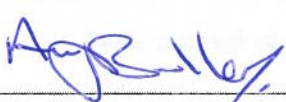



## Bristol MetroWest Phase 1

### Signalling Assessment (GRIP 2)

Project: Bristol MetroWest Phase 1	Business Unit: Investment Projects
Sponsor: Andrew Holley	Project No.: 140569
Development Manager: Rachel Leighfield Finch	CCMS No.: TBC
Client: 3 <sup>rd</sup> Party funded through North Somerset Council on behalf of the West of England Councils	
<b>Signatures</b>	
Produced by 	Name: Andy Buller
	Job Title: Signalling Principles Designer
	Date: 23 APRIL 2014
Checked By 	Name: Mark Bristow
	Job Title: Signalling Design Manager
	Date: 23/4/14

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## Issue record

Issue	Date	Comments
0.1	03.04.2014	Initial Draft
0.2	23.04.2014	Updates to review comments + Avonmouth details added.

## References

- [1] Scheme Sketch 140569-SDG-001 ver. 0.01 (Portbury & Portishead to Ashton Jn)
- [2] Scheme Sketch 140569-SDG-002 ver. 0.01 (Parson Street Jn to Bedminster)
- [3] Scheme Sketch 140569-SDG-003 ver. 0.01 (Bathampton)
- [4] Scheme Sketch 140569-SDG-004 ver. 0.01 (Avonmouth)

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## 1 Executive Summary

The assumption that BASRE project has been implemented prior to commencement of this project is fundamental to the whole process.

The design incorporating the new signal (Option 1) at Bathampton would be the recommended choice.

For the Portishead Line:

The proposed signalling layout should be possible to construct but confirmation that the new proposed speeds and that signal sighting can be achieved would need to be confirmed once the new track design is available.

Specific modelling will need to be carried out to prove that the new proposed speeds will achieve the required traffic frequency and have no effect on the mainline services.

The use of modular signalling for this scheme would not be economical and would be better delivered as an addition to the Smartlock being delivered by BASRE project.

For Avonmouth:

The proposal is to use the existing signal SA5 as the stop signal and replicate SA6 and SA8 with parallel signals on the Up Main, controlled from the existing St. Andrews local panel.

## 2 Purpose of Document

The purpose of this document is to capture the output of the signalling studies to:

- Provide a new turn-back facility at Bathampton Junction.
- Assess the previously drawn scheme sketch for the Portishead railway re-opening and the impact of the BASRE scheme.
- Provide a new turn-back facility at Avonmouth.

This document can then feed into the wider project option development.

The main driver for this project is the re-introduction of passenger services on the Portishead branch, coupled with revised passenger service between Bristol, Bath and Severn Beach.

The project proposes to remodel Parson Street Junction and Ashton Jn to provide parallel running moves from Ashton Gate to Bristol Temple Meads. A new junction is to be provided between Pill Tunnel and Pill Viaduct to split the freight traffic (to/from Portbury) and the passenger traffic (to/from Portishead).

A new turn-back facility is to be provided at Bathampton Junction incorporating the existing Loop.

A new turn-back facility is to be provided at Avonmouth on the Up Main line to provide moves towards Bristol Temple Meads.

This project will be preceded by BASRE (Bristol Area Signalling Renewal and Enhancement) project. Following completion of BASRE, the signalling will be controlled by TVSC (Thames Valley Signalling Centre) via Smartlock interlockings. This document assumes that BASRE will be commissioned prior to or with this project. It is assumed that sufficient capacity will exist within the Smartlock for the changes to be accommodated.



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### 3 Scheme Assessment

#### 3.1 Bathampton

There are 2 options to be considered for the turnback move at Bathampton:

1. A new signal (BLxxxx) at the Bath end of the Loop (reading back to Bath) giving routes to both the Up and Down Mains through a new crossover (points ZZ).
2. Using existing signal BL1882 (B477) routes to:
  - Up Main and turn back behind BL1879 (B202).
  - Down Main and turn back behind BL1877 (B2).
  - Up Trowbridge and turn back behind BL6640 (B502)

#### 3.2 Portishead Branch

##### 3.2.1 Portishead

The proposal is for 'one-train working (without train staff)' between Portishead and Pill Stations on the single track. Entering Portishead station will be controlled by a reflective distant board leading to a stop light on the buffer stop. Exiting the station will be with a telephone call to TVSC (via a 'noticeboard' instruction) who will advise of any proposed usage of any remaining UWC.

##### 3.2.2 Pill

The proposal is to split the single line before Pill viaduct providing lines to both Portishead and Portbury Dock.

The new station (and parallel move from the Docks) will be fully signalled, incorporating full axle counter detection, to provide control of the single line between the new Pill Junction and Clifton Junction replacing the existing token section.

The provision of complete signalling and train detection over this section will extend the control area of TVSC (introduced by the BASRE project) from its existing end at Ashton Junction to the whole of the Portishead branch.

##### 3.2.3 Parson Street junction

The proposal is to create a new double junction to replace the existing single one, which will have little effect on the existing signalling layout with the exception of the need to review the risk assessment of B21.

Any freight moves from the siding will have a direct effect on the Up Main traffic flow due to occupation of B21 overlap and having to hold trains further out.

##### 3.2.4 Parson Street and Bedminster Stations

The proposed BASRE design for Parson Street replicates the existing platform starter on the Up Relief (B421) and therefore services can easily stop here.

The proposed BASRE design for Bedminster Station replicates the existing arrangements, but that has no platform starters for either the Up Main or Up Relief. Instead the signalling control is via existing B25 and B27 which are approximately ¼ mile in advance but sighting is good, therefore no signalling work required for services to stop here (subject to timetable modelling).

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### 3.3 Avonmouth

The proposal is to use existing signal SA5 as the stop signal and then to replicate SA6 and SA8 with parallel signals on the Up Main.

The control panel at St. Andrews is a turn button panel with no route request (similar to the one at St. Phillips Marsh) and it is anticipated that any alterations required for the new signalling design could be undertaken.

### 3.4 Assumptions

The following assumptions have been made and if not confirmed may have an effect on the proposed signalling layout:

- The proposed line speeds can be achieved with the new track layout on the Portishead line.
- Modelling confirms that the new proposed speeds will achieve the required service and have no effect on the existing mainline services.
- Modelling confirms that the new required service can be achieved at Avonmouth, including any new turn-back moves with the new proposed signalling.
- Any changes to the main line (including Bathampton) will be updated onto the latest BASRE scheme plans.
- Signal and Point numbers are available within the allocations of the TVSC Numbering Specification.
- It is assumed that sufficient capacity will exist within the Smartlock for the changes to be accommodated

### 3.5 Potential Design Issues

The following items will need further review during the GRIP3 stage:

- Ashton Gate LX protection due to linespeed increase.
- Confirmation that ALL UWC's are to be closed or replaced with bridge access.
- Provision of further train detection between Portishead and Pill if the above comment about UWC's is not confirmed. This is to support the signaller/crossing user interaction.
- Signal & Sign sighting.
- The swinging overlap at Pill Junction to be reviewed to ease the data preparation.
- Signal spacing at Avonmouth – possible problems due to any new speed and replication of existing signalling with new parallel signals.



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### 3.6 Modular Signalling Design

For the Portishead branch the signalling could be delivered as a modular scheme but it would be more economical as an addition to the Smartlock being delivered by BASRE project rather than as a separate control system.

As Avonmouth is not part of the BASRE project, the minor additions could be delivered as a modular scheme but there is no benefit in using modular signalling process and it would be better to include these modifications into the existing panel at St. Andrews.

## 4 Conclusion

The assumption that BASRE project has been implemented prior to commencement of this project is fundamental to the whole process.

The design incorporating the new signal (Option 1) at Bathampton would be the recommended choice. Whilst this option incurs 3 extra SEU's, the impact on the present traffic flow using the other option would be major.

The proposed signalling layout for a 'one train working' railway between Portishead and Pill followed by a complete signalling and train detection railway fringing up to the new TVSC (Thames Valley Signalling Centre) area, can be delivered.

Confirmation that any new proposed speeds could be achieved would need to be confirmed once the new track design is available. Once the new track is onsite then signal and sign sighting would need to be undertaken to confirm positioning and may result in slight movement or the requirements for extra banner repeater signals..

Specific modelling will need to be carried out to prove that the new proposed speeds will achieve the required traffic frequency and have no effect on the existing mainline services.

The new proposed service will stop at both Parson Street and Bedminster Stations on the Up Relief line, using the existing signalling arrangements installed for the BASRE project

The use of modular signalling, for the Portishead part of the scheme, would not be economical and would be better delivered as an addition to the Smartlock being delivered by BASRE project. The Avonmouth turn-back design would not be economical for modular signalling as all the other signalling is controlled by a local panel at St. Andrews and any new signalling would be better included here.



For the Bathampton turn-back there is a net 3 additional SEU's.

For the Portishead branch there is a net 8 additional SEU's.

For the Avonmouth turn-back there is a net 3 additional SEU's.

## Bristol MetroWest Phase 1

### Signalling Assessment (GRIP 2) - Addendum

Project: Bristol MetroWest Phase 1	Business Unit: Infrastructure Projects
Sponsor: Andrew Holley	Project No.: 140569
Development Manager: Rachel Leighfield Finch	CCMS No.: TBC
Client: 3 <sup>rd</sup> Party funded through North Somerset Council on behalf of the West of England Councils	
<b>Signatures</b>	
Produced by 	Name: Andy Buller
	Job Title: Signalling Principles Designer
	Date: 21 <sup>st</sup> MAY 2014
Checked By 	Name: Mark Bristow
	Job Title: Signalling Design Manager
	Date: 21/5/14

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## Issue record

Issue	Date	Comments
0.1	20.05.2014	Initial Draft
0.2	20.05.2014	Updated to review comments.
1.0	21.05.2014	Updated to review comments and issued

## References

[1] Bristol MetroWest Phase 1 Signalling Assessment (GRIP 2) [CCMS: 64400525]



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Date	20 <sup>th</sup> May 2014

## 1 Executive Summary

The proposal to reinstate the old Down Relief line from Bedminster station for approximately 200m towards Parson Street and then join the Down Main line, which provides standage for a 100 SLU freight train behind the new proposed signal at Bedminster station as required.

## 2 Purpose of Document

The purpose of this document is to capture the output of the signalling studies to:

- Provide a new connection from the Down Relief (the existing Carriage Line) to the Down Main to allow standage for a 100 SLU freight train after Bristol Temple Meads station, so as not to block up Bristol East junction.

This document can then feed into the wider project option development.

## 3 Scheme Assessment

### 3.1 Reinstatement of the Down Relief

There is only 1 option being considered.

- Reinstatement the old Down Relief line (existing Carriage Line) towards Parson Street, joining on to the Down Main as close to Bedminster station as possible, but allowing for a full overlap for the new signal. This option will require a signal at Bedminster station (parallel to existing B56) and a single end junction to join the mainline just after the station. This will provide adequate signal spacing for the proposed line speed. The upgrading of the Carriage Line to a relief line does not drive the need for any additional trapping protection over the existing provision.

### 3.2 Assumptions

The following assumptions have been made and if not confirmed may have an effect on the proposed signalling layout:

- It is assumed that sufficient capacity will exist within the Smartlock/TVSC (screen layout) for the changes to be accommodated.

### 3.3 Potential Design Issues

The following items will need further review during the GRIP3 stage:

- Signal sighting.
- If the new connection is within the overlap of B56 (Bedminster starter signal on the Down Main) traffic up to the new signal on the Down Relief will prevent simultaneous moves to the B56, thus holding trains back at Bristol West Junction. To be considered within the modelling of the train service.

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## 4 Conclusion

The assumption that BASRE project has been implemented prior to commencement of this project is fundamental to the whole process.

As there is sufficient standage on the existing Carriage Line behind the proposed new parallel signal at Bedminster and 771 points to accommodate a 100 SLU freight train the solution meets the requirement, provided the existing track condition is acceptable.

For the chosen option there is a net 2 additional SEU's.