MetroWest

Portishead Branch Line (MetroWest Phase 1)

TR040011

Applicant: North Somerset District Council
5.4 Construction Strategy
The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009, 5(2)(q)

Author: Network Rail
Date: November 2019

Document Purpose

This technical document was produced by Network Rail as part of the Governance for Railway Investment Projects Stage 4 single option development and technical assessment, in accordance with Network Rail document formatting requirements.

The purpose of this document is to give the background to information presented and assessed in the Environmental Statement (submitted as part of the Portishead Branch Line (MetroWest Phase 1) DCO Scheme ("DCO Scheme")) of the likely construction methods of the DCO Scheme. Some of the information presented in this document has been superseded as Network Rail has undertaken further work to inform construction, for example the access points presented on page 82 have changed. Where information presented in the Construction Strategy has been superseded the Environmental Statement presents the latest information as informed by the Network Rail project team. The construction approach for the DCO scheme is described in Chapter 4 of the Environmental Statement (DCO document 6.7).

Infrastructure Projects

Project No:
140569

Title:
MetroWest 1

Construction Strategy

GRIP 4

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Version

Version	Update	Issued by	Date
1	First draft	Victoria Smale	25.04.18
1.1	Minor updates following further reviews.	Victoria Smale	17.05.18
1.2	Update to draft version following further reviews with North Somerset Council (NSC).	Victoria Smale	31.05.18
1.3	Further update to Quarry Underbridge number 2, use of Avonmouth Docks included, Ham Green compound updated as not suitable for RRV access. Removal of all-terrain vehicles as these are not permitted in Infrastructure Projects. Added constraints regarding Lodway siding proposal. Additional information on drainage included.	Victoria Smale	31.07.18
1.4	Updated to submit with the DCO application.	Emma Evans	10.12.18
1.5	Updated following final review with NSC.	Emma Evans	18.03.19

1. Contents

Glossary

126m 27ch – Railway terminology for measuring positions on the network infrastructure, in miles and chains
ACO drain – A brand of drainage
AiP - Approval in Principle
CCTV - Closed Circuit Television
CEMP – Construction Environmental Management Plan
DCO – Development Consent Order
DNO – Distribution Network Operator
E&P - Electrical & Plant
EA – Environment Agency
ES – Environmental Statement
FOC – Freight Operating Company
GI – Ground Investigation
GPSS - Government Pipeline Storage System
GRIP - Governance of Railway Infrastructure Projects
GSM-R – Global System for Mobile Communications-Railway
HGV – Heavy Goods Vehicle
HV - High Voltage (cables)
LEM – Power lifting trolley (French system - Lorrie Elévatéur Motorised)
LOC – Location Cabinet
LWR – Long Welded Rail
MEWP - Mobile Elevating Work Platform
MW1 – MetroWest 1
NR - Network Rail
NSC – North Somerset Council
NTC - New Track Construction train
PA - Public Announcement system
PEM – Portable handling gantry (French system – Portique, Extensible de Manutention)
POD – Portishead Branch Line
PSP – Power Supply Point
QUB - Quarry Underbridge
REB – Relocatable Equipment Building
RRAP – Road Rail Access Point
RRV – Road Rail Vehicle
S&C – Switches and Crossings
SAC – Special Area of Conservation
SPA – Special Protection Area
SPT – Signal Post Telephone
SSSI – Site of Special Scientific Interest

The MW1 Project Team - This is defined as authorised representatives of North Somerset Council and Network Rail responsible for the delivery of the works
TOC – Train Operating Company
TTRO – Temporary Traffic Regulation Order
Type 1 or Type 1 MOT - A granular material used to create a stable sub-base for roads and pathways
UB – Under Bridge, bridge under the railway line
Up & Dn – A way to measure direction on a track, for example Up (towards Bristol) and Down (towards Portishead)
UTX – Under Track Crossing
VB-9 – Type of tower light

2. Introduction

2.1. Background

The MetroWest 1 project proposes to introduce rail passenger services across Bristol with a service pattern operating between Portishead, Bath Spa and Severn Beach, with intermediate stops. Further works are required at Avonmouth and Bathampton.

Works include the construction and reopening of the 5.4km of disused Portishead rail line from Portishead to Portbury Dock Junction; targeted works to upgrade the Portbury freight line from Portbury Dock Junction to Ashton Junction to provide for an approximately hourly passenger train service; the construction of a new station at Portishead including a car park, pedestrian and cycle access, a pedestrian/cycle bridge and associated highways works; the construction/re-opening of Pill Station; the extinguishment of accommodation crossings together with associated development and engineering works.

The original requirement of the scheme was to include provision for a two train per hour service, however this has since been revised to a one train per hour service due to affordability.

'The MW1 Project Team' is defined as authorised representatives of the Council and Network Rail responsible for the delivery of the works.

2.2. Purpose of the report

This report is based on the previous ARUP GRIP 3 constructability strategy (W1097B-ARP-REP-EMF-00002 A01 13.01.2017), the track constructability report (Infrastructure Project- Track Delivery Constructability Study-Metro West Phase 1 Version 0.1 25.10.2016) and standard industry construction practice. The purpose is to provide construction guidance and possible options for construction to help inform the Development Consent Order (DCO) process. A detailed construction strategy for the works will be produced by the appointed Network Rail contractor as the scheme develops into detailed design and construction.

The options are based on the current Governance of Railway Infrastructure Projects (GRIP) stage 3 and approval in principle (AiP) designs. Designs are still in development and are subject to change during the detailed design stage. Further ground investigation and surveys are also required in some areas to inform designs. The construction strategy will be refined as the work progresses and is subject to change as designs develop. All methodologies throughout this document are deemed to be indicative at this stage.

Works outside of the DCO area have been included as an appendix to this document.

2.3. Key assumptions:

- This report covers the rail scope of work and its interfaces. The MW1 Project Team will be responsible and accountable for setting up and reinstatement of the construction compounds. A full schedule of works containing detailed scope, the time scales and the responsible parties shall be produced during the detailed design phase.

- The constructability works are based on the designs available at AiP stage.

- Environmental mitigation measures are necessary in some areas, these are included in the Construction Environmental Management Plan (CEMP) and Environmental Statement (ES) produced by Jacobs (formally known as CH2M) on behalf of NSC. It is assumed that the CEMP will be updated following the DCO process. A land and consents register will be produced to show responsibilities for obtaining each environmental permit that is required. It is assumed that all necessary environmental mitigations will be undertaken by The MW1 Project Team ahead of the construction programme, to commence as per the implementation agreement. Some mitigations such as replanting will be carried out at the end of the construction programme. Environmental mitigations and ecological constraints outlined in this document are to be used as a guide only and are not definitive.

- Due to permits and licences the sequencing of construction activities may be affected by environmental constraints and seasons. Timings throughout this document are indicative and do not reflect any delays that may be caused by such matters.

- It is assumed that old ballast taken from the disused line can be transported by rail to a Network Rail recycling facility. If this is not the case it will need to be transported by road to a local site, such as Avonmouth where it will then be transported by rail. This will be determined as the scheme progresses.

- It is assumed that works on the disused line can be carried out in the daytime Monday to Friday. Weekend and night time working may also be necessary due to programme constraints.

- For the purpose of this report it is assumed that weekday and weekend disruptive possession access will be made available on the POD line when required. It is also assumed that disruptive possession access will be made available for works at Parson Street, Bedminster and Bathampton where required. Possession access requirements will be updated as the scheme progresses through the GRIP stages and into construction and are subject to negotiations with the TOCs and the FOCs.

- Site compounds will be made wholly available with unobstructed access in line with the programme of works. This includes the M5 compound, liaison with the Port Authorities will be necessary for this (to be carried out by The MW1 Project Team). This is necessary to avoid any programme delay.

- It is assumed all road access to compounds and works will be made available for the duration of the scheme and there will be no road works or restrictions. All necessary street works permits and TTROs (Temporary Traffic Regulation Orders) will be in place when

required (to be obtained by The MW1 Project Team).

- It is assumed that the compounds will be constructed and reinstated by The MW1 Project Team.

- Durations and times of work are indicative only, these are based on current designs to give an idea of approximate durations of each activity. Detailed durations will be confirmed by the contractor ahead of construction and will be dependent upon methodology and any other factors such as the environment and construction sequence.

- It is assumed that engineering trains will be available when required.

- Key plant required will be available when needed, in particular Kirow cranes, Road Rail Vehicles (RRVs) and other specialist plant. Plant listed is given as a guide only and additional plant may be required as necessary.

- Land boundaries shall cater for 5 metres of space beyond each culvert. Bridge repairs require 3 metres to 5 metres of temporary construction area for scaffold access. Available land and access has been agreed as part of the DCO submission and is defined in the red line drawings submitted as part of the application.

- The interfaces listed in each section outline the key third party considerations at this indicative stage, this is intended to be a guide only and is not definitive. It is assumed that all interfacing works will be carried out ahead of all construction activities within this document, including but not limited to utility diversions, highways works, and footpath and cycle path diversions.

- Please see appendix 2 for general assumptions made regarding general de-vegetation requirements. It is assumed that all de-vegetation is carried out by The MW1 Project Team ahead of all works. The method of transporting waste vegetation has not been considered in this report and will be addressed as the scheme progresses. It is assumed that the waste vegetation can be transported as required.

- Levels of parking are a guide whereby:
    - Small = 6-15 vehicles
    - Medium = 15-30 vehicles
    - Large = 30+ vehicles

3. Community Engagement

The MW1 Project Team and their contractors will liaise with the local community to provide information about the works. Forms of community engagement often include:

- Letter drops carried out at least 28 days ahead of planned works.
- Site notice boards.
- Drop in sessions for local residents.

- Public bridge openings.
- Project newsletters.
- Social media updates.
- Volunteer days and involvement with local community projects.

Public notice boards will be installed at the entrance to the compound to provide project updates to the local community. These will contain key contacts onsite and helpline numbers.

Photo 1: An example of a community bridge opening.

Photo 2: An example of a community volunteer day.

4. Site Compounds

4.1. Main compounds site set up guidelines

Each main compound will have a designated haul road and pedestrian walking route to separate pedestrians and traffic. Signage will be installed at the entrance onto the main highways to warn traffic of the construction site. Security will be provided at each location and the level required will be assessed on an individual basis.

The top soil will be stripped off and stored locally for reinstatement at the end of the project. The top soil could be used to provide a noise bund in some compounds to help reduce the impact on local residents. A drainage system will be installed where required due to ground conditions. Perforated pipes, French drains or carrier drains will be installed in trenches to take away water. These pipes will connect into drains. No water will be discharged into the watercourse unless consent is in place. Drains should be protected against spillages and silt run off; a 'Terram' lining is usually sufficient however more comprehensive devices can be used such as interceptors or silt busters. This will depend on specific location conditions.

Type 1 aggregate will be placed along the haul road and main construction compounds, this will be placed on a Terram membrane to prevent weeds from coming through. Type 1 could be delivered using road haulage and spread across the site using machines.

An alternative to using type 1 could be to use a sealed surface such as 'Geobind' technology. Instead of stripping the top soil and replacing with type 01, the Geobind product is mixed into the soil transforming the site into a load bearing surface. During reinstatement, the surface is broken up and sodium bicarbonate added into the soil to return the land back to its original state.

'Lion Track' aluminium temporary haul roads could also be considered in some areas instead of using type 1.

Appropriate temporary fencing will be installed around the site to create a secure compound and prevent trespass. Additional security measures can also be used such as use of motion sensors to detect trespass. Temporary acoustic fences could also be considered in sensitive areas where required.

Site portable cabins will be installed to provide temporary welfare and office facilities. Storage containers may also be installed. These will be delivered using road haulage.

Electricity will be provided using a generator. Where feasible electricity will be used from the mains as this is more environmentally friendly. Solar panels and solar powered plant could also be considered for use where suitable.

Noise reducing fencing, acoustic enclosures or blankets for static plant can be used to reduce the impact of noise. Generators can be fully enclosed in a container, which also allows for the fuel tank and fuel pipes to be contained within a secure bunded area.

Lighting will be required on site and directional lighting will be used where possible to reduce impact on residents. VB-9 tower lights could be used, these are more energy efficient and reduce noise levels. Lighting will only be used when and where necessary.

Temporary toilet/shower blocks will be installed with septic tanks, these will need to be emptied on a regular basis using road haulage tanks (however where possible they can be connected to main sewers).

Clean water tanks will be installed but where possible water will be from the mains. Water recycling facilities will also be considered where possible.

Wheel washers can be installed for larger sites to wash off mud and dirt from lorries to reduce impact of dust and mud on the local roads. Harvested rain water could be used for this. A passive dry wash system could also be considered. Road sweepers can also be kept on larger sites for use on local roads.

Dampening down of the site compound and stockpiled material will be carried out in hot weather to reduce impact of dust on local residents. Harvested rain water could be used for this.

Spill kits will be kept available on site to clear up spills of hazardous materials and prevent impact on the environment. Fuel will be stored in secure, bunded tanks to help prevent leaks. Plant nappies will also be used to prevent leakage of fuel into the environment.

It is likely that skips will be installed to separate waste and promote recycling; these will be emptied on a regular basis using road haulage. Where required, a dedicated concrete washout point will be used away from watercourses. This could consist of a lined skip or dug pit.

Parking will be provided on site and staff will be briefed not to park on local roads. Overflow car parking areas may need to be considered during periods of high activity, this will be agreed with the local highway authority in advance.

Examples of contractor good practice are shown below:

Photo 3: Haul route with signage.

Photo 4: Project information boards.

Photo 5: Tower lights.

Photo 6: Wheel washer.

Photo 7: Water Harvesting.

Photo 8: Drain with Terram Lining.

The compounds outlined below have been identified based on indicative designs. For the purposes of this report it is assumed that the set up ahead of all set up and reinstatement activities will be carried out by The MW1 Project Team.

4.2. C-16 Portishead Station Site Compound

Purpose

For construction of Portishead Station, Trinity Bridge and possibly as a laydown area for Trinity Bridge.

Facilities

Main compound to provide parking, material storage, welfare and offices.

Access

The main access to the site will be off the Portbury Hundred, down Wyndham Way and along Quays Avenue. Deliveries will be made throughout the day and will avoid peak hours where possible. The majority of the deliveries will be on standard HGVs, any non-standard deliveries will be made outside of peak hours where possible (this could include night time delivery).

Photo 9: Access to Portishead Station Compound.

Interfaces

The following interfaces are to be considered:

- Works are to commence after the highway works.
- Due to close proximity of houses mitigation measures may need to be in place to reduce impact of construction on local residents.
- Pedestrian, vehicular and emergency access to Haven Lodge care home will need to be maintained.

Timescales

There is likely to be a construction presence here from the outset of the construction due to works at Quays Avenue through to completion of Portishead Station and Trinity Bridge.

Mainly daytime working from 6am to 6pm, although due to programme constraints some night time working may be necessary.

4.3. C-15 Sheepway

Purpose

To facilitate works on the disused line.

Facilities

Additional localised storage and welfare. There will be a small amount of parking, materials storage and toilets.

Access

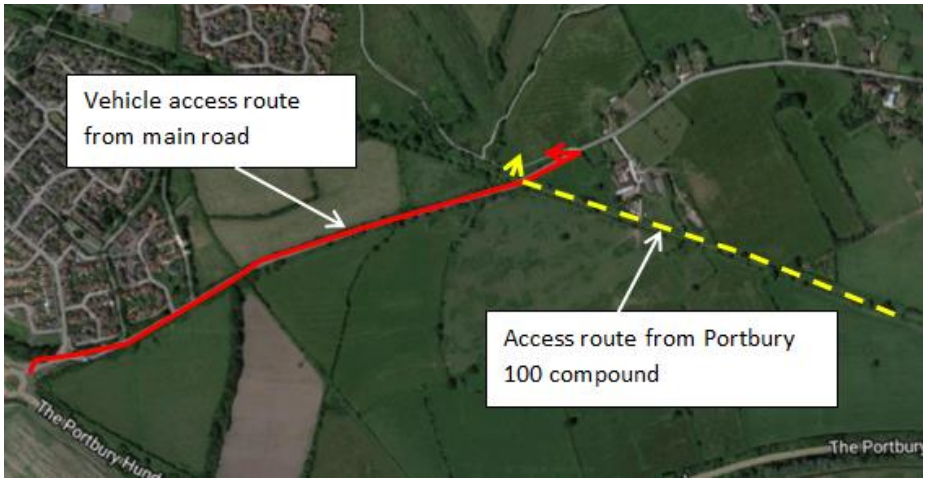

Photo 10: Access to Sheepway Compound.

Access could also be from Portishead via the disused railway line.

Interfaces

The following interfaces are to be considered:

- Interfaces with third parties including National Grid works will need to be considered by The MW1 Project Team.
- This will be a permanent maintenance compound and Road Rail Access Point (RRAP) post construction.
- Part of the site to be returned to farm land post construction, consideration to be given to farmers' movements of animals across the land, to be undertaken by The MW1 Project Team.
- The site is adjacent to the Portbury Wharf Nature Reserve.

Timescales

The works will be for the duration of the works on the disused line
A smaller permanent maintenance compound will be retained after the project.

4.4. C-14 The Portbury Hundred

Purpose

This is likely to be the main compound for disused line works.
Materials may have to be stockpiled in this compound before onward disposal or use by the project.
Storage of plant, including: dumpers, excavators, dozers, lorries.

Facilities

The site will have facilities for a large amount of parking for staff vehicles, materials storage, welfare, and offices. If multiple contractors are required to use the site it may need to be split into smaller compounds with each contractor assigned responsibility for their area. A site plan of the site will be produced before construction.

Temporary works will be required over the ditch that runs through the compound.

Access

Primary access will be off the Portbury Hundred. Due to heavy traffic volumes, vehicles exiting must turn left only onto the Portbury Hundred. Vehicles entering the site must be directed to Sheepway roundabout back up the Portbury Hundred to turn left into the compound to ease congestion. Appropriate signage will be needed to direct construction traffic appropriately. Drivers will need to be instructed on how to access the site.

The haul road may need to be segregated for incoming and outgoing traffic to make access and egress safer. This will also prevent traffic from blocking up into the road when waiting to access or egress the site.

Photo 11: Access to Portbury Hundred Compound.

Deliveries will be made outside of peak hours where possible.

Interfaces

The following interfaces are to be considered:

- Access from the Portbury Hundred will be left in situ after construction for the landowner. NSC will manage interfaces to third parties.
- The MW1 Project Team will install Newt fences nearby, and care must be taken not to disturb these. These will need to be maintained throughout construction.

- The Site will be restored to agricultural use post construction, including agricultural features such as field drains and irrigation.

Timescales

Primarily daytime working from 6am to 6pm (not including time to set up and set down), although certain deliveries may need to be outside of these hours. Periods of 24-hour working may be necessary.

The compound will be used for the duration of the project. The site could also be used as an overflow car park for short periods of high activity elsewhere on the scheme with a minibus transporting staff to other sites.

4.5. C-13 Lodway Farm

Purpose

To support works happening through Pill including track works, station, earthworks and other structural works. This compound will also be used to stockpile materials before onward disposal or use by the scheme.

Facilities

This site will have a high level of parking for staff, materials storage, welfare and offices.
The top soil could be used to create a noise bund to reduce the noise and visual impact of the site compound to local residents.
There is potential for a temporary siding to be created in the compound to allow material deliveries by train (more details given in the disused line track methodology section below).

Access

Access through Pill is limited due to narrow roads. The access route will be confirmed ahead of construction. Access will be for personal vehicles, small vans, minibuses and HGVs.

Photo 12: Access into Lodway compound from 'The Breaches'.

HGV access will be avoided during peak hours where possible to reduce traffic impact on local roads. Traffic management may be necessary; this may include temporary road closures and parking restrictions subject to agreement from NSC.

Access into the compound is likely to be via a temporary haul route. A temporary access ramp may be needed from the haul route, across the railway and into the compound. Pedestrian footpaths and cycle routes will need to be redirected to allow this (to be carried out by The MW1 Project Team).

Photo 13: HGV access from the Port shown below (subject to Port agreement and use of cycle path).

Magnetic fencing could potentially be installed from Lodway Compound through to the end of Pill station to provide a safe walking route for staff working throughout Pill. However this is dependent on access requirements of the contractor.

Photo 14: Example use of magnetic fencing to create a safe walking route for construction staff.

Interfaces

The following interfaces are to be considered:

- Close to waterways - permits may be required.
- Residents in close proximity - mitigation measures may be required.
- Archaeological site outside the compound area to be considered and contractor may need to provide a clearance around their archaeological site. Please see Appendix 3.
- To confirm the presence of field drains and other land attachments in local farm land.
- Presence of reptiles.
- Existence of hedgerow along the railway which qualifies as an important hedgerow.
- Bats nesting in Lodway Farm barns.

Timescales

The compound will be used for the duration of the project.

Daytime working will be undertaken where possible from 6am- 6pm (not including set up and set down) but periods of 24-hour working may be necessary.

4.6. C-11 Monmouth Road

Purpose

To facilitate construction activities through Pill, including Pill station and Pill Viaduct. This will be used to store materials, localised welfare and for the storage of machines.

Facilities

This site will have a small amount of parking and localised welfare. Storage of materials, plant and machines will also be required.

The ground at the site already consists of type 1 gravel, so it is unlikely that additional ground materials are required to be laid on site ahead of construction.

There will be a permanent RRAP access point installed.

Access

Road access to Monmouth Road will be minimised as much as possible due to the narrow roads. It is expected that low loader access to deliver RRVs directly to the Monmouth Road site compound will not be possible. Bulk material deliveries should be delivered by rail where possible on the existing freight line. If direct HGV deliveries are required to the compound then additional traffic management may be necessary through Pill (this may include road closures and parking restrictions in agreement with the local authority). The exact access route through Pill will be confirmed ahead of construction.

Station Road Overbridge at POD 126m 9ch has a 40-tonne limit.

Interfaces

The following interfaces are to be considered:

- This compound will be turned into a permanent maintenance compound with RRAP and also the Pill station car park.

- The site is in close proximity to local residents.
- Presence of reptiles.
- Bats nesting nearby.
- Hedgerows around the compound to be maintained where possible to provide visual screening.

Timescales

The compound will be used for the duration of the works and will predominantly facilitate daytime working, although some night time works may be required.

4.7. C-9 Ham Green Compound

Purpose

To facilitate works through Pill and the Avon Gorge, including: Switch and Crossing (S&C) unit and track works through Pill, works in Pill tunnel and signalling and telecoms works.

Facilities

A small site cabin, parking, materials storage and welfare.

Access

Access is very steep and narrow from Chapel Pill Lane, low loaders may be able to access the top of the lane and this will only be suitable for small scale deliveries.

Interfaces

The following interfaces are to be considered:

- This access will be turned into a permanent access point post construction.
- Mitigation measures may be necessary to ensure run off and sediment does not enter the nearby fishing lake.
- Local residents.
- Adjacent to the Penny Brohn cancer care - mitigation measures may be required.
- Presence of reptiles, otters and dormice.
- Temporary land take to be returned to pasture post construction by the contractor.

Timescales

The compound will be used for the duration of the construction works.

4.8. C-4 Clanage Road

Purpose

To provide a main compound for construction activities through the Avon Gorge, including track works, earthworks, underbridge strengthening, signalling and telecoms. This site could also be used as a main compound for works through to Parson Street Junction and staff parking.

Facilities

This site will have facilities for a medium sized parking area, materials storage, welfare and site offices.

There will be a RRAP installed to allow RRVs access into the Avon Gorge.

The Environment Agency may only allow facilities to be installed which can be moved quickly in the event of a flood warning, the use of cabins on stilts or blocks may be necessary.

Access

Road access will be from the A369. Deliveries should be managed carefully to mitigate against causing traffic congestion on this route.

Photo 15: Access into Clanage Road.

NSC will confirm ahead of construction the vehicles that are permitted to access the site. NSC will also provide any road modifications needed. A low loader turning circle will be provided within the compound.

Separate access will be provided for the landowner to avoid safety issues with members of the public using the site during the construction period.

Interfaces

The following interfaces are to be considered:

- This compound will be turned into a permanent maintenance compound post construction, including a RRAP. Additional flood water storage may be necessary to mitigate against loss of flood storage. This will be the responsibility of NSC and will need to be implemented ahead of construction.
- The site compound is in close proximity to local businesses and a children's nursery.

- The site is located within the Bower Ashton Conservation Area. Planting around the perimeter should be strengthened to minimise visual impact of the site compound, this will be carried out by The MW1 Project Team after construction.
- This site is also in close proximity to Ashton Gate Stadium, Bedminster Cricket Ground and Ashton Court, large scale events at these venues regularly cause heavy traffic congestion in the area. Events in the area should be considered when planning any major deliveries.
- This site is also within a flood zone 3 (high risk), flood mitigation measures are to be considered. Activities will need to be agreed with Environment Agency ahead of construction. The site is currently prone to waterlogging so additional drainage may be required. Required mitigations to be confirmed by The MW1 Project Team and the Environment Agency ahead of construction.

Timescales

The compound will be used for the duration of the construction works.

5. Satellite Compounds

There are a number of satellite compounds required to support works, below are the indicative compound suggestions.

See standard NR/PRC/MTC/SE0121 for details on requirements for transient welfare to be provided.

A small welfare unit will be provided at each of the micro compounds where necessary to provide suitable facilities. It is recommended that toilet facilities are provided within 10 minutes (1 kilometre if walking) of all worksites.

The following table should be used as a guide:

Total man hours on site	0 - 12	12 - 36	36 - 72	> 72
Toilets	Nearby or Provide	Nearby or Provide	Nearby or Provide	Provide
Hand/Arm Washing	H/wipes or on board washing facilitiey	Nearby or Provide	Nearby or Provide	Provide
Rest Facilities	On Vehicle	On Vehicle	On Vehicle	Provide
Drinking Water	On Vehicle	On Vehicle	On Vehicle	Provide
Heating for Food	On Vehicle	On Vehicle	On Vehicle	Provide
Drying Facilities	On Vehicle	On Vehicle	On Vehicle	Provide

Photo 16: Mini 2 person welfare unit for use in the Avon Gorge.
Bigger units may be required at Avon Road,
Pill Viaduct and Pill Station Top.

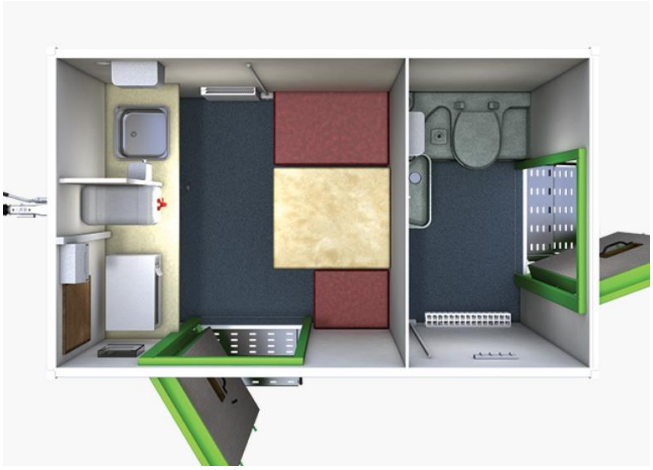

Photo 17: Internal layout of mobile welfare unit.

5.1. C-12 Avon Road

Purpose

Construction of Avon Road underbridge and associated earthworks.

Facilities

Small welfare unit, small scale deliveries, storage, lay down area and crane pad.

Access

Access is narrow and restricted. Cycle path will need to be closed. Garages need to be demolished.

Photo 18: Access through Pill.

Interfaces

The following interfaces are to be considered:

- Utilities which run under Avon Road Bridge.
- Close proximity to local residents.

Timescales

For the duration of the works to Avon Underbridge and the earthworks.

5.2. C-10 Pill Station Top

Purpose

For construction of the ramp at Pill Station and demolition of old Pill Station.

Facilities

Small welfare unit, small scale deliveries, storage and lay down area.

Access

Access through Pill.

Interfaces

The following interfaces are to be considered:

- Old Pill Station to be demolished as part of highway works. Compound to be turned into a car park post construction.
- Close proximity to local residents.
- Bats in the area (The MW1 Project Team to carry out necessary mitigations to protect the bats).

Timescales

Old Pill Station demolition is to be completed before construction works. The compound is required for the duration of the works to Pill Station.

5.3. C-9A Pill Viaduct

Purpose

Repairs to Pill Viaduct, Mount Pleasant embankment works.

Facilities

Small welfare unit, small scale deliveries and storage. Pill library car park to be used for parking.

Access

Access through Pill.

Interfaces

The following interfaces are to be considered:

- Local residents in close proximity, access to Watchhouse Road to be maintained where possible.
- Presence of bats.
- Access to village green should be maintained where possible.

Photo 19: Pill library car park.

Timescales

The compound is required for the duration of the works to Pill Viaduct.

5.4. M5 Compound

Purpose

To be used for RRV access.

Facilities

RRAP and small storage area. Space for welfare van or small welfare unit under the M5.

Access

Access will be via Royal Portbury Dock Road and Marsh Lane.

Photo 20: Road access off Marsh Lane and along bridleway.

NSC to confirm agreement with the Port Authorities to use this access point ahead of construction.

Interfaces

The following interfaces are to be considered:

- Interface with Portbury Dock.
- Potential for presence of reptiles.

Timescales

The compound is required for the duration of the construction works.

Photo 21: M5 access point as used by works delivery track renewals Summer 2017.

Photo 22: M5 access point as used by works delivery track renewals Summer 2017.

Photo 23: M5 access point as used by works delivery track renewals Summer 2017.

5.5. C-8 Chapel Pill Farm 124m 44ch

Purpose

This will be used to support the S-14 Underbridge strengthening works, installation of new pedestrian maintenance access point and to facilitate fencing works.

Facilities

Small welfare unit, small scale deliveries and storage.

Access

Photo 24: From Chapel Pill Lane, through Chapel Pill Farm. The use of this route is to be confirmed.

Interfaces

The following interfaces are to be considered:

- Site to be returned to agricultural use after the works.

Timescales

The compound is required for the duration of the S-14 Underbridge works.

5.6. C-7 Miles Dock 124m 04ch

Indicative micro compounds through the Avon Gorge are described in this section (6.6. C-7 Miles Dock) through to section 6.10 C-5 Valley UB; further assessment is required to determine suitability of each site. This will be confirmed by the contractor ahead of construction.

Purpose

C-7 Miles Dock compound will be used to support strengthening works to Miles Dock Underbridge and Quarry Underbridge (QUB) number 6, retaining wall/structure works, the installation of pedestrian access and fencing.

Facilities

Materials and equipment storage and a small welfare unit.

Access

Pedestrian access is from the cycle path and the only other access available is from the railway.

Interfaces

The following interfaces are to be considered:

- Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC). SSSI and SAC permits to be sought by The MW1 Project Team.
- Otters nearby.
- Welfare could also be provided at Chapel Pill farm (approximately 800m away) or QUB no. 6 (approximately 600m away).

Photo 25: welfare unit to be set back from cycle path where possible. Further assessment is required ahead of construction.

Timescales

The compound is required for the duration of works to Miles Dock and associated works through the Avon Gorge.

5.7. Quarry Underbridge Number 6 123m 64ch

Purpose

The compound is required to support Quarry Underbridge (QUB) no. 06 strengthening works.

Facilities

Materials and equipment storage and small welfare unit.

Access

Pedestrian access is from the cycle path and the only other access available is from the railway.

Interfaces

The following interfaces are to be considered:

- SSSI and SAC, permits to be sought by The MW1 Project Team.
- Otters nearby.

- Rare plants, whitebeams, other protected fauna.
- Bats.

Photo 26: Potential space for welfare and storage to be set back from cycle path. Further assessment is required ahead of construction.

Timescales

The compound is required for the duration of works to QUB no. 06 and associated works through the Avon Gorge.

5.8. C-6 Quarry Underbridge Number 4 123m 23ch

Purpose

The compound is required to support QUB no.4 and QUB no. 5 strengthening works, works to access points (near QUB no. 5), minor earthworks to retaining structures and fencing installation.

Facilities

Materials and equipment storage and small welfare unit.

Access

Pedestrian access is from the cycle path and the only other access available is from the railway.

Interfaces

- SSSI and SAC, permits to be sought by The MW1 Project Team.
- Otters nearby.
- Rare plants, whitebeams, other protected fauna.
- Bats.

Photo 27: Vegetation to be cleared to create space for micro compound away from cycle path.

Timescales

The compound is required for the duration of works to QUB no.4 and QUB no. 5 and associated works through the Avon Gorge.

5.9. C-5A Quarry Underbridge Number 2 122m 40ch

Purpose

The compound is required to support strengthening works to QUB no.2, minor earthworks of retaining structures and the installation of telecoms equipment and fencing.

Facilities

Materials and equipment storage and small welfare unit.

Access

Pedestrian access is from the cycle path and the only other access available is from the railway.

Interfaces

The following interfaces are to be considered:

- National Trust own the land.
- SSSI and SAC, permits to be sought by The MW1 Project Team.
- Otters nearby.
- Rare plants, whitebeams, other protected fauna.
- Potential for ravens nearby (a licence may be required).
- Potential for reptiles in the area.

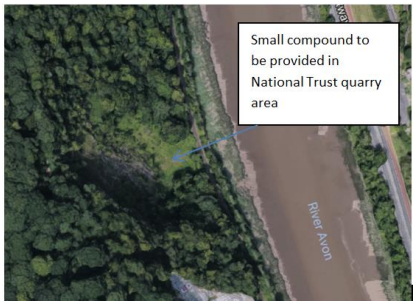

Photo 28: Compound in quarry area.

Photo 29: Potential area in the quarry to be used for storage etc.

Timescales

The compound is required for the duration of works to QUB no.2 and associated works through the Avon Gorge.

5.10. C-5 Valley UB 122m 34ch

Purpose

The compound is required to support strengthening works to Valley UB, works to access points, minor earthworks to retaining structures and fencing installation.

Facilities

Materials and equipment storage and small welfare unit.

Access

Pedestrian access is from the cycle path and the only other access available is from the railway.

Interfaces

- Public footpath runs underneath the bridge
- SSSI and SAC, permits to be sought by The MW1 Project Team.
- Otters nearby.
- Rare plants, whitebeams, other protected fauna.

Photo 30: Potential space for site compound to be set back from cycle path where possible.

Timescales

The compound is required for the duration of works to Valley UB and associated works through the Avon Gorge.

5.11. C-4 Clanage Road Access Point

Purpose

C-4 Clanage Road Access Point is also known as the 'Police dog training centre'. This site could be used to park a vehicle to support work at Valley UB and QUB no.2, to facilitate fencing works.

Facilities

Parking for welfare van or construction vehicle.

Access

Access from A369 Rownham Hill (existing Network Rail (NR) access point).

Interfaces

The following interfaces are to be considered:

- Restricted weight on the bridge of 4 tonnes.
- Security could be an issue here due to reports of previous vandalism to parked vehicles.

Photo 31: Existing NR access point.

Timescales

The access is required for the duration of the construction works.

5.12. Wessex Water Access Point

Purpose

Wessex Water access point will provide access to temporary haul roads and then a permanent access point post construction with parking.

Facilities

Parking for welfare van or construction vehicle.

Access

Access from Portbury Hundred.

Interfaces

The following interfaces are to be considered:

- Shared use with Wessex Water.
- Care to be taken at junction with Portbury Hundred.

Timescales

For the duration of the construction period, and then after the project.

6. Disused Line

6.1. Enabling Works

Methodology

This outline methodology is indicative at this stage and may be refined as the scheme progresses.

- Environmental mitigations will be carried out by The MW1 Project Team ahead of works, including newt fencing and newt ponds to be installed where necessary.
- The MW1 Project Team will also remove vegetation a minimum of 3 metres each side of the running rail, as identified in the minor civils drawings and landscape plans, including removal of root balls.
- Install permanent/ temporary fencing, dependent on contractor methodology.
- Diversion/ protection of existing services (such as the along track Openreach cable). There is a possible interface with third party contractors to move services.
- Pedestrian rights of way to be diverted; possible interface with third party contractors.
- Haul routes to be established.

Interfaces

The following interfaces are to be considered:

- Various third-party assets including but not limited to: High voltage (HV) cables that cross the line, Government Pipeline Storage System (GPSS) pipeline that runs adjacent to the line for about 127 metres, 27 Openreach chambers to be relocated, high pressure gas main and a drinking water supply pipe.
- Pedestrian rights of way including cycle paths and bridleways.
- Extra care will need to be taken around the works in the vicinity of old Portbury Station house and Trinity Primary School due to the close proximity of neighbours.
- There is a possibility that newt fences will be required which will be installed and maintained by The MW1 Project Team.

- Protected species include bats, great crested newts, reptiles, nesting birds and water voles. Where necessary licenses will be required.

Photo 32: Disused line, heavy de-vegetation is required.

6.2. Excavation

Methodology

This methodology is indicative and is subject to change following final design.

Old rail to be cut into sections and safely removed with the sleepers via mechanical means.

There is an estimated 15,000 cubic metres of waste ballast and old track to be excavated (based on the Arup GRIP 3 constructability report). The spoil is likely to be contaminated and there is a large amount of soil and vegetation mixed in with the old track formation. The ballast may need to be separated on site before onward travel to the Network Rail recycling centre. All materials are to be handled in accordance with NR standards for ballast handling 'Used Ballast and Excavation Waste' standard NR/L3/ENV/044.

There are a number of potential options for removing the old track formation from site, depending on agreements with the Port Authorities to use their land for storage and the contractors' methodology.

1. One way haul system using Portbury Docks

The track will be saw cut into smaller sections and removed using standard civil construction vehicles. The old track formation will then be excavated and removed using standard excavators and dumper trucks.

Photo 33 sets out a one-way haulage route which runs along the disused line and into the Portbury Docks, the route is not included in the application for development consent and would be the subject of a negotiation with the Port Authorities.

Subject to agreement between NSC and the Port Authorities, the existing coal yard could be used to store material. Engineering trains will travel along the freight line into Portbury Docks, before being loaded and sent to the Network Rail recycling facility. It is currently estimated that a minimum area of 40 metres x 135 metres will be required at the coal yard, however volumes are indicative at this stage. Although rail transportation is preferred, haulage via road to the recycling facility may be

required.

Photo 33: Potential access route into Portbury Docks using a one- way haul road system- to be confirmed subject to agreements with the Port Authorities.

Photo 34: Potential access route into Portbury Docks using an in/out haul road system- to be confirmed subject to agreements with the Port Authorities.

2. Use of Portbury Hundred and Lodway compounds

Option 2a- Store along the cess

The old track formation could be excavated and heaped on the disused line along the cess (next to the location of the new track). The excavated soil could also serve as a noise bund to help protect residents from excess noise. The old rail will be cut into sections and stored at either the Portbury Hundred or Lodway site compounds until ready to be taken away by rail or road haulage.

The spoil could be left in place until the new rail is constructed along the disused line. However, materials may have to be segregated, processed and tested on site for contaminates before transportation. Once constructed an engineering train could travel down the new passenger line, be loaded with the spoil using conventional plant and then take the load away to the NR recycling facility for processing.

This option is based on a number of assumptions including contaminants, volume and available space. It is subject to further assessment to determine feasibility and sufficient width of the disused line.

Further testing for contaminants is required by NSC and environmental bunds may be necessary. Some spoil could also be stored in nearby site compounds if there is insufficient space along the cess.

Available space for stockpiling is constrained by areas of vegetation that are to be maintained.

Option 2b- Stockpile in compounds

If option 2a is not suitable, the spoil could be moved to the Portbury Hundred and Lodway site compounds for removal. This would involve using standard excavators and dumpers to transport the material along the disused line. The Sheepway satellite compound could also be used to facilitate these works and provide welfare facilities.

Depending on contractors' methodology and timescales, the spoil could be kept in these compounds until the new line is complete. The engineering trains could then park alongside these compounds and remove the spoil. Road haulage to additional storage in the local area may be necessary. Further testing for contaminants is required and environmental bunds may be required.

Option 2c- Stockpile at Lodway and remove using existing freight line

An alternative option would be to take all the spoil to the Lodway compound and remove using engineering trains parked on the existing freight line. This may have to be done in stages as space for spoil storage is limited. A conveyor system to transport the old ballast from the site and onto engineering trains could be considered but does depend on a number of assumptions including retained vegetation not impeding the conveyor. This will be confirmed ahead of construction. Furthermore, the engineering trains will be blocking access into the Portbury Docks. This method of working would be taken forward only with the agreement of the Port Authorities.

Photo 35: Option 2C showing the engineering train parked on the existing freight line.

Option 2d- Temporary siding at Lodway

A temporary junction/turnout could potentially be installed linking the existing Portbury Dock line to a new section of track on the disused line or even a temporary siding in the compound itself. This will allow engineering trains to park alongside or within the Lodway compound. This option may involve further works to signalling systems and earthwork to create a flat working area and is also limited by areas of retained vegetation. Further assessment of this option is also required to determine feasibility.

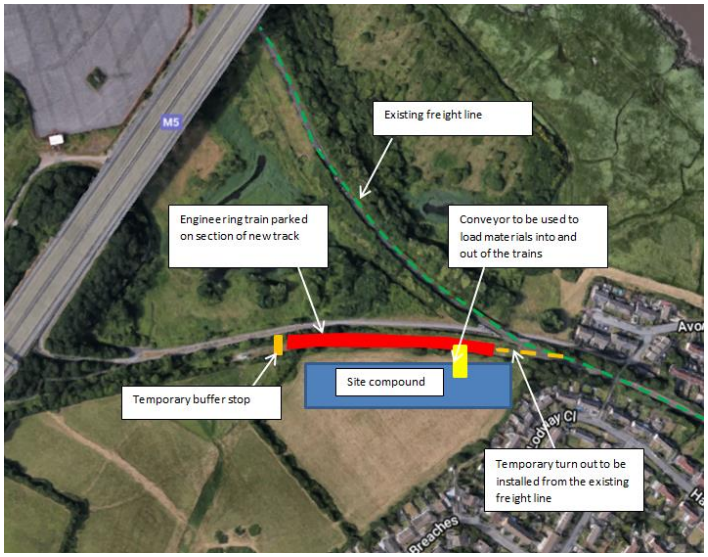

Photo 36: An alternative methodology is to install a temporary turnout from the existing freight line and install a small section of new track. This is subject to further investigation to determine feasibility.

Option 3: One-way haul system using Avonmouth Docks

Methodology will be as per option 1 but Avonmouth Docks will be used instead of Portbury Docks. Muckaway tippers will travel from the site compounds across the M5 Bridge to Avonmouth Docks, where materials will be stockpiled ready for transportation by rail to the NR recycling facility.

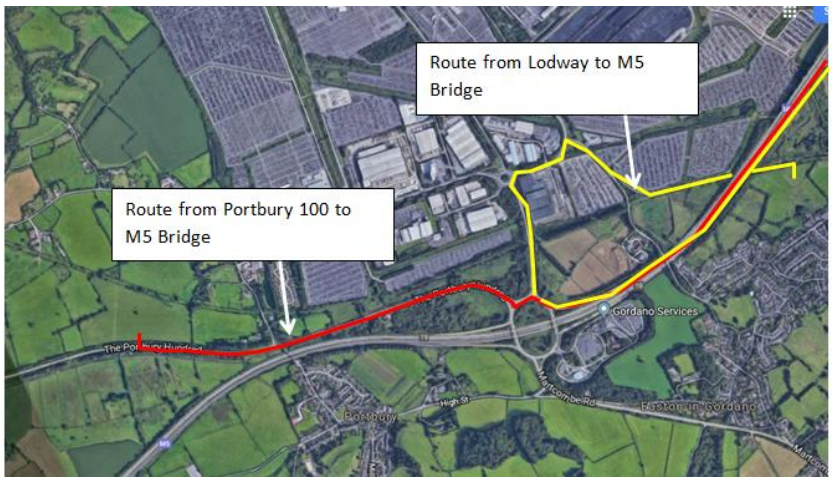

Photo 37: Routes from the site compounds to the M5 bridge.

Photo 38: Route from the M5 bridge to Avonmouth Docks.

Option Summary

The exact methodology will be confirmed ahead of construction. It is anticipated that a combination of options could be used together depending on agreements with the Port Authorities, programme interfaces with the works happening through Pill and other programme and environmental constraints.

Plant

Photo 39: Standard Excavator.

Photo 40: Standard Dumper.

Photo 41: Muckaway Tipper.

Photo 42: Saw cutting old rail.

Photo 43: Transporting materials along a temporary haul road on the Filton Bank.

Photo 44: Conveyor system.

Photo 45: Conveyor can be transported in sections.

Vehicle Movements

Early indications at this stage estimate that approximately 1,200 to 1,800 vehicle loads will be required to remove the spoil from the disused line (based on 15,000 cubic metres of material, this converts into 22,500 tonnes of waste which divides into 20 tonne loads per muckaway tipper).

Based over an estimated 2-3 months to complete the excavation works, this will equate to approximately 40- 60 vehicle movements per day. This is for excavation works only and timings will depend on programme, methodology and a number of other assumptions such as weight limits on bridges and culverts. A full traffic management plan will be completed prior to construction.

Subject to methodology, it is estimated that approximately 20 to 30 engineering trains are required to remove the spoil (depending on length of train permitted).

Interfaces

The following interfaces are to be considered:

- Sheepway Compound is within close proximity to both National Grid power cables and an oil pipeline. The depth of the oil pipeline in the area is to be confirmed and may prompt specific working arrangements.

- The construction of Royal Portbury Dock bridge at Court House Farm also needs to be considered in the context of the proposed methodology.
- There is potential for newt fencing to be required and areas of vegetation to be retained between Sheepway and Station Road.
- Protected species in the area include bats, great crested newts, reptiles, nesting birds and water voles. The MW1 Project Team will address this as part of enabling works.

Timescales

Depending on the methodology and construction sequencing the excavation could take 3-5 months, with primarily day time working.

6.3. Culverts

Culverts

There are approximately 11 existing culverts on the disused line that require replacing as part the works, subject to further assessment. It is currently assumed that these will be replaced on a like for like basis. The design for replacement of the culverts will be confirmed at detailed design phase. Access and inspection arrangements will also be reviewed and confirmed. Care will need to be taken to avoid silting and contamination of existing drains during construction.

Additional water pumping may be required and associated consent which will be subject to an assessment on local protected species including fish and water voles.

Photo 46: Culvert at 128m 42ch.

Access

Additional access will be required around the inlet and outlet points of the culverts. Access agreements may be necessary for maintenance. A construction area of 5 metres around each culvert has been advised.

Access will primarily be from the disused line; however access to clear and connect to existing ditches may be required from neighbouring land; the DCO process shall govern this.

Interfaces

The following interfaces are to be considered:

- High Voltage cables.
- Land access- permanent and temporary.
- Environmental constraints.
- Flood restrictions.
- Works are within a watercourse and additional permits and construction controls/ constraints may be required. These will be obtained by The MW1 Project Team prior to works.
- There could also be seasonal constraints as to when this work could take place due to presence of water voles near the river banks.

Timescales

Approximately 3-6 weeks per culvert, although more complex works may take considerably longer.

These works could either take place after all the excavation works are completed or at the same time if a staged approached is used. This will be determined by the contractor's methodology ahead of construction.

6.4. Track Formation and Bottom Ballast

Methodology

The indicative methodology of track formation includes digging out spoil and installing a type 1 MOT capping layer and bottom ballast then compacting as required.

The materials will be loaded into smaller trucks and transported to site for installation onto the disused line. If a staged approach is taken there is an opportunity to limit vehicle movements by using vehicles dropping off spoil to collect new material and transporting it back to site.

This methodology depends on a number of assumptions such as ground conditions.

1. Portbury Docks

As per the excavation section (6.2), new materials could be brought in via train to Portbury Docks and transported to site using muckaway tippers, this option is subject to agreement from the Port Authorities.

2. Use of site compounds

Option 2a: Store along the cess

As per the excavation section (6.2), old ballast could be stored at the side of the rail in the cess. Once the double tracking through Pill is complete engineering trains will travel along the new Portishead line and install the new ballast and rail in sections, whilst also taking away the old ballast.

Option 2b: Stockpile in compounds

Once the double tracking through Pill is complete, engineering trains will travel along the new Portishead Line and install the new ballast and rail in sections. Once the new line reaches Lodway and the Portbury Hundred compounds the old ballast could be removed using conveyors which load the old material onto the engineering trains for removal.

Amongst other assumptions, one key requirement for options 2a and 2b is that the double tracking through Pill is completed first. This is to enable engineering trains to travel onto the disused line to deliver the new ballast and materials.

Option 2c- Stockpile at Lodway using existing freight line

As per the excavation section (6.2), new ballast could be brought in on engineering trains on the existing freight line. Material could then potentially be removed from the trains and stockpiled in the Lodway compound for use on the disused line.

Option 2d- Temporary siding at Lodway

As per the excavation section (6.2), a temporary siding could be created off the existing freight line onto the disused line or in the compound itself. The new ballast could then be offloaded from the train and stockpiled before being distributed across the disused line.

3. Use of Avonmouth Docks

As per the excavation section (6.2), new materials could be delivered to Avonmouth and stockpiled ready for transportation via muckaway tipper to the disused line.

Option Summary

The exact methodology will be confirmed by the contractor ahead of construction. It is anticipated that a combination of options could be used together depending on agreements with the Port

Photo 47: Installation of track formation/ ballast.

Authorities, programme interfaces with the works happening through Pill and other programme and environmental constraints.

Vehicle Movements

At this early indicative stage it is estimated that approximately 11,500 cubic metres of Type 1 formation material and 7,000 cubic metres of bottom ballast (below sleepers) is required. Using a density of 1.9 tonnes per cubic metre for Type 1 and 1.75 tonnes per cubic metre for ballast this equates to approximately 34,500 tonnes of material. Using 20 tonne muckaway trucks this equates to 1,500 to 2,000 vehicle movements. This results in approximately 30 to 40 vehicle movements per day for material delivery only, over a 3 to 4 month programme. Timings will depend on programme, methodology and a number of other assumptions, such as height limits on bridges and weights over culverts. It is anticipated that top ballast (above sleeper level) will be delivered by rail once the sleepers are laid, but if this is not possible, there may be additional vehicle movements.

Subject to methodology it is estimated that between 20 to 30 engineering trains will be required to deliver the new material to site (depending on length of train permitted).

Interfaces

The following interfaces are to be considered:

- Third party consents.
- Environmental constraints.
- Flood restrictions.
- Other programme constraints.

Timescales

Based on current indicative designs, it is estimated to take approximately 4 to 6 months to complete track formation and bottom ballast, however this is subject to a number of assumptions including weather conditions, methodology and ground conditions.
The work will primarily take place during the day time from 6am to 6pm although 24 hour working may be necessary due to programme constraints.

6.5. Troughing route

New troughing route to be installed along the disused line for lineside cabling. The methodology will be developed as the scheme progresses.

Photo 48: Installation of cable troughing.

6.6. New rail (based on IP track Constructability report)

Methodology

This work will need to be carried out by a specialist rail contractor / sub-contractor.

Unload Long Welded Rail (LWR) lengths from the rail delivery train at the former Portbury Docks Junction (or alternatively Lodway if there is insufficient space). These could be delivered in batches. The new rail could be run out onto the disused line using a McCulloch's rail delivery machine.

Sleepers will also need to be delivered in batches to the Lodway site compound or to the Portbury Hundred compounds using rail or road haulage. Sleepers can also be delivered in batches.

The New Track Construction train (NTC) could potentially be run along the line to install the sleepers and clip in rail. Alternatively, sleepers could be installed using RRVs. Consideration could also be given to use of panel lifters. Panels could be delivered in bulk and stored at Lodway site compound or the port (subject to agreement). However, additional storage space may be required using this method.

Once the new rail has been installed, the top stone will be dropped and the line tamped ready for commissioning.

Exact methodology will be confirmed ahead of construction.

Plant

Photo 49: Falcon train (used for material transportation).

Photo 50: Sleeper delivery train.

Photo 51: McCulloch panel lifter.

Photo 52: McCulloch rail delivery machine.

Photo 53: NTC train.

The NTC train feeds sleepers from wagons using a conveyor belt system. The sleepers are automatically placed with the correct spacing. The rail is then clipped in place.

Interfaces

The following interfaces are to be considered:

- Third party consents.
- Environmental constraints.
- Flood restrictions.
- Other programme constraints.

Timescales

Based on indicative methodology, duration is approximately 2-3 months. This is based on primarily day time working with some 24-hour activities.

6.7. Lineside equipment

Methodology

The indicative methodology for lineside equipment on the disused line includes:

- Foundations installed.
- Equipment erected (may need to be elevated on stages due to flood risk).
- Cable run through troughing route.
- Testing and commissioning.

Telecoms Equipment

The exact equipment requirements are to be confirmed at detailed design, however indicative requirements include:

- Global System for Mobile Communications-Railway (GSM-R) mast Portishead Station.
- Existing GSM-R at Lodway.
- Other new GSM-R masts.

Signalling Equipment

The exact requirements are to be confirmed at detailed design, however indicative requirements include:

- LOC cabinet Portishead Station.
- Buffer Stop at Portishead Station.
- Signals.
- LOC Cabinet
- Mileposts.

Photo 54: Signal installation.

Under Track Crossing (UTX)

Under Track Crossings for cables may be required throughout. There will be a UTX near Trinity Bridge for lineside cables which is likely to be installed at the same time as the culverts.

Timescales

Lineside civils will most likely be installed after the track formation has been completed. Timing will also need to be sequenced with the construction of Portishead Station. This work will be primarily day time working with some 24 hour activities.

6.8. Access Points and Fencing (Disused Line)

Methodology

Access Points

At this stage the following access points are required:

- Marsh Lane new pedestrian access point.
- Maintenance access point at Trinity Bridge.

Further permanent and temporary access points may be required as the construction methodologies develop with final designs.

Fencing

The type of permanent fencing will be developed during detailed design and is likely to include Palisade, post and wire and Paladin.

De-vegetation is required 1 metre either side of the fence line to allow installation of the fencing, however in specific locations ecology requirements may restrict this.

Permanent fencing will be installed along the disused line as per the indicative minor civils drawings. Acoustic fencing is required near Trinity Bridge at specific points.

Depending on the contractor's methodology temporary fencing (such as Herras) 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 the permanent solution from the outset of the work although consideration will need to be given as to whether or not this restricts access.

Access to neighbouring properties may be required to help facilitate installation of the fence; this is outlined as part of the DCO process.

Interfaces

The following interfaces are to be considered:

- Cycle path reinstatement at Marsh Lane, M5, and Portbury Dock overbridge (The MW1 Project Team to reinstate).
- The Portbury Dock is potentially building a bridge to the Court House Farm site in 2020.
- Consideration to be given to newt fencing (The MW1 Project Team to install).
- There are areas of vegetation that need to be retained as far as possible to maintain a bat corridor along the line.

6.9. Drainage (Disused line)

Methodology

The potential methodology could include clearing ditches alongside the track for use as track drainage. This methodology will be finalised following the GRIP 5 design.

Portishead Station and platform drainage outfall is also to be installed, and methodology will be developed later in the programme.

Interfaces

The following interfaces are to be considered:

- Highways and car park drainage, part of NSC works.
- Interface with Environment Agency, Internal Drainage Board and local flood risk authorities.

- Any necessary environmental consents to be obtained by The MW1 Project Team.

6.10. Portishead Station

Methodology

The indicative methodology for works at Portishead Station include the following activities:

- Old track and ballast to be excavated and ground to be dug down to a suitable level. Preparation of groundworks and the installation of a piling mat.
- In consultation with Wessex Water piles could be used. As part of this work the sewer will be surveyed prior to the work taking place and ongoing monitoring may be necessary.
- Strip foundations could be installed for the buffer stop fencing and equipment compound.
- Erection of a steel structure with the use of a crane; followed by bolting and temporary bracing. The steel structure will most likely be brought in by sections; some long load deliveries may be required.
- Pre-cast hollow core concrete floor units with a sand/ cement screed. Potentially install using a crane.
- Water, utility and drainage connections will be installed.
- A transfer beam is likely to be required over the sewer; this could be cast in situ or brought in pre-cast. A crane will be required for this. On site concrete batching may be necessary, however a licence will be required for this. This will be confirmed ahead of construction.
- Install block work and cladding for architectural finish. Install roof panels, platform canopy and glass panels.
- Station entrance and buffer stop fencing.
- Platform surface finishing (ACO drain and tarmac), lighting, public announcement system (PA), customer information screens and closed circuit television (CCTV) to be installed. Platform copers and tactiles to be installed according to the final design.
- Internal fit out will be required based on a final design including: plumbing, lighting, heating, telecoms and other furniture and equipment. Testing and commissioning will be required.
- External equipment fit out of external equipment cabinets and cabling based on final design.

Photo 55: Typical installation of pre-cast hollow core concrete floor units.

Plant

Photo 56: Piling rig.

Photo 57: Crane installation at Reading station.

Site compound

Portishead Station compound will be the main compound.

Access

Deliveries will be made direct to the site compound at Portishead.

Interfaces

The following interfaces are to be considered:

- Interface with NSC Quays Avenue works.
- Utilities connections interface.
- Foul drainage to Wessex Water system.
- Potential interface with NSC footpath construction to Trinity Bridge.
- Interface with NSC Portishead Station car park construction.
- Electrical supply, telecoms supply, potable water and surface storm water drainage.
- Close proximity to local residents and care home.
- Reptiles and great crested newts in the area (The MW1 Project Team will be responsible for mitigations).
- The presence of any invasive species.

Timescales

- Based on indicative methodology the duration is expected to be 12 months or longer (during the day) however sequencing and other factors will contribute to this. It is currently assumed that NSC highways works will be completed before works to the station commence.

6.11. Trinity Bridge

Methodology

The indicative methodology for works at Trinity Bridge could include:

- Close existing crossing and install signage to re-direct the public, to be carried out by The MW1 Project Team.

- De-vegetation works in localised areas as required.
- Excavation for associated piling and foundation works.
- Build-up of embankment on the north side where required. Approximately 1 month should be allowed for soil settlement before further works can commence.
- Construction of a piling mat and concrete crane pad.
- Piled foundations (a piled slab is proposed over an existing culvert) to be confirmed at detailed design.
- The bridge could be pre-fabricated off site and delivered by road or rail in sections. This will be confirmed by the contractor ahead of construction. A large lay down area may be required. An alternative could be to deliver via rail, however this will be constrained by programme
- Any associated drainage works.
- Install lighting and finishing works.

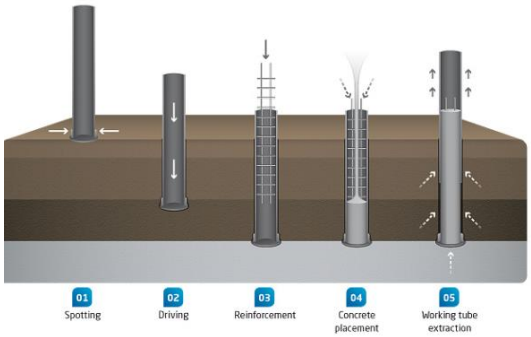

Photo 58: methodology for cast in situ piles.

Photo 59: Delivery of pre-cast bridge sections.

Plant

It is currently anticipated that a crane, piling rig, excavators, dumpers and lorries will be required.

Photo 60: Installation of bridge section using standard crane.

Photo 61: Kirow crane for rail delivery option.

Photo 62: Pile excavations.

Photo 63: Typical installation of piers.

Access

If delivered by road this could possibly come through to the Portishead or Portbury Hundred compound and delivered using the disused line as a haul route, alternatively the bridge could potentially be constructed by rail. This will be confirmed by the contractor ahead of construction and is dependent on programme restrictions.

Portishead Station is the closest compound. The Portbury Hundred compound may also be required as a lay down area for the bridge.

Interfaces

The following interfaces are to be considered:

- Works to surrounding footpaths.
- Close proximity to buried services including a gas main.
- Close proximity to local residents including Trinity Primary School.
- Newt pond in the area.

Timescales

Careful integration of this work with track works to the disused line will be required. Works to the culvert and drainage system will need to be complete before the bridge. This also depends on a number of assumptions such as ground conditions and environmental constraints.

Based on indicative methodology the duration is approximately 6- 12 months, works will primarily be during the day time but there is the potential for 24 hour working.

6.12. Cattle Creep Underbridge

Methodology

Cattle Creep Underbridge to be strengthened based on initial investigations. The methodology will be developed as design is progressed.

Photo 64: Cattle Creep Underbridge.

Access

Lodway is the closest compound using the disused line haul road for access, or using the Marsh Lane access route, although this is indicative at this stage.

Photo 65: Cattle Creep Underbridge location.

Interfaces

The following interfaces are to be considered:

- Interface with utilities providers (The MW1 Project Team will be responsible for this).
- Close proximity to flood risk zone 3 (high risk).
- Potential for newt pond location pre-construction (The MW1 Project Team will be responsible for this).
- The field to the south is a wildlife site.

Timescales

Although the methodology is still unconfirmed at this point, it is expected that works are to be carried out near the beginning of the programme so that the structure is suitable for temporary loads during construction. This will need to be confirmed as methodology develops.

The duration is approximately 4-5 months.

6.13. Disused Line Summary

It is currently anticipated that the physical works on the disused line will take approximately 18 months in total, however the phasing may not be sequential and there may be gaps in between stages. Timing, sequencing and methodology is dependent on a number of assumptions including critical plant resource availability, works happening elsewhere on the line, weather conditions, ecology seasons and access constraints.

7. Pill

7.1. Avon Road Underbridge

Methodology

The indicative methodology for works at Avon Road Underbridge could involve:

- Preparation works, potentially including demolition of garages (if necessary) and wall (to allow for access) and the installation of a crane pad and site compound where necessary. Cycle path diversion and suitable fencing is to be in place.
- Remove lighting column, electrical cabinets and vehicle bollards (via The MW1 Project Team) and relocate as required.
- Installation of retaining walls parallel to track, install drainage and backfill. Preparation of ground and northern base slab for wingwalls either side of the bridge.
- Civil enabling works to prepare the ground.
- Bridge demolition and removal of debris to nearest site compound for onward disposal.
- Excavation of embankment and benching as required.
- Drainage could outfall to a surface water sewer to the north of the structure in the highway, consent to discharge in this location will need to be obtained by The MW1 Project Team.
- Installation of modular precast concrete underbridge, subject to contractors' methodology and assumptions around ground conditions and consents.
- A road crane will need to be utilised and will be situated in the location of the demolished garages. The bridge has been designed in modular sections to allow for crane installation with limited access.
- Reinstatement of track formation and track.
- Installation of fencing and maintenance access point.
- Existing electrical cabinet and lighting column may need be relocated (to be confirmed).

Photo 66: Avon Road Underbridge. installation.

Photo 67: Garages to be demolished to allow crane pad.

Photo 68: Cycle path running adjacent to the railway need to be closed or temporarily diverted during the main construction works.

Photo 69: Access to garage and the back of the properties may need to be restricted during the main construction.

Photo 70: Access route up to the compound, temporary hoarding may be required to protect the house on the corner.

Photo 71: Typical Crane installation.

Plant

Based on indicative designs:

It is currently anticipated that a 140 tonne crane will be required to install the bridge deck. This will be confirmed ahead of construction and is subject to further assessment.

Additionally, it is likely that excavators, RRVs, dumpers and lorries will be required.

Access

Lodway and the micro compound at Avon Road are the closest compounds.

Road deliveries are likely to access through Pill, where access is tight and restricted. Temporary road closures and parking restrictions may be necessary.

Photo 72: Approximate crane route through Pill.

Interfaces

Consideration shall be given to:

- Interface with utilities provided where required.
- Very close proximity to local residents.
- Temporary construction works 30 metres from European and Nationally designated Severn Estuary Ramsar internationally protected wetland area, Special Protection Area (SPA) and SSSI.

Timescales

- Although methodology is still unconfirmed at this point, it is expected that the works are to be one of the first activities in the programme ahead of track works.
- The duration is expected to be approximately 3-6 months to complete in total based on both day and night time working.

7.2. S10 Pill Viaduct 126m 00ch

Methodology

Further surveys will be required to determine exact detail of the works required.
Potential activities include infilling of voids, backing, grouting and crack stitching.
Minor repairs may also be required, including repointing and stitching longitudinal arch cracks
Spandrel wall tie bars and pattress plates are required. Connection of track drainage to a suitable system will also be needed.

This work could be carried out using roped access or scaffolding to create a decked area.

Plant

Potential plant includes Mobile Elevating Work Platforms (MEWPs), scaffolding, drills, coring systems and excavators.

Access

The main compound is likely to be at Lodway or Monmouth Road. A micro compound could also be set up under one of the arches.

Temporary parking restrictions under the arches may be necessary.

Interfaces

The following interfaces are to be considered:

- Pedestrian access route.
- Village green.
- Access to Watchhouse Road.
- Potential need to check for nesting birds/bats prior to removal of vegetation.
- Connection of track drainage to a suitable drainage system.
- Retaining wall to be strengthened with tie bars and pattress plates. Further designs are required to determine the nature and extent of these works.

Timescales

This could take 3 to 6 months, however all timings are indicative at this point.

Photo 73: Pill viaduct.

Photo 74: An example of scaffolding used.

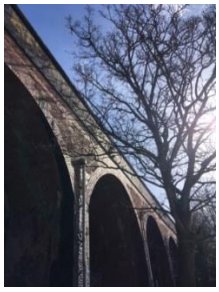

Photo 75: Tree to be cut back to allow access to abutments.

Photo 76: Access and de-vegetation maybe required into fenced area.

Photo 77: Access and De-vegetation required behind fence line.

Photo 78: Access to retaining wall is required.

Photo 79: Pill library car park, access to retaining wall is required.

Photo 80: Extent of access required.

7.3. Earthworks

Avon Road embankment POD 126m 27ch to 34ch (Up & Dn)

Methodology

- De-vegetation clearance.
- Preparation works.
- Cable protection.
- Bench existing embankment.
- install concrete toe wall foundations.
- Backfill with compacted granular fill.
- Hydroseed finish.

Indicative designs (subject to further investigation) include:
South side: Gabion toe wall (max 3 metres high) with a 1:2 regrade of slope over 20 metres length. Lineside neighbours' fencing may need to be removed and replaced to create extra space to construct the toe wall.

North Side: King post retaining wall (max 2.5 metres high) with a 1:2 regrade (40 metres stretch) between Avon Road wingwalls and existing gabion retaining wall.

Plant

Indicative plant could include hand tools, small excavators or RRVs, small piling rigs and vans for materials.

Access

Access in this area is limited and likely to be from the cycle path that runs between Lodway Close and Avon Road. A temporary closure of the cycle path may be necessary during the works or marshals used when plant is accessing the area.

C12 micro compound at base of the earthworks.

Interfaces

The following interfaces are to be considered:

- Buried services run along the toe of the embankment and pass through via Avon Road Underbridge.
- Consideration should be given to close proximity to local residents and access through gardens off Lodway Close.
- Environmental constraints.
- Exposed armoured telecoms cable.

Timescales

Works could potentially be carried out at the same time as Avon Road Underbridge. They could take 2-3 months in duration (weather dependent). Predominantly during the day with some night time working.

Photo 81: Access to Avon Road embankment works.

Hardwick Cutting POD 126m 15ch to 27ch (Dn)

Methodology

De-vegetation clearance, preparation works. Excavation, steepening and soil nailing of a mercia mudstone cutting directly to the north of Pill Station.

Reprofile slope to 80-degree angle, install soil nails and shotcrete.

Works to be carried out from the railway where possible.

Plant

Indicative plant could include hand tools, large excavators, dumpers, drilling rigs, concrete wagons and concrete pumps.

Access

Likely route is to access across track from Monmouth Road access point.

Interfaces

The following interfaces are to be considered:

- Soil nails within third party land - consents will need to be in place as part of DCO.
- Close proximity to local residents. Some access via gardens is required for works.
- Reptiles should be cleared before construction starts.
- Other environmental constraints.
- Exposed armoured telecoms cable.

Timescales

Daytime under possession, although some work could be done outside of possession with use of magnetic fencing (to be confirmed). Works will have to be integrated with works at Pill Station.

Works could take 6-12 months and will be day time where possible.

Photo 82: Hardwick cutting embankment works.

Mount Pleasant embankment POD 125m 74ch to 79ch (Dn)

Methodology

Further ground investigation is required. However, at this point based on indicative design activities include:

- De-vegetation clearance and preparation works.
- Widening of an existing embankment on the approach to Pill Viaduct.
- Installation of the king post retaining wall with intermediate concrete planks.
- Soil nailing of the slope below the proposed wall.
- Mesh facing.

Plant

Indicative plant could include hand tools, excavators, dumpers, drilling rigs, concrete wagons, and concrete pumps.

Access

The nearest main compound is Monmouth Road and the likely route is from the railway with possible use of protective magnetic fencing.

Interfaces

The following interfaces are to be considered:

- It is assumed that no works are required to third party retaining walls as part of the embankment works.
- Close proximity to local residents.
- Access via gardens is likely to be required for fencing installation.
- Exposed armoured telecoms cable.

Timescales

Works could take 6-8 months and will be day time where possible.

Photo 83: Mount Pleasant embankment works.

Photo 84: Example of Soil nailing using long reach equipment on Filton Bank- earth is excavated and profiled, mesh installed then soil nails installed to stabilise the embankment/ cutting.

Photo 85: Example of Installed netting on the soil nails- Filton Bank.

Photo 86: A concrete pump is required during soil nailing.

Photo 87: Plant with rig attached installing soil nails from the toe of the embankment.

7.4. Pill Station

Methodology

The indicative methodology for works at Pill Station could include the following activities:

- The existing track may need to be temporarily slewed or protected to create a suitable working area.
- Stabilisation of the cutting using both permanent and temporary rock bolts with a concrete facing. Temporary rock bolts may be used to stabilise the slope during construction of the reinforced concrete wall and path. The front face (closest to the track) of the path will be retained with a new L shaped reinforced concrete wall. This depends on further GI.
- Back wall drainage to be installed, which is likely to involve a collector drain installed at the base of the retaining wall.
- New staircase installed adjacent to proposed sloping path. Based on indicative design this will be a 1 metre long structure with 1.5 metres high galvanised steel bow top fence and handrails.
- Existing down side platform to be removed and new 126 metres platform installed.
- New drainage for platform.
- Ramp down to gravelled refuge area and lighting bollard installed.
- Modular shelters to be provided in car park as a waiting area.
- Installation of station lighting, PA, CCTV, customer information screens and other ancillary items.

Plant

The following plant may be utilised:

- Hand tools.
- Rigs.
- Concrete pump.
- Excavator.

Access

A small site compound at Monmouth Road could contain offices and welfare and be used as a lay down area.

Pill Station compound at the top of the cutting is restricted but could be used for materials storage and construction of the ramp. Deliveries need to be made outside of peak hours where possible.

Access will be required via road from Pill Station compound and directly from the railway.

There is a 40 tonne load and width restriction on Station Road Overbridge, traffic management may be required through Pill, including parking restrictions and this will be confirmed ahead of construction.

Interfaces

The following interfaces are to be considered:

- Pill Station car park works.
- Demolition of the Old Station house.
- Car park and maintenance compound works at Monmouth Road compound.
- Close proximity to local residents.
- Reptiles on the north and south embankment slopes (The MW1 Project Team will be responsible for necessary environmental mitigations).
- Bat roost in the large arched structure on north platform.
- Exposed armoured telecoms cable.

Photo 88: Pill Station access arrangements.

Timescales

At this stage, it is proposed for this work to be carried out in conjunction with Hardwick Cutting works.

It is anticipated that this work will take approximately 6 to 12 months, however this is based on the indicative design and a number of assumptions.

7.5. Drainage (Pill)

Methodology

The drainage arrangements at Pill are currently in the early design stages, however it is expected that there will be an outfall to highways drainage. Further details will be confirmed at the detailed design stage.

Interfaces

The following interfaces are to be considered:

- Interface with third party station car parks and highway works.

- Interface with the Environment Agency, any necessary consents to be obtained by The MW1 Project Team.
- Utilities and third parties.
- Exposed armoured telecoms cable.

7.6. Track (Pill)

Methodology

The outline methodology at this stage includes:

- Trial holes, delivery of materials, preparation of existing ballast, minor de-vegetation, scrap and spoil removal.
- It is likely that the existing track will be realigned with a tamper. This activity will need to be carried out in agreement with the Port Authorities, this could be done in midweek shifts.
- Replacement of track formation, sleepers and rail where required.
- Removal and installation of new switch and crossing unit (S&C) at the proposed Pill Junction during weekend or longer mid-week possession using PEM and LEMs. A lay down area is required at the side of the track for build-up of the S&C unit prior to installation. A Kirow crane could also be used to install the S&C unit subject to contractor methodology.
- Removal of existing track over Pill Viaduct and associated spoil.
- UTX installation where required.
- Install any required track drainage through Pill.
- Install the new Portbury single line and associated concrete sleepers and rails. Use of concrete sleepers could be fed by rail in mid-week shifts.
- Replace Portbury Docks branch line possibly using the new 'Portbury Single' line utilising the new Portbury Single as a haulage road for materials (spoil, sand and ballast).
- Carry out any required follow up works, including scrap/spoil removal, welding, stressing, tamping and snagging.

Plant

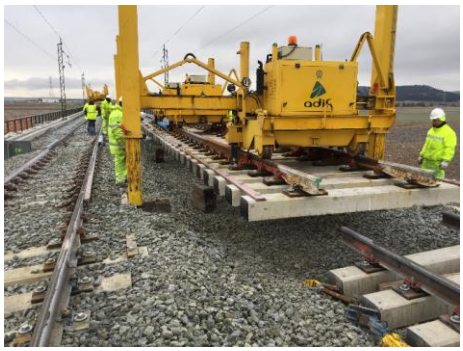

Photo 89: PEM/ LEMs.

Access

RRV access into Pill is limited. RRVs could potentially be delivered to the M5 compound and off tracked at the Monmouth Road compound ready for use during possessions.

Monmouth Road compound or Ham Green could also be used for storage and welfare facilities. This will be confirmed ahead of construction and is dependent on the other construction activities happening.

Interfaces

Consideration to be given to:

- Close proximity of local residents.
- Permits and licenses.
- Proximity of Markham Brook.
- Exposed armoured telecoms cable.

Timescales

The works are likely to take between 3-6 months and should take place after the completion of Avon Road Underbridge, Pill Viaduct and earthworks.

7.7. Lineside equipment and access points (Pill)

Methodology

The indicative lineside equipment and access points include:

- Trough routes for lineside cables
  These will need to be installed in conjunction with track works. Localised access points will be used.

- Signalling equipment near Avon Road Underbridge:
  This is likely to include a Location Cabinet (LOC) and signalling equipment.
  The Pedestrian access point will be the new Avon Road bridge access point. The main compound could be Lodway or Monmouth Road. Signalling works to take place after civils works to Avon Road Underbridge and embankment.

- Equipment near Monmouth Road Compound:
  This is likely to include a UTX, portable Power Supply Point (PSP), generator and REB.
  Monmouth Road site is to be made into a permanent Station car park and maintenance compound with RRAP.
  The PSP and REB will potentially need to be delivered via train due to the narrow roads through Pill.

- Equipment near Pill Station
  This is likely to include a telecoms cabinet, LOC cabinet, Signal Post Telephones (SPTs) and signalling equipment.

Monmouth Road could be used as the main site compound and localised access points from Pill Station (top) and Pill Station north could be used. Equipment to be potentially installed after earthworks and works at Pill Station.

- Equipment near Pill Viaduct
  This is likely to include a DNO supply for the points heating equipment. Cables will be clipped to structures where required.
  Installation to take place after Mount Pleasant embankment works and works to Pill Viaduct and the new access point at Mount Pleasant to be used. Either Ham Green or Monmouth Road could potentially be used as main compounds.

- Equipment near Mount Pleasant Embankment
  This is likely to include signalling, equipment cabinets and SPTs.

  Access points include the Watchhouse cycle path or Mount Pleasant new access point and along the railway corridor. The main compound could be Ham Green.

- Pill Tunnel West Portal
  This is likely to include LOC cabinets and signals.
  Ham Green could be used as the main compound and access will be through Pill Tunnel and along the track, this will be confirmed ahead of construction.

- Pill Tunnel
  This is likely to include emergency lighting with containment to run on hangers.

  Ham Green could be used as main compound and access point.

- Pill Tunnel East Portal
  This is likely to include a GSM-R mast.
  Ham Green compound to be made into a permanent compound with a RRAP and could be used as main compound and access point. Additionally, there will be a new pedestrian access point on the south side of the railway.

Timescales

The duration of these activities will depend on sequencing of other activities and methodologies.

8. Avon Gorge

There are several underbridges that require strengthening works to some extent throughout the Avon Gorge. Access to these sites is restricted as detailed in the Network Rail Hazard Directory. Where there is no vehicle access it is assumed that all activities will be carried out from the railway. These underbridges are discussed in more detail in the sections below.

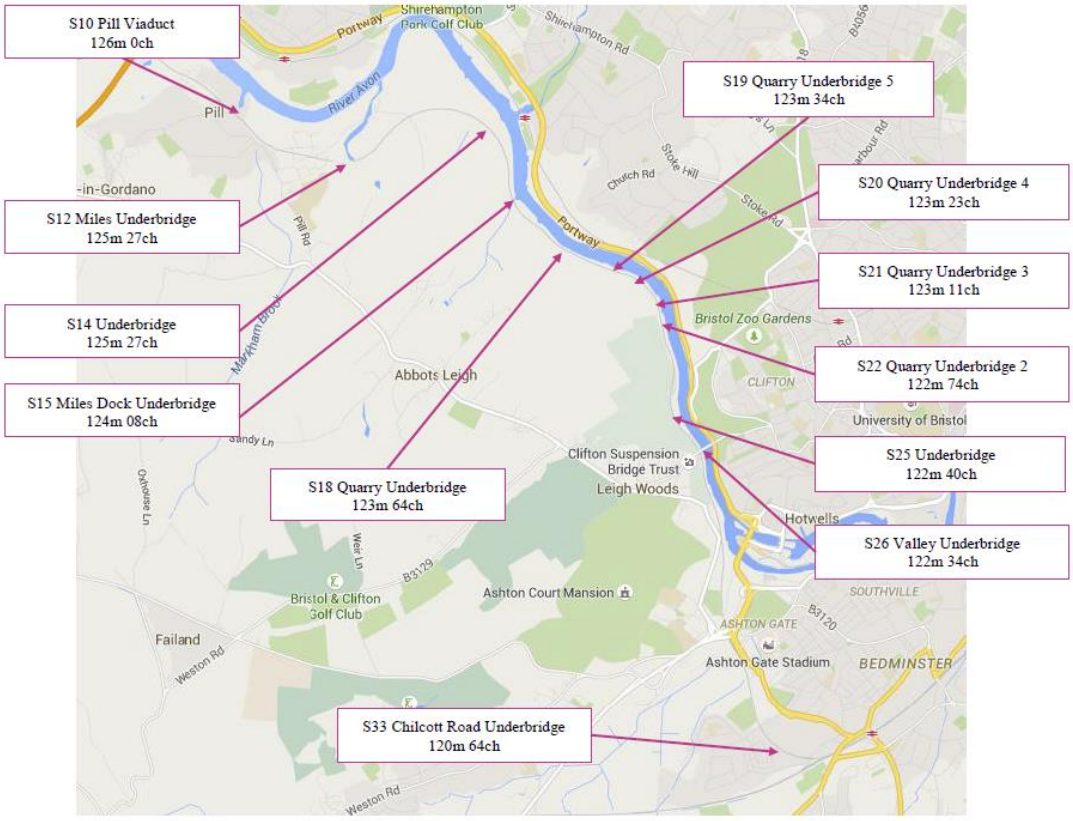

Photo 90: Summary of Underbridges.

8.1. S12 Miles Underbridge 125m 27ch

Methodology

Based on indicative designs, activities could include installing a rod drainage system. Temporary protection to siltation tank to be fitted prior to repair works.

Temporary works and roped access may be required as this is above a watercourse.

Localised vegetation removal works are required.

Plant

Plant is likely to include: hand tools, power drills, an access tower and rope access equipment.

Access

Access is from Ham Green compound, also possible access over Chapel Pill Underbridge and along the rail to the location.

Interfaces

The following interfaces are to be considered:

- Potential for bats, newts and water voles. A further ecology survey is required. Works above watercourse require a permit from EA, to be arranged by The MW1 Project Team.

Timescales

Indicative duration of work is approximately 2-4 months.

Photo 91: Miles Underbridge.

8.2. S14 Underbridge 124m 45ch

Methodology

Based on indicative designs, strengthening works may consist of installing spandrel wall tie bars and pattress plates as necessary. A localised scaffolding tower may be required.

Access point to potentially be installed next to the bridge. De-vegetation works are also required.

Plant

Plant is likely to include: power drills, an access tower and hand tools.

Access

Chapel Pill Lane to be used as micro compound and the main welfare facilities could be provided at Monmouth Road or Lodway.

The strength of Chapel Pill Lane Underbridge is to be assessed for construction traffic, it is likely that only small scale deliveries can be accommodated.

Interfaces

The following interfaces are to be considered:

- Potential presence of whitebeams (to be protected as outlined in the CEMP).

Timescales

Indicative duration of works is approximately 2-4 months.

Photo 92: S14 Underbridge.

8.3. S15 Miles Dock 124m 08ch

Methodology

Based on indicative designs, strengthening works may consist of spandrel wall tie bars and pattress plates. The methodology could include:

- Temporary works/ roped access over watercourse to carry out de-vegetation works as necessary.
- Scaffolding may also be required around the structure.
- Drill core through structure, fill and install pattress plates.

Plant

Plant is likely to include: power drills, an access tower and hand tools.

Access

Only small scale deliveries can be accommodated, there is limited headroom under bridge. Access may be via Chapel Pill Lane.

Micro compound C-7 could be used, the main welfare facilities could be provided at Monmouth Road or Lodway.

Interfaces

The following interfaces are to be considered:

- Cycle path may have to be temporarily closed, reduced in width or diverted.
- General public, cyclists and dog walkers.
- SSSI and SAC.
- Works are above a watercourse so require consent from the Environment Agency.
- Whitebeams.

Timescales

Indicative duration of works is approximately 2-3 months.

Photo 93: An example of bridge strengthening using roped access.

Photo 94: Miles Dock Underbridge.

Photo 95: De-vegetation is required the non cycle path side.

Photo 96: Limited de-vegetation is required on the cycle path side of the bridge.

8.4. S18 QUB no.6 123m 64ch

Methodology

Based on indicative designs, strengthening works may consist of spandrel wall tie bars and pattress plates. The methodology could include:

- Scaffolding around the structure as necessary.
- Drill core through structure, fill and install pattress plates.

Plant

Plant is likely to include: power drills, an access tower and hand tools.

Access

Access is not possible for large vehicles and is likely to be along the cycle path or via the railway.

A micro compound could be located at C-7 Miles Dock and the main welfare facilities could be provided at Clanage Road.

Interfaces

The following interfaces are to be considered:

- SSSI and SAC.
- General public, cyclists and dog walkers.
- Cycle path.

Timescales

The duration of the works is approximately 2-3 months, to be confirmed by the contractor.

Photo 97: Scaffolding to be set from cycle path where possible to avoid closure of the path.

Photo 98: De-vegetation is required on the non-cycle path side.

Photo 99: Cycle path side of the bridge.

8.5. S19 QUB no.5 123m 34ch

Based on indicative designs, strengthening works may include spandrel wall tie bars and pattress plates. The methodology could include:

- Scaffolding around the structure.
- Drill core through structure, fill and install pattress plates.

Plant

Plant is likely to include: power drills, an access tower and hand tools.

Access

Access is not possible for large vehicles and it is likely to be along the cycle path or via the railway.

The micro compound C-6 QUB no.4 can be used with the main welfare facilities at Clanage Road.

Interfaces

The following interfaces are to be considered:

- SSSI and SAC.
- Scaffolding to be set from cycle path where possible to avoid closure of the path where possible.
- General public, cyclists and dog walkers.

Timescales

The duration of the works is approximately 2-3 months, to be confirmed by the contractor.

Photo 100: De-vegetation may be required around the abutments.

Photo 101: Cycle path side of the bridge.

8.6. S20 QUB no.4 123m 23ch

Methodology

Based on indicative designs, strengthening works may consist of spandrel wall tie bars and pattress plates. The methodology could include:

- Scaffolding around the structure as necessary.
- Drill core through structure, fill and install pattress plates.

Plant

Plant is likely to include: power drills, an access tower and hand tools.

Access

Access is difficult for large vehicles and it is likely to be along the cycle path or via the railway.

The micro compound C-6 could be used with the main welfare facilities at Clanage Road.

Interfaces

The following interfaces are to be considered:

- SSSI and SAC.
- Scaffolding to be set back from cycle path to avoid closure where possible.
- General public, cyclists and dog walkers.

Timescales

The duration of the works is approximately 2-3 months, to be confirmed by the contractor.

Photo 102: Heavy de-vegetation is required on the non-cycle path side.

Photo 103: de-vegetation is also required on the cycle path side.

8.7. S21 QUB no.3 123m 11ch

Methodology

Based on indicative designs, strengthening works could include spandrel wall tie bars and pattress plates. The methodology could include:

- Scaffolding may also be required around the structure.
- Drill core through structure, fill and install pattress plates.

Plant

Plant is likely to include: small scale drills, access tower and hand tools.

Access

Access is difficult for large vehicles and it is likely to be along the cycle path or via the railway.

The micro compounds C-5A (QUB no.2) or C-6 (QUB no.4) could be used with the main welfare facilities at Clanage Road.

Interfaces

The following interfaces are to be considered:

- Scaffolding to be set back from cycle path to avoid closure where possible.
- General public, cyclists and dog walkers.
- SSSI and SAC.

Timescales

The duration of the works is approximately 2-3 months, to be confirmed by the contractor.

Photo 104: QUB 3.

8.8. S22 QUB no.2 122m 74ch

Methodology

The structure requires a new deck and although the design is at an early stage, the indicative methodology includes:

- De-vegetation works approximately 5 metres either side of the bridge.
- Construct a temporary access ramp with Type 1 or earth. The existing embankment may need to be graded to allow construction of this.
- During possession, cut out the track and excavate halfway down the abutments (from the rail).
- Demolish the arch using a small excavator located in the site compound.
- Prepare the abutment, install precast cill beam and lift in new structure using small plant located in the compound.
- Install precast headwalls and stitch deck together.
- Backfill and lay rail, using machines located on the rail.

The finalised methodology will be developed once the detailed design is in place will be confirmed by the contractor ahead of construction.

Plant

Plant is likely to include: RRVs, excavators, mini dumpers, access towers and hand tools.

Access

Access is difficult for large vehicles and is likely to be along the cycle path or via the railway. The cycle path may need to be closed during the works. RRV access is required along railway from Clanage Road.

The micro compound C-5A could be used with the main welfare facilities based at Clanage Road.

Interfaces

The following interfaces are to be considered:

- Scaffolding to be set back from cycle path where possible to avoid closure, however the cycle path may need to be closed for the duration of the main possession due to safety reasons and the public interface.
- Advanced warning will be given to the general public, cyclists and dog walkers.
- Potential interface with sewer pipe in the compound.
- Interface with National Trust and Natural England.
- Wildlife, rare plant species, SSSI and SAC. Licenses may be required by The MW1 Project Team.

Timescales

These are to be confirmed once methodology is finalised. However, estimated duration is 3-6 months.

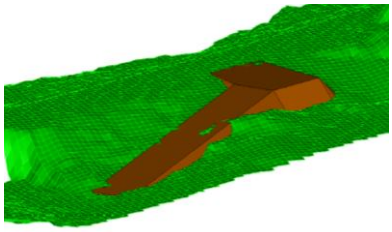

Photo 105: 3D image of potential ramped access into the compound.

Photo 106: QUB no.2.

8.9. S25 Underbridge 122m 40ch

Methodology

Based on indicative designs, strengthening works could include spandrel wall tie bars and pattress plates. The methodology could include:

- Scaffolding may also be required around the structure.
- Drill core through structure, fill and install pattress plates.

Plant

Plant is likely to include: small scale drills, access tower and hand tools.

Access

Access is difficult for large vehicles and it is likely to be along the cycle path or via the railway.

The micro compound C-5 can be used with the main welfare facilities at Clanage Road.

Interfaces

The following interfaces are to be considered:

- Scaffolding to be set back from cycle path to avoid closure where possible.
- General public, cyclists and dog walkers.
- SSSI and SAC.

Timescales

The duration of the works is approximately 2-3 months, to be confirmed by the contractor.

Photo 107: De-vegetation is required on the abutments.

Photo 108: De-vegetation is also required on the cycle path side.

8.10. S26 Valley 122m 34ch

Methodology

This underbridge is likely to require minor repairs and the specific works are to be confirmed at GRIP 5 detailed design.

Plant

Plant is likely to include: small scale drills, access tower and hand tools.

Access

Access is difficult for large vehicles and it is likely to be along the cycle path or via the railway. The pedestrian access point may need to be closed.

The micro compound C-5 can be used with the main welfare facilities at Clanage Road.

Interfaces

The following interfaces are to be considered:

- Scaffolding to be set back from cycle path to avoid closure where possible. The public footpath that runs under the bridge may have to be temporarily closed. A public right of way diversion may be required for this.
- General public, cyclists and dog walkers.
- SSSI and SAC.

Timescales

These are to be confirmed once the methodology has been finalised, however the estimated duration is 2-3 months.

Photo 109: Cycle path side of the bridge.

Photo 110: Non-cycle path side of the bridge.

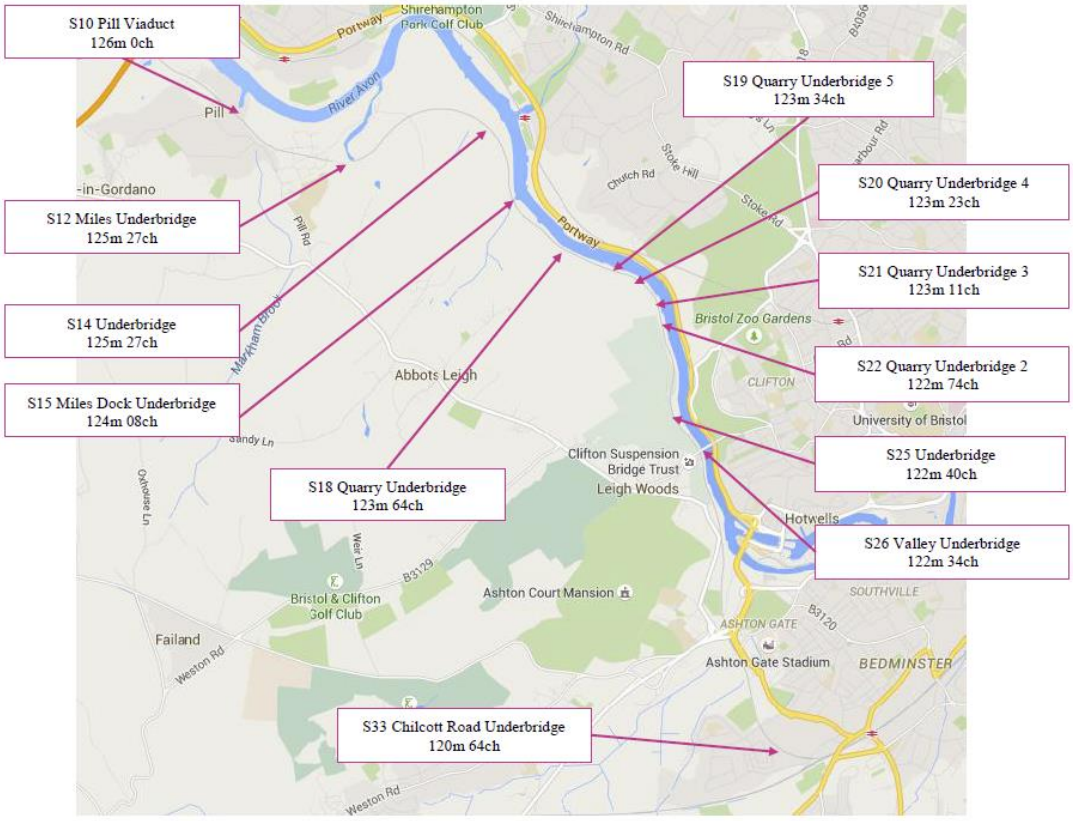

Photo 111: Summary of Underbridges.

Photo 112: Scaffold access tower.

Photo 113: Scissor lift.

A standard scaffold tower could be used to access the underbridges in the Avon Gorge. Based on indicative design it is currently estimated that a working space of approximatley 5 metres x 10 metres

will be required at each underbridge. The cycle path will be kept open where possible, further details will be confirmed ahead of construction.

Encapsulation may be required around the scaffolding to control dust created by the tie bar installation, as shown below.

Photo 114: Typical equipment used for installing tie bars and pattress plates.

If cycle path closures are required, where possible, the contractor shall aim to do work to the underbridges at the same time to reduce the cycle path closure times. Where the cycle path remains open during the work, the management of the cycle path may also be required to ensure the safety of the public, noting that there is likely to be an interface with the general public, cyclists, and dog walkers.

8.11. Earthworks Avon Gorge POD 122m 06ch to 124m 26ch

Methodology

The works required to the Avon Gorge rock faces are still in development. Surveys need to be undertaken to understand the full requirements, these are likely to require vegetation clearance, geological inspections, rockfall and slope assessments. The output from the surveys may result in works such as overhang removal, localised rock bolting, netting and catch fencing. This could be carried out using roped access from above or from the railway.

Plant

The type of plant required may include hand tools, drilling rigs and potentially a working platform.

Access

Access is only along the railway or from above by roped access.

The main compound at Clanage Road could be used.

Interfaces

The following interfaces are to be considered:

- National Trust, Forestry Commission and Natural England.
- SSSI, whitebeams, orchids, wildlife and otters.

Timescales

Works to be daytime working under possession where possible.

Photo 115: Recent rock netting installed in the Avon Gorge to protect the track from rock falls.

8.12. Avon Gorge Tunnels

Areas above portals are to be assessed for vegetation and loose material. Some clearance works may be required. Localised repairs and strengthening may be also required to the tunnel linings. This will be confirmed at the detailed design stage.

Photo 116: Location of tunnels in the Avon Gorge.

Photo 117: View through Clifton No 2 tunnel.

8.13. Track (Avon Gorge)

Methodology

The outline methodology at this stage includes:

- Preparation works such as trial holes, material deliveries, de-vegetation, scrap and spoil removal.
- Ballast track lifts.
- There are sections of re-rail required and this activity could be done using RRVs.
- Occasional sleeper changing may be required and this activity could be done using RRVs.
- All rail and ballast deliveries by road or rail are assumed to be in line with programme.

Plant

RRVs.

Access

It is likely that Clanage Road and Ham Green will be used as the main site compounds for welfare and delivery of plant. RRVs may have to use the M5 RRAP access point when accessing the Portishead end of the Avon Gorge.

Access to be along railway corridor with the use of localised pedestrian access points.

Interfaces

Consideration to be given to:

- Close proximity to local residents.
- Any permits or licenses.
- Proximity of Markham Brook.
- Works are taking place in SSSI and SAC, whitebeams are close to the track in places and need to be protected from damage where possible. A schedule of white beams affected by the works will be included in the Avon Gorge Vegetation Management Plan, produced by The MW1 Project Team.
- Exposed armoured telecoms cable.

Timescales

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

Photo 118: Ballast, sleepers and rail may need to be temporarily stored at the side of the cess during the track works.

8.14. Lineside Equipment, access points and other works - Avon Gorge

Indicative equipment and other associated works:

The indicative lineside equipment and access points include:

- Signalling Equipment Near Ham Green:

This is likely to include a LOC, SPT and signals. Access likely to be from Ham Green compound along rail corridor.

- Equipment near S14 Underbridge:

This is likely to include a LOC, SPT and signals. Access likely to be from Ham Green compound along rail corridor and via the new access point with steps at S14 Underbridge.

- Access Points near Miles Dock:

Access point at Miles Dock UB.
Access point 123m 67ch.

- Access Points near QUB no.6:

Access point Quarry UB no.6.
Access point 123m 79ch.

- Structures near QUB no.5:

Likely to include minor earthworks to retaining structures.

- Equipment near Clifton Tunnel:

GSM-R 122m 51ch (near Clifton Tunnel). Access point along the track from Clanage Road. GSMR-R antenna are to be fixed to tunnel portals in some areas and the details are to be confirmed at GRIP 5.

- Structures near QUB no.3:

Likely to include minor earthworks to retaining structures.
Access point 122m 79ch.

- Structures QUB no.2:

Likely to include minor earthworks to retaining structures.
Access point at QUB no.2.

- Structures near S25 UB:

Minor earthworks to retaining structures.

- Access Point near Valley UB:

Access point 122m 30ch (near Valley Underbridge). Access along track from Clanage Road.

- Equipment near Clanage Road:

This is likely to include a signal, SPT and LOC near Clanage Road. Access from Clanage Road, compound to be made permanent after construction with RRAP.

- Ashton Level crossing access points:

Works at Ashton Level Crossing to be confirmed.

- Fencing and troughing:

Troughing and fencing to be installed along Avon Gorge using localised access points. Fencing will tie into existing features as necessary.

- De-vegetation:

A 1 metre of vegetation clearance may be required either side of the fencing to allow for installation. In general, 1 metre clearance is required around all structures; however de-vegetation will be reduced as much as possible.

Timescales

It is likely that this work will happen in stages before the track modifications are completed.

Photo 119: Signalling equipment on small platform, used to install equipment on embankments.

Photo 120: Localised works to the retaining walls through the Avon Gorge may be required. To be confirmed at detailed design.

9. Appendix 1- Works around Parson Street Junction, Bedminster, and Bathampton

9.1. Compounds:

C-1 Parson Street/ Freightliner yard- (Subject to agreement with Freightliner)

Purpose

Track and signalling works at Parson Street Junction, lay down area and build up of the switch.

Facilities

Site compound, welfare, parking, office.

Access

Access of South Liberty Lane.

Interfaces

The following interfaces are to be considered:

- Freightliner.
- Restricted bridge on South Liberty Lane for road vehicles.

Timescales

For the duration of the works at Parson Street and Bedminster.

Chilcott Road (micro compound)

Purpose

Chilcott Road Underbridge strengthening works.

Facilities

Parking for welfare van and materials vans.

Access

Via Ashton Drive.

Interfaces

The following interfaces are to be considered:

- Local residents and allotments in close proximity.

Timescales

For the duration of the works to Chilcott Road underbridge.

Bathampton Compound

Works and any site compound to be confirmed ahead of construction.

9.2. Track - Parson Street Junction and Bedminster

Methodology

These works are still being finalised and are likely to take place in a staged approach such as:

- The Up relief plain line relay.
- The Up Portishead plain line relay and associated 70 metres re-rail.
- Down Portishead plain line relay and associated 70 metres re-rail.
- 2x S&C turnouts relay and plain line recoveries.
- Freightliner S&C and signalling update.

A large lay down area is required for S&C unit. A large Kirow crane may also be required for this work.

Plant

Kirow crane.
RRVs.
Tamper.
Tilting wagons.

Access

The compound is likely to be at the Freightliner yard.

Access is expected to be via South Liberty Lane.

Timescales

This is currently being reviewed, but it is possible that the stages are likely to need to follow on from each other in sequence. This could either be carried out in one long blockade or a series of longer weekend possessions subject to access.

The S&C switches will arrive on tilting wagons from the NR depot. Sections could be offloaded into the freightliner depot ahead of the main possession and built up in the yard. During the possession, the switches will be installed in place using RRVs/ Kirow crane.

Works in this area affect the mainline and are therefore constrained by available possession access which is more restricted than the rest of the line. TOC and FOC agreement is necessary. Disruptive possessions must also be planned to avoid clashes with other projects in the area as abnormal possessions are more expensive.

9.3. Lineside equipment

Lineside Equipment: Chilcott Road

Likely to include signal, LOC and SPT (Near Chilcott Road UB).

Lineside Equipment: Parson Street

Likely to include Signal, LOC base and SPT (access from Liberty Sidings, subject to agreement with Freightliner).
Also Signal BL 2167 (access from Bedminster station).
The Existing RRAP at Freightliner yard to be potentially relocated.
Troughing is to be installed.

Lineside Equipment Bathampton

This is currently being designed and will be confirmed at GRIP 5 detailed design.

9.4. Civils- Parson Street and Bedminster

S33 Chilcott Road Bridge 120m 64ch

Methodology

Strengthening works are likely to include:

- Installation of spandrel wall tie bars and pattress plates required.

Plant

Hand tools, rig, scaffold tower.

Access

Clanage Road to be used as main compound. Welfare van to be used on site.

Temporary road closure may be required. This may need to be carried out at night as there is a long diversionary route via Liberty Lane for local residents.

Micro compound/ welfare van to be parked nearby.

Interfaces

The following interfaces are to be considered:

- Local residents in close proximity.

Timescales

Likely to take 2-3 months in total.

Photo 121: Chilcott Road Underbridge.

Platform adjustments at Parson Street Station

Methodology

The works below assume minor coper adjustments only, however full details to be confirmed at GRIP 5.

Plant

Hand tools.

Access

Use of station access.

Micro compound/welfare van.

Interfaces

The following interfaces are to be considered:

- Local residents in close proximity. There are potential noise restrictions in the area.

Timescales

To be confirmed by the contractor ahead of construction. This work could be carried out by the track contractor at the same time as the track relaying works in the area. Alternatively, the work could be carried out under possessions, potentially mid-week nights.

Platform adjustments at Bedminster Station

Methodology

The works below assume minor coper adjustments only, however full details to be confirmed at GRIP 5.

Plant

Hand tools.

Access

Use of station access.

Micro compound/ welfare van.

Interfaces

The following interfaces are to be considered:

- Local residents in close proximity.

Timescales
To be confirmed by contractor ahead of construction. Work will need to be carried out under possessions, potentially mid-week nights.

9.5. Track: Bathampton

Methodology
There is likelihood for the requirement of a new turn and drivers' walkway to be installed.

Plant
RRVs.

Access
The access and micro compound/ welfare van to be confirmed ahead of construction.

Interfaces
The following interfaces are to be considered:

- Local residents in close proximity.

Timescales

To be confirmed by contractor ahead of construction. Work will need to be carried out under possessions.

10. Appendix 2

10.1. De-vegetation principles

Below are general indicative de-vegetation principles. The method of transporting waste vegetation has not been considered in this report and will be addressed as the work progresses.

General de-vegetation requirements

- All land 3 metres from running rail to be cleared.
- All access points will have 1 metre either side cleared.
- All structures and lineside equipment will have 1 metre cleared on all sides.
- Areas of retained vegetation will be as agreed with The MW1 Project Team.
- All de-vegetation works will follow NR standards.
- Invasive species will be dealt with as necessary in accordance with NR standards.

Avon Gorge

- Underbridges: 5 metres vegetation clearance/ construction area is required in the areas under the arches of each underbridge to allow for scaffold installation. An additional 1 metre of clearance is required either side of the wing walls in case any works are required in these areas.

- Additional clearance is required along the Avon Gorge for small welfare units, this will be in the locations detailed in the construction strategy. Only areas of low grade vegetation (e.g. brambles) will be cleared to allow for this. There spaces where the cycle path widens out to allow space for a small compound if required.

- Embankment at QUB no.2 to have vegetation removed to allow construction of the ramp. The flat area of grassland is to be protected as much as possible. All materials and spoil to be removed after construction. The temporary ramp shall be protected with a Terram lining to avoid contamination of the ground underneath.

- Areas of retaining wall re-build works require 2 metres de-vegetation either side of the retaining wall and 1 metre tie in either side.

- 1 metre of de-vegetation is required either side of the new fencing all along the Avon Gorge. This will be minimised during construction as much as possible, but the full amount will be included in the assessment.

- Whitebeams will be protected as far as reasonably practicable.

- Rail corridor requires vegetation clearance 3 metres from running rail.

Pill and disused line

- Vegetation will be removed in all areas where earthworks are required.
- Fencing will have 1 metre cleared on both sides of the fence to allow installation.

- Lodway site compound will provisionally have s section approximately 7-10 metres long of vegetation taken out at the southern end to allow HGV access in and out of the compound. An additional 6 metres long section may also be taken out at the northern end to allow siding/ conveyor belt access in and out of the compound. Other conveyors may use natural gaps in the vegetation where available.

11.Appendix 3

An archaeological site at the Lodway compound is shown on the drawing below (demarcated in blue). This area will need to be fenced off during construction.