scoping Opinion). As the operational stage of the DCO Scheme is very long term and has no foreseeable end-date there are no proposals to decommission the DCO Scheme in the future. The design standards and requirements that have driven the development of a design are set out in Section 4.3 below. Chapter 12: Materials and Waste (DCO Document Reference 6.15) considers the potential environmental effects associated with the use and consumption of materials and the production and management of waste during construction of the DCO Scheme in accordance with paragraph 3.2.8 of the Scoping Opinion provided by the Secretary of State, materials used in waste during the operation of the DCO Scheme have been scoped out of the ES.

Referencing and Conventions Adopted in this Chapter

4.1.11 The standard distance referencing system adopted by the railways in the 19th century was miles ("mi") and chains ("ch") and this continues to be used on the national rail network. A chain is 66 feet long and there are 80 chains in a statute mile. The distance on the Portishead Branch Line was measured out from London Paddington, so the Portishead Branch Scheme extends between about 120 mi and 77 ch at Ashton Junction to 129 mi and 28 ch at Portishead Station. Reference to high mileage and low mileage means a location closer to Portishead or Bristol respectively. Metric measurements have also been used for design purposes, with Ashton Junction at about 4+740 m and Portishead at 18+240 m. Both referencing systems are shown on DCO Document Reference 2.4 General Arrangement Plans Sheets 1 to 17.

4.1.12 Reference to the 'up' and 'down' line refers to the direction of travel. In England, the up line generally refers to the track in the direction of London and on the left hand side where there is double tracking. For the Portishead

[1] The Scoping Opinion prepared by The Planning Inspectorate sets out the matters to be addressed in the ES to be submitted with the DCO application by the applicant. The Scoping Opinion is available at The Planning Inspectorate's webpage at the following address https://infrastructure.planninginspectorate.gov.uk/projects/south-west/portishead-branch-line-metrowest-phase-1/.

Branch Line on the section of double tracking is relatively short between Parson Street Junction and Ashton Junction. For the DCO Scheme, the up line is the track up to Bristol and the down line is in the direction of Portishead.

4.1.13 It is standard practice on railway projects to describe features from the direction of low to high mileage. Consequently, Network Rail reports describe the scheme from the eastern end at Parson Street Junction to Portishead in the west.

4.1.14 For the Portishead Branch Line, the NSIP is located at the high mileage end, that is between Portishead and Pill. Consequently, much of the description of the DCO Scheme in this chapter is described in the direction from high to low mileage (or west to east) from Portishead to Ashton Junction. This has been done in order to focus on the NSIP as the Work that brings the DCO Scheme into the Planning Act 2008 regime. However, this chapter includes some tables and description taken from reports prepared for or on behalf of Network Rail which order the information from low to high mileage (that is, from east to west).

4.1.15 An explanation of technical terms is provided in the glossary at the end of the ES. Abbreviations are defined at the end of this chapter.

4.2 The Existing Railway and Highway Infrastructure

Brief Route Description from Bristol (Parson Street) to Portishead

4.2.1 From the junction with the Bristol to Exeter Railway at Parson Street, the Portishead Branch Line curves to the north and lies in a slight cutting passing under Liberty Lane overbridge and rising onto embankment to pass over Ashton Drive. Through the outskirts of Bristol to the southern end of the Avon Gorge, the railway is either on a slight embankment or is at grade. The railway generally lies on embankment through the Avon Gorge, heading north-west with a steep drop to the River Avon Tow Path and the River Avon on the east side and a deep cess and cliff face of the gorge on the west side. At the north end of the Avon Gorge the railway leaves the river bank then curves around to the south west then west and generally continues on embankment, within cutting approaching Ham Green. The railway passes through three tunnels in the Avon Gorge and a fourth between Ham Green and Pill, before crossing a six span brick viaduct at Pill. The site of Pill Station is in a deep cutting.

4.2.2 The railway comes out of cutting and onto embankment at Avon Road before a slight embankment between the Portbury Junction and the M5 Motorway Bridge. Between the M5 and Portishead the railway is either at grade or on a slight embankment. The railway is crossed by two overbridges carrying the highways of Marsh Lane and Royal Portbury Dock Road whilst heading south west, running parallel to the fence of the Bristol Port Company's Royal Portbury Dock and the highway known as The Portbury Hundred. At the next highway overbridge, carrying Station Road, the site of the former Portbury station is reached. The railway thereafter runs west towards Portishead passing under the highway of Sheepway before terminating in Portishead.

4.2.3 The principal existing structures along the Portishead Line (known by Network Rail as the “POD”) are identified in Table 4.1.

Table 4.1: Approximate location of existing structural assets on the Portishead Branch Line, from Parson Street Junction to Portishead

Structure ID No.	Asset	Network Rail's Code for the Railway Line	Approximate mileage (miles and chains)
	Parson Street Junction	*MNL1 (Bristol to Exeter Mainline)*	*120mi 25ch (ref)*
	Coal Pit Lane Overbridge	*POD (Portbury Branch)*	*120mi 38ch*
S33	*Chilcott Road Underbridge*	*POD (Portbury Branch)*	*120mi 64ch*
	Ashton Road Overbridge	POD (Portbury Branch)	121mi 24ch
	A370 Overbridge	POD (Portbury Branch)	121mi 27ch
	Purell's Overbridge	POD (Portbury Branch)	121mi 33ch
	Clifton Overbridge	POD (Portbury Branch)	121mi 68ch
	Clifton Bridge No. 1 Tunnel	POD (Portbury Branch)	122mi 23ch
S26	Valley Underbridge	POD (Portbury Branch)	122mi 34ch
S25	Underbridge	POD (Portbury Branch)	122mi 40ch
122 53	Clifton Bridge No. 2 Tunnel	POD (Portbury Branch)	122mi 53ch
S23	Underbridge 1	POD (Portbury Branch)	122mi 66ch
S22	Underbridge 2	POD (Portbury Branch)	122mi 74ch
S21	Underbridge 3	POD (Portbury Branch)	123mi 11ch
S20	Underbridge 4	POD (Portbury Branch)	123mi 23ch
S19	Underbridge 5	POD (Portbury Branch)	123mi 34ch
S18	Underbridge 6	POD (Portbury Branch)	123mi 64ch

Table 4.1: Approximate location of existing structural assets on the Portishead Branch Line, from Parson Street Junction to Portishead

Structure ID No.	Asset	Network Rail's Code for the Railway Line	Approximate mileage (miles and chains)
123 77	Sandstone Tunnel	POD (Portbury Branch)	123mi 77ch
S15	Miles Dock Underbridge	POD (Portbury Branch)	124mi 08ch
S14	Underbridge	POD (Portbury Branch)	124mi 44ch
S13	Cages Overbridge	POD (Portbury Branch)	124mi 77ch
S12	Miles Viaduct Underbridge	POD (Portbury Branch)	125mi 27ch
125 33	Pill Tunnel	POD (Portbury Branch)	125mi 33ch
S10	Pill Viaduct Underbridge	POD (NSIP)	126mi 00ch
S09	Pill Overbridge	POD (NSIP)	126mi 07ch
S08	Pill Station Overbridge	POD (NSIP)	126mi 08ch
S07	Avon Road Underbridge	POD (NSIP)	126mi 29ch
S06	M5 Motorway Overbridge	POD (NSIP)	126mi 60ch
S05	Underpass	POD (NSIP)	126mi 65ch
S04	Marsh Lane Overbridge	POD (NSIP)	127mi 04ch
S03	Portbury Dock Road Overbridge	POD (NSIP)	127mi 25ch
S02	Station Road Overbridge	POD (NSIP)	128mi 00ch
S01	Sheepway Overbridge	POD (NSIP)	128mi 47ch

Structures in italics lie outside the Order limits for the DCO Scheme

Track Bed Condition and Drainage

4.2.4 Track bed investigations have been undertaken along the permanent way to assess the current condition, the suitability of the track bed for the proposed DCO Scheme and to inform the design for track bed renewal.

4.2.5 On the disused railway the track bed was overgrown throughout, although the vegetation has been cleared in recent years to facilitate inspections. The build-up of organic matter over several decades has made the ballast unsuitable and the particle size of the ballast does not meet current standards for railway ballast. The remaining track is unsuitable for modern railway use. The rails, sleepers and ballast will also need to be completely removed and replaced.

4.2.6 Between Portbury Junction and Parson Street Junction the Portishead Branch Line is an operational railway used for freight workings from Royal Portbury Dock and maintained to freight line standards by Network Rail. Along the operational railway line between Pill and Parson Street Junction, at the time of the survey in 2017 the rails were generally in reasonable condition, with a few areas exhibiting minor side wear and some areas of pitting. The track is continuous welded rail ("CWR") throughout. Organic matter and silt have also mixed with the ballast and the existing track bed formation will require minor works to achieve modern standards for passenger train operation, including ballast removal and replenishment.

4.2.7 Sections of the rails through the Avon Gorge are at the end of their asset life and need to be replaced with new rail for the introduction of passenger traffic as the alignment, track category and maintenance regimes will change.

4.2.8 Track bed sampling has demonstrated elevated levels of some contaminants in the ballast, predominantly lead and zinc, at discrete locations along the disused section of the railway and along sections of the freight line between Portbury Junction and the Ashton Junction. Further testing along the disused line prior to the commencement of construction works will determine the detail of appropriate handling, treatment, and disposal.

4.2.9 Along the disused railway, drainage ditches have gradually degraded due to vegetation growth and sedimentation. The railway crosses a number of drains and small streams or rhynes which are culverted under the railway.

4.2.10 Along the operational railway the track drains well, albeit slowly in localised areas.

Tunnels

4.2.11 The line between Ashton Junction and Pill Junction passes through four tunnels. Working north from Parson Street, these are known as Clifton Bridge No. 1 Tunnel, Clifton Bridge No. 2 Tunnel, Sandstone Tunnel, and Pill Tunnel. The locations of the tunnels are shown on Figure 4.2 below.

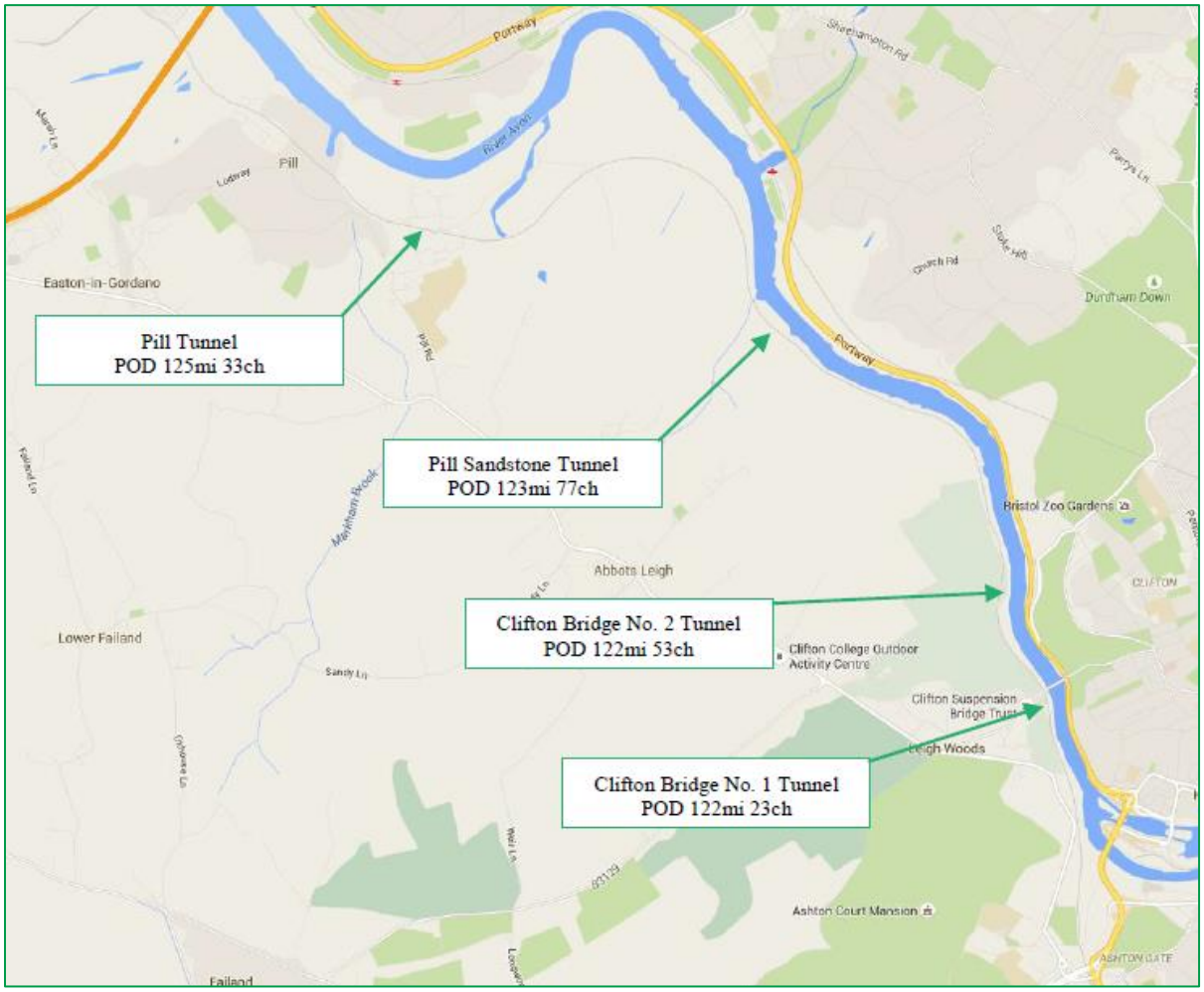

Figure 4.2: Location of the tunnels on the existing operational railway

4.2.12 Network Rail and their advisors have carried out geotechnical and structural assessments through a combination of desk study and visual inspections. The results indicate:

- Clifton Bridge No. 1: very good and stable condition.
- Clifton Bridge No. 2: lined components are deteriorating gradually, particularly in the relieving arches.
- Sandstone Tunnel: areas of sandstone may be degrading gradually and recent repairs need to be improved and monitored.
- Pill Tunnel: in a similar condition to Sandstone Tunnel but degrading more rapidly due the high levels of water ingress.

4.2.13 The track formation, track alignment, gauging, fire and evacuation routes have all been considered within the design to verify that the tunnels are suitable for the change of use from freight to passenger service. Subject to minor works, the tunnels are suitable for the restoration of passenger services.

Existing Maintenance Commitments along the Operational Railway

4.2.14 Network Rail currently undertakes routine maintenance activities along their network. Current and planned maintenance activities along the operational railway between Parson Street Junction and Royal Portbury Dock are summarised in Table 4.2 below.

Table 4.2: Summary of on-going and planned maintenance activities

Asset / Land	Maintenance Activity	Programme
Underbridges	Minor repairs and repointing	As required.
Rails, sleepers and ballast	The rails and sleepers are replaced periodically, in response to inspections. Ballast is cleaned or renewed periodically.	As required.
Avon Gorge	Network Rail periodically undertakes slope stability assessments.	Generally rock inspections are undertaken annually in high risk areas. The findings determine the scope and programme of remedial works.
Vegetation	Network Rail has developed a Site Management Statement ("SMS") in consultation with Natural England for a five year period 2018-2023 to manage the vegetation along the railway corridor through the Avon Gorge Woodlands Special Area of Conservation ("SAC") and Avon Woods Site of Special Scientific Interest ("SSSI"). Outside the SAC/SSSI, vegetation is controlled as per Network Rail standards.	The SMS is in place.

The Surrounding Highway Network

4.2.15 A detailed description of the highway network and the potential impacts of the DCO Scheme on transport and traffic is provided in Chapter 16 Transport, Access and Non-Motorised Users (DCO Document Reference 6.19) and ES Appendix 16 Transport Assessment (DCO Document Reference 6.25). This section provides an overview of the highway network. The main rail and highway features are shown on Figure 1.3 and on DCO Document Reference 2.4 General Arrangement Plans where they lie close to the railway corridor.

4.2.16 The M5 crosses the lower River Avon at Avonmouth on a long bridge known as the M5 Avonmouth Viaduct. To the north, Junction 18 in Shirehampton connects with the A4 into Bristol along the north and east side of the River Avon and along The Portway, under the Clifton Suspension Bridge, onto Hotwells Road and into Bristol city centre or to the south west via Brunel Way. On the south side of the lower River Avon, Junction 19 Gordano connects with the A369 between Portishead and the centre of Bristol along the south side of the River Avon. Between Junction 19 and the junction with the A370 in Ashton Gate, the A369 is known from west to east as Martcombe Road, Abbots Leigh Road, Rownham Hill, and Clanage Road.

4.2.17 The A369 between Junction 19 and Portishead, also called The Portbury Hundred, is a dual single lane carriageway providing the principal highway into Portishead. From Junction 19, the A369 Portbury Hundred extends westward across open countryside to a roundabout with Sheepway on the outskirts of the town. Sheepway continues towards the north east and east crossing the disused railway twice. The road continues as Station Road between the eastern bridge over the disused railway and Old Portbury Station (now a private house) and reconnects with the A369 Portbury Hundred at a T-junction close to Junction 19 on the M5.

4.2.18 The A369 Portbury Hundred continues through an area of recent housing development and at the next roundabout connects with Serbert Way into a commercial centre, and with Quays Avenue, the main link into recent housing in western Portishead. Quays Avenue was built in 2004 and crosses the disused railway corridor, which was already safeguarded in the North Somerset District Council ("NSDC") local plan. Planning permission was granted for Quays Avenue, assuming that in the event the railway scheme is implemented, a level crossing would be acceptable. However the Office of Rail and Road ("ORR") is seeking to reduce the number of existing level crossings and does not support the opening of new railway crossings. As a result, the northern end of Quays Avenue needs to be re-aligned to provide sufficient space for the new station. (The options for station sites in Portishead are discussed in Chapter 3 Scheme Development and Alternatives Considered, DCO Document Reference 6.6.)

4.2.19 The A370 connects with the A369, Brunel Way and the A3029 (Winterstoke Road) at a complicated junction in Ashton Gate. The Brunel Way links with the southern end of Hotwell Road and Bristol city centre on the north side of the River Avon while the A3029 Winterstoke Road links south to the A38 between Bristol and Taunton in the vicinity of Parson Street Station.

4.2.20 There is an existing level crossing over the railway on Ashton Vale Road which connects the A3029 Winterstoke Road and the Ashton Gate Industrial Estate. The industrial estate is bounded by the railway to the east, the A370 to the north, the Long Ashton Park and Ride to the east, and open land to the south.

4.2.21 There are several public rights of way and permissive paths along the railway corridor:

- The Sustrans National Cycle Network ("NCN") 26 uses part of the disused railway corridor between the Royal Portbury Dock Road overbridge and passes under the M5 Motorway Bridge while NCN 41 crosses the River Avon on the M5 Avonmouth Viaduct and passes through Pill Village.
- The River Avon Tow Path runs along the western shore of the River Avon and alongside the operational railway for much of its length through the Avon Gorge.
- There is a pedestrian crossing at Barons Close in Ashton Vale which was closed during the construction of the metrobus scheme (m2 route) and has not reopened. It is proposed to close this crossing permanently as part of the DCO Scheme.

4.3 Portishead Branch Line (MetroWest Phase 1) DCO Scheme

Overview of MetroWest Phase 1

4.3.1 The Portishead Branch Line DCO Scheme is part of a larger project known as MetroWest Phase 1.

4.3.2 The MetroWest Phase 1 project comprises the delivery of infrastructure and passenger train operations to provide:

i. a half hourly service for the Severn Beach line (hourly for St. Andrew's Road station and Severn Beach station);

ii. a half hourly service for Keynsham and Oldfield Park stations on the Bath Spa to Bristol line; and

iii. an hourly service (or an hourly service plus) for a reopened Portishead Branch Line with new/reopened stations at Portishead and Pill (and also serving existing stations at Parson Street, Bedminster and Bristol Temple Meads).

4.3.3 The works on the railway between Parson Street and Bristol Temple Meads and the line between Bristol and Bath are within the existing operational railway and can be delivered using Network Rail's general permitted development rights. The works required on the Severn Beach line have been delivered by the Filton Four Tracking project under permitted development rights.

4.3.4 The proposals for the DCO Scheme are to operate an hourly service, as set out below in paragraph 4.3.5. A second stage may be promoted separately at some point after the delivery of the initial stage, to upgrade the infrastructure to operate a half hourly passenger train service. This would require separate statutory processes, business case and funding package and will not be progressed until after the delivery of the initial stage. There is currently no estimated date for commencing design work and preparation of an application for funding and consent for the second stage. In the absence of details about the second stage and infrastructure that would be required to operate a half hourly service, as well as no funding proposal, the proposal has not been considered as a cumulative effect at any stage of the assessment of the DCO Scheme. If the second stage is progressed in the future in a subsequent application, the current DCO Scheme would form part of the baseline against which assessment for the development required for the second stage would be assessed.

Proposed Service Pattern

4.3.5 The hourly service for the Portishead Branch Line entails passenger trains operating hourly all day between Portishead and Bristol Temple Meads, calling at Pill, Parson Street, and Bedminster. This provides up to 18 passenger trains in each direction per day (Monday to Saturday), with approximately 10 passenger trains in each direction on Sundays. An alternative 'hourly service plus' for the Portishead Branch Line entails 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. This hourly service plus option provides up to 20 passenger trains in each direction per day (Monday to Saturday), with approximately 10 passenger trains in each direction on Sundays.

4.3.6 The assessment set out in this ES has been undertaken on the basis of the 'hourly service plus' service of 20 passenger trains in each direction per day (Monday to Saturday), with approximately 10 passenger trains in each direction on Sundays. Both the ‘hourly service’ and the ‘hourly service plus’ option require exactly the same infrastructure.

4.3.7 Further information about the evolution of the DCO Scheme is set out in Chapter 3 Scheme Development and Alternatives Considered (DCO Document Reference 6.6).

Design Standards and Requirements

4.3.8 This section sets out the key design standards and requirements which have driven the development of the design, and is followed by a description of the main elements of the DCO Scheme. A plan of the DCO Scheme is provided in DCO Document Reference 2.4 General Arrangement Plans Sheets 1 to 17.

4.3.9 The design of the railway infrastructure will comply with relevant National and European Railway Industry Standards and be carried out in accordance with current Network Rail’s standards.

4.3.10 The highway designs comply with:

- *Design Manual for Roads and Bridges* (“DMRB”) by The Department for Transport,
- *Manual for Streets 1* by the Department for Transport and the Ministry for Housing Communities and Local Government, and
- *Manual for Streets 2* by the Chartered Institution of Highways and Transportation in collaboration with the Department for Transport and the Welsh Assembly Government.
- Highways Development Design Guide (“HDDG”) North Somerset Council

4.3.11 The DCO Scheme accommodates the existing freight paths between Portbury Docks and Parson Street Junction.

4.3.12 To deliver the timetable for the passenger train service, the design line speed for the new railway between Pill and Portishead needs to be 75 mph. The line speed on the existing operational railway will remain unchanged at 30 mph. However in order to achieve acceptable ride comfort for passengers some minor adjustment to the track geometry (horizontal and vertical) will be needed to smooth out the curves along the pathway. The displacement of the rails along the operational railway is small, in the order a few centimetres and the new rails will lie approximately 300 mm higher than the existing rails in some locations.

4.3.13 These design requirements govern the horizontal and vertical alignment of the permanent way.

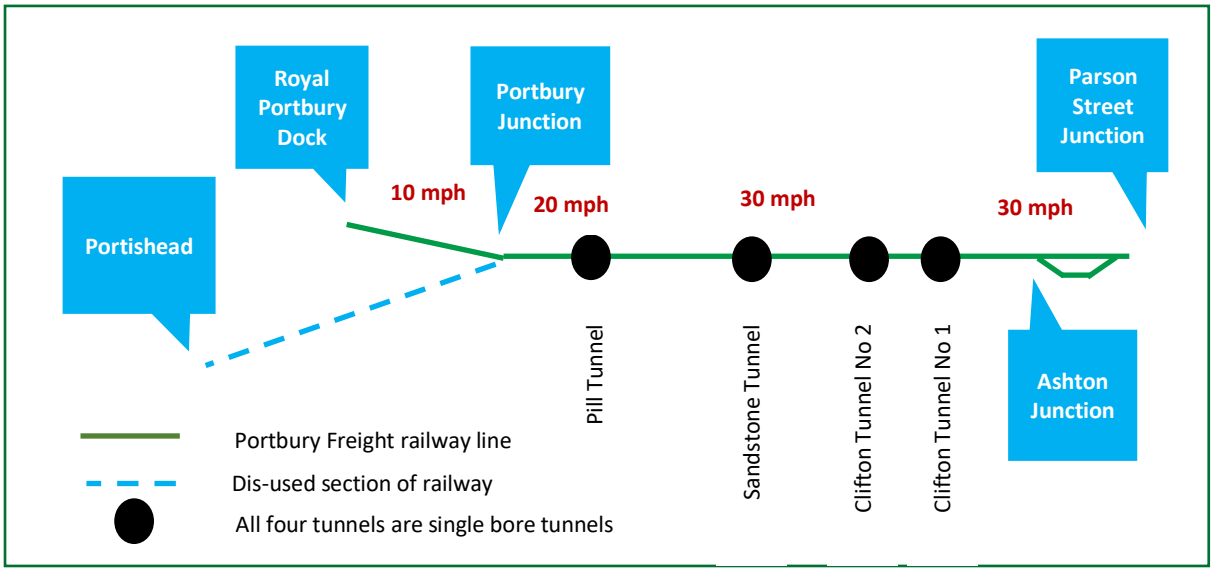

Figure 4.3: Current line configuration and line speeds

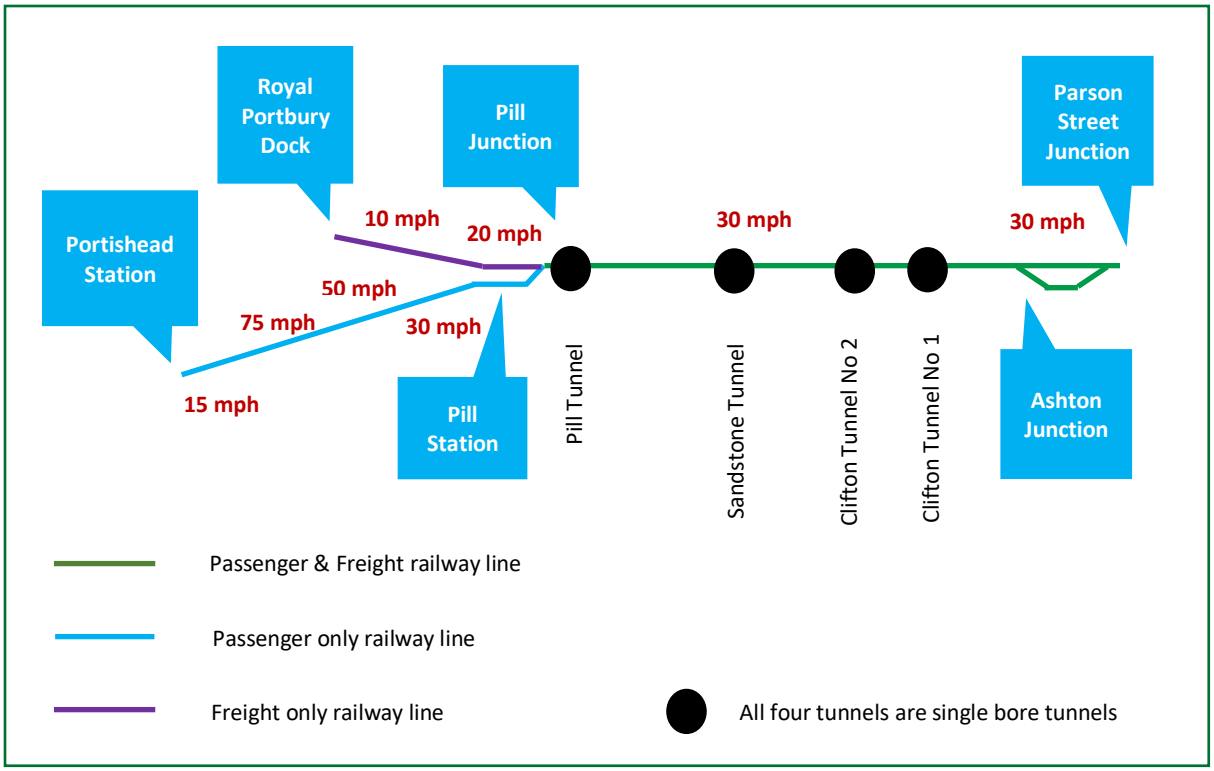

Figure 4.4: Proposed line configuration and line speeds for the DCO Scheme

4.3.14 The design life of the DCO Scheme is based on 60 years for the purposes of the flood risk assessment. However, asset classes will have different design lives, and would be replaced as and when required during the life of the scheme.

4.3.15 Proposals for environmental mitigation and management also need to meet with Network Rail standards to comply with health and safety, operational and maintenance requirements. This includes guidance on the species of trees and shrubs to be used in landscaping on Network Rail land, vegetation management regimes, and approved designs for mitigation measures such as animal crossing tunnels.

4.3.16 Further details on the proposals for temporary and permanent drainage design for the highways, car parks, hauls roads and construction sites are presented in *The MetroWest Phase 1 Surface Water Drainage Strategy for Portishead and Pill Stations, haul roads and compounds* (CH2M, July 2018). The key principles of the drainage design are as follows:

- Permanent drainage for the Portishead and Pill Stations and car parks drainage will have capacity to drain the 30 year return period design storm with a climate change allowance of 40%, and allowing for potential tide locking.
- Temporary drainage for the construction sites will have capacity to drain the 30 year return period design storm with a climate change allowance of 10%.
- The design life (and hence climate change horizon) applied in the drainage design is 60 years in the permanent development sites and 1-2 years for the temporary construction sites.
- The maximum discharge rates for green-field sites are assumed to be 2.5 l/s for pre-developed sites green-field peak rate or minimum of 2.5 l/s if attenuation is possible, otherwise a reduction of 30% for the existing discharge rate.
- Sustainable Drainage Systems ("SuDS") based on ground infiltration are not suitable due to the impermeable ground conditions and location within Flood Zones 2 or 3. Consequently, infiltration is not recommended and a combination of traditional drainage and SuDS are promoted to ensure pollutants in surface water flows are minimised and exceedance flow paths are managed.

4.3.17 The outline drainage design and surface water drainage strategy for the railway works has been developed in consultation with the Environment Agency ("EA") and North Somerset Levels Internal Drainage Board ("NSLIDB") who are responsible for "Main Rivers" and other watercourses respectively, and the two local planning authorities NSDC and Bristol City Council ("BCC") who have responsibilities for drainage issues in relation to planning applications. Key features of the track design are:

- the track drainage is designed to accommodate a 25-year return period storm with a 20% uplift to allow for projected future climate change,
- catch pits at 30 m spacing along straight sections, and more frequent spacing on curves; and
- the drainage pipe gradients will be set to achieve self-cleaning velocities where possible.

Land Required for the DCO Scheme

4.3.18 Most of the DCO Scheme will be constructed on land already owned by NSDC or Network Rail. NSDC owns the disused railway track bed from Portishead to the Old Portbury Station. Network Rail retained the track bed from Old Portbury Station to Portbury Junction, whilst the remainder of the route to Ashton Junction forms part of the national rail network owned and managed by Network Rail.

4.3.19 The total area of land required for the DCO Scheme is about 84 ha, comprising, approximately 49.24 ha of permanent freehold acquisition, 33.02 ha of temporary land required for construction, 1.39 ha for permanent rights and 0.22 ha for subsoil rights.

4.3.20 Additional land is required from third parties for the temporary construction compounds, some of the permanent new accesses to the railway, and for some of the highway works. NSDC is currently negotiating with landowners to purchase land required for the DCO Scheme. Additional land at Portishead and Pill has already been acquired. Where agreements have not been reached, NSDC proposes to use compulsory acquisition and temporary possession powers under the DCO.

4.3.21 NSDC intends to transfer ownership of the land comprising railway assets to Network Rail on or before completion of construction of the DCO Scheme, including the agreed railway land, access and permanent compounds, which will not be available for public use.

4.3.22 The station car parks will be retained and managed by NSDC.

4.3.23 Land required for the new highway works will become highway maintainable at the public expense and will be owned and maintained by the relevant local highway authority.

4.3.24 Land temporarily required for construction purposes will be returned to its owner in a condition to allow it to revert to its former use.

Closure of Level Crossings

4.3.25 There are eleven crossings along the disused railway between Portishead and Pill. The DCO includes powers to provide that each historic occupation or accommodation crossing is extinguished prior to construction of the DCO Scheme (see Table 4.3).

4.3.26 The foot crossing between Galingale Way and Tansy Lane was created after the closure of the railway. Whilst it is not currently a Public Right of Way (“PRoW”) recorded in NSDC's definitive map it will be treated as such by the provisions of the Draft DCO, which will provide for its extinguishment (both public and private rights) and its replacement with a new foot and cycle bridge. The bridge and PRoW will be adopted by the local highway authority.

4.3.27 In Bristol, the Ashton Vale Road all-purpose level crossing will remain open.

4.3.28 The footpath level crossing at Barons Close is proposed to be closed.

Table 4.3: Historic crossings to be closed along the NSIP under the DCO Scheme

Crossing	Replacement or Extinguishment
Historic crossing serving former oil depot	Extinguishment
Moor Lane	Extinguishment
Sheepway 1	Extinguishment with enhancements to the existing access provided south of the disused railway via the Sheepway overbridge
Sheepway 2	Extinguishment
Elm Tree Farm	Extinguishment with replacement access provided via the A369 Portbury Hundred
Portbury Station	Extinguishment
The Drove crossing	Extinguishment
Portbury No. 3	Extinguishment
Manor Farm No. 2	Extinguishment
Manor Farm No. 1	Extinguishment
Lodway Farm	Extinguishment

The DCO Scheme

4.3.29 The Portishead Branch Line DCO Scheme comprises the NSIP and its associated development. The associated development consists of both listed Works and a number of other works, such as earthworks, structures and bridges, drainage, signal installation.

4.3.30 The key elements of the DCO Scheme are set out below. The NSIP itself is first covered from Portishead to the new Pill Junction. The associated development is then described, from Portishead, east to Ashton Junction.

4.3.31 The proposed approach to the construction of the rail elements of the DCO Scheme is described in the Construction Strategy (DCO Document Reference 5.4). This includes maps and illustrative photographs to indicate the type of plant and construction activities likely to be employed on this scheme. The construction strategy will be developed in detail once the successful contractors have been appointed. This section includes sufficient information on the construction strategy to inform the environmental impact assessment.

4.4 The Nationally Significant Infrastructure Project

4.4.1 The new railway between Portishead and the new Pill Junction is the NSIP for which development consent is sought.

Work Numbers 1, 1A, 1B and 1C*:* A new single track railway between Portishead and the New Pill Junction and realignment of a section of the Parson Street to Royal Portbury Dock railway

4.4.2 *Plan reference(s)*: Works Plan Sheets 1 to 7 (DCO Document Reference 2.3) and General Arrangement Plans Sheets 1 to 7 (DCO Document Reference 2.4).

4.4.3 *Location:* On the track bed of the former Portishead Branch Line, from Quays Avenue Portishead, to a new junction with the operational railway, between Pill Viaduct and the western portal of Pill Tunnel.

4.4.4 *Detail*: A new single track railway of 5,558 metres (“m”) in length will be built from the new Portishead Station on the track bed of the former railway to Pill Junction. Work Number 1 is a railway 2,264 m long commencing at a point just north of the junction of Quays Avenue and Galingale Way in Portishead and terminating at a point 96 m to the east of the bridge carrying Station Road over the former railway in Portbury. Work Number 1A is a railway 2,498 m long from east of Station Road in Portbury to the junction of the former Portishead Branch Line railway and the Bristol Port company’s railway, known as Portbury Junction, which is located approximately 49 m west of Avon Road Bridge. Work Number 1B refers to a new permanent railway of 796 m from Portbury Junction, through the village of Pill to the new junction between Pill Viaduct and Pill Tunnel. Work Number 1C is a railway 1003 m long comprising a slight realignment to the north of the existing Parson Street to Royal Portbury Dock railway from west of the Avon Road Bridge (Pill) and terminating at the new junction with Work Number 1B known as Pill Junction. This slight realignment of the existing railway (freight) will provide space for both the new railway (NSIP) and the existing railway (freight) to run in parallel through Pill, and then merge together at Pill Junction.

4.4.5 The NSIP will head east under the Bridges at Sheepway and Station Road, Portbury, past the site of the old Portbury Station then proceed north east, parallel to and north of the Portbury Hundred Highway. The railway will then pass under the highways of Royal Portbury Dock Road and Marsh Lane, Easton-in-Gordano, before turning east to pass under the M5 Motorway Bridge to meet the existing operational freight railway at the location of Portbury Junction. The new railway and the operation freight railway will then run parallel on the to-be-widened track bed on a new bridge over the footpath between Avon Road and Lodway Close, Pill through Pill Station and over Pill Viaduct before a new junction of the new railway and the operational freight railway west of Pill Tunnel. The new junction is to be known as Pill Junction.

4.4.6 *Key elements:* As the railway track bed is already in existence the principal elements of the works are in summary:

- Removal of existing rails, sleepers and ballast;
- Placement of new ballast, sleepers and rails; and

- A new railway switch and associated points motor at Pill Junction.

Construction of the railway Work Numbers 1 and 1A

4.4.7 It is estimated that approximately 15,000 m^3 of waste ballast and old track will need to be excavated along the disused section of track between Portishead and Portbury Junction. The waste ballast is likely to be contaminated by a large amount of soil and vegetation mixed in with the old track formation. The ballast may need to be separated into aggregate and soil/vegetation on site before onward transport to the Network Rail recycling centre. All materials are to be handled in accordance with Network Rail's standard for ballast handling *Used Ballast and Excavation Waste* NR/L3/ENV/004.

4.4.8 There are a number of options for removing the old track formation. The main options are as follows:

- Option 1 – One way haul system using Royal Portbury Dock, then taken by engineering train to the Network Rail recycling centre.
- Option 2 – Excavate and store temporarily at the side of the cess or at the construction compounds. There are various sub-options for transporting the old materials to the Network Rail recycling centre, which are described below.
- Option 3 – One way haul system using Avonmouth Docks, then taken by engineering train to the Network Rail recycling centre.

4.4.9 Under Option 1 a one way haul system would be set up between the disused railway line and from Royal Portbury Dock, making use of the highway network and the disused line. The track would be cut into smaller sections and removed using standard civils construction vehicles. Excavators and dumper trucks would be used to take away waste ballast and old rail to Royal Portbury Dock. The existing coal yard in the port could be used to store material, before loading the material into engineering trains for transport up to the Network Rail recycling centre. This option would be subject to agreement with the owners of Royal Portbury Dock.

4.4.10 Option 2 is similar to Option 1, however under this option the waste ballast would be excavated and stored temporarily either along the disused line next to the location of the new track or stockpiled at the construction compounds. Temporarily stockpiling the old ballast along the railway line under Option 2a would reduce the working width and may also require the removal of vegetation. Options 2b, 2c and 2d allow for maximum working width along the railway and the retention of existing vegetation to provide ecological habitat for protected species known to occur along the railway and visual screening.

4.4.11 Under Option 2a the waste ballast could be excavated and stored temporarily along the disused line while the old rail would be cut into sections and stored at either the Portbury Hundred or Lodway construction compounds until ready to be taken away by rail or road haulage. The waste ballast could be left in place until the new railway is constructed along the disused line. Then an engineering train could travel down the new passenger line, be loaded with the spoil using conventional plant and taken away for reprocessing. This option assumes that there is sufficient space

along the disused railway line for a working area, temporary stockpiling and the conservation of existing mature vegetation to be retained.

4.4.12 Under Option 2b, the waste ballast could be stored at either the Portbury Hundred or the Lodway construction compounds prior to removal off site. This would involve using standard excavators and dumpers to transport the material along the disused line. The waste ballast could be stored at the compounds temporarily until the new line is complete. The engineering trains could park alongside the compounds and the spoil loaded on to the trains. However both rail and road haulage may be required.

4.4.13 Under Option 2c all the waste ballast would be stored at the Lodway construction compound and removed using engineering trains parked on the existing freight line. This might have to be done in stages, as space for spoil storage is limited. A conveyor system might be used to load the waste ballast onto the engineering trains and this will be confirmed ahead of construction. The engineering trains would also block access to and from the port, so this option would have to be co-ordinated with the port operators.

4.4.14 Option 2d is a variant Option 2c under which a temporary junction could be installed linking the existing Portbury Dock line to a new section of track on the disused line or even a temporary siding into the Lodway construction compound. Option 2d may require further works to signalling systems and earthworks to create a flat working area. This option may also be constrained by areas of retained vegetation.

4.4.15 Option 3 is similar to Option 1, but the waste ballast and old rail would be taken by road via the M5 from site to a temporary storage area in Avonmouth Docks (accessed via junction 18) on the north side of the River Avon instead of Royal Portbury Dock.

4.4.16 The preferred option will be determined ahead of construction and may include a combination of options.

4.4.17 It is estimated that approximately 11,500 m^3 of Type 1 formation (a grade of aggregate) and 7,000 m^3 of bottom ballast are required to construct the railway. New ballast will be delivered using Network Rail engineering trains either to Portbury Docks, subject to agreement with the port, Avonmouth, or to the construction compound at Lodway (and possibly transported on to Portbury Hundred) for storage. The new ballast will be loaded into trucks and transported to site for installation on the disused line. If a staged construction approach is adopted, there is an opportunity to reduce vehicle movements by using vehicles dropping off spoil to collect new material and transport back to site. The options for delivering and placing the track formation and bottom ballast are similar to the three options described above for the removal of ballast.

4.4.18 Long welded rail (“LWR”) lengths will be delivered and unloaded from the rail delivery train at the former Portbury Junction (or Lodway construction compound if there is insufficient space). Sleepers would also be delivered to either the Portbury Hundred or Lodway construction compounds. The exact methodology for placing the new rail and sleepers will be confirmed ahead of construction. A New Track Construction (“NTC”) train could be run along the line to install the sleepers and clip in the rail. Alternatively, sleepers could be installed using RRVs and the new rail run out onto the disused line using a McCulloch’s rail delivery machine. Once the new rail has been

installed, the top ballast would then be dropped and the line would be tamped ready for commissioning. A new buffer stop will be installed at Portishead Station. Plate 4.1 illustrates typical plant that may be used to construct the new railway.

Plate 4.1 Examples of Typical Plant Used for Track Laying

Excavator

Dumper Truck

Laying Ballast by Dumper

Conveyor System

Ballast Delivery Train

Unloading Ballast

Road Rail Excavator

Road Rail Dumper

Rail Tamping Machine

McCulloch Panel Lifter

McCulloch Rail Delivery

NTC Train

Construction of the railway from Portbury Junction to Pill Junction (Work Number 1B) and realignment of the existing operational railway (Work Number 1C)

4.4.19 The tracks from Portishead and Royal Portbury Dock will run parallel through Pill before converging into a single line at Pill Junction.

4.4.20 The existing freight line will be slightly realigned so that it is on the correct alignment for the future freight branch, which will permit works on the redundant track bed. This slight realignment of the existing railway (freight) will provide space for both the new railway (the NSIP) and the existing railway

(freight) to run in parallel through Pill, and then merge together at Pill Junction.

4.4.21 The switches and crossings ("S&C") at the proposed Pill Junction will be installed (see Plate 4.2) after the works at Pill Viaduct are completed. This will then allow engineering trains onto the passenger line to facilitate renewal of the freight line, including installation of new sleepers and rail.

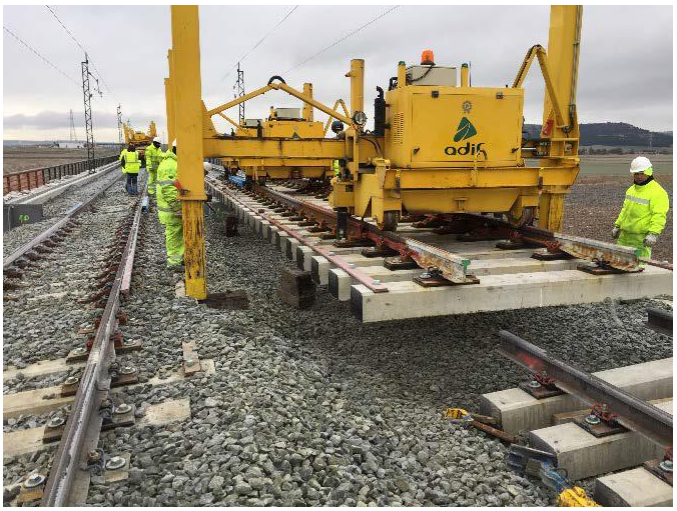

Plate 4.2 Rail panel handling machine

4.4.22 The track works should take place after the completion of the new Avon Road Underbridge, Pill Viaduct repairs and embankment earthworks, and after the works to Cattle Creep Bridge. Details of these associated works through Pill are provided in the following section.

4.5 Associated Development

4.5.1 The proposed works comprising the associated development elements of the DCO Scheme are described below, by reference to Works Numbers in the draft DCO. They are described in geographical order from Portishead to Pill.

4.5.2 Between the proposed new Pill Junction and the existing Ashton Junction the majority of proposed activities are minor in nature and would fall within Network Rail's permitted development rights, save for any necessary works within the Avon Gorge Woodlands SAC. As explained in ES Chapter 1 Introduction (DCO Document Reference 6.4), any works within a European site is protected under the Conservation of Habitats and Species Regulations 2017 (as amended) ("Habitats Regulations") and a Habitat Regulations Assessment has to be carried out.

4.5.3 East of Pill Junction the only numbered works are temporary or permanent compounds or works to the public rights of way and highway network in the vicinity of the existing highway level crossing at Ashton Vale Road.

Portishead - Highway works, new boulevard for non-motorised users works, car parks and the new station

Work Number *2*: Realignment of Quays Avenue Portishead

4.5.4 *Plan reference(s):* Works Plan Sheet 1 (DCO Document Reference 2.3) and General Arrangement Plan Sheet 1 (DCO Document Reference 2.4).

4.5.5 *Location:* From Harbour Road Portishead south to the junction of Quays Avenue and Galingale Way.

4.5.6 *Detail*: Diversion of the highway of Quays Avenue, Portishead from the junction of Quays Avenue and Galingale Way to a point west of Quays Avenue, Harbour Road and Phoenix Way roundabout, together with landscaping, new bus waiting facilities, signage, lighting, pedestrian crossing facilities, pipes, drains, cables, ducts, troughs, telecommunications apparatus, conduits and apparatus for utilities as well as footways, and connection to the pedestrian and cycle track (forming part of Work Number 4).

4.5.7 *Key elements:*

- New carriageway and footways;
- Pedestrian crossings;
- Utilities conduits and apparatus under the new highway;
- Drainage;
- Lighting columns;
- Signage and
- Bus stops.

4.5.8 The northern part of Quays Avenue in Portishead will be re-aligned to the west to accommodate the new station site for the DCO Scheme. This will require alterations to Phoenix Way and relocating the existing roundabout between Quays Avenue, Phoenix Way and Harbour Road approximately 100 m to the west. The highway alterations include various formal and informal pedestrian crossings and cycling route enhancements.

4.5.9 The realigned Quays Avenue and footpaths to the south of the station would be drained through a mix of filter drain and swales (space permitting) and discharge to the highway drainage system.

Work Number 2A: A new surface water drain from Phoenix Way

4.5.10 Highway runoff from Harbour Road and Phoenix Way will be connected to the existing highway drainage and discharge to The Cut watercourse. Runoff will be treated by a combination of filtration through the bio-retention areas (vegetation, soil and filter material), or in other locations by trapped-gullies and a subsequent bypass oil separator before discharge.

Work Number 3: New Pedestrian and Cycle boulevard south of Harbour Road, Portishead

4.5.11 *Plan reference(s):* Works Plan Sheet 1 (DCO Document Reference 2.3) and General Arrangement Plans Sheet 1 (DCO Document Reference 2.4).

4.5.12 *Location*: Across the Portbury Ditch, south of Harbour Road Portishead.

4.5.13 *Detail*: A combined pedestrian and cycle link from the realigned Quays Avenue to the town centre for non-motorised users ("NMU") will be provided using the section of disused railway to the west of the re-aligned Quays Avenue.

4.5.14 *Key elements*:

- A shared use surfaced path;
- Lighting;
- Landscaping;
- Surface water drainage;
- Signage
- Fencing.

Work Number 4: New Car Park south of Harbour Road, Portishead

4.5.15 *Plan reference(s):* Works Plan Sheet 1 (DCO Document Reference 2.3) and General Arrangement Plans Sheet 1 (DCO Document Reference 2.4).

4.5.16 *Location:* Between the Portbury Ditch, south of Harbour Road Portishead, to the realigned Quays Avenue.

4.5.17 *Detail:* A new car park, referred to as car park B will be built to the south of Harbour Road and west of the re-aligned Quays Avenue. Car parking for up to 209 cars is proposed including six disabled spaces together with landscaping and a new access on to Harbour Road. A new pedestrian and cycle link will be provided from Quays Avenue towards to the town centre.

4.5.18 Surface water from car park B will be attenuated through infiltration via permeable pavement in the southern parking bays to an underground stone reservoir layer prior to discharge via a pipe into a linear swale with check dams along the southern boundary of the car park by the adjacent Sainsbury's Supermarket. Water quality treatment will be provided by filtration through the stone reservoir layer and geotextile membrane and along the swale. The swale drains to the Portbury Ditch.

4.5.19 An area of landscaping and open space will be provided to the north west of the car park, south of Harbour Road.

4.5.20 The proposed site for car park B will be used as a construction compound, including temporary parking for site traffic.

4.5.21 *Key elements:*

- hard standing
- lighting
- signage
- surface water drainage to the adjacent Portbury Ditch
- landscaping
- new vehicular access to Harbour Road, Portishead.

Work Number 5: New Portishead Station

4.5.22 *Plan reference(s):* Works Plan Sheet 1 (DCO Document Reference 2.3); General Arrangement Plan Sheet 1 (DCO Document Reference 2.4) and inset Portishead Station Car Park Layout, Landscaping and New Boulevard and Access Plan Sheets 1 to 3 (DCO Document Reference 2.38).

4.5.23 *Location:* The new Portishead Station will be constructed on the north side of the new railway and between the re-aligned Quays Avenue and the existing Wessex Water pumping station.

4.5.24 *Detail:* The station will comprise a single platform, station building and canopy structure sheltering a section of the platform. The building will include a ticket and waiting area, an accessible public toilet and staff facilities. There will also be an external mechanical and electrical compound and bin area.

4.5.25 The platform is to be approximately 130 m long, which is sufficient to accommodate a five car train, although the service will commence with three car trains, initially. The longer platform provides provision for five-car trains to meet future demand for rail travel. CCTV, train departure information displays, and a public address system will be provided on the platform.

4.5.26 A Global System for Mobile Communications-Railway ("GSM-R") communications mast (maximum height 12 m) will also be located at the station. The GSM-R mast allows communication between the train driver and the signaller.

4.5.27 The platform will be lit by luminaires on lighting columns 5 m high at 15 m spacing along the platform.

4.5.28 On the south side of the railway an acoustic barrier will be provided between the railway and the nearby residential properties in Peartree Field.

4.5.29 At Portishead Station, rainwater from the station (and adjacent car park A) will be discharged to the open drain known as The Cut by the Wessex Water pumping station.

4.5.30 *Key elements:*

- station building and platform;
- visual feature wrapping around buffers next to Quays Avenue;
- CCTV;
- public address system;
- communications apparatus;
- communications mast;
- lighting;
- drainage works;
- utilities connections; and
- acoustic fence and security fencing.

4.5.31 The construction of the new station comprises piling, *in situ* and precast concrete works, erection of a steel framed structure, block work and cladding for the main body of the building, and fittings. The screen wall at the end of the station will be constructed from reinforced concrete. The main construction works are as follows:

- Old track and ballast will be excavated and the ground dug down to a suitable level followed by preparation of the ground works and installation of the piling mat.
- Piling using pre-cast driven piles will be undertaken to create the foundations for the station. As part of this work, the Wessex Water sewer will be surveyed prior to the piling work and monitored during piling.

- A transfer beam is likely to be required over the Wessex Water sewer. This could be cast *in situ* or brought in pre-cast. A crane will be required to install the transfer beam. On site concrete batching may be required, in which case a licence will be sought.
- A steel structure will be erected using a crane, followed by bolting and temporary bracing. The steel structure will most likely be brought in by sections, potentially requiring some abnormal load deliveries.
- Pre-cast hollow core concrete floor units will be installed with a sand / cement screed. This work may be carried out using a crane.
- Water, utility and drainage connections will be installed.
- Block work and cladding, roof panels, platform canopy and glass panels, station entrance and the wall behind the buffer stop will all be installed.
- A new platform approximately 130 m long, platform surface finishings (channel drain and tarmac), lighting, public announcement ("PA") system, customer information system ("CIS") and closed circuit television ("CCTV") will be installed. The platform copers and tactiles will be installed according to the final design.
- Internal fitting, testing and commissioning will be required for plumbing, lighting, heating, telecoms and other furniture and equipment.
- External equipment fit out of external equipment cabinets and cabling based on the final design.

4.5.32 Construction materials for Portishead Station will be delivered to the site compound at Portishead (car park B).

Work Number 6: New Station Car Park

4.5.33 *Plan reference(s):* Works Plan Sheet 1 (DCO Document Reference 2.3) and General Arrangement Plans Sheet 1 (DCO Document Reference 2.4).

4.5.34 *Location:* On the north side of the Portishead Branch Line and between the re-aligned Quays Avenue and the existing Wessex Water pumping station, south of Phoenix Way.

4.5.35 *Detail:* This car park will include cycle spaces, mobility impaired spaces, station/railway staff parking and drop off points, as well as 67 spaces including 13 disabled spaces, and access from the highway off Phoenix Way.

4.5.36 Prior to the works to lay out the new car park the area will be used as a temporary construction compound to provide parking, material storage, welfare and offices. Deliveries would be via the A369 Portbury Hundred, Wyndham Way and along Quays Avenue. The majority of deliveries would be by standard HGVs. Non standard deliveries will be made outside peak hours.

4.5.37 Stormwater runoff will be collected via linear drainage channels and feed into a geo-celullar crate system located beneath the parking bays. The runoff will be treated to remove grit, hydrocarbons and floatables, prior to discharge to The Cut watercourse to the north east of the compound. Temporary drainage will be provided during construction as described in DCO Document Reference 6.26 Drainage Strategy.

4.5.38 *Key elements:*

- hard standing;
- lighting;
- signage;
- surface water drainage;
- utilities;
- fencings and landscaping and
- access from Phoenix Way.

Trinity Primary School Bridge and associated new paths

4.5.39 A new combined pedestrian and cycle overbridge is proposed to link residential areas on the south the railway to the residential areas to the north of the railway and Trinity Primary School, also on the north side of the railway. The existing permissive at grade crossing over the disused railway will be replaced by the new bridge, referred to as the Trinity Primary School Bridge. New footpath routes to Quays Avenue, parallel to the railway will be provided. The existing access routes linking with the surrounding residential area will be altered and improved, from Galingale Way to the Trinity Primary School Bridge on the south side and from Tansy Lane to the Trinity Primary School Bridge on the north side.

4.5.40 During construction the open space to the north of the disused railway and south of Tansy Lane may be used for construction lay down areas. The new bridge will be built on approximately the same alignment as the existing crossing and a temporary crossing over the railway will be provided nearby during construction.

4.5.41 Trinity Primary School Bridge will be pre-fabricated off site and delivered in sections. The vegetation on site will be removed and excavation works will be undertaken for the associated piling and foundation works. The embankment on the north side will be built up and drainage ditches will be infilled or culverted as required. A piling mat and crane pad will be constructed to provide a stable platform for the pile driver and crane. Piles will be driven into the ground using a pile driver and the crane will be used to construct the bridge piers and install the pre-fabricated bridge sections.

Work Number 7: A combined pedestrian and cycle overbridge

4.5.42 *Plan reference(s)*: Works Plan Sheet 1 (DCO Document Reference 2.3) and General Arrangement Plans Sheet 1 (DCO Document Reference 2.4).

4.5.43 *Location:* South west of Trinity Primary School, Portishead

4.5.44 *Detail:* The new bridge is designed with staircases and ramps to provide step free access over the railway. A zig-zag ramp arrangement will be provided on both sides of the railway (with a gradient of 1:15) as well as staircases. Solid parapets 1.8 m high will be provided over the Portishead Branch Line while open parapets and handrails will be provided on the staircases and ramps. The whole structure is likely to be made of steel painted in a neutral colour. The overall height of the structure will be approximately 8.5 m above rail level to accommodate future electrification as required by Network Rail. A temporary crossing will be provided nearby during the construction of the bridge.

4.5.45 *Key elements*:

- Pedestrian and cycle bridge including steps and ramps;
- Lighting;
- Signage;
- Surface water drainage;
- Fencing; and
- Hardstanding.

Work Numbers 7A, 7B and 7C: New paths to connect Portishead Station to the Village Quarter, Portishead

4.5.46 *Plan reference(s)*: Works Plan Sheet 1 (DCO Document Reference 2.3) and General Arrangement Plans Sheet 1 (DCO Document Reference 2.4).

4.5.47 *Location*: North and south of the Portishead Branch line, between Quays Avenue and Trinity Primary School.

4.5.48 *Detail*: A network of paths will be provided between Quays Avenue, Phoenix Way and the Trinity Primary School Bridge to link with the existing permissive paths between Galingale Way and Tansy Lane. The new paths will become public rights of way and maintained by the local highway authority.

4.5.49 *Key elements*:

- Hardstanding to form new combined pedestrian and cycle paths;
- Lighting;
- Signage;
- Surface water drainage;
- Fencing and
- Landscaping.

Work Number 7D: Temporary construction compound, Tansy Lane, Portishead

4.5.50 *Plan reference(s)*: Works Plan Sheet 1 (DCO Document Reference 2.3) and General Arrangement Plans Sheet 1 (DCO Document Reference 2.4).

4.5.51 *Location*: North of the Portishead Branch line, south of Tansy Lane and west Trinity Primary School.

4.5.52 *Detail*: A small temporary compound will be established on the land between the disused railway and Tansy Lane to be used for the works to construct the new bridge to connect Tansy Lane and Galingale Way.

4.5.53 *Key elements*:

- Temporary fencing;
- Storage of materials plant and machinery.

Work Number 7E: Electrical supply cables to Work No. 7

4.5.54 *Plan reference(s)*: Works Plan Sheet 1 (DCO Document Reference 2.3) and General Arrangement Plans Sheet 1 (DCO Document Reference 2.4).

4.5.55 *Location*: North of the Portishead Branch line and south of Tansy Lane.

4.5.56 *Detail*: Electrical supply cables are required to power the lighting on the new Trinity School Bridge.

4.5.57 *Key elements*:

- Permanent electricity supply cables

Works in the vicinity of Sheepway

4.5.58 A new permanent maintenance (vehicular) compound and track access point will be provided to the railway from the north side off Sheepway. Temporary and permanent diversions of the existing permissive cycle route at Sheepway will also be required.

4.5.59 During the construction period construction haul roads will be laid down either side of Sheepway.

4.5.60 The layout and design of the works have been developed taking into consideration the National Grid Hinkley Point C Connection Project as presented in their DCO application. (Further information on the National Grid project is provided in ES Chapter 18 In-combination and Cumulative Effects Assessment, DCO Document Reference 6.21, and Appendix 18.2 Assessment Matrix in the ES Volume 4 Appendices, DCO Document Reference 6.25.)

Work Numbers 8, 10B, 11A and 11B*:* Temporary Construction Haul Roads

4.5.61 *Plan reference(s):* Works Plan Sheet 2 (DCO Document Reference 2.3) and General Arrangement Plans Sheet 2 (DCO Document Reference 2.4).

4.5.62 *Location:* East and West of the bridge carrying Sheepway over the Portishead Branch Line.

4.5.63 *Detail:* Temporary haul roads (Work Numbers 8 and 11A) will be laid to the south side of the Portishead Branch Line extending east and west from Sheepway and accessing Sheepway south of the overbridge carrying Sheepway over the disused railway. These haul roads link the railway (Work Number 1) with the Portbury Hundred construction compound (Work Number 12A). In addition, haul roads (work Numbers 10B and 11B) are proposed to connect with the National Grid Hinkley Point C Connection Project's haul roads, to enable both that project and the DCO Scheme to be constructed at the same time, as it is understood it is possible both projects will be in their construction phase at the same time.

4.5.64 *Key elements:*

- removal of topsoil;
- temporary roads created by unbound aggregate laid over an appropriate sub-layer;
- temporary fencing;
- restoration of the land occupied temporarily following completion of construction.

Work Numbers 9, 10, and 10A: Permanent maintenance compound (and temporary construction compound) at Sheepway, Portbury

4.5.65 *Plan reference(s):* Works Plan Sheet 2 (DCO Document Reference 2.3); General Arrangement Plans Sheet 2 (DCO Document Reference 2.4) and inset Sheepway Bridge Maintenance Compound and Landscaping Plan (DCO Document Reference 2.49).

4.5.66 *Location:* West of Sheepway overbridge, north of the disused railway.

4.5.67 *Detail*: The permanent compound (Work Number 9) will provide a permanent road rail access to the railway line for Network Rail via a secure gate. The vehicular maintenance unbound aggregate (gravel) surfaced compound will be sufficiently large to permit a turning area and parking for up to four 4.6 t light vans of the type used by Network Rail for maintenance activities. There is space for a low loader to park off the highway at the top of the compound. The existing gates enabling access to the highway of Sheepway will be replaced and a gravel area will be provided outside the new gates to accommodate a number of parking places for cars similar to the existing public car park on Sheepway (approximately seven). The existing bus stop on Sheepway will be relocated about 20 m further east to remove the potential conflict between buses approaching the bus stop and Network Rail vehicles entering and leaving the compound. The existing permissive foot and cycle path from Sheepway to the Portbury Wharf Ecology Park will be diverted slightly to the north to accommodate the new compound (Work Number 10).

4.5.68 During construction the area proposed for the permanent compound will be used together with an additional area to the north of the permanent compound as a temporary construction compound (Work Number 10A). As a result of this, the permissive foot and cycle path will be diverted further north during the construction period. The temporary construction compound may provide a small amount of parking, materials storage and welfare facilities.

4.5.69 *Key elements:*

- New gravel-surfaced compound, parking and turning area;
- Road rail access point
- Fencing and gated access;
- Landscaping;
- Surface water drainage;
- Relocation of existing bus stop;
- Reconfiguration of existing car parking area; and
- Temporary and permanent diversions of existing foot and cycle path to the north.

Work Number 11*:* Improvement to existing agricultural access

4.5.70 *Plan reference(s)*: Works Plan Sheet 2 (DCO Document Reference 2.3); General Arrangement Plans Sheet 2 (DCO Document Reference 2.4) and inset Sheepway Southern Interim Access Arrangements (DCO Document Reference 2.51).

4.5.71 *Location*: Eastern side of Sheepway, south of the disused railway

4.5.72 *Detail:* On the south side of Sheepway bridge over the railway the existing access to the field on the eastern side of Sheepway will be improved (Work Number 11). This work is required to replace the two existing accommodation crossings at Shipway Gate Farm, which will be extinguished.

4.5.73 *Key elements*:

- New gate to provide access to highway adjoining field; and
- additional hardstanding to form widened access.

Works in the Vicinity of the A369 Portbury Hundred and Old Portbury Station

4.5.74 A new access for agricultural purposes will be provided on the A369 Portbury Hundred to the west of Station Road, Portbury to replace the access to those fields currently reached from Sheepway across the railway formation. These fields are also proposed to be the location of one of the principal temporary construction compounds and the new access will be used by construction traffic during the works to construct the NSIP. Temporary construction haul roads are also proposed in this area, parallel with the disused railway.

Work Number 12*:* Permanent new access to the highway known as the A369 Portbury Hundred, Portbury

4.5.75 *Plan reference(s):* Works Plan Sheet 3 (DCO Document Reference 2.3); General Arrangement Plans Sheet 3 (DCO Document Reference 2.4) and inset Portbury Hundred Construction Compound / Permanent Access Plan (DCO Document Reference 2.40).

4.5.76 *Location:* A369 Portbury Hundred*,* west of Station Road Portbury

4.5.77 *Detail:* A new access is to be formed on the A369 Portbury Hundred to provide a new access to the field on the north of that road. This will provide access to the field between the A369 Portbury Hundred to the south and the disused railway to the north, to be used initially for access to the temporary construction compound then to replace the current accommodation crossing over the disused railway providing access to that field. During construction, access will be limited to left hand turns in and left hand turns out, due to the volume of traffic on the A369 Portbury Hundred and available sight lines.

4.5.78 *Key elements*:

- New gate to provide access to highway adjoining field;
- additional hardstanding to form access

Work Number 12A: Temporary construction compound to the north of the A369 Portbury Hundred

4.5.79 *Plan reference(s)*: Works Plan Sheets 3 to 4 (DCO Document Reference 2.3); General Arrangement Plans Sheets 3 to 4 (DCO Document Reference 2.4) and inset Portbury Hundred Construction Compound / Permanent Access Plan (2.40).

4.5.80 *Location*: A369 Portbury Hundred, west of Station Road, Portbury

4.5.81 *Detail*: One of the principal temporary construction compounds for the DCO Scheme will be located to the north of the A369 Portbury Hundred and south of the disused railway, west of the junction of Station Road with the A369 Portbury Hundred. Activities at this site may include: stockpiling of waste ballast prior to removal by HGV (or engineering train), storage of plant and equipment, parking for a large workforce, material storage and ballast, welfare facilities and offices.

4.5.82 The primary access will be via a new access of the A369 Portbury Hundred (Work Number 12).

4.5.83 *Key elements*:

- removal of topsoil
- temporary surface created by unbound aggregate laid over an appropriate sub-layer
- temporary fencing
- storage of materials plant and machinery
- welfare facilities
- temporary buildings for site offices
- vehicle parking
- storage of redundant track and ballast
- storage of new track and ballast
- restoration of the land occupied temporarily following completion of construction.

West of Station Road Portbury and south of Portbury Dock, To Marsh Lane, Easton-in-Gordano

4.5.84 The existing public bridleway (LA8/66/10) that runs north of the disused railway and south the Port fence will be subject to minor alterations. An enhanced vehicular access for construction and permanent maintenance purposes will be provided at the Wessex Water pumping station located off the A369 Portbury Hundred at The Drove. A haul road will be provided west from The Drove to a terminus south of the disused railway and south of Elm Tree Park, Portbury, together with a temporary access to the A369 Portbury Hundred.

4.5.85 An Openreach fibre cable route follows the alignment of the railway in this location. It is proposed to relocate the cable to place it alongside the new cess in order to accommodate the new alignment of the railway.

Work Number 13: Improved vehicular access and parking for construction and permanent maintenance proposes

4.5.86 *Plan reference(s)*: Works Plan Sheet 4 (DCO Document Reference 2.3) and General Arrangement Plans Sheet 4 (DCO Document Reference 2.4).

4.5.87 *Location:* Wessex Water pumping station located off the A369 Portbury Hundred at The Drove.

4.5.88 *Detail*: The existing gated access and track forming part of the former accommodation road known as The Drove will be provided with a hard standing between the A369 Portbury Hundred and the disused railway together with additional permanent car parking spaces for the use of Network Rail and Wessex Water.

4.5.89 *Key elements:*

- Improved access to A369 Portbury Hundred;
- Gated access;
- Hard standing and parking spaces.

Work Number 13A Temporary vehicle turning circle

4.5.90 *Plan reference(s)*: Works Plan Sheet 4 (DCO Document Reference 2.3) and General Arrangement Plans Sheet 4 (DCO Document Reference 2.4).

4.5.91 *Location*: Near the Wessex Water pumping station east of The Drove

4.5.92 *Detail*: A temporary vehicle turning circle east of The Drove to facilitate the movement of construction vehicles.

4.5.93 *Key elements*:

- Temporary hardstanding.

Work Numbers 14, 14A and 14B*:* Works to bridleways LA15/21/20 and LA8/66/10 at Royal Portbury Dock Road and permissive cycling route

4.5.94 *Plan reference(s):* Works Plan Sheet 4 (DCO Document Reference 2.3); General Arrangement Plans Sheet 4 (DCO Document Reference 2.4) and inset National Cycle Network (NCN) / Temporary and Permanent Work Plans (DCO Document Reference 2.37).

4.5.95 *Location:* Royal Portbury Dock Road, Easton-in-Gordano

4.5.96 *Detail:* The waiting areas for cyclists and equestrians looking to cross Royal Portbury Dock Road will be increased in area on bridleways LA15/21/20 and LA8/66/10 (Work Numbers 14 and 14A respectively). The “holding area” on both sides of the carriageway will connect to the bridleway and be fenced along their outer boundaries. Equestrians will be able to wait back from the road until there is a suitable gap in the traffic before crossing.

4.5.97 The related permissive cycle route path under Royal Portbury Dock Road, which is permitted under licence by Network Rail, will be slightly realigned to allow both the permissive route and the railway to pass under Royal Portbury Dock Road (Work Number 14B). Similar alterations to the alignment of National Cycle Route 26 are proposed at the Marsh Lane and the M5 Motorway Bridge. The alterations to the National Cycle Route 26 realign the existing cycle path to the northern side of the underbridges and increase its width, from between 1.8 and 2.03 m at present to between 2.5 and 2.65 m. These alterations will enable Network Rail to re-grant a licence for cycle use following construction. The existing licences will be revoked prior to the NSIP being constructed. The railway and permissive cycle path will be separated by security fencing.

4.5.98 *Key elements*:

- Vegetation clearance to improve visibility splays;
- Hard standing;
- Fencing.

Works Between Marsh Lane, Easton-In-Gordano and the M5 Motorway

4.5.99 Between Marsh Lane and the M5, the existing bridleway and perimeter road used by the Bristol Port Company will be used as a haul road providing access to the compound under the M5 Avonmouth Viaduct and the compound on the eastern side of the M5 at Lodway. Minor works to the bridleway are also proposed.

4.5.100 The existing underbridge known as Cattle Creep (an accommodation bridge to the west of the M5 Motorway Bridge) requires strengthening. A concrete saddle will be installed above the arch barrel of Cattle Creep Bridge to strengthen and protect it. These works will avoid the need to divert the Bristol Water main and the high pressure gas main that pass under the accommodation bridge.

4.5.101 The Openreach fibre cable route continues to follow the alignment of the railway in this location. It is proposed to relocate the cable to place it alongside the new cess in order to accommodate the new alignment of the railway.

Work Number 15: Temporary alteration of Bridleway LA8/66/10

4.5.102 *Plan reference(s):* Works Plan Sheet 5 (DCO Document Reference 2.3) and General Arrangement Plans Sheet 5 (DCO Document Reference 2.4).

4.5.103 *Location:* The western side of Marsh Lane to the north of the disused railway.

4.5.104 *Detail:* A short spur is proposed to connect bridleway LA8/66/10 with the highway of Marsh Lane on the western side of Marsh Lane, Easton-in-Gordano, slightly to the south of the existing alignment of the bridleway. This will allow users of the bridleway to access Marsh Lane without conflicting with construction traffic using Marsh Lane and the access road to the compounds at Lodway Farm and under the M5 Motorway Bridge via Royal Portbury Dock Road.

4.5.105 *Key elements:*

- Vegetation clearance;
- New hardstanding.

Work Number 16: Realignment of the existing cycling route to Work Number 1A

4.5.106 *Plan reference(s):* Works Plan Sheet 5 (DCO Document Reference 2.3) and General Arrangement Plans Sheet 5 (DCO Document Reference 2.4).

4.5.107 *Location:* The eastern side Marsh Lane to the north of the disused railway.

4.5.108 *Detail:* A short section of the existing permissive cycling route parallel to the disused railway will be realigned on the eastern side of Marsh Lane, Easton-in-Gordano, to provide a better alignment for the connection with bridleway LA8/67/10.

4.5.109 *Key elements:*

- Vegetation clearance;
- Hardstanding.

Work Number 16A: Temporary construction compound

4.5.110 *Plan reference(s):* Works Plan Sheet 5 (DCO Document Reference 2.3) and General Arrangement Plans Sheet 5 (DCO Document Reference 2.4).

4.5.111 *Location:* Under the M5 Avonmouth Viaduct, Easton-in-Gordano

4.5.112 *Detail:* The area under the M5 Avonmouth Viaduct will be used as a temporary compound for storage of plant and materials during the construction works. Being located close to the existing level crossing at the

entrance to the Royal Portbury Dock from the Bristol Port Company's railway, it is proposed to use this compound as a road-rail vehicle access point during the works.

4.5.113 *Key elements:*

- Temporary lighting;
- Hardstanding;
- Storage of materials, plant and machinery.
- Temporary fencing.

Work Number 16B: Not used

Work Number 16C: Permanent road rail access point

4.5.114 *Plan reference(s):* Works Plan Sheet 5 (DCO Document Reference 2.3) and General Arrangement Plans Sheet 5 (DCO Document Reference 2.4).

4.5.115 *Location:* On the Bristol Port Company's railway from Portbury Junction under the M5 Avonmouth Viaduct, Easton-in-Gordano.

4.5.116 *Detail:* Works to improve the existing level crossing at the entrance to the Royal Portbury Dock over the Bristol Port Company's railway are proposed to provide a suitable access point to the railway network for road-rail vehicles both for constructing the DCO Scheme and for future maintenance of the railway.

4.5.117 *Key elements:*

- Extension of existing concrete apron at level crossing

Work Number 16D*:* Not used

Works Between the M5 Motorway and Pill Station

4.5.118 The principal features for the DCO Scheme east of the M5 are the temporary construction compound proposed at Lodway Farm, on the open land between the M5 and Pill, together with embankment and cutting strengthening and works to the pedestrian underpass between Avon Road and Lodway Close.

4.5.119 The Lodway construction compound will be used for transhipment of materials recovered from the disused railway on to the rail network or to road vehicles that can then access the M5 via Marsh Lane. It will also be used for the delivery of materials for the DCO Scheme, again by rail or road.

4.5.120 The Avon Road Bridge over the footpath between Avon Road and Lodway Close, Pill has a number of defects and needs to be wider to accommodate both the new railway from Portishead and the operational freight line.

4.5.121 However, before the existing rail bridge over the Avon Road / Lodway Close pedestrian and cycle underpass can be replaced, it will be necessary to widen and strengthen the embankment on the west side of the Avon Road / Lodway bridge. The nature of the works is subject to ground conditions.

4.5.122 Vegetation on the embankment will be removed. The embankment will be benched and steepened to a 1:2 slope, toe wall foundations installed, and the embankment backfilled with compacted granular fill, and then hydroseeded with grass. On the southern embankment the slope will be

steepened over a 20 m length, with a toe wall provisionally comprising a gabion wall between 1 and 3 m high. On the north-facing embankment, the slope will be steepened over a 40 m length between the Avon Road wingwalls and the existing gabion retaining wall at the western end. The king post retaining wall will be up to 2.5 m high and may need to be piled at the eastern end near Avon Road Bridge. The plant required may include hand tools, small excavators or RRVs, small piling rigs and vans for materials.

4.5.123 Access to this area is limited. It is proposed to take temporary access for plant and machinery from Lodway construction compound, across the rear gardens of six residential properties in Lodway Close, to the Avon Road embankment and bridge. The gardens and boundary fences will be reinstated at the end of the construction phase. Access may also be possible from the footpath between Lodway Close and Avon Road, when not closed for health and safety.

4.5.124 The embankment works would potentially be undertaken at the same time as Avon Road Bridge works. Most of the works would be undertaken during the day-time, but some night-time working may be required.

Work Number 17 and 17A: Temporary construction compound and haul roads at Lodway

4.5.125 *Plan reference(s):* Works Plan Sheets 5 and 6 (DCO Document Reference 2.3) and General Arrangement Plans Sheets 5 and 6 (DCO Document Reference 2.4).

4.5.126 *Location:* Lodway Farm, Lodway, Pill.

4.5.127 *Detail:* A large construction compound will be provided at Lodway Farm together with haul road and construction compound for works to provide for embankment widening and stabilization. The principal construction traffic access will be from Marsh Lane on the north side of the disused railway and accessing the compound using the railway corridor under the M5 Motorway Bridge. A section of hedgerow about 7-10 m long will be removed to allow HGV access in and out of the compound. Some light traffic and workers' cars will use the highway network through Easton-in-Gordano to access the compound from the highway known as The Breaches. This highway access may also be used for some HGV traffic, particularly in the later stages of the construction, after the completion of works to replace the track formation.

4.5.128 This site will be used to stockpile waste ballast prior to removal by HGV or engineering train. To facilitate removal by train, a short siding may be constructed into the site off the existing operational railway, as described above in section 4.4. A 6 m section of hedgerow would be removed to allow the siding / conveyor belt access in and out of the compound. There will also be a high level of parking, materials storage, welfare and office facilities.

4.5.129 Because the compound is also close to the underbridge on the operational freight railway between Avon Road and Lodway Close, Pill, a temporary haul road will continue from the compound east through the rear of 6 residential gardens at Lodway Close, Pill to access the bridge to be replaced and also to enable embankment strengthening works and the installation of permanent re-enforcing structures within the railway land for the widened embankment (described as part of the works for the new railway, Work No 1B, above).

4.5.130 *Key elements:*

- Vegetation clearance;
- Removal of fences;
- Earthworks to create temporary bunding;
- Topsoil removal and storage;
- Laying of temporary hardstanding;
- Temporary fencing;
- Site offices;
- Vehicle parking;
- Storage of redundant track and ballast;
- Storage of new track and ballast;
- Storage of materials;
- Removal of bunds and hardstanding;
- Restoration of land and gardens.

Work Number 18*:* New bridleway

4.5.131 *Plan reference:* Works Plan Sheet 5 (DCO Document Reference 2.3); General Arrangement Plans Sheet 5 (DCO Document Reference 2.4) and inset National Cycle Route ("NCN") Temporary and Permanent Work Plans (DCO Document Reference 2.37).

4.5.132 *Location:* Under the M5 Avonmouth Viaduct and turning south to join National Cycle Way Network route 41 and the permissive cycle path between the Avonmouth Viaduct of the M5 and Pill.

4.5.133 *Detail:* The existing bridleway LA8/66/10 terminates under the M5 Motorway Bridge. It is proposed to extend the bridleway east to meet the permissive cycle path route to a point west of Avon Road, Pill. The new bridleway will be 3 m wide with a maximum gradient of 1 in 12. On the south-eastern side of the M5, the new bridleway would be raised above existing ground levels to ensure that it is sufficiently above marshy conditions to avoid flooding.

4.5.134 The cycle route NCN26 under the M5 will be diverted during construction. It is intended to be re-provided and will (subject to Network Rail granting a new licence for its use) be available for pedestrians and cyclists, separated from the railway by security fencing. Equestrian users will instead use the new bridleway avoiding crossing under the M5 next to the railway.

4.5.135 *Key elements:*

- Earthworks to create new bridleway
- Fencing.

Work Number 19: Installation of railway signalling equipment at the Bristol Port Company's Royal Portbury Dock

4.5.136 *Plan reference:* Works Plan Sheets 5 and 6 (DCO Document Reference 2.3) and General Arrangement Plans Sheets 5 and 6 (DCO Document Reference 2.4).

4.5.137 *Location:* Bristol Port Company's railway from Portbury Junction, Easton-in-Gordano.

4.5.138 *Detail:* A new starter signal is required to regulate freight traffic leaving the Bristol Port Company's Royal Portbury Dock. The dock entry signal will be upgraded. Cables and troughing will be laid between the signal and the national rail network.

4.5.139 *Key elements*:

- New starter signal and upgraded dock entry signal;
- Cables and cable troughing.

Work Number 20: Temporary diversion of part of National Cycle Network Route 41

4.5.140 *Plan reference:* Works Plan Sheet 6 (DCO Document Reference 2.3) and General Arrangement Plans Sheet 6 (DCO Document Reference 2.4).

4.5.141 *Location:* North of the operational freight railway west of Avon Road, Pill.

4.5.142 *Detail:* To provide working space during the reconstruction of the Avon Road / Lodway bridge between north from its existing alignment on the private street north of the field known as Jenny's Meadow to connect with the western turning head of Avon Road, Pill, temporary matting will be laid in Jenny's Meadow, an open space west of Avon Road, Pill, to provide for cyclists using NCN41 to continue to access the cycle path over the M5 Avonmouth Viaduct.

4.5.143 *Key elements:*

- Temporary matting;
- Restoration of land to previous condition following completion of the works to install the new bridge under the railway south of Avon Road.

Work Number 20A: Replacement of the bridge carrying the railway over footpath LA8/5/40, between Lodway Close and Avon Road, Pill

4.5.144 *Plan reference*: Works Plan Sheet 6 (DCO Document Reference 2.3) and General Arrangement Plans Sheet 6 (DCO Document Reference 2.4).

4.5.145 *Location*: Existing bridge carrying the Portishead Branch Line over footpath LA8/5/40 between Avon Road and north of Lodway Close in Pill.

4.5.146 *Detail*: The existing single deck bridge over footpath LA8/5/40 needs to be replaced with a new double track structure, to allow both the new railway and the operational freight railway to run in parallel between Portbury Junction and Pill. A new deck will be lifted in to place following works to strengthen the embankments as described above and works to the bridge abutments.

4.5.147 The temporary compounds and haul roads associated with the construction of the new bridge are described for Works Numbers 17, 17A, 20 and 20B. Road deliveries for these works are likely to route through Pill, where access is tight and restricted. Temporary parking restrictions may be necessary, for example when mobilising and de-mobilising the crane (see DCO Document Reference 2.29 Compounds, Haul Roads and Access to Works Plan Sheets 7 and 8).

4.5.148 The indicative methodology for the Avon Road Bridge works comprises:

- Preparation works, including demolition of 12 garages (Work Number 20B) and part of a garden wall on Marine Parade to allow for crane access, establish the crane pad and site compound on the north side of the railway.
- Divert the cycle path NCN 41 around Jenny’s Meadow and ensure suitable fencing is in place.

- Remove the existing lighting column, electrical cabinets and vehicle bollards and relocate as required.
- Install retaining walls parallel to the track, install drainage and back fill. Prepare the ground and northern base slab for the wingwalls on either side of the bridge.
- Civil enabling works to prepare the ground.
- Demolish the bridge and remove debris to the nearest site compound for onward disposal.
- Excavate the embankment and benching as required.
- Drainage could outfall to the highway drainage to the north of the structure.
- A road crane will be brought to site and situated in the location of the demolished garages. The bridge has been designed in modular sections to allow for crane installation with limited access.
- Install modular precast concrete bridge, subject to the contractor's methodology and assumptions around ground conditions, consents, etc.
- Reinstate the track formation and track.
- Install fencing and maintenance access point.
- If required, relocate existing electrical cabinet and lighting column.

4.5.149 Once the construction works are complete the garden wall will be reinstated.

4.5.150 Plant and equipment to be used may include: a crane, RRVs, dumpers and HGVs.

4.5.151 During construction the footpath between Avon Road and Lodway Close will be closed for health and safety reasons.

4.5.152 *Key elements*:

- demolition of the existing bridge;
- cycle diversion;
- new abutments and wing walls;
- modular bridge sections;
- drainage;
- fencing and maintenance access;
- relocate electrical cabinet and lighting column;
- construction of new bridge and abutments;

Work Number 20B: Demolition of existing garages and temporary construction compound at Avon Road, Pill

4.5.153 *Plan reference:* Works Plan Sheet 6 (DCO Document Reference 2.3) and General Arrangement Plans Sheet 6 (DCO Document Reference 2.4).

4.5.154 *Location:* South of Avon Road Pill

4.5.155 *Detail:* To provide space for a crane to lift the new double track bridge deck in to place, an area of hardstanding is required. The existing garages at the south end of Avon Road will be demolished to provide for the appropriate hard standing and working space. It is not proposed the garages will be rebuilt.

4.5.156 *Key elements:*

- demolition of existing garages;
- temporary fencing;
- storage of plant and equipment.

Pill Station and Car Parks and Pill Viaduct

4.5.157 At Pill, a new car park for rail users will be created on the site of the former goods yard, at Monmouth Road, on the north side of the railway. The site will also have a permanent compound for Network Rail including a road rail access point and a Principal Supply Point building ("PSP") for electricity supply for signalling.

4.5.158 The site of the former Pill Station will be used for the new Pill Station, with the former Down (southern) platform being rebuilt for passenger use. The condition of the cutting and the need to create a ramp down to platform level from Station Road requires significant strengthening works to be carried out to Hardwick cutting at the rear of the residential properties at Hardwick Road and Sambourne Lane.

4.5.159 On Station Road, Pill, the building at No. 7 Station Road will be demolished and replaced by a station forecourt with a drop off area and three disabled parking spaces, as well as cycle stands. This area will be used as a temporary construction compound during the construction phase.

4.5.160 As Pill Station will not be accessible by buses, the bus stop at nearby Heywood Road will be improved, requiring the demolition and rebuilding of the retaining wall on the boundary of Heywood Road and Pill Memorial Club. During the works a small construction compound will be sited within the car park of the Pill Memorial Club.

4.5.161 Repairs are required to Pill Viaduct including the vertical faces of the abutments and intermediate piers. A small temporary compound is proposed under the viaduct, on Underbanks between Star Lane and Pill Library.

4.5.162 In addition works to the top of Pill Viaduct include replacement of the ballast and laying a second railway – part of Work 1B – across the structure, with the existing operational freight railway being slewed to the north to accommodate the second track.

4.5.163 Key access and welfare locations for the works in Pill will include the construction compounds at Lodway, Pill Yard (to become Pill Station car park) and Ham Green compound. Additional access will be provided at the small compound at the location of 7 Station Road (to become the entrance to the new station) and Pill Library under Pill Viaduct.

4.5.164 Embankment strengthening works will be required along Mount Pleasant and Eirene embankment on the east side of Pill Viaduct. The top of the embankment needs to be widened without widening the foot of the embankment, resulting in steeper slopes. Construction works at Mount Pleasant embankment will be accessed from the railway however for the installation of temporary fencing some access may be required through gardens of nearby residential properties.

4.5.165 This section ends at Pill Junction which will be built as part of the NSIP.

Work Numbers 21 and 21A: New car park and road rail access point

4.5.166 *Location*: South of Severn Road and Monmouth Road, Pill.

4.5.167 *Plan reference*: Works Plan Sheet 6 (DCO Document Reference 2.3); General Arrangement Plans Sheet 6 (DCO Document Reference 2.4) and inset Pill Station, Car Park, and PSP layout, Landscaping, Lighting and Access Plan (DCO Document Reference 2.42).

Plate 4.3: Example of a principal supply point

4.5.168 *Detail*: The former goods yard off Monmouth Road, is to be used for the main Pill Station car park, providing an estimated 58 spaces. (Work Number 21). Lighting will be provided at the car park with 5 m high lighting columns and LED luminaires. In addition three disabled spaces will be provided separately within the station forecourt (Work Number 22).

4.5.169 Vehicle movements into and out of the car park will be via the entrance at the south east end off Monmouth Road. One tree on Monmouth Road will be removed. Low level planting will be provided near the proposed car park entrance to maintain adequate visibility splays.

4.5.170 A vehicle restraint barrier will be provided along the southwestern edge of the car park and a security fence will be installed along the railway boundary.

4.5.171 The pedestrian route to the re-opened Pill Station from the car park, up Monmouth Road and across Station Road bridge to the station, will provide a new informal pedestrian crossing and be signposted. The existing planting along Monmouth Road between the car park and Station Road will be retained where possible to screen views of trains in the station and the station lighting.

4.5.172 Runoff will be collected through permeable pavement in the parking bays (aisles to remain asphalt) and attenuated within a clean stone reservoir beneath. The clean stone (reservoir layer) will provide treatment as the water flows through the stone and the geotextile membrane. The proposed discharge from the reservoir layer will connect into the existing highway drainage system on Avon Road. It is proposed to convey drainage from Pill Station platform, retaining wall and ramp to the highway drainage adjacent to the car park.

4.5.173 Part of the former goods yard will be used to provide the new road rail access point (“RRAP”), PSP for signalling equipment and permanent railway maintenance compound (Work Number 21A). The PSP will be housed in a single storey building similar in size and appearance to a shipping container as illustrated in Plate 4.3.

4.5.174 The former goods yards will be used as a temporary compound during construction to store materials and machines, and provide welfare facilities. The narrow roads in the vicinity mean bulk materials will be delivered by rail where possible.

4.5.175 *Key elements*:

- Hardstanding;
- Lighting;
- Signage;
- Fencing and landscaping;
- Drainage
- Vehicle restraint barrier;
- Utilities
- Communications apparatus
- Permanent maintenance compound including the RRAP and PSP.

Work Number 22: New railway station at Pill

4.5.176 *Location:* North west of Station Road, Pill

4.5.177 *Plan reference:* Works Plan Sheet 6 (DCO Document Reference 2.3); General Arrangement Plans Sheet 6 (DCO Document Reference 2.4) and inset Pill Station, Car Park, and PSP layout, Landscaping, Layout and Access Plan (DCO Document Reference 2.42).

4.5.178 *Detail:* The existing down (southern) platform at the disused Pill Station will be removed and re-built. The new platform will be approximately 3.3 m wide and 126 m long. A small shelter will be provided on the platform in front of the pedestrian ramp. An emergency refuge area will be provided at the Down (Portishead) end of the platform in the event of a fire on the train in the station. Lighting will consist of columns about 5 m high and by lighting bollards in the emergency refuge area, all at 11 m spacings. CCTV and public announcement speakers will also be provided on the platform.

4.5.179 The access to Pill Station will be off Station Road on the south side of the road bridge. No. 7 Station Road will be demolished and initially the site will be used as a small construction compound before being laid out as the station forecourt. The station forecourt will include three disabled parking spaces and a car passenger drop off area. A shelter by the entrance will house a ticket machine, waiting area, seating and cycle parking for about 20 bicycles. Vehicular access into and out of the new station forecourt will be one-way, with the entrance off Sambourne Lane and the exit on to Station Road.

4.5.180 A new pedestrian ramp 2 m wide, 109 m long with a gradient of 1 in 22 will be constructed from the site of the new station forecourt to the platform. The ramp will be formed in a half turn shape in cross section, integral with the retaining wall, supporting the railway alignment cutting. The first 79 m will descend from the station forecourt towards the station platform, with a 180° turn, and the remaining 30 m of the ramp will descend to the platform in the direction facing the new station entrance. A new staircase 2 m wide and 11 m long will also be installed adjacent to the ramp to provide additional access.

4.5.181 In order to achieve sufficient space for the new pedestrian ramp, platform and emergency refuge area, the existing Hardwick Road cutting, located between the Avon Road / Lodway close Bridge and the Portishead end of Pill Station, will need to be cut back, steepened to about an 80 degree slope, and strengthened in order to provide sufficient space for the new track alignment and fire refuge areas.

4.5.182 To provide for sufficient stability of the cutting slope, reinforcing works are required over about 220 m length and to the north of the gardens of properties along Hardwick Road and Sambourne Lane. The precise nature of the works is subject to ground conditions. These works will be undertaken within the operational railway boundary, although it will be necessary to secure land or rights over land to allow access to the top of the cutting. The crest of the new cutting slope will be c0.5 m from the existing fence line and gardens. To stabilize the steepened cutting slope it will be necessary to use soil nails to penetrate the subsoil below the gardens of the residential properties off Hardwick Road and Sambourne Lane and spray the cutting slope with reinforced concrete (shotcrete). The Order limits for the DCO Scheme include the area of land required to accommodate subsoil rights for the soil nails.

4.5.183 The plant required to undertake the work may include hand tools, large excavators, dumpers, drilling rigs, concrete wagons and concrete pumps. The works would be carried out from the railway accessed from Monmouth Road during day-time possessions where possible. The works would be sequenced with the construction of Pill Station.

4.5.184 Surface water drainage of the drop off area in the station forecourt will be provided by a permeable pavement and reservoir layer beneath the three disabled parking spaces. The clean stone (reservoir layer) will provide treatment as the water flows through the stone and the geotextile membrane. Discharge will be into the existing highway drainage on Station Road.

4.5.185 Surface water drainage from the station platform, retaining wall and ramp, and a short section of railway track will be conveyed to the highway drainage next to Pill Station car park on Monmouth Road.

4.5.186 The northern platform will remain largely untouched. The coping stones along the disused platform will be cut back to make space for the minor re-alignment of the operational railway line. A new signal may be required on the platform.

4.5.187 The following text summarises the construction sequence required at Pill Station.

- 7 Station Road will be demolished and the area used as a temporary construction compound before it is redeveloped as the entrance to the station.
- The existing railway may need to be temporarily slewed or protected to create a suitable working area for the works to the station platform area.
- Hardwick cutting slope will be steepened and stabilised using both temporary soil nails to stabilise the slope during construction of the reinforced concrete wall and ramp and permanent soil nails. The front face (closest to the track) of the ramp will be retained with a new L-shaped reinforced concrete wall, dependent on further geotechnical investigation.

- Installation of drainage including backwall drainage and a collector drain at the base of the retaining wall.
- Installation of a new staircase adjacent to the proposed ramp. The staircase will be 2 m wide and 11 m long with a 1.5 m high galvanised steel bow top fence and handrails.
- The existing down side platform will be removed and replaced with a new platform 126 m long. New drainage for the platform will be installed.
- At the western end of the station a new ramp down to the gravelled emergency refuge area and lighting bollards will be installed.
- Modular shelters will be provided in the car park as a waiting area
- Installation of station lighting, public announcement system, CCTV, and CIS.

4.5.188 Plant to be used for construction works at Pill Station include: hand tools, soil nailing rigs, concrete pumps, excavators, RRV, and crane and mobile elevating work platforms (“MEWP”).

4.5.189 Access to the construction site would be via the construction compound off Monmouth Road. The small satellite compound on Station Road could be used for material storage and construction of the ramp. A weight and width restriction on Station Road Bridge, the narrow streets and parking through Pill restricts access to the Monmouth Road car park site for large vehicles.

4.5.190 *Key elements:*

- new southern platform;
- pedestrian ramp and staircase;
- small passenger shelter;
- cutting slope regrading and strengthening;
- soil nails to cutting slope to rear of gardens off Sambourne Lane and Hardwick Road;
- emergency refuge at Portishead end of the platform;
- lighting;
- utilities;
- CCTV;
- fencing;
- landscaping;
- drainage;
- public address system;
- communications apparatus;
- tarmacking;
- station forecourt including mobility-impaired parking spaces;
- car passenger drop off area;
- shelter with ticket machine, waiting area, seating and cycle parking; and
- vehicular access off Sambourne Lane and the exit on to Station Road.

Work Numbers 22A and 22B: An improved bus stop and temporary construction compound

4.5.191 *Location:* Highway junction Heywood Road, Station Road and Lodway, Pill.

4.5.192 *Plan reference:* Works Plan Sheet 6 (DCO Document Reference 2.3); General Arrangement Plan Sheet 6 (DCO Document Reference 2.4) and inset Pill Memorial Club Bus Stops and Car Park Plan (DCO Document Reference 2.43).

4.5.193 *Detail*: The existing retailing wall on the boundary of Heywood Road and Pill Memorial Club's car park will be cut back and the area of highway widened to the North of the Pill Memorial Club, to accommodate an enhanced bus stop, to improve the facility for mobility impaired users (Work Number 22A). New lighting and drainage will be installed and utilities apparatus diversions carried out as required.

4.5.194 To facilitate the works, a temporary construction compound will be established on a further part of the Memorial Club's car park during the works (Work Number 22B).

4.5.195 *Key elements:*

- Demolition of existing and construction of new retaining wall
- New bus stop
- Lighting
- Highway drainage works
- Utility diversions
- Temporary fencing
- Storage of plant and material for construction purposes.

Work Number 23: Temporary construction compound beneath and to the north of Pill Viaduct at Underbanks, Pill

4.5.196 *Location*: Beneath and to the north of Pill Viaduct at Underbanks, Pill.

4.5.197 *Plan reference*: Works Plan Sheet 6 (DCO Document Reference 2.3) and General Arrangement Plan Sheet 6 (DCO Document Reference 2.4).

4.5.198 *Detail*: The hardstanding under the arch of the viaduct closest to Star Lane will be used as a compound for works to Pill Viaduct, to the viaduct abutments and for the works to the Mount Pleasant Embankment. It will be used for vehicle parking, small amounts of storage and for welfare facilities.

4.5.199 *Key elements*:

- Temporary fencing
- Storage of material plant and machinery
- Vehicle parking.

Minor works to Pill Viaduct

4.5.200 Minor works are required to repair the abutments and structure of Pill Viaduct. These include:

- infilling of voids, backing, grouting and crack stitching,
- minor repairs including repointing and stitching longitudinal arch cracks,
- spandrel wall tie bars and pattress plates, and
- connection of track drainage to a suitable drainage system.

4.5.201 The work could be carried out used in roped access off the top of Pill Viaduct or scaffolding to create a decked area. The plant and equipment likely to be used for repairs to Pill Viaduct include: MEWP, drills, coring systems and excavators.

Mount Pleasant Embankment and Pill Junction

4.5.202 The Mount Pleasant and Eirene Terrace Embankment (see General Arrangements Plan Sheet 7, DCO Document Reference 2.4) lies on the southern side of the railway between the eastern abutment of Pill Viaduct and the proposed new Pill Junction. The toe of the embankment lies at the rear of a number of properties on Mount Pleasant and Eirene Terrace. A number the gardens of these properties have been extended on to the embankment.

4.5.203 It is proposed to widen and strengthen the embankment within Network Rail's ownership. The nature of the works is subject to ground conditions. The current proposal is to install a high level retaining wall at the crest of the slope over a length of about 86 m from Pill Viaduct eastwards to widen the top of the embankment. The retaining wall provisionally comprises a king post and concrete plank high level retaining wall with a 1.25 m high hand rail to the top of the wall along the cess for safety. The retaining wall may need to be fixed using soil nails, depending on the strength of the subsoil, into the embankment under the railway.

4.5.204 The embankment slope below the retaining wall will be excavated and re-profiled to a steeper angle. High tensile steel wire mesh will be laid over the slope to retain soils and to help prevent erosion. Soil nailing will then be undertaken to fix the mesh and stabilise the slope. The length and spacing of the soil nails will be confirmed during detailed design.

4.5.205 The nearest compound is at Monmouth Road, with access along the railway. Access via gardens may be required to install fencing.

4.5.206 These works will require temporary restrictions on householders to access their back gardens during the course of the works for health and safety reasons.

4.5.207 The new Pill Junction, the termination point of the NSIP, will be constructed between the eastern end of Pill Viaduct and the Western Portal of Pill Tunnel, in conjunction with the embankment strengthening works described above.

East of Pill Junction to the Clifton Suspension Bridge

4.5.208 Minor Works are required along the operational railway line between Pill Junction and the Clifton Suspension Bridge. Subject to Habitats Regulations approvals, the works could be carried out under Network Rail's permitted development rights where within Network Rail's operational railway boundary.

4.5.209 Outside of the railway boundary are the proposed new permanent compound at Ham Green Lake and the proposed temporary compound at Quarry Bridge No. 2, both of which are described below.

4.5.210 Key access and welfare locations for the works to this section may include Lodway Farm, the compound under the M5 Avonmouth Viaduct, Pill Station car park, Ham Green compound and Clanage Road. There will also be a number of permanent pedestrian track access points, including stepped access from the River Avon Tow Path to the railway, and temporary micro-welfare points installed throughout the Avon Gorge.

Minor works to Pill Tunnel

4.5.211 Minor works are required to the Pill Tunnel portals and the tunnel itself. Emergency lighting with containment to run on hangers are required through Pill Tunnel. GSM-R repeaters are required at both the western and eastern portals. The Western Portal is also likely to require LOC cabinets and signals nearby. Access to Pill Tunnel will be via Ham Green construction compound.

Work Numbers 24 and 24A: New permanent vehicular compound and access at Chapel Pill Lane, Ham Green and a temporary construction compound

4.5.212 *Plan reference:* Works Plan Sheet 8 (DCO Document Reference 2.3); General Arrangement Plan Sheet 8 (DCO Document Reference 2.4) and inset Pill Tunnel Eastern Portal Maintenance Compound, Landscaping and Access Plan (DCO Document Reference 2.46).

4.5.213 *Location*: Access from the highway of Chapel Pill Lane, Ham Green, south to the eastern portal of Pill Tunnel.

4.5.214 *Detail*: A new permanent compound is proposed for maintenance and emergency purposes at the eastern portal of Ham Green (Work Number 24). It will consist of hardstanding for vehicle parking and turning, with fencing and landscaping. The new construction and maintenance access will run parallel to Hayes Mayes Lane on the western field boundary to the tunnel entrance and along the railway boundary towards Ham Green Lake to minimise land-take. The hard standing for parked vehicles and turning area will be provided to the bottom of the slope adjoining the railway. Localised land contouring will be required to provide sufficient flat land to accommodate the turning circle. Tree and shrub screening will be provided along the northern boundary of the compound. A new access to Ham Green Lake will also be formed.

4.5.215 The site will be used as a temporary construction compound (Work Number 24A) to provide a small site cabin, welfare facilities parking, and materials storage.

4.5.216 *Key elements*:

- road rail access point,
- fencing,
- temporary lighting,
- landscaping,
- temporary utilities provision,
- drainage,
- temporary communications apparatus,
- car parking facilities and hardstanding for turning,
- access track.

Minor works within the highway at Ham Green

4.5.217 To accommodate the safe movement of HGV vehicles during construction, minor highway modifications need to be made which will all be carried out within the existing highway.

4.5.218 The existing traffic island at the T-junction on Ham Green and Macrae Road needs to be replaced with a flush island and removable reflective signs to allow the low-loader to make a right hand turn onto Macrae Road. Double yellow lines are required on Macrae Road to prevent parking near the junction.

4.5.219 The existing footpath on the traffic island between Macrae Road and Chapel Pill Lane needs to be strengthened to allow potential run-over by heavy vehicles.

4.5.220 A new access is required off Chapel Pill Lane sufficient to accommodate turning movements of HGV vehicles onto the new access lane.

Work Number 25: Partial dismantling and rebuilding of Quarry Bridge No. 2 and temporary construction compound

4.5.221 *Location*: Adjoining the underbridge known as Quarry Bridge No. 2, Abbots Leigh.

4.5.222 *Plan reference:* Works Plan Sheet 12 (DCO Document Reference 2.3) and General Arrangement Plan Sheet 12 (DCO Document Reference 2.4).

4.5.223 *Detail:* Quarry Bridge No. 2 on the operational railway north of Clifton Bridge No. 2 Tunnel is a masonry, single span arch bridge. Following the inspections and assessment it has been determined that the bridge requires strengthening to accommodate the new passenger service. The National Trust has a right of access under the structure off the River Avon Tow Path to manage their land in Quarry 2 and have requested that the current headroom under the structure is maintained. To accommodate this requirement, the bridge will be partially dismantled and rebuilt. However a less invasive option to insert a sleeve through the bridge opening is under discussion with the National Trust.

4.5.224 To enable the construction work an area of the quarry on the eastern side of the operational railway has been shown in the land plans and land affected plans as an area for use as a temporary construction compound during the work. A temporary ramp from the railway embankment to the construction compound will be built and removed on completion of the works.

4.5.225 Vegetation would be cleared 5 m around the bridge and under the footprint of the proposed ramp and Terram lining will be laid under the ramp to prevent the underlying ground from any pollution. The nearby grassland will be protected as much as possible.

4.5.226 The proposals involve cutting out the track and excavating halfway down the abutments from the railway. The bridge arch will be demolished using an excavator located in the site compound. The abutments will be prepared and a precast cill beam lifted into the new structure using plant located in the compound. Precast beams and parapet units will be installed, stitched together and waterproofed. The embankments will be backfilled and the track re-laid, using machines located on the track. The works will have to be undertaken during a line possession. The final methodology will be developed by the contractor.

4.5.227 *Key elements:*

- vegetation clearance approximately 5 m either side of the bridge
- ramp made with Type 1 aggregate or earth
- storage of plant machinery and materials
- welfare facilities
- restoration of land following completion of the work to Quarry Bridge No. 2.

4.5.228 The works would require RRVs, excavators and mini-dumpers, and possibly a rail crane.

Minor Works to the operational freight railway between Pill and the Clifton Suspension Bridge

4.5.229 The only major features of the DCO scheme between Pill and the Clifton Suspension Bridge are the two compounds at Ham Green (temporary and permanent) and Quarry Bridge No. 2 (temporary) described above.

4.5.230 As there will be minor works to the existing operational freight railway along the length of the railway and these minor works, together with the works to and compound at Quarry Bridge No. 2 are within the Avon Gorge Woodlands Special Area of Conservation, detail is provided below on the minor works, which will require appropriate assessment under the Habitats Regulations. A list of works in the Avon Gorge Woodlands SAC is provided in ES Appendix 4.4 (DCO Document Reference 6.25).

Work to improve existing track geometry

4.5.231 The line speed on the existing operational railway between Pill and Ashton Junction will remain unchanged at 30 mph. However in order to achieve an acceptable ride comfort for passengers, some minor adjustments to the track geometry will be needed. These design requirements govern the horizontal and vertical alignment of the permanent way. This will include some track slewing[2] up to a few centimetres and recanting[3] to improve the alignment of the track to achieve the required ride comfort. All track realignment work will be within Network Rail's existing railway boundary.

4.5.232 The track ballast along the operational railway line between Pill and Ashton Junction is generally shallow and partly contaminated with organic matter from the surrounding vegetation.

4.5.233 Some sections of track between Pill Junction and Ashton Junction will be renewed including track lifting, re-railing, re-ballasting, sleeper replacement and tamping. It is expected that for sections requiring re-railing, the works will be undertaken from the railway using RRVs, engineering trains, tampers, and other rail-based plant such as ballast cleaners and auto-ballaster wagons.

[2] Slewing refers to moving the railway track sideways to change the horizontal alignment.

[3] The cant of the railway track refers to the difference in height of the two rails (similar to the camber for roads). This is normally done on curves, with the outer rail higher than the inner rail to allow trains to travel through the curve at higher speeds. Excessive canting leads to uneven wear of the rails and increased maintenance liability.

4.5.234 This work could be carried out in consecutive 8 hour shifts, either day time or night-time, subject to agreement with the Bristol Port Company and freight operating companies regarding freight movements and agreed possessions.

Minor works to tunnels along the operational freight railway

4.5.235 There are no plans for major works to the three tunnels through the Avon Gorge and the railway will remain single track through each one. Some vegetation clearance works may be required above tunnel portals and localised repairs and strengthening may also be required to the tunnel linings. This will be confirmed at detailed design stage.

Minor works to bridges along the operational freight railway

4.5.236 A structural survey has been undertaken of underbridges between Pill and Ashton Junction. Defects and sub-standard capacities have been recorded and remedial works identified. A distinction has been made between remedial works required for the DCO Scheme, non-critical repairs to be undertaken as part of a maintenance programme of under Network Rail's permitted development rights (see Section 4.2), and defects to be monitored. Some of the non-critical repairs will be undertaken under permitted development rights at the same time as the remedial works required for the DCO Scheme for reasons of efficiency.

4.5.237 A number of bridges along the Avon Gorge section of the line require strengthening works and minor repairs. Spandrel wall tie bars and pattress plates will be installed to strengthen the following underbridges: S14 Underbridge, S15 Miles Dock; S18 Quarry 6; S19 Quarry 5; S20 Quarry 4; S21 Quarry 3; and S25 Underbridge. This involves using hand drills to drill through the spandrel wall structures. Tie bars will be installed through the width of the bridge and secured at each end with nuts, washers and the pattress plates.

4.5.238 Works will be undertaken either using roped access (as illustrated in Plate 4.4) or use of small scaffolding towers which may require the removal of vegetation about 2 m from the structure.

4.5.239 S26 Valley underbridge is likely to require minor repairs and specific works are to be confirmed during detailed design. The works are expected to be small scale, involving the use of hand drills, an access tower and hand tools.

Plate 4.4 An example of bridge strengthening works

An example of bridge strengthening using tie bars and pattress plates	An example of bridge strengthening using roped access
	

4.5.240 Drainage repair works will also be required at S12 Miles Viaduct Underbridge comprising installation of a rod drainage system. It is likely that roped access will be required. The plant required may include hand tools, power drills, and access tower and rope access equipment. It may be necessary to remove vegetation around the structure to accommodate the access tower. If required mitigation measures will be taken to prior to the start of works to protect the watercourse below the underbridge.

4.5.241 If it is necessary to close the River Avon Tow Path during these works, then efforts will be made to undertake the bridge works at the same time to reduce the Tow Path closure times. When the Tow Path remains open, management may be required to protect the safety of the public.

Retaining walls

4.5.242 A structural survey has been completed for the retaining walls along the operational railway. The location of retaining walls are illustrated on the General Arrangement Plan DCO Document Reference 2.4 (DCO Document Reference 2.4).

4.5.243 In general the retaining walls were found to be in a fair condition. Some local rebuilding of retaining wall at Chainages 122mi 79ch and 122mi 67ch will be undertaken due to local failure, such as bulging or rotation. Assessments to determine the need for additional strengthening works, which Network Rail would (save for any requirement for appropriate assessment) ordinarily carry out as routine maintenance, continue.

Geotechnical works in the Avon Gorge

4.5.244 Slope instability is a known risk in the Avon Gorge, with recorded incidents of stones and boulders slipping downslope and rock falls. Some individual trees naturally become unstable and fall downslope, while others are damaged by rock fall. Network Rail carries out regular visual inspections of the rock face throughout the gorge. Stone picking, rock bolting and catch nets are already applied in the gorge to protect the freight line services.

4.5.245 Additional risk assessments of the geotechnical stability of the Avon Gorge cliff face close to the railway within NR railway land and on third party land have been undertaken for the DCO Scheme. The remedial works required include the hand picking loose stones and blocks, removal of trees which are causing root jacking in the cliff face, rock bolting to secure larger boulders, and the provision of 2 m high catch fences at three locations. It is expected that this work could be undertaken using roped access from above or from the railway depending on the location. Plant and equipment that may be used include: hand tools, drilling rigs and potentially a working platform.

4.5.246 All of the geotechnical works are within the Avon Gorge Woodlands SAC. Access to the cliff slope may be from the top or bottom of the cliff faces. Access to the top of the cliff face would be via a road into Leigh Woods off Abbots Leigh Road, with temporary parking and welfare unit in the Abbots Leigh Road car park. Access to the base of the cliff would be from the railway or the River Avon Tow Path.

4.5.247 The scale of the works required to secure the rock face is small, dependent on manual labour, with staff lowered on ropes to pick off loose stones or undertake rock bolting using hand held equipment and local removal of vegetation. In some cases it may be possible to coppice rare species of

trees which are causing root jacking to avoid future damage while saving the tree. Larger boulders will be allowed to slide downslope in a controlled way, although this would damage vegetation in the path of the boulder.

Permanent pedestrian maintenance access points in the Avon Gorge

4.5.248 A small permanent maintenance (pedestrian) access point will be located at the end of Chapel Pill Lane adjoining the railway (outside of the Avon Gorge Woodlands SAC).

4.5.249 Further permanent accesses to the railway are proposed at three locations within the Avon Gorge Woodlands SAC from the neighbouring River Avon Tow Path for long term maintenance. Stepped access would be provided at two locations, typically 2.4 m wide.

Works within the City of Bristol From Clifton Suspension Bridge to Ashton Junction

4.5.250 A new road rail access point and permanent railway maintenance compound is proposed between Clanage Road and the operational freight railway, to provide permanent access to the railway to enable access north towards the Clifton Suspension Bridge and Avon Gorge. A ramp from the existing ground level to the railway will be provided to enable road rail vehicles to access the railway.

Work Numbers 26, 26A, 26B and 26C: A permanent vehicular access and compound together with temporary construction compound off Clanage Road and floodplain compensation

4.5.251 *Location*: Clanage Road, Ashton, north of the Bedminster Cricket Club.

4.5.252 *Plan reference*: Works Plan Sheet 15 (DCO Document Reference 2.3); General Arrangement Plan Sheet 15 (DCO Document Reference 2.4) and inset Clanage Road Compound, Landscaping and Access Plan (DCO Document Reference 2.52).

4.5.253 *Details*: A new permanent maintenance (vehicular) compound and track access point with hard standing will be required with access off Clanage Road (Work Number 26) and a separate access from land to the north of the Bedminster Cricket Ground (Work Number 26B). This location was selected as being the only suitable site south of the Avon Gorge and close to the operational railway. The site is also located within the Bower Ashton Conservation Area and close to the Clifton Suspension Bridge, so the proposals include planting around the perimeter to screen the site from surrounding areas. The permanent maintenance compound will be lowered by about 10 cms to 7.4 mAOD over approximately 3000 m^2 to provide floodplain compensation for the new ramp to the railway (Work Number 26C).

4.5.254 During construction an additional area of land at this location will be occupied for a construction purposes compound (Work 26A) to provide medium sized parking area, materials, storage, welfare and site offices. As the site is located in Flood Zone 3b, the use and layout of the site will be the subject of consultation with the Environment Agency through their permitting system.

4.5.255 *Key elements*:

- permanent reinforced ramp for access to the operational freight railway
- widened access from Clanage Road
- ground lowering over the permanent maintenance compound (except for the ramps off Clanage Road and onto the railway
- hardstanding for vehicle parking and storage,
- temporary lighting,
- signage,
- fencing
- landscaping,
- drainage
- temporary communications apparatus,
- temporary utilities apparatus,
- restoration of land occupied temporarily, and
- new permanent access for the landowner.

Work Number 27: Not used

Work Number 28: Improvement of the junction of Winterstoke Road with Ashton Vale Road, Ashton

4.5.256 *Location:* Winterstoke Road and Ashton Vale Road, Ashton

4.5.257 *Plan reference(s):* Works Plan Sheet 17 (DCO Document Reference 2.3); General Arrangement Plan Sheet 17 (DCO Document Reference 2.4) and inset Ashton Vale Road and Winterstoke Road Highway Works Plan (DCO Document Reference 2.47).

4.5.258 *Details:* Provision of a new left turn lane into Ashton Vale Road, works and utilities apparatus and works to the existing traffic signal control system. In addition a new "MOVA" traffic control system will be installed to regulate the traffic controls and to align them with the closures of the adjacent level crossing. The modified highway will drain into the existing highway drainage system.

4.5.259 *Key elements*:

- extending the length of the left turn lane on Winterstoke Road into Ashton Vale Road,
- modifications to the footway on Winterstoke Road,
- modifications to drainage,
- utility diversions,
- installation of new MOVA traffic light regulation system.

4.5.260 The pedestrian crossing at Barons Close in Ashton Vale was closed temporarily during the construction of the metrobus scheme (m2 route). MetroWest Phase 1 is proposing to close this crossing as part of the DCO Scheme.

4.5.261 The Ashton Vale Road level crossing will remain operational. No alterations will be undertaken to the level crossing itself.

Work Number 29: Temporary compound within the rail freight facility at Liberty Lane

4.5.262 *Location*: Freightliner depot at Liberty Lane.

4.5.263 *Plan reference(s)*: Works Plan Sheet 20 (DCO Document Reference 2.3) and General Arrangement Plan Sheet 20 (DCO Document Reference 2.4).

4.5.264 *Details*: Temporary construction compound within the rail freight facility at Liberty Lane, Bristol.

4.5.265 *Key elements*:

- temporary construction compound.

Other associated development required for the construction of the railway

4.5.266 Other associated development within the Order limits consists of:

- permanent way (rail tracks) electrical equipment, power supply cubicles, cables, telecommunications apparatus, railway mobile communications masts and apparatus and signalling;
- ramps, means of access (including temporary haul roads) and construction compounds;
- embankments, aprons, abutments, shafts, foundations, retaining walls and structures, drainage, wing walls, fences, acoustic fences, catch fences, paths, access steps and culverts;
- works to alter, divert, maintain, replace and repair apparatus (including statutory undertakers' apparatus), including mains, sewers, pipes, drains and cables or for their protection;
- works to clear, maintain and interfere with water courses other than a navigable water course;
- landscaping and other works to mitigate any adverse effects of the construction, maintenance or operation of the authorised development described in the environmental statement;
- works for the benefit or protection of land affected by the authorised development;
- works required for the strengthening, improvement, maintenance or reconstruction of any streets;
- works to level crossings;
- works for the temporary diversion of public footpaths shown in the permanent and temporary stopping up and diversion plan;
- trenching and cabling associated with the new signalling and communications masts;
- strengthening earthworks and reconstructing retaining walls;
- vegetation clearance, rock bolting and rock dowels and safeguarding of unstable slopes or rock faces by stone-picking and removal of loose rocks;

- replacement or renewal of fencing;
- repairs to existing bridges, adding barriers to bridge parapets and raising of bridge parapets;
- alteration of the layout of any street permanently or temporarily, including but not limited to increasing or reducing the width of the carriageway of the street by increasing or reducing the width of any kerb, footway, cycle track or verge within the street or removing replacing, altering or providing splitter islands in streets;
- works to place alter remove or maintain road furniture;
- works to place, alter, divert, relocate, protect, remove or maintain the position of apparatus (including statutory undertakers' apparatus), services, plant and other equipment in, under or above a street, or in other land, including mains, sewers, drains, pipes, lights, cables, cofferdams, fencing and other boundary treatments and to provide connections to adjoining land and buildings;
- landscaping, re-grading, re-profiling, contouring, noise barriers, works associated with the provision of ecological and archaeological mitigation and other works to mitigate any adverse effects of the construction, maintenance or operation of the authorised development:
- site preparation works, site clearance (including fencing and other boundary treatments, vegetation removal, demolition of existing structures and the creation of alternative highways or footpaths); earthworks (including soil stripping and storage and site levelling);
- establishment of site construction compounds and working sites, temporary structures, storage areas (including storage of excavated material and other materials), temporary vehicle parking, construction fencing, perimeter enclosure, security fencing, construction related buildings, welfare facilities, office facilities, other ancillary accommodation, construction lighting, haulage roads and other buildings, machinery, apparatus, drainage systems, temporary bridges over watercourses, storage ponds, processing plant, works and conveniences;
- pavement, kerbing and paved areas;
- signing, signals, street lighting, road markings, traffic management measures including temporary roads and such other works as are associated with the construction of the authorised development; and
- such other works, including working sites and works compounds, as may be necessary or expedient for the purposes of or in connection with the construction of the authorised development and which do not give rise to any materially new or materially worse adverse environmental effects to those assessed in the environmental statement.

Railway Signalling and Communications Equipment along the DCO Scheme

4.5.267 New lineside equipment will be installed including telecommunications equipment, signalling equipment and under-track crossings ("UTX") for cables.

Signalling, Electrical Systems and Intermediate Signals along the DCO Scheme

4.5.268 New signals are required along the operational railway line between Ashton Junction and Portishead for the safe movement of passenger trains and freight trains in both directions along the single track railway and, given the short sight lines, through the Avon Gorge owing to the winding route and tunnels.

4.5.269 The signals will be mounted on a column about 5 m high with a hooded canopy to direct the lights to face oncoming trains (Plate 4.5). The lights will be on permanently except when the power is switched off for works or maintenance. The lights show red (wait), green (safe to proceed) or yellow (proceed at caution).

Plate 4.5: An example of a signal

Troughing and Signalling Cabinets along the DCO Scheme

4.5.270 New cabling will be laid along a trough on one or other side of the railway. Small electrical cabinets will be placed periodically along the railway, including inside the tunnels. Plate 4.6 shows a typical Location Cabinet ("LOC"). Cabinets are typically made of metal and painted grey and may be raised on a shallow platform for example due to ground conditions or flood risk.

Plate 4.6: An example of LOC Cabinets

GSM-R masts along the DCO Scheme

4.5.271 GSM-R masts and GSM-R repeaters are required to ensure coverage of communications throughout the entire route. These are essential infrastructure for the safe management of the railway.

Plate 4.7: A typical pole mounted GSM-R repeater

4.5.272 The GSM-R repeaters are likely to be required along the route at the following locations (to be confirmed during detailed design):

- Two repeater antennae mounted on an 8 m pole at the south end of Clifton Bridge No. 2 Tunnel, with one antenna facing up the railway towards Clifton Bridge No. 1 Tunnel mounted at 8 m and the other mounted at 5 m pointing north into Clifton Bridge No. 2 Tunnel about 500 m from the Clifton Suspension Bridge,
- Two repeater back to back antennae attached at 5 m to Sandstone Tunnel East (south) portal,
- Two GSM-R repeater antennae attached to Chapel Pill Lane Overbridge, (one on each side).
- One GSM-R mast and repeater antenna mounted at 12 m on Pill Tunnel Eastern Portal
- One GSM-R repeater antenna at 5 m on Pill Tunnel Eastern Portal
- One GSM-R mast and two back to back repeater antennas mounted at about 5 m high on Pill Tunnel Western Portal
- One new antenna and one upgrade to an existing antenna mounted on an existing 25 m mast at Lodway
- One GSM-R mast and new antenna mounted at no more than 12 m at Portishead Station
- Other masts along the existing railway on the east side of the River Avon and at Parson Street Junction to be installed under Network Rail's permitted development rights to complete the coverage.

4.5.273 GSM-R repeaters antennae look like TV aerials which may be mounted on slender poles as illustrated in Plate 4.7.

Drainage and Culverts

4.5.274 The drainage ditches along each side of the disused railway corridor will be cleared of vegetation, excavated and reformed. Some new access points will be installed. Track drainage will be via infiltration into the ballast and

soil, with excess water channelled via the drainage ditches to existing discharge points to the local drainage network as indicated on the Minor Civils drawings (DCO Document Reference 2.7).

4.5.275 There are approximately eleven culverts under the disused railway which will be either restored or replaced on a like-for-like basis. It is not envisaged that it will be necessary to enlarge the existing culverts under the railway. Culverts will be excavated, inspected in detail and, if required, replaced with plastic or pre-cast concrete pipes. Headwalls will be repaired or re-built and the ground above the culvert re-instated. Care will be taken to avoid silting and contamination of existing drains during construction. De-watering may be required to control water from the existing culverts.

4.5.276 The DCO Scheme crosses culverts on Colliter's Brook and Ashton/Longmoor Brook in the Bower Ashton area.

Fencing Strategy along the DCO Scheme

4.5.277 The existing fencing along both sides of the railway will be replaced between Portishead and Ashton Junction. The nature of the replacement fencing is determined by Network Rail's assessment of safety risk. Network Rail has three grades of fencing illustrated in Plate 4.8:

- Grade I fencing, such as Palisade, typically metal vertical bar fencing 1.8 m and up to 2.4 m high in areas of risk to trespass.
- Grade II fencing, such as Paladin, typically welded mesh fence, 1.8 m high unless circumstances require a higher fence.
- Grade III fencing, such as post and wire, suitable to prevent cattle getting onto the railway, typically used in areas where trespass is not a problem.

4.5.278 It is anticipated that Grade I fencing will be required in urban areas, namely through Portishead, Pill and in the Ashton Gate area from Purell's Overbridge to Ashton Junction. Grade II fencing will be required along much of the rest of the route and Grade III fencing may be appropriate in the rural section between Portishead and Pill.

4.5.279 Depending on the location, some of the fencing could be installed from the railway corridor, but in other locations it would have to be installed from neighbouring land.

4.5.280 Depending on the contractor's methodology, temporary fencing could be installed prior to works on the disused line and replaced with permanent fencing when the work is complete. Alternatively, the contractor could install permanent fencing from the outset.

4.5.281 Where fencing is to be replaced, it will be necessary to remove the existing vegetation 1 m on both sides of the fenceline, except in specific locations where ecological constraints restrict vegetation removal.

4.5.282 The fencing strategy through the Avon Gorge takes into consideration the risk of trespass on a line with one passenger train per hour at 30 mph, the need for maintenance access, and the visual impact of the fencing. The fencing has been designed to reduce the visual impact of vegetation removal and the paladin fencing by either keeping the existing fencing or relocating the new fencing closer to the railway line and within the existing fenceline to maintain the screening vegetation.

- Between the pedestrian overbridge at the old Clifton Bridge station 121mi 58ch and Clifton Bridge 121mi 68.5ch the new fence on the east (river) side of the railway will be set within the existing fenceline and alongside the cess.
- Between Clifton Bridge 121mi 68.5ch and 122mi 20.5ch the existing fence along the east (river) side of the railway will be retained, thereby removing any change to the vegetation, the existing landscape and views.

Plate 4.8: Examples of fencing

Clockwise from top left

(a) Palisade fencing
(b) Paladin fencing
(c) Post and wire fencing

4.5.283 Between Portishead Station and Trinity Primary School Bridge an acoustic barrier 200 m long and 2 m high close timber boarded fence will be installed along the south side of the railway (see Work Number 5). The acoustic fence will be separate to the Network Rail security fence which will be located approximately 1 m inward of the acoustic fence. To the east of the footbridge, the existing fencing will be removed and replaced with paladin fencing. On the north side of the railway, the existing palisade fencing will be retained between the station and the end of the platforms for security purposes and continue as paladin fencing.

4.5.284 An acoustic barrier about 55 m long and 2.4 m high from the track will be provided by old Portbury Station House, Portbury.

4.6 Construction Management

Construction Programme

4.6.1 The current programme anticipates that construction would commence in winter 2022-23 with the DCO Scheme opening in autumn 2024.

Community Engagement

4.6.2 The project management team and their contractors will liaise with local communities to provide information about the works. The form of communication may include letter drops 28 days in advance of works, site notice boards, drop in sessions for local residents, and social media updates.

Temporary Construction Compounds and Haul Roads

4.6.3 The main construction compounds will be set up at Portishead Station, Sheepway, The Portbury Hundred, Lodway, the compound under the M5 Avonmouth Viaduct, Pill Station car park site off Monmouth Road, Ham Green, and Clanage Road.

4.6.4 In rural locations, the top soil at construction sites will be stripped and stockpiled temporarily on site, and a Type 1 aggregate laid down to provide a working surface. On completion of the construction works, the aggregate would be removed and the soil replaced. Alternatively the soil may be treated to provide a load bearing surface by mixing it with a compound such as “Geobind”. On completion of the works, the soil is broken up and sodium bicarbonate added into the soil to return it back to its original site. Haul roads would be surfaced temporarily with Type 1 aggregate or “Lion tracks” aluminium temporary haul roads may be considered in some locations.

4.6.5 Other features of the main construction compounds may include: temporary site fencing, signage at the site entrance, temporary drainage, electricity generator, lighting, temporary noise bunds, water supply, portable / temporary wash room facilities, spill kits, bowers to water down surfaces to reduce dust, wheel washers, and site parking for deliveries and the workforce.

4.6.6 Each of the main construction compounds will be set up to provide facilities needed to construction the DCO Scheme in the area, such as temporary portacabins for offices and welfare facilities, storage for materials, segregated storage for separate waste streams, and internal haul roads and pedestrian routes through the compound.

4.6.7 Several smaller satellite compounds are required to support the works, located at sites off Tansy Lane, the Wessex Water pumping station off the A369 Portbury Hundred, under the M5 Avonmouth Viaduct, Avon Road Bridge, at the proposed Pill Station forecourt, by Pill Viaduct, at Chapel Pill Farm to support works a S-14 Underbridge and at several sites through the Avon Gorge (such as Miles Dock, Quarry Underbridge No. 6, Quarry Underbridge No. 4, Quarry Underbridge No. 2, Valley Underbridge, and the Clanage Road access point on Clifton Bridge) and the public car park off Abbots Leigh Road in Leigh Woods.

4.6.8 As a minimum the satellite compounds will have space for a welfare unit to provide a portable toilet and basic washing, cooking and rest facilities. The satellite compounds outside the Avon Gorge Woodlands SAC may also provide space for small scale deliveries, storage, and vehicle parking.

4.6.9 The estimated areas of the proposed construction compounds are provided in Table 4.4.

Table 4.4: Estimated areas of the proposed construction compounds

Name of construction compound	Area (ha)
Portishead Car Park B	0.919
Portishead Car Park A	0.414
Tansy Lane	0.288
Sheepway	0.396
Portbury Hundred	11.390
Wessex Water	0.048
M5 Avonmouth Viaduct	0.706
Lodway	9.128
Avon Road	0.200
Pill Station Car Park	0.282
Memorial Hall Car Park, Pill	0.107
Station House, Pill	0.042
Pill Viaduct / Underbanks	0.015
Pill Tunnel Eastern Portal	0.671
Chapel Pill	0.033
Quarry U/b No. 2	0.091
Clanage Road	0.646
Winterstoke Road	0.100
Liberty Lane Sidings	0.318
Total Area	**25.794**

4.6.10 Proposals for temporary drainage of construction compounds and haul roads are presented in DCO Document Reference 6.26 Drainage Strategy. Temporary drainage at the Portbury Hundred and Lodway construction compound is likely to be based on a mix of filter drains, linear drains, and detention basins with flow control to limit the discharge rate to the local drainage system. Drainage ditches will be provided along the haul roads with flow controls to limit discharge to local watercourses.

Construction Traffic

4.6.11 Wastes such as ballast, sleepers, rails and materials required for construction will be transported by road and rail. Along the existing operational railway, much of the transport of waste and materials will be done along the railway, due to the lack of vehicular access through the Avon Gorge. This is similar to the works undertaken in the early 2000s to re-open the railway line to the port and subsequently to refresh the ballast and rails in some locations.

4.6.12 It is anticipated that along the disused section of the railway, much of the waste and materials will be moved locally between the construction sites, temporary storage at the construction compounds and movements to and from rail access points by HGVs, but transported over longer distance by rail. Anticipated vehicle movements to remove waste and deliver materials for the disused line are estimated in Table 4.5.

Table 4.5 Construction traffic vehicle movements between Portishead and Portbury Junction

Activity	Vehicle type	Number of vehicle loads	Duration	Approximate number of vehicle movements per day
Excavation – removal of 15,000 m^3 of spoil converted to 22,500 tonnes of waste to be removed by 20 ton loads per muckaway tipper.	Muckaway Tipper	1,200-1,800	2-3 months	40-60
Track formation – placement of 11,500 m^3 of Type 1 formation and 7,000 m^3 of bottom ballast. This equates to approximately 34,500 tonnes of material delivery	Muckaway Tipper	1,500-2,000	3-4 months	30-40

4.6.13 Most vehicle movements would be along the following local routes

- Off road haul routes:
  - The haul route between Portbury Hundred Construction Compound and the outskirts of Pill on the south side of the railway.
  - The haul route between Marsh Lane, the NCN 26 and the M5 construction compound
- Local Road Network
  - The A369 Portbury Hundred between Junction 19 on the M5 and Portishead to the site of the new Portishead Station.
  - Sheepway and Station Road

  - Marsh Lane
  - Agreed haulage routes through Pill to the north and south side of the railway
- Strategic Road Network
  - Junction 19 and the M5

4.6.14 Where possible engineering trains would be used to transport waste and deliver new materials for the disused section of the line.

4.6.15 Measures to manage construction traffic are set out in the Master Construction Traffic Management Plan ("Master CTMP") which is published within the Transport Assessment in Appendix 16.1 to the ES (DCO Document Reference 8.13). A final construction traffic management plan will be prepared by the contractor prior to works commencing. The construction traffic management plan would ensure minimal disturbance as a result of construction activities for the local road network and on access to services.

Procurement of the Main Contracts

4.6.16 The GRIP 3 outline design for the DCO Scheme has been completed (see section 4.9 for explanation of the GRIP process) and the project is in GRIP 4 single option development. Contracts for the detailed design (GRIP 5) and construction of the works (GRIP 6 – 8) will be awarded to a number of construction companies depending on the nature of the work.

4.6.17 The main highways works in Portishead will be procured separately by NSDC.

4.6.18 It is likely that NSDC and / or Network Rail will also appoint a Supervising Engineer to ensure that the works are built according to the design.

Hours of Working

4.6.19 For the construction works along the operational railway line between Portbury Junction and Ashton Junction, it will be necessary to arrange "possessions" to block freight train movements between Royal Portbury Dock and the Bristol to Exeter main line. The programme for the possessions has not been finalised at this stage, but will include: 24 hr to 100 hr possessions during the week or over weekends, and longer possessions for four to six weeks to complete specific works. As result, there will be night-time working and 24-hour working in shifts during week days and at weekends. These working hours are likely to affect, but are not limited to, residents in Ashton, Bower Ashton, Ham Green and Pill.

4.6.20 Possessions will not be needed along the disused section of the railway, so construction works will mostly be undertaken during the daytime. There may be a need for occasional night-time or Sunday working. These works could potentially disturb residents in the eastern part of Portishead, a number of farmhouses and cottages in Sheepway and Portbury, and the outskirts of Pill.

4.6.21 With the exception of works on the operational railway, the proposed working hours during the construction phase will adhere to normal daytime working hours (typically 6.30am to 6.00pm Monday to Saturday), with no working on Sundays, Bank or public holidays except as reasonably

necessary and notified to the relevant planning authority and affected residents by an agreed notification procedure.

4.6.22 Working hours at construction compounds will depend on their use and the programme of construction activities. Some construction compounds may be operational for 24 hrs a day, while others are only used during specific construction operations. Some compounds may be used outside normal working hours for loading and unloading materials from road vehicles and or engineering trains.

4.6.23 Transportation of abnormal loads that are delivered by road and require traffic management or a police escort (e.g. delivery of prefabricated bridge beams or heavy plant) may be delivered outside normal daytime working hours.

4.7 Environmental Mitigation Strategy

Measures adopted as part of the DCO Scheme

4.7.1 The description of the development for which the DCO is sought has been developed through iterative project design. The nature of the DCO Scheme is such that its design has been driven by the location of existing and historic railway infrastructure and technical considerations, including standard Network Rail construction and operation management practice. Such design iterations are independent of the EIA process. Other design iterations have also been informed by environmental considerations. Some of these are standard measures and would have been made irrespective of whether the DCO Scheme was subject to EIA. Others have been adopted to avoid, reduce or minimise likely significant environment effects.

4.7.2 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 seek to focus the EIA process on the identification and assessment of likely significant effects, rather than lesser effects, in the interests of proportionality. Where likely significant effects are identified, consideration can be given to the appropriateness of monitoring of the effectiveness of mitigation measures. The scoping process for the ES for the DCO Scheme was undertaken prior to the changes made by the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 to the scoping process. As a result, the ES assessment chapters contain much greater detail than future ESs are likely to. To assist the DCO process, the assessment chapters in this ES distinguish between mitigation of likely significant environmental effects, and mitigation of others environmental effects.

4.7.3 To ensure that understanding of the rationale for embedded mitigation of likely significant effects is understood, assessment chapters that identified the need for the mitigation in the first instance present an assessment without the mitigation in place. The proposed mitigation is then described and the residual effects then assessed with the measure in place. To ensure that the effects of such mitigation measures on other environmental receptors are assessed, all other assessment chapters assess the DCO Scheme with the mitigation in place. For example, the noise assessment identified likely significant noise effects at Portishead Station. The mitigation proposed – an acoustic barrier – was developed through consultation with other members of the project team, Network Rail and consultees. It was

incorporated within the description of the DCO Scheme and is assessed as such in other chapters, for example ES Chapter 11 Landscape and Visual Impact Assessment (DCO Document Reference 6.14). This ensures that where embedded mitigation measures themselves can give rise to likely significant effects, these are identified and assessed.

4.7.4 Measures that form part of the DCO Scheme fall within three broad categories:

a) Careful designing of the project to ensure that key receptors are avoided where possible and that measures to mitigate likely significant environmental effects are designed into the DCO Scheme where appropriate. Where modifications have been made through the iterative project design process they form an inherent part of the DCO Scheme and no further steps are required in order to secure their delivery;

b) The use of standard construction or operational management measures that would occur whether or not the DCO Scheme had been subject to EIA. Network Rail has established processes for construction activities, many of which are usually undertaken under permitted development rights, and for operational activities. These measures are identified in the Code of Construction Practice ("CoCP") (ES Appendix 4.1, DCO Document Reference 8.15) and/or the Master Construction Environmental Management Plan ("CEMP") (Appendix 4.2, DCO Document Reference 8.14) and/or the Construction Transport Management Plan (“CTMP”) (Appendix 16.1, DCO Document Reference 8.13). Their delivery will be secured through DCO requirements. These measures have not been identified to mitigate likely significant effects of the DCO Scheme though they will reduce and/or avoid commonly occurring environmental effects. Since their delivery will be secured, it would be disproportionate to require assessments to be undertaken on the assumption that such measures were not in place simply to determine which may relate to likely significant effects;

c) Measures required in order to comply with regulatory and legislative regimes that would occur whether or not the DCO Scheme was subject to EIA. Other regulatory regimes and regulators will determine the measures required and the process to be followed to secure necessary consents or measures. The list of Other Consents and Licences required under Other Legislation is set out in DCO Document Reference 5.3 and include, for example, Assessment chapters identify other regimes, for example the statutory nuisance regime of the Environmental Protection Act 1990. Measures that will be immediately effective in preventing environmental harm, for example providing ecological mitigation fencing during construction in accordance with a protected species mitigation licence, are assessed as part of the DCO Scheme since it would be unlawful to proceed if these measures would not be in place.

4.7.5 The iterative design of the DCO Scheme has continued since consultation on the Preliminary Environmental Information Report (“PEI Report”) prepared for the Stage 2 statutory consultation in the autumn 2017. Assessment chapters in the PEI Report stated that the ES would set out and detail embedded mitigation measures. The measures that form part of the DCO Scheme that are intended to mitigate likely significant adverse

environmental effects from the outset are summarised in Table 4.6. Other measures to mitigate likely significant environmental effects are set out in the individual assessment chapters and summarised in the Schedule of Mitigation (ES Appendix 4.3, DCO Document Reference 6.31).

Table 4.6: Summary of measures forming part of the DCO Scheme

- Avoidance of location of infrastructure within environmental sites with statutory designations where practical and measures to reduce or minimise impacts where required
- Acoustic barrier at Portishead Station and old Portbury Station
- Measures set out in the CoCP and Master CEMP including programming of works to avoid or reduce the potential for disturbance, and compliance with legislation to control or avoid environmental effects
- Measures to comply with legal protections for European protected species and listed in the Consents and Licences required under Other Legislation document (DCO Document Reference 5.3).

Environmental Mitigation Measures

4.7.6 Where likely significant adverse effects have been identified during the process of identifying and assessing environmental effects of the DCO Scheme, mitigation measures have been proposed following the 'mitigation hierarchy'. These mitigation measures are identified and described within each of the topic chapters and included within ES Appendix 4.3 Schedule of Mitigation (DCO Document Reference 6.31). The location of physical mitigation works is shown on DCO Document Reference 2.53 Environmental Master Plan and detailed proposals for landscaping along the disused section of the railway are shown on DCO Document Reference 2.10 Railway Landscape Plans (Disused Line).

Environmental Enhancements

4.7.7 Environmental enhancements have not been identified or assessed within the ES to avoid concealment of likely significant environmental effects.

Securing Mitigation

4.7.8 Mitigation for the project will be secured in a number of ways:

- By limitations upon the development expressed in the text of the DCO or shown on drawings referred to in its text.
- In the DCO requirements (similar to planning conditions) which are attached to the DCO.
- Under conditions attached to other environmental permissions and consents required for the project are briefly discussed in Section 4.4.

4.7.9 The Schedule of Mitigation in the ES Appendix 4.3 (DCO Document Reference 6.31) summarises the mitigation for the DCO Scheme and the means of securing the mitigation.

Environmental Management During Construction

4.7.10 Employers' Requirements for environmental management during construction are set out in the CoCP and the Master CEMP for the works (See ES Appendices 4.1 and 4.2, DCO Document References 8.15 and 8.14 respectively) and will be included in the tender documents. The CoCP presents overarching principles for environmental management during construction while the Master CEMP sets out: environmental management requirements, general site operations, and specific mitigation measures to be implemented by the contractor on a topic by topic basis covering air quality and carbon; cultural heritage; ecology and biodiversity; ground conditions; landscape and visual impact mitigation; materials and waste management; noise and vibration; soils, agriculture, land use and assets; transport, access, and non-motorised users; and water resources, drainage and flood risk.

4.7.11 The successful contractors will prepare and implement their own CEMPs which will document how they propose to comply with the CoCP and Master CEMP. Implementation of the contractors' CEMPs will be supervised by the Employers' site engineers.

Environmental Consents

4.7.12 In addition to the DCO, it may also be necessary to obtain certain environmental consents in advance of the works (see DCO Document Reference 5.3 Consents and Licences required under Other Legislation), including.

- Ecological licences to handle protected species (bats and great crested newts) and close badger setts from Natural England.
- Section 28 consents for the works in the Avon Gorge SSSI from Natural England and a Habitat Regulations Assessment for works in the Avon Gorge Woodlands SAC. The boundaries of the SSSI and the SAC are co-incident.
- Environmental permits for activities in or near watercourses under the Environmental Permitting Regulations 2016 from the Environment Agency, such as replacement of culverts, track works close to a Main River, and within a floodplain.
- Land drainage consents from the lead local flood authority either NSLIDB, NSDC or BCC.
- Water abstraction and discharge licences from the Environment Agency and utility companies.
- Waste handling, storage and disposal consents from the Environment Agency.
- Section 61 consents for noise nuisance.

4.7.13 A list of consents which may be required outside of the DCO is provided in DCO Document Reference 5.3.

4.8 Operational Phase

Proposed Services

4.8.1 A new passenger train service will be provided between Portishead, Pill and Bristol Temple Meads over the likely operational hours of 0600 to 2400, subject to contractual arrangements with the train operator. It is anticipated that the train service will operate hourly between 0600 and 2400, Monday to Saturday. On Sundays an hourly service is envisaged from 0900 to 1900. The working passenger train timetable developed by Network Rail will be progressed through the timetable validation process, which commences approximately 18th months before the start of service.

4.8.2 The hourly service for the Portishead Branch Line entails; passenger trains operational hourly all day between Portishead and Bristol Temple Meads, calling at Pill, Parson Street, and Bedminster. This provides up to 18 passenger trains in each direction per day (Monday to Saturday), with approximately 10 passenger trains in each direction on Sundays. The alternative hourly service plus for the Portishead Branch Line entails; 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. This 'hourly service plus' option provides up to 20 passenger trains in each direction per day (Monday to Saturday), with approximately 10 passenger trains in each direction on Sundays.

4.8.3 The working passenger train timetable developed by Network Rail takes 23 minutes between Portishead and Bristol Temple Meads. The dwell times are 3 minutes in Portishead and 30 seconds in Pill. The working train timetable is provided in Appendix 4.6.

4.8.4 The public announcement system will provide information about train arrivals / departures at Portishead and Pill Station. For the purposes of the noise assessment, four announcements per train, each lasting 35 seconds has been assumed.

4.8.5 Portishead and Pill Stations and car parks will be lit during dusk and at night. It is policy that platform and car park lighting will be at the minimum safe level in its 'rest' state. When movement is detected it will become brighter, dimming again after a period of inactivity. It would not turn off completely during the hours of darkness.

4.8.6 The service will be operated with either class 165/6 trains or class 150/3 trains initially in three-car formations (that is, with three carriages). The platforms at the new stations and the platforms at the existing stations between Portishead and Bristol Temple Meads will be long enough for five-car trains in the future.

4.8.7 Freight trains will continue to operate although their operation will be subordinate to the passenger service timetable. Trains to Royal Portbury Dock will continue to have their existing number of train paths. Where necessary freight trains will be required to wait on the Portbury Dock spur line for clearance prior to despatch in the 'Up' direction (to Bristol) or at the Bedminster Down Relief Line in the 'Down' to Portbury Dock. Freight trains will be limited to a maximum of 30 mph throughout the entire branch line, as is the current line speed.

Routine Maintenance Activities

4.8.8 All Network Rail assets are subject to routine maintenance inspections and examinations. The existing maintenance regime will be increased due to the introduction of passenger services between Parson Street Junction and Portishead.

4.8.9 Vegetation along the railway is generally inspected annually by “cab ride”, every three years on foot, and in response to specific queries about hazards. Vegetation surveys are generally undertaken every five years and include the recording of reduced sight lines, hazardous trees and invasive species. Records are kept of incidents involving falling trees and branches.

4.8.10 Vegetation maintenance will be undertaken periodically to ensure adequate sight-lines along the railway and remove unstable trees and branches. The ballast and the cess must be kept clear of woody vegetation, and the ballast clear of 95% of other vegetation. The clearance includes the airspace above the ballast and cess, to avoid any overhanging branches near the railway. Where the line speed is less than 60 mph, a strip 3 m wide over the cess must be kept clear of vegetation on both sides of the rail. For speeds over 60 mph, the clearance distance is 5 m.

4.8.11 Care is taken to avoid windthrow of trees, particularly on the edge of woodland, and to avoid vegetation clearance on earthworks that could lead to instability of the embankment or cutting slope.

4.8.12 Network Rail has currently developed a vegetation management plan as part of a Site Management Statement (“SMS”) in consultation with Natural England for the management of vegetation through the Avon Gorge Woodlands SAC/Avon Woods SSSI to balance the safe operation of the railway with nature conservation objectives. An Avon Gorge Vegetation Management Plan (ES Appendix 9.11, DCO Document Reference 8.12) has been prepared for the construction phase. Following completion, the existing SMS will be updated as required to adopt any outstanding management activities.

4.8.13 The train operating company will be responsible for activities in the stations such as cleaning, the removal of solid waste and litter, and maintaining utility connections. Solid waste will be stored at the stations and be collected periodically by the waste disposal carrier.

Incidents and Accidents

4.8.14 The Major Accidents and Disasters Plan (see ES Appendix 4.5, DCO Document Reference 6.25) sets out the potential for incidents and accidents associated with the construction and operation of the DCO Scheme and proposed actions.

4.8.15 In the event of an incident on the railway, the site of the incident could be accessed along the railway itself or from permanent access points along the railway. A new emergency access will be provided to Pill Tunnel Eastern Portal, the longest tunnel on the scheme.

4.8.16 An Outline Flood Plan for the Operations Phase (see ES Appendix 17.1 FRA Appendix T, DCO Document Reference 5.6) has been prepared which sets out protocols to be followed in the event of a risk of flooding during the

operation phase. This is based on Network Rail's procedures on operations in the event of extreme weather.

Tunnel Safety

4.8.17 The probability of a fire on the train or fire in the tunnel forcing a train to come to a halt is considered to be extremely low, for the following reasons.

- The signalling system will only allow one train into Pill Tunnel at a time. The signal shall be given at either side outside of the tunnel and once a green signal is indicated, a train shall be given a clear way to pass through the tunnel. No signal shall be provided in the tunnel to stop a train.
- All proposed rolling stock has been designed to achieve continual operation for a minimum of 5 minutes after the outbreak of any fire. As the tunnel is only 609 m long, any train on which a fire is detected would have sufficient time to pass through the tunnel at reduced power supply / free wheeled or come to a complete stop before entering the tunnel. All passenger rolling stock proposed are provided with automatic fire detection systems whereby the driver will be able to pick up a detection signal from the cab and respond accordingly.
- All the passenger rolling stock proposed for the DCO Scheme are diesel multiple units ("DMU") where a serious fire affecting a single carriage and a single engine should not affect the other engines from other sections of the train.

4.8.18 Pill Tunnel is the longest tunnel along the DCO Scheme at some 609 m. A fire strategy has been developed to address the requirements of the Regulatory Reform (Fire Safety) Order 2005 using the Common Safety Method set out by the ORR.

4.8.19 The key elements of the fire strategy for Pill Tunnel are summarised in Table 4.7 below.

Table 4.7: Summary of the key features of the fire strategy for Pill Tunnel

Item	Provision
Evacuation strategy	A compacted ballast walkway shall be provided along the length of the tunnel complete with emergency lighting, to allow passengers to evacuate the tunnel at either end.
Exit provision	The exits will be via the two tunnel portals.
Access and facilities for the fire service	Fire service access shall be provided in the Network Rail maintenance compound near the east portal (Bristol side).
Detection and alarm	No automatic detection and alarm systems will be provided for the tunnel.
Emergency lighting	Emergency lighting shall be provided throughout the tunnel in accordance with the relevant standard.
Signage	Signage to be provided in accordance with the relevant standard.

Table 4.7: Summary of the key features of the fire strategy for Pill Tunnel

Item	Provision
Communications	GSM-R system shall be provided to enable the driver to communicate from the cab to the Thames Valley Signalling Centre located in Didcot.

4.9 Institutional Arrangements

4.9.1 NSDC and the West of England Combined Authority ("WECA") are acting as joint promoters for the DCO Scheme on behalf of the five West of England Authorities[4]. NSDC's Highways Department has responsibilities for the oversight of the highway designs, the procurement of construction services and supervision of construction of the highways works for this DCO Scheme. The planning department has responsibilities for developing and implementing local policy, adjudicating planning applications submitted to them, and will also act as a consultee for the DCO Scheme as an affected local authority.

4.9.2 Network Rail is responsible for the design of the railway infrastructure, procurement and supervision of the railway works during construction, and on commissioning will take on the responsibility for asset management and maintenance of all railway infrastructure.

4.9.3 The management and control process used by Network Rail for delivering projects that enhance or renew the operational railway is called Governance for Railway Investment Projects ("GRIP"). The GRIP process provides assurance that a project can successfully progress to the next stage. The GRIP process comprises of the following stages:

- GRIP Stage 1 – Output Definition
- GRIP Stage 2 – Feasibility
- GRIP Stage 3 – Option Selection
- GRIP Stage 4 – Single Option Development
- GRIP Stage 5 – Detailed Design
- GRIP Stage 6 – Construction, Test and Commission
- GRIP Stage 7 – Scheme Handback
- GRIP Stage 8 – Project Closeout

4.9.4 The GRIP stages also include environmental appraisal and the identification of environmental management and mitigation measures to address potentially adverse impacts. MetroWest Phase 1 is subject to the GRIP process. The GRIP 3 design for the previous half hourly scheme was completed in early 2017. However, additional design was needed along the operational railway for the hourly/ hourly plus Scheme which was completed in 2018. Some additional work usually undertaken in GRIP 4 and 5 was also brought forward to the GRIP 3 stage. The remaining design works for GRIP

[4] The West of England Combined Authority, North Somerset District Council, Bristol City Council, South Gloucestershire Council, and Bath and North East Somerset Council.

4 was completed in early 2019 and GRIP 5 will be undertaken between winter 2019/20 and winter 2020/21.

4.9.5 During GRIP stage 4 Network Rail undertook a consultation within the rail industry known as Network Change. The purpose of Network Change is for passenger and freight train operators to have sight of proposed changes to the national rail network and to provide comments on whether the proposals will impact their ability to operate their train services. The Network Change Notification (the consultation with the train operators) dated 17th May 2019 is attached in Appendix 4.7. Following the resolution of representations made by train operators Network Rail issued the Network Change Establishment (formal confirmation that the DCO Scheme proposals have been accepted into the national rail network) on 8th July 2019, see Appendix 4.8.

4.9.6 It is envisaged that all the railway infrastructure and associated land currently in the ownership of NSDC will be transferred to Network Rail, except the car parks, highways and associated pedestrian and cycling works, and any land bought for environmental mitigation.

4.9.7 The train service will be run by a train operating company. The train operator is not yet confirmed; however the promoter NSDC is in discussion with the incumbent operator Great Western Railways and the Department for Transport. The Department for Transport is currently making arrangements to extend the current franchise with Great Western Railways up to 2024 (Direct Award 3) and have stated in consultation documents that this will include the proposed MetroWest Phase 1 train services.

4.10 Decommissioning

4.10.1 No specific plans have been formulated for the decommissioning phase of the Portishead Branch Line. It is expected that the services will continue for as long as there is a business case for doing so. Closure of railways is a regulated process, overseen by the Office of Rail and Road. Disposal of railway assets is also regulated by the Office of Rail and Road under the terms of Network Rail's licence.

4.10.2 Railways are not designed to be decommissioned, although in accordance with paragraph 5.85 of the National Policy Statement for National Networks, development plan policies (and Network Rail's Sustainable Development Strategy), consideration will be given to the sustainability of materials used in construction, including their embodied carbon content, where choice is available and some information on this is provided in the ES Chapter 12 Materials and Waste (DCO Document Reference 6.15). For the NSIP, in the event that the train operating company decides to cease services on the Portishead Branch Line, it is likely that the railway assets will remain in place, as occurred after traffic ceased in the 1980s. Previous practice following railway closures suggests that the railway formation will remain available either for re-development over time or finding an alternative transport use such as a guided busway or a cycle path. Such proposals would be subject to their own assessment including consideration of environmental effects. As such proposals are not reasonably foreseeable, the likely impacts cannot be assessed.

4.10.3 For any abandoned part of the railway track bed, vegetation would gradually encroach upon the railway line, with herbaceous plants, shrubs and trees

gradually recolonising the railway corridor. The assets comprising the trackbed would gradually fall into disrepair due to the action of erosion and corrosion from rain, plants and animals. As the railway to be authorised by the DCO is largely laid at surface level between Portishead and Pill it is not anticipated that there would be significant need for ongoing maintenance work for embankments or cuttings. Ongoing maintenance of the cuttings and embankments would still be required along the operational railway from the Port to the main line. Network Rail would probably recover (and ideally re-use) items of values such as wiring, signalling equipment and principal supply points ("PSP") for signalling equipment.

4.10.4 Remaining assets such as fencing would continue to be maintained. The bridges carrying highways over the DCO Scheme and public rights of way would continue to be maintained to standards appropriate for the public use, as a result of the obligations of NSDC as local highway authority.

4.10.5 It is anticipated that the line between Royal Portbury Dock and Parson Street would remain open for services to the Port. The currently operational railway would remain open for freight traffic even if passenger services ceased and any decision regarding the cessation of freight services would be one for the Freight Operating Companies and Bristol Port Company, so decommissioning the operational railway is not considered relevant or foreseeable for assessing the DCO Scheme. Were any decommissioning of all or part of the operational railway to be proposed in the future, a separate project would be developed, which would be accompanied by a specific assessment of the implications for the Avon Gorge Woodlands SAC.

4.10.6 It is not anticipated that the associated development comprising highway works or car parks at Portishead would be altered as a result of the cessation of rail passenger services between Portishead and Bristol. Similarly it is anticipated the car parks at Pill would remain as car parks. If development proposals come forward in the future, the proposals would be assessed for their planning impacts and any environmental effects for the local planning authority to consider. Changes to the UK's use of fuel for transport mean that the nature of emissions from vehicles undertaking any removal of items could only be a matter of speculation.

4.10.7 For the reasons set out above, it is not possible to identify realistic options for decommissioning for assessment and no basis on which to consider that there would be reasonably foreseeable significant environmental impacts resulting from decommissioning.

4.11 References

N/A

4.12 Abbreviations

BCC	Bristol City Council
BPM	Best practicable means
BWNS	Bristol Wildlife Network Site
CCTV	close circuit television
CEMP	Construction Environmental Management Plan
ch	chain
CIS	customer information system
CoCP	Code of Construction Practice
CEMP	Construction Environmental Management Plan
CTMP	Construction Traffic Management Plan
CWR	continuous welded rail
DCO	Development Consent Order
DMU	diesel multiple units
EA	Environment Agency
EPR	Environmental Permitting Regulations
GRIP	Governance for Railway Investment Projects
GRP	Glass reinforced plastic
GSM-R	Global System for Mobile Communications – Railway
HDDG	Highways Development Design Guide
HGV	Heavy goods vehicle
LDA	Land Drainage Act
LLFA	Lead Local Flood Authority
LWR	Long welded rail
mi	mile
MOVA	Microprocessor Optimised Vehicle Actuation
NCN	National Cycle Network
NMU	Non-motorised users (commonly used term for pedestrians, cyclists and equestrians)
NSDC	North Somerset District Council
NSIP	Nationally significant infrastructure project
NSLIDB	North Somerset Levels Internal Drainage Board
NTC	new track construction
ORR	Office of Rail and Road (formerly Office of Rail Regulation)

OSGR	Ordnance Survey grid reference
PA	Public announcement
PD	permitted development
PEI Report	Preliminary Environmental Information Report
POD	Portishead Line
PRoW	Public rights of way
PSP	Principal supply point (for signalling equipment)
RRV	road rail vehicles
S&C	switches and crossings
SAC	Special Area of Conservation
SMS	Site Management Statement
SPT	Signal post telephones
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
SWMP	Site Waste Management Plan
TBC	To be confirmed
UTX	Under track crossings
WECA	West of England Combined Authority