

High Speed Rail (Crewe – Manchester)

Supplementary Environmental Statement 2 and Additional Provision 2 Environmental Statement

Volume 5: Appendix WR-001-00000

Water resources and flood risk

Water Framework Directive compliance
assessment addendum

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Department for Transport

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1 Introduction

1.1 Background

- 1.1.2 This report is an appendix which forms part of Volume 5 of the Supplementary Environmental Statement 2 (SES2) and Additional Provision 2 Environmental Statement (AP2 ES).
- 1.1.3 This report covers the following community areas:
- Hough to Walley's Green (MA01);
 - Wimboldsley to Lostock Gralam (MA02);
 - Pickmere to Agden and Hulseheath (MA03);
 - Hulseheath to Manchester Airport (MA06);
 - Davenport Green to Ardwick (MA07); and
 - Manchester Piccadilly Station (MA08).
- 1.1.4 This report provides an update to the Water Framework Directive (WFD) compliance assessment presented in the High Speed Two (HS2) High Speed Rail (Crewe – Manchester) Environmental Statement (ES) published in 2022¹ (the main ES) and the Supplementary Environmental Statement 1 (SES1) and Additional Provision 1 Environmental Statement (AP1 ES) also published in 2022². This update should be read in conjunction with the Water Framework Directive (WFD) compliance assessment set out in the main ES Volume 5, Appendix: WR-001-00000.
- 1.1.5 The WFD Background Information and Data (BID) report, BID WR-002-00001 has been updated to accompany SES2 and AP2 ES, including changes to baseline data since the publication of the main ES.
- 1.1.6 Maps referred to within this assessment are contained in the SES2 and AP2 ES Volume 5, Water resources and flood risk Map Book: Map Series WR-03 – Water Framework Directive. This map series shows the location and current overall WFD status of surface water and groundwater bodies across the extent of the AP2 revised scheme.
- 1.1.7 This report also includes the combined assessment of new or different significant traffic effects that are relevant to WFD compliance, as a result of changes in construction or operational traffic flows.

¹ High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Environmental Statement*. Available online at: <https://www.gov.uk/government/collections/hs2-phase2b-crewe-manchester-environmental-statement>.

² High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Supplementary Environmental Statement 1 and Additional Provision 1 Environmental Statement*. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-supplementary-environmental-statement-1-and-additional-provision-1-environmental-statement>.

- 1.1.8 An assessment was undertaken to determine if the SES2 changes and AP2 amendments would be likely to materially alter the conclusions on WFD compliance reported in the main ES WFD assessment (Volume 5, Appendix: WR-001-00000 of the main ES) and the SES1 and AP1 WFD compliance assessment addendum (SES1 and AP1 ES Volume 5, Appendix: WR-001-00000).
- 1.1.9 In order to differentiate between the original scheme and the subsequent changes, the following terms are used:
- ‘the original scheme’ – the Bill scheme submitted to Parliament in 2022, which was assessed in the main ES;
 - ‘the SES1 scheme’ – the original scheme with any changes described in SES1 that are within the existing powers of the Bill;
 - ‘the AP1 revised scheme’ – the original scheme as amended by SES1 changes and AP1 amendments;
 - ‘the SES2 scheme’ – the original scheme with any changes described in SES1 (submitted in July 2022) and the SES2; and
 - ‘the AP2 revised scheme’ – the original scheme as amended by SES1 and SES2 changes (as relevant) and AP2 amendments.

1.2 Purpose of this addendum

- 1.2.2 The AP2 revised scheme will cross a number of surface water bodies and groundwater bodies. An assessment of the original scheme's compliance against the objectives of the Water Environment (WFD) Regulations³, was undertaken as part of the water resources and flood risk assessment set out in the main ES (WFD compliance assessment Volume 5, Appendix: WR-001-00000, referred to hereafter as ‘the original WFD assessment’), and updated for the AP1 revised scheme (SES1 and AP1 ES WFD compliance assessment Volume 5, Appendix: WR-001-00000, referred to hereafter as ‘the AP1 revised scheme WFD assessment’).
- 1.2.3 The purpose of this addendum is to report any changes or updates to environmental information and scheme design or assumptions that have occurred since the main ES and SES1 and AP1 ES, which will result in a change in effects and/or the introduction of new effects on WFD status and status objectives from those reported in the original WFD assessment.
- 1.2.4 The original WFD assessment identified potential compliance risks for the following water bodies and scheme components:
- Wistaston Brook – highway drainage (David Whitby Way);
 - Weaver (Marbury Brook to Dane) – highway drainage (A530 Nantwich Road);

³ *The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (SI 2017 No. 407)*. Available online at: <https://www.legislation.gov.uk/uksi/2017/407/made>.

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- Puddinglake Brook – highway drainage (A530 King Street); changes to groundwater-surface water flow (MA02 Granular Borrow Pit D);
- Wade Brook – highway drainage (A530 King Street, A556 Shurlach Road, Penny's Lane);
- Hey/Borsdane Brook – multiple culverts (Critchley culvert; Windy Bank culvert; Coffin Lane Brook culvert; Nan Holes Brook culvert; Nan Holes Brook offline culvert);
- Timperley Brook – highway drainage (M56 East and West Link/access to Manchester Airport High Speed station/Runger Lane realignment);
- Weaver and Dane Quaternary Sand and Gravel Aquifers – changes to groundwater flows (MA02 Granular Borrow Pit D) and groundwater quality (Manchester Ship Canal viaduct foundations and highway drainage to ground); and
- Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone Aquifers – groundwater quality (Lowton cutting).

1.2.5 The AP1 revised scheme WFD assessment addendum removed the following WFD compliance risks:

- Wistaston Brook (GB112068055280): amber risk of deterioration associated with highway drainage (David Whitby Way);
- Weaver (Marbury Brook to Dane) (GB112068060460): amber risk of deterioration associated with highway drainage (A530 Nantwich Road);
- Puddinglake Brook (GB112068060220): amber risk of deterioration associated with potential impacts on flow velocity and volume due to dewatering arising from MA02 Granular Borrow Pit D and water quality risk associated with highway drainage (A530 King Street);
- Weaver and Dane Quaternary Sand and Gravel Aquifers (GB41202G991700): amber risk of deterioration associated with potential damming of groundwater flow and reduction in groundwater contribution to surface water, due to dewatering arising from MA02 Granular Borrow Pit D, and risk to groundwater quality (Manchester Ship Canal viaduct foundations);
- Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone Aquifers (GB41201G101700): amber risk of deterioration of groundwater quality (Lowton cutting); and
- Hey/Borsdane Brook (GB112069064520): amber risk of deterioration associated with the footprint impact of multiple culverts.

1.2.6 Following the AP1 WFD assessment addendum, the remaining WFD compliance risks were:

- Wade Brook (GB112068060370): amber risk of deterioration associated with potential impacts on surface water quality from highway drainage; and
- Timperley Brook (GB112069064520): amber risk of deterioration associated with potential impacts on surface water quality from highway drainage.

1.3 Assessment methodology

- 1.3.2 The assessment method for deriving effects on WFD status and status objectives is outlined in the Environmental Impact Assessment (EIA) Scope and Methodology Report (SMR), WFD compliance assessment technical note (Volume 5, Appendix: CT-001-00001)⁴.

⁴ High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Environmental Statement, Environmental Impact Assessment Scope and Methodology Report, WFD Compliance Assessment Technical Note*, Volume 5, Appendix: CT-001-00001. Available online at: <https://www.gov.uk/government/collections/hs2-phase2b-crewe-manchester-environmental-statement>.

Part 1: Supplementary Environmental Statement 2

2 New environmental baseline information relevant to WFD

- 2.1.1 New environmental baseline data relevant to the WFD have been derived since publication of the main ES.
- 2.1.2 The BID WR-002-00001 report which accompanies SES2 and AP2 ES has been updated to include:
- Removal of WFD baseline classification data related to MA04 and MA05, following the amendments contained in the SES/AP1 revised scheme; and
 - New WFD survey data for groundwater features, surface water reconnaissance and detailed hydromorphological surveys.
- 2.1.3 New WFD survey data including reconnaissance surveys and additional information from the Environment Agency resulted in the following changes to receptor values:
- Tributary of Tabley Brook 2 and Tributary of Tabley Brook 3 have been changed from moderate to low value and screened out of WFD assessment;
 - Tributary of Timperley Brook 1 has been changed from low to moderate value and screened in to WFD assessment; and
 - Surveys of Wood near Chapel Lane Site of Biological Importance (SBI) including Hennersley Bank Ancient Woodland Inventory (AWI) site have confirmed that this is a largely Ash woodland, which is not considered to be groundwater dependent. This is no longer considered a groundwater receptor.
- 2.1.4 The River Basin Management Plan (RBMP)⁵ Cycle 2 data (published in 2015 with an update to status information in 2019) was used as the baseline for the SES2 and AP2 ES assessment. The Cycle 3 RBMP which included updates to environmental objectives, was published in December 2022. The WFD BID reports and assessments will be updated to the Cycle 3 data during the progression of the Bill.
- 2.1.5 The Manchester Airport High Speed station is located over Timperley Brook. An inverted siphon is proposed in the original scheme to allow the watercourse to pass beneath the station footprint. To mitigate this loss, the original scheme included a 330m permanent

⁵ Under the WFD, 'water bodies' are the basic management units and are defined as all or part of a river system or aquifer. These water bodies form part of a larger 'river basin district' (RBD), for which 'river basin management plans' (RBMP) are developed, and environmental objectives are set for all water bodies. These RBMP are produced every six years by the Environment Agency in England and by the Scottish Environment Protection Agency in Scotland, in accordance with the river basin management planning cycle.

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realignment of Timperley Brook. This realigned the watercourse away from an assumed existing 300m long culvert thought to be positioned along Brooks Drive. Since the main ES was published, a site visit by the Environment Agency has identified that the Brook Drive culvert does not exist. It is now understood that Timperley Brook crosses from Davenport Green Wood in a 60m long culvert beneath Brooks Drive and then re-emerges on the western side of Brooks Drive at the boundary of Ringway Golf Club.

3 Changes to design or construction assumptions relevant to WFD which do not require changes to the Bill

- 3.1.1 Since the main ES, the need to make changes to the design or construction assumptions has been identified. The changes that do not require a change to the Bill are detailed in Part 1 of the relevant SES2 and AP2 ES Volume 2, Community Area reports.
- 3.1.2 There are no SES2 design changes identified as being relevant to WFD.

4 Assessment of effects on WFD water bodies

- 4.1.1 New water quality sampling data has been used to refine and update assessments of WFD compliance risks to surface water and groundwater quality arising from highway drainage. These changes are reported in SES2 and AP2 ES Volume 5, Appendix: WR-003-00000 and the Background Information and Data (BID), BID WR-004-0MA06 which accompanies the SES2 and AP2 ES.
- 4.1.2 In line with WFD best practice guidance and industry standard assessment principles, this data has been used to carry out a metal bioavailability assessment using the Environment Agency metal bioavailability assessment tool (M-BAT)⁶. Further information on the assessments is reported in SES2 and AP2 ES Volume 5, Appendix: WR-003-00000 and the SES2 and AP2 ES Volume 5, Appendix: WR-003-0MA06 – Water resource assessment. As a result, the following WFD compliance risks reported previously have been updated:
- Wade Brook (GB112068060370): removal of the amber risk of deterioration associated with potential impacts on surface water quality from highway drainage. The previously reported risk to Wade Brook has been removed following the M-BAT assessment; and
 - Timperley Brook (GB112069064520): potential risk to Environmental Quality Standards (EQS) from highway drainage to Tributary of Timperley Brook 1. The previously reported risk to Timperley Brook has been removed following the M-BAT assessment; however, the risk to Tributary of Timperley Brook 1 has been introduced following change to the watercourse receptor value. Therefore, the previously reported water body scale amber risk of deterioration associated with potential impacts on surface water quality from highway drainage remains. This assessment does not take into consideration the proposed AP2 amendment: Additional land permanently required to reconfigure M56 Junction 6 (AP2-006-014), which is described and assessed in Section 5.2 of this report. Should the proposed AP2 amendment AP2-006-014 be adopted, the amber risk of deterioration reported in this section would not occur.
- 4.1.3 Assessment of construction traffic data indicated the potential for changes to water quality at 14 highway drainage outfalls, related to predicted concentrations of copper above EQS values. The potential impacts compared to the background concentrations represent negligible changes in water quality and are not considered to present a risk to WFD compliance at a water body scale in any instances. Further information on the assessments is reported in SES2 and AP2 ES Volume 5, Appendix: WR-003-00000 and the SES2 and AP2 ES Volume 5, Appendix: WR-003-0MA06, Water resource assessment.
- 4.1.4 In the original scheme, Timperley Brook would pass beneath the Manchester Airport High Speed station in an inverted siphon. This siphon will lead to the loss of open channel which would cause permanent changes to the hydromorphology of Timperley Brook.

⁶ Environment Agency metal bioavailability assessment tool (M-BAT). Tool and method statement available online at: <https://www.wfduk.org/resources/rivers-lakes-metal-bioavailability-assessment-tool-m-bat>.

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- 4.1.5 In the original scheme, a 330m permanent realignment of Timperley Brook was included. This realignment was designed to realign the watercourse away from an existing 300m long culvert thought to be positioned along Brooks Drive and create new open channel habitat. With the inclusion of this realignment, the main ES reported a minor localised adverse (yellow) effect on Timperley Brook, due to the loss of open channel.
- 4.1.6 Since the main ES was prepared, a site visit by the Environment Agency has identified that the Brooks Drive culvert, reported in the main ES, does not exist. Therefore, the channel realignment proposed in the original scheme would not remove an existing culvert and would not create an additional open channel to mitigate the effect of the station footprint. Therefore, the new SES2 baseline means that the loss of open channel would lead to amber adverse effects on Timperley Brook. This assessment does not take into consideration the proposed AP2 amendment: Additional land permanently required for modifications to the WFD mitigation for Timperley Brook (AP2-006-018), which is described and assessed in Section 5.2 of this report. Should the proposed AP2 amendment AP2-006-018 be adopted, the amber risk of deterioration reported in this section would not occur.

Part 2: Additional Provision 2 Environmental Statement

5 Summary of changes to scheme design and construction assumptions relevant to WFD

- 5.1.1 There are no amendments in the AP2 revised scheme within community areas Hough to Walley's Green (MA01), Wimboldsley to Lostock Gralam (MA02) or Pickmere to Agden and Hulseheath (MA03).
- 5.1.2 In the Hulseheath to Manchester Airport (MA06) community area, the amendments proposed in the AP2 revised scheme that are relevant to WFD assessment are:
- AP2-006-010: Additional land permanently required for watercourse diversions at Mobberley Road;
 - AP2-006-012 Additional land permanently required for the revised realignment of Tributary of Birkin Brook 2 south of Thorns Green embankment;
 - AP2-006-014: Additional land permanently required to reconfigure M56 Junction 6; and
 - AP2-006-018: Additional land permanently required for modifications to WFD mitigation for Timperley Brook.
- 5.1.3 In the Davenport Green to Ardwick (MA07) community area, the amendments proposed in the AP2 revised scheme that are relevant to WFD assessment are:
- AP2-007-005: Change to Bill powers required for modifications to the Birchfield Road vent shaft headhouse; and
 - AP2-007-009: Additional land temporarily required for the reconfiguration of Ardwick construction sidings.
 - In the Manchester Piccadilly (MA08) community area, there are no amendments in the AP2 revised scheme with potential to alter the previously reported effects on WFD status and status objectives.
- 5.1.4 A detailed description of these changes is provided in the SES2 and AP2 ES Volume 2, Community Area reports for MA06, MA07 and MA08 and in the relevant maps from the Volume 2 Map Book: Map Series CT-06 – Proposed Scheme.
- 5.1.5 Table 1 summarises the scheme components amended by the AP2 revised scheme which have potential to change effects on surface water WFD status and objectives that were reported in the original WFD assessment or the AP1 revised scheme WFD assessment addendum.

- 5.1.6 Table 2 summarises the scheme components amended by the AP2 revised scheme which have potential to change effects on groundwater WFD status and objectives reported in the original WFD assessment or the AP1 revised scheme WFD assessment addendum.

5.2 Hulseheath to Manchester Airport (MA06) community area Additional Provision changes relevant to WFD

AP2-006-010: Additional land permanently required for watercourse diversions at Mobberley Road (Tributaries of Birkin Brook)

- 5.2.1 The watercourse diversions (AP2-006-010) amendment was scoped in as having the potential to alter effects on WFD status and status objectives for the Birkin Brook - Mobberley Brook to River Bollin (including Rostherne Brook) WFD water body.
- 5.2.2 Since the main ES, further design development has identified the need to modify the design to meet requirements for flood risk and drainage standards and improve resilience to climate change. An overflow channel is proposed to convey flood flows from the Tributary of Birkin Brook 1 beneath the Mid-Cheshire Railway.

Changes in Birkin Brook - Mobberley Brook to River Bollin (including Rostherne Brook) (GB112069061340)

- 5.2.3 The watercourse diversions (AP2-006-010) amendment has the potential to alter effects on WFD status and status objectives for Tributary of Birkin Brook 1 (Middle House Brook). The AP2 amendment design incorporates an overspill weir from the existing watercourse to pass high flow into a new flood overflow channel and a number of additional culverts to carry the overflow channel beneath the Mid-Cheshire Railway, highways and access roads (Table 1).

AP2-006-012: Additional land permanently required for the revised realignment of Tributary of Birkin Brook 2 south of Thorns Green embankment

- 5.2.4 The realignment of Tributary of Birkin Brook 2 (AP2-006-012) amendment was scoped in as having the potential to alter effects on WFD status and status objectives for the Birkin Brook - Mobberley Brook to River Bollin (including Rostherne Brook) WFD water body.

- 5.2.5 Since the main ES, further design development has identified that a section of Tributary of Birkin Brook 2 is situated within the footprint of Thorns Green embankment, resulting in the requirement for an additional permanent watercourse realignment.

Changes in Birkin Brook - Mobberley Brook to River Bollin (including Rostherne Brook) (GB112069061340)

- 5.2.6 The realignment of Tributary of Birkin Brook 2 (AP2-006-012) amendment has the potential to alter effects on WFD status and status objectives for Tributary of Birkin Brook 2. The proposed amendment includes a watercourse realignment and two new culverts (Table 1).
- 5.2.7 Tributary of Birkin Brook 2 is a minor, low value watercourse which is not scoped in for detailed WFD assessment. The amendment does not create a risk for WFD compliance and is not discussed further in this report.

AP2-006-014: Additional land permanently required to reconfigure M56 Junction 6

- 5.2.8 The reconfiguration of M56 Junction 6 (AP2-006-014) amendment was scoped in as having the potential to alter effects on WFD status and status objectives for the Bollin (River Dean to Ashley Mill) WFD water body and the Weaver and Dane Quaternary Sand and Gravel Aquifers WFD groundwater body.
- 5.2.9 Since the main ES, consultation with National Highways has identified the need to amend the original scheme around M56 Junction 6 to meet required highway standards. The M56 will be realigned for a length of 2.5km and Junction 6 will be reconfigured.

Changes in Bollin (River Dean to Ashley Mill) (GB112069061381)

- 5.2.10 The reconfiguration of M56 Junction 6 (AP2-006-014) amendment has the potential to alter effects on WFD status and status objectives for the River Bollin and a number of its tributary watercourses. The existing M56 bridge crossing of the River Bollin will require widening to introduce new slip roads, and the new junction and approach roads will cross several watercourses in the area (Table 1). The proposed design incorporates culverts, watercourse realignments, drainage and attenuation ponds.

Changes in Weaver and Dane Quaternary Sand and Gravel Aquifers (GB41202G991700)

- 5.2.11 The reconfiguration of M56 Junction 6 (AP2-006-014) amendment has the potential to alter effects on WFD status and status objectives for the groundwater body, as the proposed design includes below ground structures such as overbridge foundations and retaining walls (Table 2).

AP2-006-018: Additional land permanently required for modifications to WFD mitigation for Timperley Brook

- 5.2.12 The modification of mitigation for Timperley Brook (AP2-006-018) amendment was scoped in as having the potential to alter effects on WFD status and status objectives for the Timperley Brook WFD water body.
- 5.2.13 Since the main ES, additional consultation with the Environment Agency concluded that a culvert proposed to be daylighted for WFD mitigation in the original WFD assessment does not exist. Therefore, the amendment provides land for alternative WFD mitigation to offset the loss of Timperley Brook beneath Manchester Airport High Speed station.

Changes in Timperley Brook (GB112069061260)

- 5.2.14 The modification of mitigation for Timperley Brook (AP2-006-018) amendment has the potential to alter effects on WFD status and status objectives for Timperley Brook and Tributary of Timperley Brook 1. The proposed mitigation design includes several additional watercourse realignments, de-culverting or daylighting of existing culverts (Table 1) and riparian/flood plain habitats.

5.3 Davenport Green to Ardwick (MA07) community area Additional Provision changes relevant to WFD

AP2-007-005: Change to Bill powers required for modifications to the Birchfields Road vent shaft headhouse

- 5.3.1 The vent shaft modifications (AP2-007-005) amendment was scoped in as having the potential to alter effects on WFD status and status objectives for the Manchester and East Cheshire Permo-Triassic Sandstone Aquifers WFD groundwater body.
- 5.3.2 Since the main ES, additional work has identified the requirement for the Birchfield Road vent shaft and headhouse to be reconfigured to accommodate redesign of the tunnel ventilation system.

Changes in Manchester and East Cheshire Permo-Triassic Sandstone Aquifers (GB1201G101100)

- 5.3.3 The vent shaft modifications (AP2-007-005) amendment has the potential to alter effects on WFD status and status objectives for the groundwater body as the proposed design includes a new concrete basement structure (Table 2).

AP2-007-009: Additional land temporarily required for the reconfiguration of Ardwick construction sidings

- 5.3.4 The Ardwick modifications (AP2-007-009) amendment was scoped in as having the potential to alter effects on WFD status and status objectives for the Manchester and East Cheshire Permo-Triassic Sandstone Aquifers WFD groundwater body.
- 5.3.5 Since the main ES, design development has resulted in substantial changes to the design in the area around Manchester Piccadilly Station.

Changes in Manchester and East Cheshire Permo-Triassic Sandstone Aquifers (GB1201G101100)

- 5.3.6 The Ardwick modifications (AP2-007-009) amendment has the potential to alter effects on WFD status and status objectives for the groundwater body as the proposed design includes a new retaining wall (Table 2).

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Table 1: Summary of scheme components proposed or removed under the AP2 revised scheme with the potential to change effects on WFD surface water body status and status objectives reported in the original WFD assessment and SES/AP1 WFD addendum

Surface water body	Surface watercourse	Scheme component type	Scheme component name	Details	Location (NGR)	Scheme component new, modified or removed from original scheme?	Scheme component (ID)	Comments
Birkin Brook - Mobberley Brook to River Bollin (including Rostherne Brook) (GB112069061340)	Tributary of Birkin Brook 2	Realignment	Tributary of Birkin Brook 2 realignment	The realignment will follow the HS2 embankment, around a drainage pond and under an access road.	378023, 383735	New	GB11206906 1370-T-03-RE-01a	New watercourse realignment for AP2-006-012
Birkin Brook - Mobberley Brook to River Bollin (including Rostherne Brook) (GB112069061340)	Tributary of Birkin Brook 2	Highway realignment culvert	Tributary of Birkin Brook 2 offline west culvert	Approximately 14m in length.	377502, 383680	New	GB11206906 1370-T-03-CV-01	New culvert for AP2-006-012 (see Figure 1 in SES2 and AP2 ES Volume 5, Appendix: WR-003-MA06)
Birkin Brook - Mobberley Brook to River Bollin (including Rostherne Brook) (GB112069061340)	Tributary of Birkin Brook 2	Access road culvert	Tributary of Birkin Brook 2 offline east culvert	Approximately 23m length of culvert under access road.	378044, 383699	New	GB11206906 1370-T-03-CV-02	New culvert for AP2-006-012 (see Figure 1 in SES2 and AP2 ES Volume 5, Appendix: WR-003-MA06)
Birkin Brook - Mobberley Brook to River Bollin (including Rostherne Brook) (GB112069061340)	Tributary of Birkin Brook 1	Access road culvert	Tributary of Birkin Brook 1 offline east culvert	Currently indicated as a culvert to provide access to Lower House Farm field. May be replaced by an overbridge. Length is approximately 34m.	377811, 383308	New	GB11206906 1370-T-04-CV-03	New culvert for AP2-006-010 (see Figure 1 in SES2 and AP2 ES Volume 5, Appendix: WR-003-MA06)

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Surface water body	Surface watercourse	Scheme component type	Scheme component name	Details	Location (NGR)	Scheme component new, modified or removed from original scheme?	Scheme component (ID)	Comments
Birkin Brook - Moberley Brook to River Bollin (including Rostherne Brook) (GB112069061340)	Tributary of Birkin Brook 1	Culvert	Mid-Cheshire line offline south culvert	Permanent structure on overflow channel following removal of Ashley Railhead Culvert (construction) to convey flood flows. Length under Mid-Cheshire Railway is approximately 26.5m.	377582, 383269	New	GB11206906 1370-T-04-CV-04	New culvert on overflow channel for AP2-006-010 (see Figure 1 in SES2 and AP2 ES Volume 5, Appendix: WR-003-MA06)
Birkin Brook - Moberley Brook to River Bollin (including Rostherne Brook) (GB112069061340)	Tributary of Birkin Brook 1	Culvert	Ashley railhead offline temporary culvert south	Temporary culvert on overflow channel approximate length of 165m, to be replaced by an open channel after decommissioning of Ashley Railhead.	377409, 383224	New	GB11206906 1370-T-04-CV-05	New temporary culvert on overflow channel for AP2-006-010 (see Figure 1 in SES2 and AP2 ES Volume 5, Appendix: WR-003-MA06)
Birkin Brook - Moberley Brook to River Bollin (including Rostherne Brook) (GB112069061340)	Tributary of Birkin Brook 1	Realignment	Tributary of Birkin Brook 1 overflow channel	Overflow channel for flood flow. Includes an overspill weir to pass water into the overflow channel.	377488, 383237	New	GB11206906 1370-T-04-RE-02a	New realignment is overflow channel for flood flow for AP2-006-010 (see Figure 1 in SES2 and AP2 ES Volume 5, Appendix: WR-003-MA06)
Birkin Brook - Moberley Brook to River Bollin (including Rostherne Brook) (GB112069061340)	Tributary of Birkin Brook 1	Culvert	Moberley Road offline culvert	Culvert carrying overflow channel under Moberley Road, approximately 45m in length.	377278, 383359	New	GB11206906 1370-T-04-CV-06	New culvert on overflow channel for AP2-006-010 (see Figure 1 in SES2 and AP2 ES Volume 5,

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Surface water body	Surface watercourse	Scheme component type	Scheme component name	Details	Location (NGR)	Scheme component new, modified or removed from original scheme?	Scheme component (ID)	Comments
Rostherne Brook) (GB112069061340)								Appendix: WR-003-MA06)
Birkin Brook - Mobberley Brook to River Bollin (including Rostherne Brook) (GB112069061340)	Tributary of Birkin Brook 1	Culvert	Tributary of Birkin Brook 1 offline west culvert	Length is approximately 7.5m.	377520, 383604	New	GB11206906 1370-T-04-CV-07	New culvert for AP2-006-010 (see Figure 1 in SES2 and AP2 ES Volume 5, Appendix: WR-003-MA06)
Birkin Brook - Mobberley Brook to River Bollin (including Rostherne Brook) (GB112069061340)	Tributary of Birkin Brook 1	Extension of existing culvert	Mid-Cheshire line offline north culvert	Length is approximately 21m to replace existing culvert under railway line.	377475, 383686	New	GB11206906 1370-T-04-CVX-08	New culvert to replace existing structure for AP2-006-010 (see Figure 1 in SES2 and AP2 ES Volume 5, Appendix: WR-003-MA06)
Birkin Brook - Mobberley Brook to River Bollin (including Rostherne Brook) (GB112069061340)	Tributary of Birkin Brook 1	Culvert	Ashley railhead offline temporary culvert north	Temporary culvert for construction railhead. Length is approximately 50m, to be replaced by an open channel after decommissioning of Ashley Railhead.	377372, 383569	New	GB11206906 1370-T-04-CV-09	New temporary culvert for AP2-006-010 (see Figure 1 in SES2 and AP2 ES Volume 5, Appendix: WR-003-MA06)
Bollin (River Dean to Ashley Mill) (GB112069061381)	River Bollin	Underbridge	River Bollin offline bridge widening	River Bollin offline bridge widening South. River Bollin offline bridge widening North.	379193, 384545	New	GB11206906 1381-MW-01-UB-01	Widening of existing M56 bridge crossing for AP2-006-014

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Surface water body	Surface watercourse	Scheme component type	Scheme component name	Details	Location (NGR)	Scheme component new, modified or removed from original scheme?	Scheme component (ID)	Comments
Bollin (River Dean to Ashley Mill) (GB112069061381)	Tributary of River Bollin 2	Realignment	Tributary of River Bollin 2 realignment	Approximately 64m in length, average depth 1m channel, top width 3m and bottom width 1m.	379990, 384498	New	GB112069061381-T-02-RE-01	New watercourse realignment for AP2-006-014
Bollin (River Dean to Ashley Mill) (GB112069061381)	Tributary of River Bollin 2	Culvert	Tributary of River Bollin 2 offline culvert	Approximate length is 96m.	379976, 384510	New	GB112069061381-T-02-CV-01	New culvert for AP2-006-014 (see Figure 3 in SES2 and AP2 ES Volume 5, Appendix: WR-003-MA06)
Bollin (River Dean to Ashley Mill) (GB112069061381)	Tributary of River Bollin 3	Realignment	Tributary of River Bollin 3 realignment	Approximately 222m in length, average depth 1m channel, top width 3m and bottom width 1m.	379467, 384460	New	GB112069061381-T-03-RE-02	New watercourse realignment for AP2-006-014
Bollin (River Dean to Ashley Mill) (GB112069061381)	Tributary of River Bollin 3	Culvert	Tributary of River Bollin 3 M56 drain offline culvert	Approximate length is 8m.	379718, 384808	New	GB112069061381-T-03-CV-02	New culvert for AP2-006-014 (see Figure 3 in SES2 and AP2 ES Volume 5, Appendix: WR-003-MA06)
Bollin (River Dean to Ashley Mill) (GB112069061381)	Tributary of River Bollin 3	Culvert	Tributary of River Bollin 3 M56 offline culvert	Approximate length is 298m.	379596, 384503	New	GB112069061381-T-03-CV-03	New culvert for AP2-006-014 (see Figure 3 in SES2 and AP2 ES Volume 5, Appendix: WR-003-MA06)

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Surface water body	Surface watercourse	Scheme component type	Scheme component name	Details	Location (NGR)	Scheme component new, modified or removed from original scheme?	Scheme component (ID)	Comments
Bollin (River Dean to Ashley Mill) (GB112069061381)	Tributary of River Bollin 4	Realignment	Tributary of River Bollin 4 diversion	Approximately 12m in length. Steep topography – cascade.	379114, 384469	New	GB112069061381-T-04-RE-03	New watercourse realignment for AP2-006-014
Bollin (River Dean to Ashley Mill) (GB112069061381)	Tributary of River Bollin 4	Culvert	Tributary of River Bollin 4 offline culvert south	Approximate length is 102m.	379059, 384479	New	GB112069061381-T-04-CV-04	New culvert for AP2-006-014 (see Figure 3 in SES2 and AP2 ES Volume 5, Appendix: WR-003-MA06)
Bollin (River Dean to Ashley Mill) (GB112069061381)	Tributary of River Bollin 4	Culvert	Tributary of River Bollin 4 offline culvert north	Approximate length is 8m.	379169, 384483	New	GB112069061381-T-04-CV-05	New culvert for AP2-006-014 (see Figure 3 in SES2 and AP2 ES Volume 5, Appendix: WR-003-MA06)
Bollin (River Dean to Ashley Mill) (GB112069061381)	Tributary of River Bollin 5	Realignment	Tributary of River Bollin 5	Approximately 205m in length, average depth 2.5m channel, top width 6m and bottom width 1m.	379332, 384614	New	GB112069061381-T-04a-RE-04	New watercourse realignment for AP2-006-014
Bollin (River Dean to Ashley Mill) (GB112069061381)	Tributary of River Bollin 6	Culvert	Tributary of River Bollin 6 offline culvert	Approximate length is 75m.	378688, 384566	New	GB112069061381-T-05-CV-06	New culvert for AP2-006-014 (see Figure 3 in SES2 and AP2 ES Volume 5, Appendix: WR-003-MA06)

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Surface water body	Surface watercourse	Scheme component type	Scheme component name	Details	Location (NGR)	Scheme component new, modified or removed from original scheme?	Scheme component (ID)	Comments
Bollin (River Dean to Ashley Mill) (GB112069061381)	Tributary of River Bollin 6	Realignment	Tributary of River Bollin 6 realignment	Approximate length is 22m, average depth 1m channel, top width 3m and bottom width 1m.	378663, 384586	New	GB112069061381-T-05-RE-05	New watercourse realignment for AP2-006-014
Bollin (River Dean to Ashley Mill) (GB112069061381)	Tributary of River Bollin 7	Culvert	Tributary of River Bollin 7 offline culvert	Approximate length is 68m.	378486, 384532	New	GB112069061381-T-06-CV-07	New culvert for AP2-006-014 (see Figure 3 in SES2 and AP2 ES Volume 5, Appendix: WR-003-MA06)
Bollin (River Dean to Ashley Mill) (GB112069061381)	Tributary of River Bollin 7	Realignment	Tributary of River Bollin 7 realignment	Approximately 48m in length, average depth 1m channel, top width 3m and bottom width 1m.	378515, 384593	New	GB112069061381-T-06-CV-08	New watercourse realignment for AP2-006-014
Bollin (River Dean to Ashley Mill) (GB112069061381)	Drain to M56 1	Realignment	M56 J6 drain realignment	Approximately 354m in length, average depth 1m channel, top width 3m and bottom width 1m.	379577, 384269	New	GB112069061381-T-07-RE-06	New watercourse realignment for AP2-006-014
Bollin (River Dean to Ashley Mill) (GB112069061381)	Drain to M56 1	Culvert	M56 J6 drain Sunbank Lane offline culvert 4	Approximate length is 5m.	379614, 384294	New	GB112069061381-T-07-CV-09	New culvert for AP2-006-014 (see Figure 3 in SES2 and AP2 ES Volume 5, Appendix: WR-003-MA06)
Bollin (River Dean to Ashley Mill) (GB112069061381)	Drain to M56 1	Culvert	M56 J6 drain Sunbank Lane offline culvert 1	Approximate length is 15m.	379729, 384362	New	GB112069061381-T-07-CV-10	New culvert for AP2-006-014

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Surface water body	Surface watercourse	Scheme component type	Scheme component name	Details	Location (NGR)	Scheme component new, modified or removed from original scheme?	Scheme component (ID)	Comments
								(see Figure 3 in SES2 and AP2 ES Volume 5, Appendix: WR-003-MA06)
Bollin (River Dean to Ashley Mill) (GB112069061381)	Drain to M56 1	Culvert	M56 J6 drain Sunbank Lane offline culvert 2	Approximate length is 12m.	379768, 384403	New	GB11206906 1381-T-07-CV-11	New culvert for AP2-006-014 (see Figure 3 in SES2 and AP2 ES Volume 5, Appendix: WR-003-MA06)
Bollin (River Dean to Ashley Mill) (GB112069061381)	Drain to M56 1	Culvert	M56 J6 drain Sunbank Lane offline culvert 3	Approximate length is 16m.	379794, 384435	New	GB11206906 1381-T-07-CV-12	New culvert for AP2-006-014 (see Figure 3 in SES2 and AP2 ES Volume 5, Appendix: WR-003-MA06)
Timperley Brook (GB112069061260)	Tributary of Timperley Brook 1	Culvert	Tributary of Timperley Brook 1 offline culvert south	Approximate length is 82m.	380237, 385509	New	GB11206906 1260-T-01-CV-01	New culvert for AP2-006-018, replacing part of an existing culvert
Timperley Brook (GB112069061260)	Tributary of Timperley Brook 1	Culvert	Tributary of Timperley Brook 1 offline culvert north	Approximate length is 8m.	380208, 385603	New	GB11206906 1260-T-01-CV-02	New culvert for AP2-006-018, replacing part of an existing culvert
Timperley Brook (GB112069061260)	Tributary of Timperley Brook 1	Realignment	Tributary of Timperley	Approximate length is 128m. WFD mitigation for loss of open channel	380205, 385535	New	GB11206906 1260-T-01-RE-01	New watercourse realignment and daylighting/removing

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Surface water body	Surface watercourse	Scheme component type	Scheme component name	Details	Location (NGR)	Scheme component new, modified or removed from original scheme?	Scheme component (ID)	Comments
			Brook 1 realignment 1	under Manchester Airport High Speed station, includes daylighting/removing existing culvert.				existing culvert for AP2-006-018
Timperley Brook (GB112069061260)	Tributary of Timperley Brook 1	Realignment	Tributary of Timperley Brook 1 realignment 2	Approximate length is 122m. WFD mitigation for loss of open channel under Manchester Airport High Speed station includes daylighting/removing existing culvert	380117, 385812	New	GB11206906 1260-T-01-RE-02	New watercourse realignment and daylighting/removing existing culvert for AP2-006-018
Timperley Brook (GB112069061260)	Tributary of Timperley Brook 1	Realignment	Tributary of Timperley Brook 1 realignment 3	Approximate length is 91m. WFD mitigation for loss of open channel under Manchester Airport High Speed station.	379726, 386257	New	GB11206906 1260-T-01-RE-03	New watercourse realignment for AP2-006-018
Timperley Brook (GB112069061260)	Timperley Brook	Diversion	Timperley Brook diversion	Timperley Brook creation of high flow channel/wetland area to provide flood capacity and also improve habitat, associated with other WFD mitigation downstream of Manchester Airport High Speed station.	380148, 386140	Modified	GB11206906 1260-MW-01-RE-01	New high flow channel/wetland area for AP2-006-018

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Surface water body	Surface watercourse	Scheme component type	Scheme component name	Details	Location (NGR)	Scheme component new, modified or removed from original scheme?	Scheme component (ID)	Comments
Timperley Brook (GB112069061260)	Timperley Brook	Extension of existing culvert	Brooks Drive offline culvert	Approximate length is 20m replacing/extending assumed existing culvert.	380184, 386157	New	GB11206906 1260-MW-01-CVX-03	Culvert extension for AP2-006-018
Timperley Brook (GB112069061260)	Timperley Brook	Realignment	Timperley Brook realignment west	Approximate length is 136m. WFD mitigation for loss of open channel under Manchester Airport High Speed station.	379758, 386266	New	GB11206906 1260-MW-01-RE-04	New watercourse realignment/ enhancement at Shay Lane for AP2-006-018
Timperley Brook (GB112069061260)	Timperley Brook	Realignment	Timperley Brook realignment east	Approximate length is 193m. WFD mitigation for loss of open channel under Manchester Airport High Speed station.	380098, 386201	New	GB11206906 1260-MW-01-RE-05	New watercourse realignment/ enhancement at Ringway Golf Club for AP2-006-018
Timperley Brook (GB112069061260)	Timperley Brook	Culvert	Timperley Brook field access culvert south	Approximate length is 5m.	379726, 386280	New	GB11206906 1260-MW-01-CV-04	New culvert for AP2-006-018 replacing existing culvert
Timperley Brook (GB112069061260)	Timperley Brook	Culvert	Timperley Brook field access culvert north	Approximate length is 5m.	379708, 386298	New	GB11206906 1260-MW-01-CV-05	New culvert for AP2-006-018 replacing existing culvert

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Table 2: Summary of scheme components proposed or removed under the AP2 revised scheme with the potential to change effects on WFD groundwater body status and status objectives reported in the original WFD assessment and SES1/AP1 ES WFD addendum

Groundwater body	Scheme component type	Scheme component name	Details	Location (NGR)	Scheme component new, modified or removed from original scheme?	Scheme component (ID)	Comments
Weaver and Dane Quaternary Sand and Gravel Aquifers (GB41202G991700)	Overbridge Foundations	Thorns Green accommodation offline overbridge	Bridge length approximately 67m.	378907, 384520	New	GB41202G991700-OF-151A	New bridge foundations for AP2-006-014
Weaver and Dane Quaternary Sand and Gravel Aquifers (GB41202G991700)	Underbridge Foundations	M56 River Bollin offline bridge widening south	Extension of approximately 12.8m.	379178, 384483	New	GB41202G991700-OF-155A	Widening of existing motorway bridge crossing of River Bollin for AP2-006-014
Weaver and Dane Quaternary Sand and Gravel Aquifers (GB41202G991700)	Underbridge Foundations	M56 River Bollin offline bridge widening north	Extension of approximately 12.8m.	379209, 384574	New	GB41202G991700-OF-155B	Widening of existing motorway bridge over River Bollin for AP2-006-014
Weaver and Dane Quaternary Sand and Gravel Aquifers (GB41202G991700)	Retaining Wall	M56 J6 Southbound merge offline retaining wall	Approximately 444m length, up to 10m deep.	379567, 384522	New	GB41202G991700-RT-157A	New retaining wall for AP2-006-014
Weaver and Dane Quaternary Sand and Gravel Aquifers (GB41202G991700)	Overbridge Foundations	M56 J6 gyratory offline overbridge west	Bridge approximately 52.5m length.	379767, 384637	New	GB41202G991700-OF-157B	New bridge foundations for AP2-006-014
Weaver and Dane Quaternary Sand and Gravel Aquifers (GB41202G991700)	Retaining Wall	M56 J6 Wilmslow Road link offline retaining wall	Approximately 131m length, up to 13.5m deep.	379995, 384511	New	GB41202G991700-RT-157C	New retaining wall for AP2-006-014

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Groundwater body	Scheme component type	Scheme component name	Details	Location (NGR)	Scheme component new, modified or removed from original scheme?	Scheme component (ID)	Comments
Weaver and Dane Quaternary Sand and Gravel Aquifers (GB41202G991700)	Overbridge Foundations	M56 J6 gyratory offline overbridge east	Bridge approximately 63.1m length.	379908, 384715	New	GB41202G991700-OF-157D	New bridge foundations for AP2-006-014
Weaver and Dane Quaternary Sand and Gravel Aquifers (GB41202G991700)	Retaining Wall	M56 J6 Northbound merge offline retaining wall	Up to 4.4m deep, length 48m.	380004, 384791	New	GB41202G991700-RT-159A	New retaining wall for AP2-006-014
Weaver and Dane Quaternary Sand and Gravel Aquifers (GB41202G991700)	Retaining Wall	M56 J6 Southbound diverge offline retaining wall	Approximately 216m length, up to 8.5m deep.	380114,384720	New	GB41202G991700-RT-159B	New retaining wall for AP2-006-014
Weaver and Dane Quaternary Sand and Gravel Aquifers (GB41202G991700)	Retaining Wall	M56 J6 Hale Road link overbridge retaining wall	Approximately 25m length, up to 2m deep.	380219, 384678	New	GB41202G991700-RT-160A	New retaining wall for AP2-006-014
Weaver and Dane Quaternary Sand and Gravel Aquifers (GB41202G991700)	Retaining Wall	M56 J6 The Hut Group (THG) attenuation tank retaining wall	Approximately 40m length and up to 4m deep.	380250, 384708	New	GB41202G991700-RT-160B	New retaining wall for AP2-006-014
Manchester and East Cheshire Permo-Triassic Sandstone Aquifers (GB1201G101100)	Vent Shaft	Birchfields Road vent shaft	24.0m by 47.8m deep. Basement fan room 64.0m x 27.9m x 8.5m.	386465, 394127	Modified	2DE01-MWJ-CV-DPL-M003-021315	New underground basement for horizontal fan ventilation for AP2-006-008

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Groundwater body	Scheme component type	Scheme component name	Details	Location (NGR)	Scheme component new, modified or removed from original scheme?	Scheme component (ID)	Comments
Manchester and East Cheshire Permo-Triassic Sandstone Aquifers (GB1201G101100)	Retaining Wall	Ardwick access road retaining wall	Approximately 144m length up to 3m deep.	386239, 397275	New	GB1201G101100-RT-09A	New retaining wall for AP2-006-011

6 Assessment of effects on WFD water bodies

6.1 Existing baseline

- 6.1.1 Details of the WFD status and status objectives of the relevant surface and groundwater bodies are summarised in the BID WR-002-00001 report which accompanies SES2 and AP2 ES.

6.2 Embedded mitigation

- 6.2.1 Mitigation has been embedded within the design, construction methodology and operational phase of the original scheme in order to reduce any effects on the water environment and to ensure that the scheme is, where possible, inherently compliant with the objectives of the WFD for both surface water and groundwater bodies. This is described in the SMR WFD compliance assessment technical note (see Volume 5, Appendix: CT-001-00001)⁴.
- 6.2.2 A number of additional measures have been embedded within the AP2 revised scheme proposals at Mobberley Road to mitigate flood risk. These measures are outlined in Section 5 of the SES2 and AP2 ES Volume 2, Hulseheath to Manchester Airport (MA06) Community Area report. Assessment including the embedded mitigation at the M56 Junction 6 amendment, shows that the drainage design would be sufficient to avoid WFD deterioration risks from highway drainage on Timperley Brook and Tributary of Timperley Brook 1 (see Annex A).

6.3 Effects on Birkin Brook - Mobberley Brook to River Bollin (including Rostherne Brook) (GB112069061340)

- 6.3.1 The watercourse diversions (AP2-006-010) amendment has potential to introduce new effects on the Birkin Brook - Mobberley Brook to River Bollin (including Rostherne Brook) surface water body.
- 6.3.2 Although the amendment introduces additional culvert structures compared to the main ES, these will be located on a new channel that will function only during high flow periods. The permanent watercourse diversion remains largely as described in the main ES.

Effects on current status

- 6.3.3 The Birkin Brook - Mobberley Brook to River Bollin (including Rostherne Brook) surface water body is currently at Bad status.

- 6.3.4 A detailed impact assessment has been undertaken to identify the magnitude of the effects of the AP2 revised scheme on the current status of the quality elements of the water body. The additional design elements listed in Table 1 have been assessed as having additional minor localised adverse (yellow) effects on hydromorphological and biological quality elements. These are reported in detail in the updated WFD detailed impact assessment tables in Annex A.
- 6.3.5 The watercourse diversions (AP2-006-010) amendment is not expected to introduce any new risks to the deterioration of the current status of any quality elements in the water body.

Effects on status objectives

- 6.3.6 The Birkin Brook - Mobberley Brook to River Bollin (including Rostherne Brook) surface water has an objective to achieve Moderate status.
- 6.3.7 The Environment Agency has identified 'Reasons for Not Achieving Good' status (RNAG) which include diffuse and point source pollution. The AP2 revised scheme has been considered in terms of its potential to inhibit the water body from achieving its status objective.
- 6.3.8 The AP2-006-010 amendment will not significantly alter pollution sources or pathways and therefore, is not expected to prevent the water body from achieving its future status objectives.

6.4 Effects on Bollin (River Dean to Ashley Mill) (GB112069061381)

- 6.4.1 The reconfiguration of M56 Junction 6 (AP2-006-014) amendment has potential to introduce new effects on the Bollin (River Dean to Ashley Mill) surface water body.
- 6.4.2 The amendment includes a substantial number of new watercourse realignments, culverts, and below ground structures that could affect surface watercourses directly as well as groundwater features such as springs. It also includes the widening of an existing motorway bridge crossing of the River Bollin.

Effects on current status

- 6.4.3 The Bollin (River Dean to Ashley Mill) surface water body is currently at Moderate status.
- 6.4.4 The original WFD assessment identified a number of overall minor localised adverse (yellow) effects on the Bollin (River Dean to Ashley Mill). A detailed impact assessment has been undertaken to identify the magnitude of the effects of the AP2 revised scheme on the current status of the quality elements of the water body.
- 6.4.5 The additional culverts listed in Table 1 have been assessed as having individual additional minor localised adverse (yellow) effects on hydromorphological and biological quality

elements. These are reported in the updated WFD detailed impact assessment tables in Annex A.

- 6.4.6 The changes are not considered to present a risk of deterioration when considered individually; however, in total, an approximate loss of 450m to 500m of open watercourses is expected due to the combined effect of culverts. This is anticipated to lead to a widespread adverse (amber) effect.
- 6.4.7 Between 500m to 550m of watercourse realignments are proposed, which could theoretically offset the impacts of the additional culverts by improving existing watercourses. However, due to physical constraints in the area, on a precautionary basis, it is considered that hard engineering is likely to be required for some watercourse realignments. On a precautionary basis, the watercourse realignments have typically been assessed as having minor localised adverse (yellow) effects as they may introduce engineered sections to natural watercourses.
- 6.4.8 Therefore, there is considered to be a new risk of the reconfiguration of M56 Junction 6 (AP2-006-014) amendment causing deterioration in the current status of biological and hydromorphological quality elements for the water body, unless appropriate mitigation for the combined effects of culverts can be identified.

Effects on status objectives

- 6.4.9 The Bollin (River Dean to Ashley Mill) surface water body has an objective to achieve (or remain at) Moderate status.
- 6.4.10 The Environment Agency has identified several RNAG which include diffuse and point source pollution from a range of activities, including urban and transport sectors as well as physical modifications. The AP2 revised scheme has been considered in terms of its potential to inhibit the water body from achieving its status objective.
- 6.4.11 As the reconfiguration of M56 Junction 6 (AP2-006-014) amendment introduces the potential deterioration risks reported above relating to physical modifications, there is a corresponding risk to meeting future WFD status objectives.

6.5 Effects on Timperley Brook (GB112069061260)

- 6.5.1 The modification of mitigation for Timperley Brook (AP2-006-018) and the reconfiguration of M56 Junction 6 (AP2-006-014) amendments have the potential to alter effects on WFD status and status objectives for the Timperley Brook WFD water body.
- 6.5.2 The AP2-006-018 amendment includes additional WFD mitigation design to offset the impacts identified in the original WFD assessment. The proposed mitigation design includes several additional watercourse realignments, de-culverting or daylighting of existing culverts and riparian habitat enhancements.

6.5.3 The AP2-006-014 amendment includes changes to the highways drainage which increase the percentage of highways runoff which passes through mitigation rain gardens, before being discharged into Tributary of Timperley Brook 1.

Effects on current status

6.5.4 The Timperley Brook surface water body is currently at Moderate status.

6.5.5 A detailed impact assessment has been undertaken to identify the magnitude of the effects of the AP2 revised scheme on the current status of the quality elements of the water body. The additional design elements listed in Table 1 have been included to offset the adverse WFD effects associated with Manchester Airport High Speed station that were identified in the main ES.

6.5.6 As set out in SES2 (Section 4) updated baseline data from the Environment Agency has identified that the culvert along Brooks Drive, reported in the main ES, does not exist. Therefore, the channel realignment proposed in the original scheme would not create additional open channel to mitigate for the amber risk of deterioration from the station footprint. With the inclusion of the mitigation set out in this amendment, the remaining impact on Timperley Brook due to the station footprint, is assessed to be minor localised adverse (yellow) risk. This amendment will, therefore, remove the amber risk of deterioration set out in the SES2 (Section 4).

6.5.7 The majority of the amended proposals in AP2-006-018 will have minor localised beneficial effects (light blue) on hydromorphological and biological quality elements through de-culverting and improving the morphology and riparian zone of existing modified watercourses. These are reported in the updated WFD detailed impact assessment tables in Annex A.

6.5.8 The modification of mitigation for Timperley Brook (AP2-006-018) amendment is not expected to introduce any new risks to the deterioration of the current status of any quality elements in the water body.

6.5.9 The reconfiguration of M56 Junction 6 (AP2-007-014) amendment is anticipated to remove the amber risk of deterioration from Tributary of Timperley Brook 1, reported in the SES2 (Part 1 of this report), due to the change in receptor value. A screening exercise identified the need for a routine runoff assessment related to the proposed modifications to the M56 Junction 6, as part of the AP2 revised scheme (see SES2 and AP2 Volume 5, Appendix: WR-003-0MA06 for further details).

6.5.10 The assessment has identified that routine runoff drainage from the proposed highway drainage changes to Tributary of Timperley Brook 1 would result in a pass for sediment-bound and soluble pollutant zinc, against EQS. While the predicted annual average copper concentrations are above EQS (due to higher than EQS baseline values), the assessment shows that the highways drainage discharge into this watercourse would lead to dilute of the existing high background concentrations (due to the increase in highways drainage passing through rain garden mitigation). Therefore, this amendment is anticipated to remove the

amber risk of deterioration to Timperley Brook (GB112069061260), reported in the main ES and updated in the SES2 (Part 1 of this report).

Effects on status objectives

- 6.5.11 The Timperley Brook surface water body has an objective to achieve Moderate status.
- 6.5.12 The Environment Agency has identified RNAG including diffuse and point source pollution from urban areas and transport as well as physical modifications, and the water body is classed as heavily modified. The AP2 revised scheme has been considered in terms of its potential to inhibit the water body from achieving its status objective.
- 6.5.13 The proposed amendments have been designed to be in line with WFD objectives and mitigation measures for the water body and should make a positive contribution to delivering future status objectives.

6.6 Effects on Weaver and Dane Quaternary Sand and Gravel Aquifers (GB41202G991700)

- 6.6.1 The reconfiguration of M56 Junction 6 (AP2-006-014) amendment has potential to introduce new effects on the Weaver and Dane Quaternary Sand and Gravel Aquifers WFD groundwater body. The amendment includes a number of structures that could intercept groundwater and affect associated features such as springs, either by reducing groundwater flow or by the physical loss of their surface expression.

Effects on current status

- 6.6.2 The Weaver and Dane Quaternary Sand and Gravel Aquifers groundwater body is currently at Poor overall status (Poor chemical status and Good quantitative status).
- 6.6.3 A detailed impact assessment has been undertaken to identify the magnitude of the effects of the AP2 revised scheme on the current status of the quality elements of the water body. The additional design elements listed in Table 2 have been assessed as having individual additional minor localised adverse (yellow) effects. These are reported in the updated WFD detailed impact assessment tables in Annex A.
- 6.6.4 The reconfiguration of M56 Junction 6 (AP2-006-014) amendment is not expected to introduce any new risks to the deterioration of the current status of any quality elements in the water body.

Effects on status objectives

- 6.6.5 The Weaver and Dane Quaternary Sand and Gravel Aquifers groundwater body has an objective to achieve Good status.

- 6.6.6 The Environment Agency has identified RNAG for chemical status including diffuse pollution from agriculture as well as other reasons currently unknown and under investigation. The AP2 revised scheme has been considered in terms of its potential to inhibit the water body from achieving its status objective.
- 6.6.7 As the reconfiguration of M56 Junction 6 (AP2-006-014) amendment will not significantly alter pollution sources or pathways affecting chemical conditions, it is not expected to prevent the water body from achieving its future status objectives.

6.7 Effects on Manchester and East Cheshire Permo-Triassic Sandstone Aquifers (GB1201G101100)

- 6.7.1 The vent shaft modifications (AP2-007-005) at Birchfield Road and Ardwick modifications (AP2-007-008) have potential to introduce new effects on the Manchester and East Cheshire Permo-Triassic Sandstone Aquifers WFD groundwater body.
- 6.7.2 The amendments include below ground structures that could affect groundwater flows and levels. The vent shaft modifications (AP2-007-005) will involve an additional basement structure in the vent shaft, and Ardwick modifications (AP2-007-009) includes an additional shallow retaining wall for an access road.

Effects on current status

- 6.7.3 The current status of the Manchester and East Cheshire Permo-Triassic Sandstone Aquifers groundwater body is Poor for both quantitative and chemical status. A detailed impact assessment has been undertaken to identify the magnitude of the effects of the AP2 revised scheme on the current status of the quality elements of the water body.
- 6.7.4 The vent shaft modifications (AP2-007-005) amendment is anticipated to introduce an additional minor localised adverse (yellow) effect, as the basement fan room could form a barrier to groundwater flow in the superficial glacial till which could lead to localised displacement of groundwater. This is not considered to present any risk of WFD deterioration at water body scale.
- 6.7.5 The Ardwick modifications (AP2-007-009) amendment is anticipated to introduce an additional minor localised adverse (yellow) effect, as groundwater flow is not thought to be parallel to the retaining wall, so may partially form a barrier to very shallow groundwater flow. This is not considered to present any risk of WFD status deterioration at water body scale especially given the shallow nature of the below ground penetration.
- 6.7.6 The vent shaft modifications (AP2-007-005) and Ardwick modifications (AP2-007-009) amendments are not expected to introduce any new risks to the deterioration of the current status of any quality elements in the water body.

Effects on status objectives

- 6.7.7 The Manchester and East Cheshire Permo-Triassic Sandstone Aquifers groundwater body has an objective to meet Good status.
- 6.7.8 The Environment Agency has identified RNAG relating to saline intrusions to groundwater. The AP2 revised scheme has been considered in terms of its potential to inhibit the water body from achieving its status objective.
- 6.7.9 The vent shaft modifications (AP2-007-005) and Ardwick modifications (AP2-007-009) amendments are not expected to prevent the water body from achieving its future status objectives.

6.8 Additional mitigation requirements to reduce risk of deterioration of current status

- 6.8.1 For the Bollin (River Dean to Ashley Mill) surface water body, the deterioration risk from the combined impacts of culverts may be reduced by identifying enhancements to existing watercourses to offset the footprint loss of open channel from culverts. This may be in the form of naturalised watercourse realignments within the design, if not limited by topographic and geological conditions and design constraints.
- 6.8.2 An initial review has been completed to identify similar watercourses nearby within the water body which could be improved. This has identified potential mitigation opportunities including:
- removal of redundant structures and culverts;
 - riparian habitat enhancements;
 - potential wetland habitat creation; and
 - in-channel habitat works to increase morphological diversity.
- 6.8.3 Wherever possible, like for like mitigation measures would be included, such as removal of culverts to create open channel habitat. However, where this is not practicable, alternative mitigation options will be considered. The approach to mitigation will be discussed and developed in consultation with the Environment Agency. Further surveys of the baseline condition of the watercourses would also enable a more detailed assessment and development of mitigation designs.

6.9 Additional mitigation requirements to reduce risk of prevention of status objectives

- 6.9.1 For the Bollin (River Dean to Ashley Mill) risks to future status from additional physical modifications (culverts), the proposed development of mitigation is as outlined in the section above.

7 WFD Compliance

7.1 No deterioration of current status

7.1.1 The following scoped in AP2 amendments do not have the potential to introduce additional WFD deterioration risks to affected surface and groundwater bodies:

- AP2-006-010: Watercourse diversions (Tributaries of Birkin Brook);
- AP2-006-012: Realignment of Tributary of Birkin Brook 2;
- AP2-006-018: Modification of mitigation for Timperley Brook;
- AP2-007-005: Vent shaft modifications, Birchfield Road; and
- AP2-007-009: Ardwick modifications.

7.1.2 The reconfiguration of M56 Junction 6 (AP2-006-014) amendment has potential to deteriorate the Bollin (River Dean to Ashley Mill) (GB112069061381) surface water body due to a large number of additional new culverts and potential to require hard engineering of watercourse realignments. As a result, a number of new scheme elements for reconfiguration of M56 Junction 6 (AP2-006-014) are considered to be potentially non-compliant due to the risk of deterioration of current status and will require further ongoing assessment.

7.1.3 The reconfiguration of M56 Junction 6 (AP2-006-014) amendment will also lead to the removal of the amber risk of deterioration to Timperley Brook (GB112069061260), reported in the SES2 (Part 1 of this report) due to changes in the highway drainage mitigation.

7.1.4 The modification of mitigation for Timperley Brook (AP2-006-018) amendment will also lead to the removal of the amber risk of deterioration to Timperley Brook (GB112069061260), reported in the SES2 (Part 1 of this report) due to loss of open channel and the implications of hydromorphology.

7.2 No prevention of future status objectives

7.2.1 The assessment has screened the AP2 revised scheme against the RNAG for all relevant water bodies.

7.2.2 The identified risk to future status objectives arising from the AP2 revised scheme is reconfiguration of M56 Junction 6 (AP2-006-014). This has potential to exacerbate physical modification pressures identified by the Environment Agency that are currently restricting the Bollin (River Dean to Ashley Mill) (GB112069061381) surface water body from achieving its status objectives.

7.2.3 As a result, the reconfiguration of M56 Junction 6 (AP2-006-014) is considered to be potentially non-compliant due to the risk of preventing future status objectives and will require further ongoing assessment.

8 Conclusion

- 8.1.1 This WFD assessment addendum provides an indication of the likely compliance of the SES2 scheme and AP2 revised scheme at the time the assessment was prepared.
- 8.1.2 The assessment has concluded that the AP2 revised scheme may cause a new risk of deterioration of the current WFD status of one surface water body.
- 8.1.3 The new WFD compliance risk arises from reconfiguration of M56 Junction 6 (AP2-006-014) amendment. There is a risk of deterioration in biological and hydromorphological quality elements of the Bollin (River Dean to Ashley Mill) surface water body due to a widespread adverse effect from additional culverts included in the AP2 revised scheme.
- 8.1.4 There is also a risk of preventing future status objectives for the Bollin (River Dean to Ashley Mill) surface water body from the addition of further physical modifications exacerbating existing RNAG within the water body.
- 8.1.5 The reconfiguration of M56 Junction 6 (AP2-006-014) amendment is therefore potentially non-compliant with WFD objectives and will require further assessment and development of mitigation.
- 8.1.6 The updated assessments of water quality WFD compliance risks from highway drainage removed one previously identified amber risk of deterioration for the Wade Brook water body, reported in the main ES and one amber risk of deterioration for Tributary of Timperley Brook 1 (part of Timperley Brook water body), reported in the SES2 section of this report.
- 8.1.7 The modification of mitigation for Timperley Brook (AP2-006-018) amendment will lead to the removal of the amber risk of deterioration to Timperley Brook (GB112069061260), reported in the SES2 (Part 1 of this report) due to loss of open channel and the implications of hydromorphology.
- 8.1.8 The remaining water body scale risk (both for deterioration and preventing future status objectives) identified in the AP2 revised scheme is Bollin (River Dean to Ashley Mill): amber risk due to multiple culverts
- 8.1.9 A Regulation 19⁷ test may be required for the AP2 revised scheme. This would include the new modifications to the physical characteristics of the Bollin (River Dean to Ashley Mill) that have been identified in this assessment.

⁷ Regulation 19 of the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 provides a means whereby a derogation for a proposed modification or sustainable development may be granted where it meets specific conditions. Full details are provided in Section 7 of the SMR WFD compliance assessment procedure technical note Volume 5, Appendix: CT-001-00001 of the main ES.

Annex A: Revised detailed impact assessment tables

Table A.1: Wistaston Brook (GB112068055280) detailed impact assessment - effects on current status

Wistaston Brook (GB112068055280)		Detailed Impact Assessment											Detailed Impact Assessment Outcome							
Water body type:	River	Watercourse (receptor value):			Tributary of Swill Brook 1 (Moderate)			Tributary of Gresty Brook 1 (Moderate)			Gresty Brook (High)		Cumulative effects - effects on quality element from scheme component(s) located in other WFD water bodies	Overall effect on quality element at water body scale	Additional mitigation requirements	Residual effect on quality element at water body scale	WFD compliance outcome - potential for deterioration of current status of quality element at water body scale			
Hydromorphological designation:	Not A/HMWB	Scheme component (Unique ID):			Crewe Tunnel (GB112068055280-T-01-BT-01)			Crewe Tunnel (GB112068055280-T-02-BT-01)			Crewe Tunnel (GB112068055280-MW-01-BT-01)									
Overall Status (2015):	Bad	Description of scheme component:			A 6.2km long x 8.8m internal diameter bored tunnel up to a			A 6.2km long x 8.8m internal diameter bored tunnel up to a			A 6.2km long x 8.8m internal diameter bored tunnel up to a									
Overall Status Objective:	Good by 2027	Impact type from scheme component:			Impacts from bored tunnel are scoped out of detailed impact assessment at Preliminary Assessment stage, unless flagged as a risk in Groundwater WFD assessment															
Overall Status (2019):	Bad	RBMP Cycle 2 2015 Status	RBMP Cycle 2 Status Objective	2019 Status																
WFD Status Element	WFD Quality Element																			
Biological	Fish	Bad	Good by 2027	Bad	-	-	-	-	-	-	-	-	-	None	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated		
	Macroinvertebrates	Good	Good by 2015	Good	-	-	-	-	-	-	-	-	-	None	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated		
	Macrophytes and Phytobenthos - combined	Poor	Good by 2027	Moderate	-	-	-	-	-	-	-	-	-	None	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated		
Physicochemical	Dissolved oxygen	Moderate	Good by 2015	Moderate	-	-	-	-	-	-	-	-	-	None	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated		
	pH	High	Good by 2015	High	-	-	-	-	-	-	-	-	-	None	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated		
	Phosphate	Poor	Good by 2027	Poor	-	-	-	-	-	-	-	-	-	None	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated		
	Ammonia	High	Good by 2015	High	-	-	-	-	-	-	-	-	-	None	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated		
	Temperature	High	Good by 2016	High	-	-	-	-	-	-	-	-	-	None	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated		
Specific Pollutants	Copper, Triclosan, Zinc	N/A (high)	N/A	-	-	-	-	-	-	-	-	-	-	None	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated		
Hydromorphological	Quantity and dynamics of water flow	Supports Good	Supports Good by 2015	Supports Good	-	-	-	-	-	-	-	-	-	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated		
	Connection to groundwater bodies				-	-	-	-	-	-	-	-	-	-	-	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	River continuity				-	-	-	-	-	-	-	-	-	-	-	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	River depth and width variation				-	-	-	-	-	-	-	-	-	-	-	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Structure and substrate of the river bed				-	-	-	-	-	-	-	-	-	-	-	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Structure of the riparian zone				-	-	-	-	-	-	-	-	-	-	-	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Chemical	Priority substances	Good	Good by 2015	Fail	-	-	-	-	-	-	-	-	-	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated		

Table A.2: Valley Brook (Englesea Brook to Weaver) (GB112068055310) detailed impact assessment - effects on current status

Valley Brook (Englesea Brook to Weaver) (GB112068055310)		Detailed Impact Assessment				Detailed Impact Assessment Outcome						
Water body type:	River	Watercourse (receptor value):			Valley Brook (High)			Cumulative effects - effects on quality element from scheme component(s) located in other WFD water bodies	Overall effect on quality element at water body scale	Additional mitigation requirements	Residual effect on quality element at water body scale	WFD compliance outcome - potential for deterioration of current status of quality element at water body scale
Hydromorphological designation:	HMWB	Scheme component (Unique ID):			Crewe Tunnel (GB112068055310-MW-01-BT-01)							
Overall Status (2015):	Moderate	Description of scheme component:			A 6.2km long x 8.8m internal diameter bored tunnel up to a max. depth of 42.7m below ground level.							
Overall Status Objective:	Good by 2027	Impact type from scheme component:			Impacts from bored tunnel are scoped out of detailed impact assessment at Preliminary Assessment stage, unless flagged as a risk in Groundwater WFD assessment							
Overall Status (2019):	Moderate	RBMP Cycle 2 2015 Status	RBMP Cycle 2 Status Objective	2019 Status								
WFD Status Element	WFD Quality Element	RBMP Cycle 2 2015 Status	RBMP Cycle 2 Status Objective	2019 Status								
Biological	Fish	Bad	Good by 2027	Bad	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated
	Macroinvertebrates	Bad	Good by 2027	Moderate	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated
	Macrophytes and Phytobenthos - combined	N/A	N/A in 2015	-	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated
Physicochemical	Dissolved oxygen	High	Good by 2015	High	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated
	pH	High	Good by 2015	High	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated
	Phosphate	Poor	Good by 2027	Poor	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated
	Ammonia	Good	Good by 2015	Good	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated
	Temperature	High	Good by 2015	High	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated
Specific Pollutants	Copper, Triclosan, Zinc	N/A (high)	N/A in 2015	-	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated
Hydromorphological	Quantity and dynamics of water flow	Supports Good	Supports Good by 2015	Supports Good	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated
	Connection to groundwater bodies				-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated
	River continuity				-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated
	River depth and width variation				-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated
	Structure and substrate of the river bed				-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated
	Structure of the riparian zone				-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated
Chemical	Priority substances	Good	Good by 2015	Fail	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated

Table A.4: Shropshire Union Canal, Market Drayton to Ellesmere Port (GB71210133) detailed impact assessment - effects on current status

Shropshire Union Canal, Market Drayton to Ellesmere Port (GB71210133)		Watercourse (receptor value):				Detailed Impact Assessment				Detailed Impact Assessment Outcome				
Water body type:	Canal	Scheme component (Unique ID):			Shropshire Union Canal (Very high)				Cumulative effects - effects on quality element from scheme component(s) located in other WFD water bodies	Overall effect on quality element at water body scale	Additional mitigation requirements	Residual effect on quality element at water body scale	WFD compliance outcome - potential for deterioration of current status of quality element at water body scale	
Hydromorphological designation:	Artificial	Description of scheme component:			Shropshire Union Canal Off-line Overbridge (GB71210133-MW-01-OB-01)	Shropshire Union Canal Viaduct No.2 (GB71210133-MW-01-VD-01)	Shropshire Union Canal Viaduct No.1 (GB71210133-MW-01-VD-02)	Shropshire Union Canal Viaduct No.3 (GB71210133-MW-01-VD-03)						
Overall Status (2015):	Moderate	Impact type from scheme component:			Shading	Shading	Shading	Shading	None	None	None	None	Compliant - no deterioration in quality element status anticipated	
Overall Status Objective:	Good by 2021	RBMP Cycle 2 2015 Status	RBMP Cycle 2 Status Objective	2019 Status										
Overall Status (2019):	Moderate													
WFD Status Element	WFD Quality Element	RBMP Cycle 2 2015 Status	RBMP Cycle 2 Status Objective	2019 Status										
Biological	Fish	N/A	N/A	N/A	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated	
	Macroinvertebrates	N/A	N/A	N/A	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated	
	Macrophytes and Phytobenthos - combined	N/A	N/A	N/A	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated	
Physicochemical	Dissolved oxygen	High	Good by 2015	N/A	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated	
	pH	High	Good by 2015	High	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	None	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated	
	Biological dissolved oxygen demand (BOD)	High	Good by 2015	N/A	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	None	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated	
	Ammonia	High	Good by 2015	High	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	None	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated	
	Temperature	High	Good by 2015	High	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated	
Specific Pollutants	Copper, Triclosan, Zinc	N/A	N/A	N/A	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated	
Hydromorphological	Quantity and dynamics of water flow	N/A	N/A	N/A	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated	
	Connection to groundwater bodies				Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated	
	River continuity				Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated	
	River depth and width variation				Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated	
	Structure and substrate of the river bed				Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated	
	Structure of the riparian zone				Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated	
Chemical	Priority substances	Good	Good by 2015	Fail	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated	

Table A.5: Dane (Wheelock to Weaver) (GB112068060470) detailed impact assessment - effects on current status

Dane (Wheelock to Weaver) (GB112068060470)					Detailed Impact Assessment		Detailed Impact Assessment Outcome				
Water body type:	River	Watercourse (receptor value):			River Dane (Very high)		Cumulative effects - effects on quality element from scheme component(s) located in other WFD water bodies	Overall effect on quality element at water body scale	Additional mitigation requirements	Residual effect on quality element at water body scale	WFD compliance outcome - potential for deterioration of current status of quality element at water body scale
Hydromorphological designation:	Not A/HMWB	Scheme component (Unique ID):			River Dane Viaduct (GB112068060470-MW-01-VD-01)						
Overall Status (2015):	Bad	Description of scheme component:									
Overall Status Objective:	Moderate by 2027	Impact type from scheme component:									
Overall Status (2019):	Moderate										
WFD Status Element	WFD Quality Element	RBMP Cycle 2 2015 Status	RBMP Cycle 2 Status Objective	Status 2019	Shading	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream					
Biological	Fish	Good	Good by 2015	Moderate	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Negligible effect anticipated when when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Macroinvertebrates	Bad	Good by 2027	Good	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Negligible effect anticipated when when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Macrophytes and Phytobenthos - combined	Moderate	Moderate by 2015	Moderate	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Negligible effect anticipated when when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Physicochemical	Dissolved oxygen	High	Good by 2015	High	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	None	Negligible effect anticipated when when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	pH	High	Good by 2015	High	Element is insensitive to impact. No measurable change to quality element.	Impacts on element screened out at preliminary assessment stage.	None	Negligible effect anticipated when when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Phosphate	Poor	Poor by 2015	Poor	Element is insensitive to impact. No measurable change to quality element.	Impacts on element screened out at preliminary assessment stage.	None	Negligible effect anticipated when when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Ammonia	High	Good by 2015	High	Element is insensitive to impact. No measurable change to quality element.	Impacts on element screened out at preliminary assessment stage.	None	Negligible effect anticipated when when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Temperature	High	Good by 2015	High	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	None	Negligible effect anticipated when when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Specific Pollutants	Copper, Triclosan, Zinc	High	High by 2015	High	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	None	Negligible effect anticipated when when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Hydromorphological	Quantity and dynamics of water flow	Supports Good	Supports Good by 2015	Supports Good	Impacts on element screened out at preliminary assessment stage.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Negligible effect anticipated when when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Connection to groundwater bodies				Impacts on element screened out at preliminary assessment stage.	Element is insensitive to impact. No measurable change to quality element.	None	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	River continuity				Impacts on element screened out at preliminary assessment stage.	Element is insensitive to impact. No measurable change to quality element.	None	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	River depth and width variation				Impacts on element screened out at preliminary assessment stage.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Negligible effect anticipated when when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Structure and substrate of the river bed				Impacts on element screened out at preliminary assessment stage.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Negligible effect anticipated when when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Structure of the riparian zone				Impacts on element screened out at preliminary assessment stage.	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	None	Localised adverse effect anticipated when when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Chemical	Priority substances	Good	Good by 2015	Fail	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated

Table A.6: Trent and Mersey Canal, summit to Preston Brook Tunnel (GB71210247) detailed impact assessment - effects on current status

Trent and Mersey Canal, summit to Preston Brook Tunnel (GB71210247)		Watercourse (receptor value):			Trent and Mersey Canal (Very High)			Detailed Impact Assessment Outcome				
Water body type:	Canal	Scheme component (Unique ID):			River Dane Viaduct (GB71210247-MW-01-VD-01)	Puddinglake Brook Viaduct (GB71210247-MW-01-VD-02)	Trent and Mersey Canal Viaduct (GB71210247-MW-01-VD-03)	Cumulative effects - effects on quality element from scheme component(s) located in other WFD water bodies	Overall effect on quality element at water body scale	Additional mitigation requirements	Residual effect on quality element at water body scale	WFD compliance outcome - potential for deterioration of current status of quality element at water body scale
Hydromorphological designation:	Artificial	Description of scheme component:			A 14.0m wide x 1.13km RC box girder viaduct comprising 26 spans up to a max. height of 28.9m.	A 14.0m wide x 160m long RC box girder viaduct comprising 4 x 40.0m spans up to a max. height of approx 10m	An approx 14.0m wide x 283m long RC box girder viaduct comprising 4x19.4m span, 2x28.0 span, 2x27.3m span and 1x39 span up to a max. height of approx 12.6m.					
Overall Status (2015):	Moderate	Impact type from scheme component:			Shading	Shading	Shading	None	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Overall Status Objective:	Moderate by 2015											
Overall Status (2019):	Moderate				Shading	Shading	Shading	None	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
WFD Status Element	WFD Quality Element	RBMP Cycle 2 2015 Status	RBMP Cycle 2 Status Objective	2019 Status								
Biological	Fish	N/A	N/A	N/A	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Macroinvertebrates	N/A	N/A	N/A	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Macrophytes and Phytobenthos - combined	N/A	N/A	N/A	N/A	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A
Physicochemical	Dissolved oxygen	N/A	N/A	N/A	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	pH	High	Good by 2015	High	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	None	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Biological dissolved oxygen demand (BOD)	N/A	N/A	N/A	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	None	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Ammonia	N/A	N/A	N/A	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	None	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Temperature	N/A	N/A	N/A	N/A	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A
Specific pollutants	Copper, Triclosan, Zinc	N/A	N/A	N/A	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Hydromorphological	Quantity and dynamics of water flow	N/A	N/A	N/A	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Connection to groundwater bodies				Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	River continuity				Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	River depth and width variation				Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Structure and substrate of the river bed				Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Structure of the riparian zone	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	None	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated	
Chemical	Priority substances	Fail	Fail by 2015	Fail	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated

Table A.7: Puddinglake Brook (GB112068060220) detailed impact assessment - effects on current status

Puddinglake Brook (GB112068060220)		Detailed Impact Assessment				Detailed Impact Assessment Outcome					
Water body type:	River	Watercourse (receptor value):			Puddinglake Brook (High)		Cumulative effects - effects on quality element from scheme component(s) located in other WFD water bodies	Overall effect on quality element at water body scale	Additional mitigation requirements	Residual effect on quality element at water body scale	WFD compliance outcome - potential for deterioration of current status of quality element at water body scale
Hydromorphological designation:	Not A/HMWB	Scheme component (Unique ID):			Puddinglake Brook Viaduct (GB112068060220-MW-01-VD-01)	Puddinglake Brook Overbridge (GB112068060220-MW-01-OB-01)					
Overall Status (2015):	Poor	Description of scheme component:			A 14.0m wide x 160m long RC box girder viaduct comprising 4 x 40.0m spans up to a max. Height of approx 10m.	Wharftoft Hall Lane temporary road realignment	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	Localised adverse effect anticipated when additional mitigation applied. No deterioration in status of quality element anticipated at water body scale.	Compliant - no deterioration in quality element status anticipated
Overall Status Objective:	Good by 2027	Impact type from scheme component:			Shading	Shading					
Overall Status (2019):	Poor	RBMP Cycle 2 2015 Status	RBMP Cycle 2 Status Objective	2019 Status	Shading	Shading	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	Localised adverse effect anticipated when additional mitigation applied. No deterioration in status of quality element anticipated at water body scale.	Compliant - no deterioration in quality element status anticipated
WFD Status Element	WFD Quality Element										
Biological	Fish	N/A	N/A	N/A	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	Localised adverse effect anticipated when additional mitigation applied. No deterioration in status of quality element anticipated at water body scale.	Compliant - no deterioration in quality element status anticipated
	Macroinvertebrates	Moderate	Good by 2027	Moderate	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.					
	Macrophytes and Phytobenthos - combined	Poor	Good by 2027	Poor	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.					
Physicochemical	Dissolved oxygen	High	Good by 2015	Poor	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	Compliant - no deterioration in quality element status anticipated
	pH	High	Good by 2015	High	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.					
	Phosphate	Poor	Good by 2027	Poor	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.					
	Ammonia	Moderate	Good by 2021	Poor	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.					
	Temperature	High	Good by 2015	High	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	Compliant - no deterioration in quality element status anticipated
Specific Pollutants	Copper, Triclosan, Zinc	N/A	N/A	N/A	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.					
Hydromorphological	Quantity and dynamics of water flow	Supports Good	Supports Good by 2015	Supports Good	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.					
	Connection to groundwater bodies				Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.					
	River continuity				Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.					
	River depth and width variation				Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.					
	Structure and substrate of the river bed				Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.					
	Structure of the riparian zone				Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.					
Chemical	Priority substances	Good	Good by 2015	Fail	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated

Table A.12: Birkin Brook - Moberley Brook to River Bollin (including Rossethorne Brook) (GB112069061370) detailed impact assessment - effects on current status

Watercourse (receptor value):					Scheme component (Unique ID):			Detailed Impact Assessment Outcome				
Water body type:	River	Scheme component (Unique ID):			Ashley Railroad Off-line Temporary Culvert North (GB112069061370-T-04-CV-09)			Cumulative effects - effects on quality element from scheme component(s) located in other WFD water bodies	Overall effect on quality element at water body scale	Additional mitigation requirements	Residual effect on quality element at water body scale	WFD compliance outcome - potential for deterioration of current status of quality element at water body scale
Hydromorphological designation:	Not A/HMWI	Description of scheme component:			Temporary culvert for construction railroad. Length approx 50m to be replaced by an open channel after decommission of the Ashley Railroad							
Overall Status (2015):	Bad	Impact type from scheme component:			Footprint	Shading	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Cumulative effects - effects on quality element from scheme component(s) located in other WFD water bodies	Overall effect on quality element at water body scale	Additional mitigation requirements	Residual effect on quality element at water body scale	WFD compliance outcome - potential for deterioration of current status of quality element at water body scale
Overall Status Objective:	Moderate by 2027	Impact type from scheme component:										
Overall Status (2019):	Bad	Impact type from scheme component:			Footprint	Shading	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Cumulative effects - effects on quality element from scheme component(s) located in other WFD water bodies	Overall effect on quality element at water body scale	Additional mitigation requirements	Residual effect on quality element at water body scale	WFD compliance outcome - potential for deterioration of current status of quality element at water body scale
WFD Status Element	WFD Quality Element	RBMP Cycle 2 2015 Status	RBMP Cycle 2 Status Objective	Status 2019								
Biological	Fish	Bad	Good by 2027	Bad	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Macroinvertebrates	High	Good by 2015	High	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Macrophytes and Phytobenthos - combined	Moderate	Moderate by 2015	Moderate	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Physicochemical	Dissolved oxygen	Poor	Good by 2027	High	Impacts on element screened out at preliminary assessment stage.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	pH	High	Good by 2015	High	Impacts on element screened out at preliminary assessment stage.	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	None	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Phosphate	Moderate	Moderate by 2015	Good	Impacts on element screened out at preliminary assessment stage.	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	None	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Ammonia	High	Good by 2015	High	Impacts on element screened out at preliminary assessment stage.	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	None	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Temperature	High	Good by 2015	High	Impacts on element screened out at preliminary assessment stage.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Element is insensitive to impact. No measurable change to quality element.	None	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Specific Pollutants	Copper, Triclosan, Zinc	High	High by 2015	High	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	None	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Hydromorphological	Quantity and dynamics of water flow	Supports Good	Supports Good by 2015	Supports Good	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Connection to groundwater bodies				Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	Element is insensitive to impact. No measurable change to quality element.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	River continuity				Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	Element is insensitive to impact. No measurable change to quality element.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	River depth and width variation				Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Structure and substrate of the river bed				Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Structure of the riparian zone				Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	Element is insensitive to impact. No measurable change to quality element.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Chemical	Priority substances	Good	Good by 2015	Fail	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated

Table A.14: Sugar Brook (GB112069061350) detailed impact assessment - effects on current status

Sugar Brook (GB112069061350)					Tributary of Sugar Brook (Moderate)			Detailed Impact Assessment Outcome				
Water body type:	River	Watercourse (receptor value):			Tributary of Sugar Brook (Moderate)			Cumulative effects - effects on quality element from scheme component(s) located in other WFD water bodies	Overall effect on quality element at water body scale	Additional mitigation requirements	Residual effect on quality element at water body scale	WFD compliance outcome - potential for deterioration of current status of quality element at water body scale
Hydromorphological designation:	Not A/HMWB	Scheme component (Unique ID):			Extension of existing culvert (GB112069061350-T-02-CVX-01)							
Overall Status (2015):	Moderate	Description of scheme component:			Tributary crosses Ashley Railhead footprint adjacent to existing railway culvert.							
Overall Status Objective:	Good by 2027	Impact type from scheme component:										
Overall Status (2019):	Moderate				Footprint	Shading	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream					
WFD Status Element	WFD Quality Element	RBMP Cycle 2 2015 Status	RBMP Cycle 2 Status Objective	Status 2019								
Biological	Fish	N/A	N/A	N/A	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Macroinvertebrates	Good	Good by 2015	High	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Macrophytes and Phytobenthos-combined	Moderate	Good by 2027	Moderate	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Physicochemical	Dissolved oxygen	High	Good by 2015	High	Impacts on element screened out at preliminary assessment stage.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	pH	High	Good by 2015	High	Impacts on element screened out at preliminary assessment stage.	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	None	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Phosphate	Moderate	Good by 2027	Moderate	Impacts on element screened out at preliminary assessment stage.	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	None	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Ammonia	High	Good by 2015	High	Impacts on element screened out at preliminary assessment stage.	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	None	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Temperature	High	Good by 2015	High	Impacts on element screened out at preliminary assessment stage.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Element is insensitive to impact. No measurable change to quality element.	None	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Specific Pollutants	Copper, Triclosan, Zinc	High	N/A	N/A	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Hydromorphological	Quantity and dynamics of water flow	Supports Good	Supports Good by 2015	Supports Good	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Connection to groundwater bodies				Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	Element is insensitive to impact. No measurable change to quality element.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	River continuity				Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	River depth and width variation				Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Structure and substrate of the river bed				Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Structure of the riparian zone				Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	Element is insensitive to impact. No measurable change to quality element.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Chemical	Priority substances	Good	Good by 2015	Fail	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated

Table A.15: Bollin (River Dean to Ashley Mill) (GB112069061381) detailed impact assessment - effects on current status

Bollin (River Dean to Ashley Mill) (GB112069061381)					Additional mitigation requirements	Residual effect on quality element at water body scale	WFD compliance outcome - potential for deterioration of current status of quality element at water body scale
Water body type:	River	Watercourse (receptor value):					
Hydromorphological designation:	Not A/HMWB	Scheme component (Unique ID):					
Overall Status (2015):	Moderate	Description of scheme component:					
Overall Status Objective:	Moderate by 2015	Impact type from scheme component:					
Overall Status (2019):	Moderate						
WFD Status Element	WFD Quality Element	RBMP Cycle 2 2015 Status	RBMP Cycle 2 Status Objective	Status 2019			
Biological	Fish	Moderate	Good by 2027	Moderate	Additional mitigation for the footprint impacts of multiple culverts has been identified and is partially included in the design of realignments. However there is some uncertainty over how naturalised the realignments can be in this location and also how essential the smaller watercourses are for biological quality elements. Further investigations will be undertaken in consultation with the Environment Agency and other stakeholders, to identify appropriate mitigation measures to mitigate any significant effects on hydromorphology from the cumulative impact of culverts and road drainage. On a precautionary basis, until such time as these investigations are carried out, a residual significant effect will remain.	Widespread adverse effect anticipated until mitigation is confirmed. Potential deterioration in status of quality element at water body scale.	Non compliant - risk of deterioration from current status
	Macroinvertebrates	N/A	N/A	Moderate	Additional mitigation for the footprint impacts of multiple culverts has been identified and is partially included in the design of realignments. However there is some uncertainty over how naturalised the realignments can be in this location and also how essential the smaller watercourses are for biological quality elements. Further investigations will be undertaken in consultation with the Environment Agency and other stakeholders, to identify appropriate mitigation measures to mitigate any significant effects on hydromorphology from the cumulative impact of culverts and road drainage. On a precautionary basis, until such time as these investigations are carried out, a residual significant effect will remain.	Widespread adverse effect anticipated until mitigation is confirmed. Potential deterioration in status of quality element at water body scale.	Non compliant - risk of deterioration from current status
	Macrophytes and Phytobenthos - combined	N/A	N/A	Good	Additional mitigation for the footprint impacts of multiple culverts has been identified and is partially included in the design of realignments. However there is some uncertainty over how naturalised the realignments can be in this location and also how essential the smaller watercourses are for biological quality elements. Further investigations will be undertaken in consultation with the Environment Agency and other stakeholders, to identify appropriate mitigation measures to mitigate any significant effects on hydromorphology from the cumulative impact of culverts and road drainage. On a precautionary basis, until such time as these investigations are carried out, a residual significant effect will remain.	Widespread adverse effect anticipated until mitigation is confirmed. Potential deterioration in status of quality element at water body scale.	Non compliant - risk of deterioration from current status
Physicochemical	Dissolved oxygen	High	Good by 2015	High	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	pH	High	Good by 2015	High	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Phosphate	Poor	Moderate by 2027	Poor	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Ammonia	Poor	Good by 2027	Moderate	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Temperature	High	Good by 2015	High	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Specific Pollutants	Copper, Triclosan, Zinc	N/A	N/A	N/A	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Hydromorphological	Quantity and dynamics of water flow				N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Connection to groundwater bodies				N/A	N/A	Compliant - no deterioration in quality element status anticipated
	River continuity	Supports Good	Supports Good by 2015	Supports Good	Additional mitigation for the footprint impacts of culverts has been identified and is partially included in the design of realignments. However there is some uncertainty over how naturalised the realignments can be in this location. Further investigations will be undertaken in consultation with the Environment Agency and other stakeholders, to confirm the most appropriate mitigation measures to mitigate the combined effects of culverts on watercourses. On a precautionary basis, until such time as these investigations are carried out, a residual significant effect will remain.	Widespread adverse effect anticipated until mitigation is confirmed. Potential deterioration in status of quality element at water body scale.	Non compliant - risk of deterioration from current status
	River depth and width variation				Additional mitigation for the footprint impacts of culverts has been identified and is partially included in the design of realignments. However there is some uncertainty over how naturalised the realignments can be in this location. Further investigations will be undertaken in consultation with the Environment Agency and other stakeholders, to confirm the most appropriate mitigation measures to mitigate the combined effects of culverts on watercourses. On a precautionary basis, until such time as these investigations are carried out, a residual significant effect will remain.	Widespread adverse effect anticipated until mitigation is confirmed. Potential deterioration in status of quality element at water body scale.	Non compliant - risk of deterioration from current status
	Structure and substrate of the river bed				N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Structure of the riparian zone				Additional mitigation for the footprint impacts of culverts has been identified and is partially included in the design of realignments. However there is some uncertainty over how naturalised the realignments can be in this location. Further investigations will be undertaken in consultation with the Environment Agency and other stakeholders, to confirm the most appropriate mitigation measures to mitigate the combined effects of culverts on watercourses. On a precautionary basis, until such time as these investigations are carried out, a residual significant effect will remain.	Widespread adverse effect anticipated until mitigation is confirmed. Potential deterioration in status of quality element at water body scale.	Non compliant - risk of deterioration from current status
Chemical	Priority substances	Good	Good by 2015	Fail	N/A	N/A	Compliant - no deterioration in quality element status anticipated

Table A.16: Timperley Brook (GB112069061260) detailed impact assessment - effects on current status

Timperley Brook (GB112069061260)											
Water body type:	River	Watercourse (receptor value):									
Hydromorphological designation:	HMWB	Scheme component (Unique ID):			Manchester Airport High Speed Station Cutting Retaining Wall (GB112069061260-MW-01-CU-01)	Highway Drainage - M56 East and West Link Realignment/ Access to Manchester Airport High Speed Station/ Rungler Lane Realignment (GB112069061260-MW-01-HD-01)					
Overall Status (2015):	Moderate	Description of scheme component:			<i>Manchester Airport High Speed cutting is approx. 255m in length, with a maximum of 15.5m cutting depth. The cutting will penetrate the glacial till and the Mercia Mudstone Group. The Manchester Airport High Speed cutting retaining wall north is 1.8km in length, all of which will be below ground level.</i>	<i>Road drainage outfall from M56 East and West Link Realignment/ Access to Manchester Airport High Speed Station/ Rungler Lane Realignment: Drains to timperley siphon. Fails HEWRAT assessment, but passed further metal bioavailability assessment resulting in minor localised effects.</i>	Cumulative effects - effects on quality element from scheme component(s) located in other WFD water bodies	Overall effect on quality element at water body scale	Additional mitigation requirements	Residual effect on quality element at water body scale	WFD compliance outcome - potential for deterioration of current status of quality element at water body scale
Overall Status Objective:	Good by 2027	Impact type from scheme component:									
Overall Status (2019):	Moderate										
WFD Status Element	WFD Quality Element	RBMP Cycle 2 2015 Status	RBMP Cycle 2 Status Objective	Status 2019	Changes in flow velocity and volume / Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Drainage (changes in water quantity or quality due to discharge of surface water runoff to surface water body);					
Biological	Fish	N/A	N/A	N/A	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	Additional mitigation for the effects of the siphon and highway drainage has now been embedded in the design at AP2. No further mitigation is required.	N/A	Compliant - no deterioration in quality element status anticipated
	Macroinvertebrates	Moderate	Good by 2027	Moderate	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	Additional mitigation for the effects of the siphon and highway drainage has now been embedded in the design at AP2. No further mitigation is required.	N/A	Compliant - no deterioration in quality element status anticipated
	Macrophytes and Phytobenthos - combined	Moderate	Good by 2027	Moderate	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	Additional mitigation for the effects of the siphon and highway drainage has now been embedded in the design at AP2. No further mitigation is required.	N/A	Compliant - no deterioration in quality element status anticipated
Physicochemical	Dissolved oxygen	Good	Good by 2015	Good	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	pH	High	Good by 2015	High	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	None	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Phosphate	Moderate	Good by 2027	Moderate	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	None	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Ammonia	Good	Good by 2015	Moderate	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	None	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Temperature	High	Good by 2015	High	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	None	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Specific Pollutants	Copper, Triclosan, Zinc	High	High by 2015	High	Impacts on element screened out at preliminary assessment stage.	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	Additional mitigation for the effects of the siphon and highway drainage has now been embedded in the design at AP2. No further mitigation is required.	N/A	Compliant - no deterioration in quality element status anticipated
Hydromorphological	Quantity and dynamics of water flow	Supports Good	Supports Good by 2015	Supports Good	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Connection to groundwater bodies				Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	River continuity				Element is insensitive to impact. No measurable change to quality element.	Impacts on element screened out at preliminary assessment stage.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	Additional mitigation for the effects of the siphon and highway drainage has now been embedded in the design at AP2. No further mitigation is required.	N/A	Compliant - no deterioration in quality element status anticipated
	River depth and width variation				Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Structure and substrate of the river bed				Element is insensitive to impact. No measurable change to quality element.	Impacts on element screened out at preliminary assessment stage.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Structure of the riparian zone				Element is insensitive to impact. No measurable change to quality element.	Impacts on element screened out at preliminary assessment stage.	None	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Chemical	Priority substances	Good	Good by 2015	Fail	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	None	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated

Table A.17: Sinderland Brook (Fairywell Brook and Baguley Brook) (GB112069061270) detailed impact assessment - effects on current status

Sinderland Brook (Fairywell Brook and Baguley Brook) (GB112069061270)											
Water body type:	River	Watercourse (receptor value):			Baguley Brook (Moderate)	Mill Brook (Moderate)	Detailed Impact Assessment Outcome				
Hydromorphological designation:	HMWB	Scheme component (Unique ID):			Manchester Tunnel GB112069061270-MW-03-BT-01 Altrincham Road Vent Shaft	Manchester Tunnel GB112069061270-T-02-BT-01	Cumulative effects - effects on quality element from scheme component(s) located in other WFD water bodies	Overall effect on quality element at water body scale	Additional mitigation requirements	Residual effect on quality element at water body scale	WFD compliance outcome - potential for deterioration of current status of quality element at water body scale
Overall Status (2015):	Moderate	Description of scheme component:			Consists of twin bored tunnels 12.8km in length, 7.55m internal diameter, and max. 43.0m deep. There are 37 cross passages. Altrincham Road Vent Shaft has a 24.0m internal diameter and is up to 48.6m bgl	Consists of twin bored tunnels 12.8km in length, 7.55m internal diameter, and max. 43.0m deep. There are 37 cross passages.					
Overall Status Objective:	Good by 2027	Impact type from scheme component:			Changes in flow velocity and volume	Impacts from bored tunnel are scoped out of detailed impact assessment at Preliminary Assessment stage, unless flagged as a risk in Groundwater WFD assessment					
Overall Status (2019):	Moderate	RBMP Cycle 2 2015 Status	RBMP Cycle 2 Status Objective	Status 2019							
WFD Status Element	WFD Quality Element	RBMP Cycle 2 2015 Status	RBMP Cycle 2 Status Objective	Status 2019	Changes in flow velocity and volume	Impacts from bored tunnel are scoped out of detailed impact assessment at Preliminary Assessment stage, unless flagged as a risk in Groundwater WFD assessment	Cumulative effects - effects on quality element from scheme component(s) located in other WFD water bodies	Overall effect on quality element at water body scale	Additional mitigation requirements	Residual effect on quality element at water body scale	WFD compliance outcome - potential for deterioration of current status of quality element at water body scale
Biological	Fish	N/A	N/A	N/A	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	N/A	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Macroinvertebrates	N/A	N/A	Poor	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	N/A	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Macrophytes and Phytobenthos - combined	N/A	N/A in 2015	N/A	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	N/A	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Physicochemical	Dissolved oxygen	High	Good by 2015	High	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	N/A	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	pH	High	Good by 2015	High	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	N/A	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Phosphate	Moderate	Good by 2027	Poor	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	N/A	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Ammonia	High	Good by 2015	High	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	N/A	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Temperature	High	Good by 2015	High	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	N/A	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Specific Pollutants	Copper, Triclosan, Zinc	High	High by 2015	High	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	N/A	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Hydromorphological	Quantity and dynamics of water flow	Supports Good	Supports Good by 2015	Supports Good	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	N/A	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Connection to groundwater bodies				Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	N/A	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	River continuity				Element is insensitive to impact. No measurable change to quality element.	Impacts on element screened out at preliminary assessment stage.	N/A	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	River depth and width variation				Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	N/A	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Structure and substrate of the river bed				Element is insensitive to impact. No measurable change to quality element.	Impacts on element screened out at preliminary assessment stage.	N/A	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Structure of the riparian zone				Element is insensitive to impact. No measurable change to quality element.	Impacts on element screened out at preliminary assessment stage.	N/A	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Chemical	Priority substances	Good	Good by 2015	Fail	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	N/A	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated

Table A.18: Mersey (upstream of Manchester Ship Canal) (GB112069061030) detailed impact assessment - effects on current status

Mersey (upstream of Manchester Ship Canal) (GB112069061030)		Watercourse (receptor value):			Detailed Impact Assessment			Detailed Impact Assessment Outcome				
Water body type:	River	Scheme component (Unique ID):			River Mersey (Very high)	Tributary of River Mersey 2 (Moderate)		Cumulative effects - effects on quality element from scheme component(s) located in other WFD water bodies	Overall effect on quality element at water body scale	Additional mitigation requirements	Residual effect on quality element at water body scale	WFD compliance outcome - potential for deterioration of current status of quality element at water body scale
Hydromorphological designation:	HMWB	Description of scheme component:			Manchester Tunnel GB112069061030-MW-01-BT-01	Manchester Tunnel GB112069061030-T-02-BT-01						
Overall Status (2015):	Moderate	Impact type from scheme component:			Consists of twin bored tunnels 12.8km in length, 7.55m internal diameter, and max. 43.0m deep. There are 37 cross passages.	Consists of twin bored tunnels 12.8km in length, 7.55m internal diameter, and max. 43.0m deep. There are 37 cross passages. Palatine Road Vent Shaft is 41.5m by 51.0m internal diameter and depth of 36.6m bgl						
Overall Status Objective:	Moderate by 2015	Impact type from scheme component:			Impacts from bored tunnel are scoped out of detailed impact assessment at Preliminary Assessment stage, unless flagged as a risk in Groundwater WFD assessment	Changes in flow velocity and volume / Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Changes in water quality due to discharge of groundwater to surface water body					
Overall Status (2019):	Moderate	RBMP Cycle 2 2015 Status	RBMP Cycle 2 Status Objective	Status 2019								
WFD Status Element	WFD Quality Element	RBMP Cycle 2 2015 Status	RBMP Cycle 2 Status Objective	Status 2019								
Biological	Fish	N/A	N/A	N/A	Impacts on element screened out at preliminary assessment stage.	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Macroinvertebrates	N/A	N/A	N/A	Impacts on element screened out at preliminary assessment stage.	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Macrophytes and Phytobenthos - combined	N/A	N/A	N/A	Impacts on element screened out at preliminary assessment stage.	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Physicochemical	Dissolved oxygen	High	Good by 2015	High	Impacts on element screened out at preliminary assessment stage.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	Element is insensitive to impact. No measurable change to quality element.	N/A	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	pH	High	Good by 2015	High	Impacts on element screened out at preliminary assessment stage.	Element is insensitive to impact. No measurable change to quality element.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Phosphate	Poor	Poor by 2015	Poor	Impacts on element screened out at preliminary assessment stage.	Element is insensitive to impact. No measurable change to quality element.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Ammonia	Good	Good by 2015	Good	Impacts on element screened out at preliminary assessment stage.	Element is insensitive to impact. No measurable change to quality element.	Negligible effect anticipated when balanced against embedded mitigation. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	Negligible effect anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Temperature	High	Good by 2015	High	Impacts on element screened out at preliminary assessment stage.	Element is insensitive to impact. No measurable change to quality element.	Element is insensitive to impact. No measurable change to quality element.	N/A	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Specific Pollutants	Copper, Triclosan, Zinc	High	High by 2015	High	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	N/A	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Hydromorphological	Quantity and dynamics of water flow	Supports Good	Supports Good by 2015	Supports Good	Impacts on element screened out at preliminary assessment stage.	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	N/A	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Connection to groundwater bodies				Impacts on element screened out at preliminary assessment stage.	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	N/A	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	River continuity				Impacts on element screened out at preliminary assessment stage.	Element is insensitive to impact. No measurable change to quality element.	Impacts on element screened out at preliminary assessment stage.	N/A	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	River depth and width variation				Impacts on element screened out at preliminary assessment stage.	Localised adverse effect anticipated when balanced against embedded mitigation. However, no deterioration in status of quality element anticipated at the water body scale. Additional mitigation not required.	Impacts on element screened out at preliminary assessment stage.	N/A	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Structure and substrate of the river bed				Impacts on element screened out at preliminary assessment stage.	Element is insensitive to impact. No measurable change to quality element.	Impacts on element screened out at preliminary assessment stage.	N/A	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
	Structure of the riparian zone				Impacts on element screened out at preliminary assessment stage.	Element is insensitive to impact. No measurable change to quality element.	Impacts on element screened out at preliminary assessment stage.	N/A	Element is insensitive to impact. No measurable change to quality element.	N/A	N/A	Compliant - no deterioration in quality element status anticipated
Chemical	Priority substances	Good	Good by 2015	Fail	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	Impacts on element screened out at preliminary assessment stage.	N/A	Impacts on element screened out at preliminary assessment stage.	N/A	N/A	Compliant - no deterioration in quality element status anticipated

Table A.19: Fallowfield Brook (GB112069061410) detailed impact assessment - effects on current status

Fallowfield Brook (GB112069061410)					Cringle Brook (Moderate)			Detailed Impact Assessment Outcome					
Water body type:		Watercourse (receptor value):			Scheme component (Unique ID):			Cumulative effects - effects on quality element from scheme component(s) located in other WFD water bodies	Overall effect on quality element at water body scale	Additional mitigation requirements	Residual effect on quality element at water body scale	WFD compliance outcome - potential for deterioration of current status of quality element at water body scale	
Hydromorphological designation:		Description of scheme component:			Impact type from scheme component:								
Overall Status (2015):		Overall Status Objective:			Overall Status (2019):			Impacts from bored tunnel are scoped out of detailed impact assessment at Preliminary Assessment stage, unless flagged as a risk in Groundwater WFD assessment	None	None	N/A	None	
Overall Status (2019):		Overall Status (2015):			Overall Status Objective:								
WFD Status Element	WFD Quality Element	RBMP Cycle 2 2015 Status	RBMP Cycle 2 Status Objective	Status 2019									
Biological	Fish	N/A	N/A	N/A	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated	
	Macroinvertebrates	N/A	N/A	Moderate	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated	
	Macrophytes and Phytobenthos - combined	N/A	N/A	N/A	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated	
Physicochemical	Dissolved oxygen	High	Good by 2015	High	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated	
	pH	High	Good by 2015	High	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated	
	Phosphate	Moderate	Good by 2027	Moderate	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated	
	Ammonia	Good	Good by 2015	High	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated	
	Temperature	High	Good by 2015	High	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated	
Specific Pollutants	Copper, Triclosan, Zinc	High	High by 2015	High	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated	
Hydromorphological	Quantity and dynamics of water flow	Supports Good	Supports Good by 2015	Supports Good	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated	
	Connection to groundwater bodies				-	-	-	None	None	N/A	None	None	Compliant - no deterioration in quality element status anticipated
	River continuity				-	-	-	None	None	N/A	None	None	Compliant - no deterioration in quality element status anticipated
	River depth and width variation				-	-	-	None	None	N/A	None	None	Compliant - no deterioration in quality element status anticipated
	Structure and substrate of the river bed				-	-	-	None	None	N/A	None	None	Compliant - no deterioration in quality element status anticipated
Structure of the riparian zone	-	-	-	None	None	N/A	None	None	None	Compliant - no deterioration in quality element status anticipated			
Chemical	Priority substances	Good	Good by 2015	Fail	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated	

Table A.20: Platt Brook (Source to Fallowfield Brook) (GB112069061060) detailed impact assessment - effects on current status

Platt Brook (Source to Fallowfield Brook) (GB112069061060)		Watercourse (receptor value):			Fallowfield Brook (Moderate)		Gora Brook (Moderate)			Detailed Impact Assessment Outcome									
Water body type:	River	Scheme component (Unique ID):			Manchester Tunnel GB112069061060-MW-01-BT-01		Manchester Tunnel GB112069061060-MW-03-BT-01			Cumulative effects - effects on quality element from scheme component(s) located in other WFD water bodies	Overall effect on quality element at water body scale	Additional mitigation requirements	Residual effect on quality element at water body scale	WFD compliance outcome - potential for deterioration of current status of quality element at water body scale					
Hydromorphological designation:	HMW/B	Description of scheme component:			Consists of twin bored tunnels 12.8km in length, 7.55m internal diameter, and max. 43.0m deep. There are 37 cross passages.		Consists of twin bored tunnels 12.8km in length, 7.55m internal diameter, and max. 43.0m deep. There are 37 cross passages.												
Overall Status (2015):	Moderate	Impact type from scheme component:			Impacts from bored tunnel are scoped out of detailed impact assessment at Preliminary Assessment stage, unless flagged as a risk in Groundwater WFD assessment														
Overall Status Objective:	Good by 2027	RBMP Cycle 2 2015 Status	RBMP Cycle 2 Status Objective	Status 2019															
Overall Status (2019):	Moderate																		
Biological	WFD Status Element	WFD Quality Element																	
		Fish	N/A	N/A	N/A	-	-	-	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated			
		Macroinvertebrates	Bad	Good by 2027	Bad	-	-	-	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated			
Physicochemical		Macrophytes and Phytobenthos - combined	Good	Good by 2015	Good	-	-	-	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated			
		Dissolved oxygen	High	Good by 2015	High	-	-	-	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated			
		pH	High	Good by 2015	High	-	-	-	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated			
		Phosphate	Poor	Good by 2027	Poor	-	-	-	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated			
		Ammonia	Moderate	Good by 2027	Good	-	-	-	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated			
Specific Pollutants		Temperature	High	Good by 2015	High	-	-	-	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated			
		Copper, Triclosan, Zinc	High	High by 2015	High	-	-	-	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated			
Hydromorphological		Quantity and dynamics of water flow	Supports Good	Supports Good by 2015	Supports Good	-	-	-	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated			
		Connection to groundwater bodies				-	-	-	-	-	-	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated
		River continuity				-	-	-	-	-	-	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated
		River depth and width variation				-	-	-	-	-	-	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated
		Structure and substrate of the river bed				-	-	-	-	-	-	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated
		Structure of the riparian zone				-	-	-	-	-	-	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated
Chemical		Priority substances	Good	Good by 2015	Fail	-	-	-	-	-	-	None	None	N/A	None	Compliant - no deterioration in quality element status anticipated			

Table A22: Weaver and Dam Quaternary Sand and Gravel Aquifer

Weaver and Dam Quaternary Sand and Gravel Aquifer's (GB 1020091700) (Secondary aquifer (sand/gravel))				Detailed Impact Assessment	
EA Management Catchment	North West GW	Scheme component (ID)		GB1020091700-CB-115	
Overall Status (2015):	Poor	Scheme component type		Cutting with retaining structure	
		Scheme component name		Hoo Green South cutting retaining wall	
Overall Status Objective:	Good by 2027	Impact type from scheme component			
WFD Status Element	WFD Quality Element	2015 RBSP Cycle 2 Status	2015 RBSP Cycle 2 Status Objective	2019 Status	<p>Lowering of groundwater levels and potential reduction in groundwater contributions to surface water bodies, GWOTE or groundwater abstractions by temporary dewatering/permanent groundwater control</p> <p>'Damming' of groundwater flow and reduction in groundwater contributions</p>
Quantitative	Quantitative Saline Intrusions	Good	Good	Good	<p>The temporary dewatering will dewater groundwater levels but will have no measurable change on saline intrusions. Permanent secure sheet piling retaining walls are to be built along the entire length of the Hoo Green cutting thereby significantly reducing the requirement for dewatering.</p> <p>No measurable change due to scale of works relative to water body, shallow depth of works and embedded mitigation.</p>
	Quantitative Water Balance	Good	Good	Good	<p>The temporary dewatering will dewater groundwater levels but will have no measurable change on water balance. Permanent secure sheet piling retaining walls are to be built along the entire length of the Hoo Green cutting thereby significantly reducing the requirement for dewatering.</p> <p>Some localized damming effects may be encountered but not likely to be significant on the waterbody scale.</p>
	Groundwater Dependent Terrestrial Ecosystems (GWOTEs) Test	Good	Good	Good	<p>Belt Wood (W1) and 1B1 is a potential GWOTE 100m east of the Proposed scheme component. The upper reaches of Tabby Brook 8, which runs through Belt Wood, are within the potential zone of influence of the cutting. This zone includes any checker flows within the potential zone of influence of the Proposed Scheme will be discharged into a watercourse. Some changes should compensate for some of reduction in groundwater contribution.</p> <p>Belt Wood (W1) and 1B1 is a potential GWOTE 100m east of the Proposed scheme component. The retaining wall has the potential to intercept groundwater flow to the Tributary of Tabby Brook 8 which runs through Belt Wood. A small proportion of groundwater may be intercepted that will otherwise discharge to this watercourse. Some change from the Proposed Scheme will be discharged into a watercourse upstream of Belt Wood which should compensate for some of the flow lost.</p>
	Quantitative Dependent Surface Water Body	Good	Good	Good	<p>No measurable change due to scale of works relative to water body, shallow depth of works and embedded mitigation.</p> <p>The retaining structure has the potential to dewater groundwater flow to the Tributary of Tabby Brook 8 and 9, localized effects anticipated due to scale of works and embedded mitigation.</p>
Chemical	Chemical Saline Intrusions	Good	Good	Good	<p>No measurable change due to embedded mitigation - i.e. no or minimal dewatering/permanent groundwater control required.</p> <p>No measurable change due to embedded mitigation - i.e. no or minimal dewatering/permanent groundwater control required.</p>
	Chemical Drinking Water Protected Areas (DWPAAs)	Good	Good	Good	<p>None in community area (MAG).</p> <p>None in community area (MAG).</p>
	Chemical Groundwater Dependent Terrestrial Ecosystems (GWOTEs) Test	Poor	Good by 2027	Poor	<p>Belt Wood (GWOTE) is located 100m down hydraulic gradient of the proposed scheme component. However, no measurable change anticipated due to the scale of works and embedded mitigation.</p> <p>Belt Wood (GWOTE) is located 100m down hydraulic gradient of the proposed scheme component. However, no measurable change anticipated due to the scale of works and embedded mitigation.</p>
	Chemical Dependent Surface Water Body	Poor	Good by 2027	Poor	<p>The temporary works have the potential to affect groundwater quality to Tributary of Tabby Brook 8 and 9, although this is likely to be localized and temporary. This will be mitigated through the implementation of the draft C&P.</p> <p>The temporary works have the potential to affect groundwater quality to Tributary of Tabby Brook 8 and 9, although this is likely to be localized and temporary. This will be mitigated through the implementation of the draft C&P.</p>
	General Chemical Test	Poor	Good by 2027	Poor	<p>No measurable change due to embedded mitigation - i.e. no or minimal dewatering/permanent groundwater control required.</p> <p>No measurable change due to embedded mitigation - i.e. no or minimal dewatering/permanent groundwater control required.</p>

Table A23: Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone Aquifers (GB41201G101700) detailed impact assessment - effects on current status

Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone Aquifers (GB41201G101700) (Principal aquifer)		Detailed Impact Assessment				Detailed Impact Assessment				Detailed Impact Assessment				Detailed Impact Assessment				Detailed Impact Assessment Outcome											
EA Management Catchment:	North West GW	Scheme component (ID):				GB41201G101700-C-01				GB41201G101700-DF-02				GB41202G991700-HD-13a				GB41202G991700-HD-21a				Cumulative effects - effects on quality element from scheme component(s) located in other WFD water bodies	Overall effect on quality element at water body scale	Additional mitigation requirements	Residual effect on quality element at water body scale	WFD compliance outcome - potential for deterioration of current status of quality element at water body scale			
Overall Status (2015):	Poor	Scheme component type				Cutting				Overbridge Foundations				Highways Drainage discharge				Highways Drainage discharge											
Overall Status Objective:	Good by 2027	Impact type from scheme component				Millington cutting				Millington Lane overbridge				3 Highways Drainage discharges into Culbreth Linear Drain 1				BS207 Withon Lane Highways Drainage discharge to ground											
WFD Status Element	WFD Quality Element	2015 RBMP Cycle 2 Status	2015 RBMP Cycle 2 Status Objective	2019 Status	Lowering of groundwater levels and potential reduction in groundwater contributions to surface water bodies, GWDE or groundwater abstractions by temporary dewatering/permanent groundwater control	"Damping" of groundwater flow and reduction in groundwater contributions	"Damping" of groundwater flow and reduction in groundwater contributions	"Damping" of groundwater flow and reduction in groundwater contributions	"Damping" of groundwater flow and reduction in groundwater contributions	"Damping" of groundwater flow and reduction in groundwater contributions	"Damping" of groundwater flow and reduction in groundwater contributions	"Damping" of groundwater flow and reduction in groundwater contributions	"Damping" of groundwater flow and reduction in groundwater contributions	"Damping" of groundwater flow and reduction in groundwater contributions	"Damping" of groundwater flow and reduction in groundwater contributions	"Damping" of groundwater flow and reduction in groundwater contributions	"Damping" of groundwater flow and reduction in groundwater contributions	"Damping" of groundwater flow and reduction in groundwater contributions	"Damping" of groundwater flow and reduction in groundwater contributions	"Damping" of groundwater flow and reduction in groundwater contributions	"Damping" of groundwater flow and reduction in groundwater contributions	"Damping" of groundwater flow and reduction in groundwater contributions	"Damping" of groundwater flow and reduction in groundwater contributions	"Damping" of groundwater flow and reduction in groundwater contributions	"Damping" of groundwater flow and reduction in groundwater contributions	"Damping" of groundwater flow and reduction in groundwater contributions	"Damping" of groundwater flow and reduction in groundwater contributions	"Damping" of groundwater flow and reduction in groundwater contributions	"Damping" of groundwater flow and reduction in groundwater contributions
Quantitative	Quantitative Saline Intrusions	Poor	Good by 2027	Poor	No measurable change expected from saline intrusions due to scale of works relative to water body scale.			No measurable change expected from saline intrusions due to scale of works relative to water body scale.												None identified	No measurable change anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	No measurable change anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated.	Compliant - no deterioration in quality element status anticipated					
	Quantitative Water Balance	Good	Good by 2015	Good	Localised and temporary effect when balanced against embedded mitigation. Cutting is 11m deep and extends for 140m and intersects Agden Brook. No information on groundwater levels in the sandstone in this area, so on a precautionary basis assumed to be at ground level. Dewatering likely to be required due to depth of groundwater and nature of works. Therefore lowering in groundwater levels anticipated which could impact water balance in this small area of Sandstone.			No measurable change due to scale of works and embedded mitigation.												None identified	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale.	Compliant - no deterioration in quality element status anticipated					
	Groundwater Dependent Terrestrial Ecosystems (GWDEs) Test	Good	Good by 2015	Good	Millington cutting radius of influence includes part of Rosethorne Mere and Yarwood Heath Covert. Groundwater in this area could be intercepted and lowered within the radius of influence. Impact anticipated on groundwater springs from Rosethorne Mere Ramsar site/SSSI. Track drainage from the cutting will be pumped to recharge trenches above the mere to ensure no measurable change on water levels in Rosethorne Mere. The timing of the recharge may be different to the timing of natural groundwater discharge. However, the additional discharge from the extended area of the cuttings would mean that the total discharge exceeds the natural groundwater discharge area.			None present within or in close proximity down-hydraulic gradient of RO1.													None identified	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale.	Compliant - no deterioration in quality element status anticipated				
	Quantitative Dependent Surface Water Body	Good	Good by 2015	Good	Agden Brook is within the radius of influence of Millington cutting so groundwater level may be reduced in proximity to the watercourse. However, this watercourse is likely to be supported by the overlying superficial deposits rather than the Sandstone. Any water intercepted by the drainage system would be discharged into Agden Brook approximately 80m downstream of the Proposed Scheme so there would be a reduction in flow along this stretch of the Agden Brook reach, leading to a minor localised impact on groundwater flow to Agden Brook.			None present within or in close proximity down-hydraulic gradient of RO1.													None identified	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale. Additional mitigation not required.	N/A	Localised adverse effect anticipated when scheme component effects considered in combination. However no deterioration in status of quality element anticipated at water body scale.	Compliant - no deterioration in quality element status anticipated				
					Disturbing or mobilising existing poor quality groundwater by temporary dewatering or depressionation and permanent groundwater control	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate	Creating or altering of pathways along which existing poor quality groundwater can migrate
Chemical	Chemical Saline Intrusions	Poor	Good by 2027	Poor	No measurable change expected from saline intrusions due to scale of works relative to water body scale.			No measurable change due to embedded mitigation - i.e. no or minimal dewatering/permanent groundwater control required.												None identified	No measurable change anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	No measurable change anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated.	Compliant - no deterioration in quality element status anticipated					
	Chemical Drinking Water Protected Areas (DWWAs)	Poor	Good by 2027	Poor	None in community area MA06.			None in community area MA06.													None identified	No measurable change anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	No measurable change anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated.	Compliant - no deterioration in quality element status anticipated				
	Chemical Groundwater Dependent Terrestrial Ecosystems (GWDEs) Test	Good	Good by 2015	Good	The radius of influence of Millington cutting includes Rosethorne Mere and Yarwood Heath Covert. There is the potential to alter groundwater and surface water quality during temporary dewatering for construction near to these habitats. This will be mitigated through the implementation of the draft CoCP.			None present within or in close proximity down-hydraulic gradient of RO1.													None identified	No measurable change anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	No measurable change anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated.	Compliant - no deterioration in quality element status anticipated				
	Chemical Dependent Surface Water Body	Poor	Good by 2027	Poor	The temporary construction works have the potential to affect groundwater quality to Agden Brook. This will be mitigated through the implementation of the draft CoCP.			None present within or in close proximity down-hydraulic gradient of RO1.													None identified	No measurable change anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	No measurable change anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated.	Compliant - no deterioration in quality element status anticipated				
	General Chemical Test	Good	Good by 2015	Poor	Some localised effects may be anticipated but these are unlikely to impact waterbody status due to embedded mitigation.	The cutting will remove some superficial deposits along the line of the cutting, creating a shorter pathway for surface water to discharge into the bedrock. This could cause a change in groundwater chemistry. However, no measurable changes are expected considering the scale of works relative to water body scale and embedded mitigation.			No measurable change due to embedded mitigation - i.e. no or minimal dewatering/permanent groundwater control required.	Some localised effects may be anticipated but likely to be restricted to the superficial deposits, pending further investigations.										None identified	No measurable change anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated. Additional mitigation not required.	N/A	No measurable change anticipated when scheme component effects considered in combination. No measurable change in quality element anticipated.	Compliant - no deterioration in quality element status anticipated					

Table A24: Manchester and Cheshire East Permo-Triassic Sandstone Aquifers (GB120610100) detailed impact assessment - effects on current status

Manchester and Cheshire East Permo-Triassic Sandstone Aquifers (GB120610100) (Principal aquifer)		Detailed Impact Assessment				Detailed Impact Assessment				Detailed Impact Assessment				Detailed Impact Assessment				Detailed Impact Assessment						
EA Management Catchment:	North West GW	Scheme component (ID):				Scheme component (ID):				Scheme component (ID):				Scheme component (ID):				Scheme component (ID):						
Overall Status (2015):	POOR	Scheme component type:				Scheme component type:				Scheme component type:				Scheme component type:				Scheme component type:						
Overall Status Objective:	GOOD BY 2021	Impact type from scheme component:				Impact type from scheme component:				Impact type from scheme component:				Impact type from scheme component:				Impact type from scheme component:						
WFD Status Element	WFD Quality Element	2015 RBMP Cycle 2 Status	2015 RBMP Cycle 2 Status Objective	2019 Status	Lowering of groundwater levels and potential reduction in groundwater contributions to surface water bodies, GWDE or groundwater abstractions by temporary dewatering/permanent groundwater control				Lowering of groundwater levels and potential reduction in groundwater contributions to surface water bodies, GWDE or groundwater abstractions by temporary dewatering/permanent groundwater control				Lowering of groundwater levels and potential reduction in groundwater contributions to surface water bodies, GWDE or groundwater abstractions by temporary dewatering/permanent groundwater control				Lowering of groundwater levels and potential reduction in groundwater contributions to surface water bodies, GWDE or groundwater abstractions by temporary dewatering/permanent groundwater control				Lowering of groundwater levels and potential reduction in groundwater contributions to surface water bodies, GWDE or groundwater abstractions by temporary dewatering/permanent groundwater control			
WFD Status Element	WFD Quality Element	2015 RBMP Cycle 2 Status	2015 RBMP Cycle 2 Status Objective	2019 Status	Lowering of groundwater levels and potential reduction in groundwater contributions to surface water bodies, GWDE or groundwater abstractions by temporary dewatering/permanent groundwater control				Lowering of groundwater levels and potential reduction in groundwater contributions to surface water bodies, GWDE or groundwater abstractions by temporary dewatering/permanent groundwater control				Lowering of groundwater levels and potential reduction in groundwater contributions to surface water bodies, GWDE or groundwater abstractions by temporary dewatering/permanent groundwater control				Lowering of groundwater levels and potential reduction in groundwater contributions to surface water bodies, GWDE or groundwater abstractions by temporary dewatering/permanent groundwater control				Lowering of groundwater levels and potential reduction in groundwater contributions to surface water bodies, GWDE or groundwater abstractions by temporary dewatering/permanent groundwater control			
Quantitative	Quantitative Saline Intrusions	Poor	Good by 2021	Poor	No dewatering along the tunnel itself as TBM in use - see embedded mitigation. Thus, no lowering of groundwater levels anticipated.	The tunnel will consist of twin bore tunnels 12.8km in length, 7.55m internal diameter and maximum 45.0m tgl. The presence of the tunnel will have no measurable change on saline intrusion as this issue is associated with long-term abstractions.	Minimal dewatering required due to use of full depth diaphragm walls at the Holies vent shaft (internal dewatering only).	Unlikely to be affected at a water body scale compared to scale of works.	The construction methodology of the vent shaft assumes that external dewatering is not permitted. Diaphragm walls are not proposed as vent shaft is located in the Sherwood Sandstone. Temporary dewatering during construction could lead to upconing of deeper poor quality (connate) from underlying formation such as coal measures or drawdown of near surface (anthropogenically contaminated) water.	Unlikely to be affected at a water body scale compared to scale of works.	Shaft located in an isolated block with no flow boundaries on three sides. The construction methodology of the vent shaft assumes that external dewatering is not permitted (diaphragm walls are not proposed). Temporary lowering of groundwater levels could lead to drawing in of poor quality water from the adjacent Etruria Formation or coal measures aquifer blocks.	Unlikely to be affected at a water body scale compared to scale of works.	No measurable change expected from saline intrusions due to scale of works relative to water body scale.	No measurable change expected from saline intrusions due to scale of works relative to water body scale.	No measurable change expected from saline intrusions due to scale of works relative to water body scale.	No measurable change expected from saline intrusions due to scale of works relative to water body scale.	No measurable change expected from saline intrusions due to scale of works relative to water body scale.	No measurable change expected from saline intrusions due to scale of works relative to water body scale.	No measurable change expected from saline intrusions due to scale of works relative to water body scale.					
	Quantitative Water Balance	Good	Good by 2015	Good	No dewatering along the tunnel itself as TBM in use - see embedded mitigation. Thus, no lowering of groundwater levels anticipated.	The tunnel creates an extended cylinder of no flow leading to changes in groundwater level due to a partial barrier to flow created by the tunnel. This leads to adverse localised effects for the Appley Group, Warwickshire Group and the Cambrian Coast Group.	Internal dewatering from the diaphragm walls will be small quantities and temporary in nature, therefore unlikely to be affected at a water body scale.	Unlikely to be affected at a water body scale compared to scale of works.	Construction methodology (such as grouting, dewatering with ejector wells) will minimise the dewatering requirements. Dewatering volume will be small and temporary in nature, therefore unlikely to be affected at a water body scale.	Unlikely to be affected at a water body scale compared to scale of works.	Construction methodology (such as grouting, dewatering with ejector wells) will minimise the dewatering requirements. Dewatering volume will be small and temporary in nature, therefore unlikely to be affected at a water body scale.	Unlikely to be affected at a water body scale compared to scale of works.	No measurable change on quantitative water balance due to scale of works relative to water body scale.	Superficial deposits are fully penetrated by the portal. The below ground structures may form a barrier to groundwater flow in the superficial aquifer but on the scale of the aquifer, no measurable change is expected.	No measurable change on quantitative water balance due to scale of works relative to water body scale.	Groundwater flow is not parallel to the cutting, hence the cutting is likely to partially form a barrier to groundwater flow, leading to a localised risk of groundwater flooding on the upgradient side (refer to the flood risk assessment, Volume 5, WR-005-0MA07).	No measurable change on quantitative water balance due to scale of works relative to water body scale.	Groundwater flow is not parallel to the cutting, hence the cutting is likely to partially form a barrier to groundwater flow, leading to a localised risk of groundwater flooding on the upgradient side (refer to the flood risk assessment, Volume 5, WR-005-0MA07).						
	Groundwater Dependent Terrestrial Ecosystems (GWDEs) Test	Good	Good by 2015	Good	The tunnel will consist of twin bore tunnels 12.8km in length, 7.55m internal diameter and maximum 45.0m tgl. No dewatering along the tunnel itself as TBM in use - see embedded mitigation. Thus, no lowering of groundwater levels anticipated.	At shallow depth the tunnel may act as a localised groundwater dam, but no measurable change expected on flow to GWDE.	Stenner Woods and Milgate Fields, Didsbury and Fletcher Moss and Wrengate Wood & Heycroft are located within the ROI. Due to embedded mitigation (full depth diaphragm walls) no measurable change to the habitat from the impact of dewatering is expected.	None present within ROI of vent shaft dewatering.	None present within ROI of vent shaft dewatering.	None present within ROI of vent shaft dewatering.	None present within ROI of vent shaft dewatering.	None present within or in close proximity down-hydraulic gradient of ROI.	None present within or in close proximity down-hydraulic gradient of ROI.	None present within or in close proximity down-hydraulic gradient of ROI.	None present within or in close proximity down-hydraulic gradient of ROI.	None present within or in close proximity down-hydraulic gradient of ROI.	None present within or in close proximity down-hydraulic gradient of ROI.	None present within or in close proximity down-hydraulic gradient of ROI.	None present within or in close proximity down-hydraulic gradient of ROI.					
	Quantitative Dependent Surface Water Body	Good	Good by 2015	Good	The tunnel will consist of twin bore tunnels 12.8km in length, 7.55m internal diameter and maximum 45.0m tgl. No dewatering along the tunnel itself as TBM in use - see embedded mitigation. Thus, no lowering of groundwater levels anticipated.	At shallow depth the tunnel may act as a localised groundwater dam, but no measurable change expected on flow to surface water bodies.	Internal dewatering from the shaft will be small quantities and temporary in nature, therefore unlikely to be affected at a water body scale when compared to the scale of works.	River Mersey and Tributary of River Mersey 2 are unlikely to be affected at a water body scale when compared to the scale of works.	Internal dewatering from the shaft will be small quantities and temporary in nature, therefore unlikely to be affected at a water body scale when compared to the scale of works.	Unlikely to be affected at a water body scale compared to scale of works.	Fallowfield Brook, Cringle Brook, Tributary of Cringle Brook 1, Gore Brook and Tributary of Platt Brook 1 are fully partially in culvert in the vicinity of the shaft and since internal dewatering from the shaft will be small quantities and temporary in nature, no measurable change is expected on the surface water bodies.	Unlikely to be affected at a water body scale compared to scale of works.	Corn Brook is located within the ROI and lowering of groundwater levels may reduce contribution to this watercourse. Corn Brook is culverted in the vicinity of the portal, and therefore, it is unlikely to receive groundwater flow in this area. No measurable change is expected from the portal on the river flow.	Corn Brook is located within the ROI and groundwater that would otherwise discharge into this watercourse may be intercepted by below ground structures. However, Corn Brook is culverted in the vicinity of the portal and therefore, it is unlikely to receive groundwater flow in this area. No measurable change is expected from the portal on the river flow.	Corn Brook is located within the ROI and may receive reduced groundwater levels. Corn Brook is culverted in the vicinity of the portal and is unlikely to receive groundwater flow in this area. No measurable change is expected from the portal on the river flow.	Corn Brook is located within the ROI and may receive reduced groundwater levels. Corn Brook is culverted in the vicinity of the portal and is unlikely to receive groundwater flow in this area. No measurable change is expected from the portal on the river flow.	Corn Brook is located within the ROI and may receive reduced groundwater levels. Corn Brook is culverted in the vicinity of the portal and is unlikely to receive groundwater flow in this area. No measurable change is expected from the portal on the river flow.	Corn Brook is located within the ROI and may receive reduced groundwater levels. Corn Brook is culverted in the vicinity of the portal and is unlikely to receive groundwater flow in this area. No measurable change is expected from the portal on the river flow.						
					Disturbing or mobilising existing poor quality groundwater by temporary dewatering or depressurisation and permanent groundwater control	Creating or altering of pathways along which existing poor quality groundwater can migrate	Disturbing or mobilising existing poor quality groundwater by temporary dewatering or depressurisation and permanent groundwater control	Creating or altering of pathways along which existing poor quality groundwater can migrate	Disturbing or mobilising existing poor quality groundwater by temporary dewatering or depressurisation and permanent groundwater control	Creating or altering of pathways along which existing poor quality groundwater can migrate	Disturbing or mobilising existing poor quality groundwater by temporary dewatering or depressurisation and permanent groundwater control	Creating or altering of pathways along which existing poor quality groundwater can migrate	Disturbing or mobilising existing poor quality groundwater by temporary dewatering or depressurisation and permanent groundwater control	Creating or altering of pathways along which existing poor quality groundwater can migrate	Disturbing or mobilising existing poor quality groundwater by temporary dewatering or depressurisation and permanent groundwater control	Creating or altering of pathways along which existing poor quality groundwater can migrate	Disturbing or mobilising existing poor quality groundwater by temporary dewatering or depressurisation and permanent groundwater control	Creating or altering of pathways along which existing poor quality groundwater can migrate						
Chemical	Chemical Saline Intrusions	Poor	Good by 2021	Poor	No measurable change due to embedded mitigation - i.e. no or minimal dewatering/permanent groundwater control required.	TBM will provide full grouting which minimises the risk of creating a pathway along the line of the tunnel.	Minimal dewatering required due to use of full depth diaphragm walls at the Holies vent shaft (internal dewatering only).	Due to construction methodology any pathways would be sealed once the concrete had set. Unlikely to impact waterbody status due to embedded mitigation.	Temporary lowering of groundwater levels could lead to upconing of deeper poor quality (connate) or drawdown of near surface (anthropogenically contaminated) water. However, considering the construction methodology assumes that external dewatering is not permitted and the limited period of dewatering, the waterbody status is unlikely to be impacted. Diaphragm walls are not proposed as vent shaft is located in the Sherwood Sandstone.	Some minor localised short term effects may be anticipated but construction methodology (pathways would be progressively sealed in a staged and sequentially controlled process during construction, likely by SCL and injection grouting) will be implemented if required) mean waterbody status is unlikely to be impacted.	Shaft located in an isolated block with no flow boundaries on three sides. Temporary lowering of groundwater levels could lead to drawing in of poor quality water from the adjacent Etruria Formation or coal measures aquifer blocks, leading to adverse effects on water quality. However, the construction methodology of the vent shaft assumes that external dewatering is not permitted and considering the limited period of dewatering, the waterbody status is unlikely to be impacted.	Some minor localised, temporary effects may be anticipated but construction methodology (pathways would be progressively sealed in a staged and sequentially controlled process during construction, likely by SCL and injection grouting) will be implemented if required) mean waterbody status is unlikely to be impacted.	No measurable change due to scale of works relative to water body scale.	No measurable change due to scale of works relative to water body scale.	No measurable change due to scale of works relative to water body scale.	No measurable change due to scale of works relative to water body scale.	No measurable change due to scale of works relative to water body scale.	No measurable change due to scale of works relative to water body scale.						
	Chemical Drinking Water Protected Areas (DRWPs)	Good	Good by 2015	Good	None in community area MA07.	None in community area MA07.	None in community area MA07.	None in community area MA07.	None in community area MA07.	None in community area MA07.	None in community area MA07.	None in community area MA07.	None in community area MA07/08.	None in community area MA07/08.	None in community area MA07/08.	None in community area MA07/08.	None in community area MA07/08.	None in community area MA07/08.						
	Chemical Groundwater Dependent Terrestrial Ecosystems (GWDEs) Test	Good	Good by 2015	Good	No dewatering along the tunnel itself and majority of works are below ground level. With embedded mitigation impacts, no measurable changes to GWDEs in ROI are expected.	No dewatering along the tunnel itself and majority of works are below ground level. With embedded mitigation impacts, no measurable changes to GWDEs in ROI are expected.	Stenner Woods and Milgate Fields, Didsbury and Fletcher Moss and Wrengate Wood & Heycroft are located within land required for construction of the proposed works. There is potential for groundwater quality to these GWDEs to be affected. This will be managed through implementation of the draft CoCP, so no measurable change is expected.	None present within ROI of vent shaft dewatering.	None present within ROI of vent shaft dewatering.	None present within ROI of vent shaft dewatering.	None present within ROI of vent shaft dewatering.	None present within or in close proximity down-hydraulic gradient of ROI.	None present within or in close proximity down-hydraulic gradient of ROI.	None present within or in close proximity down-hydraulic gradient of ROI.	None present within or in close proximity down-hydraulic gradient of ROI.	None present within or in close proximity down-hydraulic gradient of ROI.	None present within or in close proximity down-hydraulic gradient of ROI.							
	Chemical Dependent Surface Water Body	Good	Good by 2015	Good	No dewatering along the tunnel itself and majority of works are below ground level. With embedded mitigation impacts, no measurable changes to surface waterbodies in ROI are expected.	No dewatering along the tunnel itself and majority of works are below ground level. With embedded mitigation impacts, no measurable changes to surface waterbodies in ROI are likely to be negligible.	The discharge location for dewatering during construction of the vent shaft has not yet been determined, but it is currently assumed to be Tributary of River Mersey 2. The dewatering discharge could lead to temporary and localised deterioration in water quality in the receiving watercourse.	Shaft will be constructed using full depth diaphragm walls which will minimise the risk of creating pathways.	Cringle Brook is in culvert in the vicinity of the shaft and therefore no impacts likely.	Shaft will be constructed using SCL which will seal pathways, minimising the risk of pathways.	Cringle Brook and Fallowfield Brook are both in culvert in the vicinity of the shaft and therefore no impacts likely.	Shaft will be constructed using SCL which will seal pathways, minimising the risk of pathways.	Corn Brook is located within the ROI and lowering of groundwater levels may reduce contribution to this watercourse. However, Corn Brook is culverted through the study area and therefore, it is unlikely to receive groundwater flow in this area. No measurable change on river flow from the portal is expected.	Corn Brook is located within the ROI and groundwater that would otherwise discharge into this watercourse may be intercepted. However, Corn Brook is culverted through the study area and therefore, it is unlikely to receive groundwater flow in this area. No measurable change on river flow from the portal is expected.	Corn Brook is culverted through the study area and therefore, it is unlikely to receive groundwater flow in this area. No measurable change on river flow from the portal is expected.	Corn Brook is in culvert through the study area so no measurable change on the watercourse is expected. River Medlock is within land required for construction of the proposed works. There is potential for these to be impacted however due to embedded mitigation, no measurable change is expected.	Corn Brook is culverted through the study area and therefore, it is unlikely to receive groundwater flow in this area. No measurable change on river flow from the portal is expected.	Corn Brook is in culvert through the study area so no measurable change on the watercourse is expected. River Medlock is within land required for construction of the proposed works. There is potential for these to be impacted however due to embedded mitigation, no measurable change is expected.						
General Chemical Test	Good	Good by 2015	Good	No measurable change due to embedded mitigation - i.e. no or minimal dewatering/permanent groundwater control required.	No measurable change due to embedded mitigation - i.e. no or minimal dewatering/permanent groundwater control required.	Some minor localised effects may be anticipated but these are unlikely to impact waterbody status due to embedded mitigation (a contingency action plan will be agreed with the Environment Agency, prior to the start of construction, with agreed actions in place if changes in water quality are observed during groundwater monitoring programme).	Some minor localised effects may be anticipated but these are unlikely to impact waterbody status due to embedded mitigation (a contingency action plan will be agreed with the Environment Agency, prior to the start of construction, with agreed actions in place if changes in water quality are observed during groundwater monitoring programme).	Some minor, localised effects may be anticipated but these are unlikely to impact waterbody status due to embedded mitigation (a contingency action plan will be agreed with the Environment Agency, prior to the start of construction, with agreed actions in place if changes in water quality are observed during groundwater monitoring programme).	Some minor, localised effects may be anticipated but these are unlikely to impact waterbody status due to embedded mitigation (a contingency action plan will be agreed with the Environment Agency, prior to the start of construction, with agreed actions in place if changes in water quality are observed during groundwater monitoring programme).	Some minor, localised effects may be anticipated but these are unlikely to impact waterbody status due to embedded mitigation (a contingency action plan will be agreed with the Environment Agency, prior to the start of construction, with agreed actions in place if changes in water quality are observed during groundwater monitoring programme).	Some minor, localised effects may be anticipated but these are unlikely to impact waterbody status due to embedded mitigation (a contingency action plan will be agreed with the Environment Agency, prior to the start of construction, with agreed actions in place if changes in water quality are observed during groundwater monitoring programme).	Some localised effects may be anticipated but these are unlikely to impact waterbody status due to embedded mitigation.	Some localised effects may be anticipated but these are unlikely to impact waterbody status due to embedded mitigation.	Some localised effects may be anticipated but these are unlikely to impact waterbody status due to embedded mitigation.	Some localised effects may be anticipated but these are unlikely to impact waterbody status due to embedded mitigation.	Some localised effects may be anticipated but these are unlikely to impact waterbody status due to embedded mitigation.								

Table A25: River Bollin (River Dean to Ashley Mill) (GB112069061381) detailed impact assessment - effects on future status objectives

Timperley Brook (GB112069061266)	Effects on attainment of status objectives (Text R)												Outcome									
RNAGs / Measures scoped in as potentially at risk from Proposed Scheme				River Bollin			Tributary of River Bollin 2			Tributary of River Bollin 3			Tributary of River Bollin 5			Cumulative effects - effects on RNAG / Measure from scheme components) located in other WFD water bodies	Overall effect at water body scale	Additional mitigation requirements	Residual overall effect at water body scale following consideration of additional mitigation	WFD compliance outcome - potential to prevent future attainment of status objective of quality element.		
WFD status objective element	RNAG / Measure ID	Relevant WFD Quality Element / RNAGs	Title / Details	River Bollin Offline Bridge Widening (GB112069061381-MW-01-UB-01)	Highway Drainage Outfalls M56 (GB112069061381-MW-01-HO-01)	River Bollin East Viaduct (GB112069061381-MW-01-VD-01)	Realignment (GB112069061381-T-02-RE-01)	Offline culvert (GB112069061381-T-02-CV-01)	M56 East Tunnel (GB112069061381-T-02-BT-01)	Realignment (GB112069061381-T-03-RE-02)	M56 Drain Offline Culvert (GB112069061381-T-03-CV-02)	M56 Offline Culvert (GB112069061381-T-03-CV-03)	M56 East Tunnel (GB112069061381-T-03-BT-01)	Realignment (GB112069061381-T-03-RE-04)	Offline Culvert (GB112069061381-T-05-CV-06)	Realignment (GB112069061381-T-05-RE-05)	Thorns Green Cutting (GB112069061381-T-05-CU-01)					
Reasons for not achieving good (RNAG)	572040	Invertebrates	Activity is Land drainage - structures and National SWM Header is Physical modification	Scheme element does not directly affect this RNAG			Scheme element does not directly affect this RNAG	Risk to RNAG - Due to additional culverts - requires further assessment and potential mitigation			Risk to RNAG - Due to additional culverts - requires further assessment and potential mitigation	Risk to RNAG - Due to additional culverts - requires further assessment and potential mitigation			Risk to RNAG - Due to additional culverts - requires further assessment and potential mitigation			None	Risk to RNAG	Further assessment is to be completed before the risk and mitigation can be confirmed. RNAG noted to be suspected and subject to investigation further discussion with Environment Agency required.	Widespread risk to RNAG anticipated until further assessment completed. Potential risk to RNAG at water body scale.	Non-Compliant - risk of preventing future attainment of quality element status objective.
RBM Programme of measures (PoM)	No Programme of measures are considered to be at risk from the Proposed Scheme for this water body.																				Compliant - no prevention of future attainment of quality element status objective.	

Table A26: Timperley Brook (GB112069061260) detailed impact assessment - effects on future status objectives

Timperley Brook (GB112069061260)				Effects on attainment of status objectives (Test B)				Outcome				
WFD status objective element	RNAGs / Measures scoped in as potentially at risk from Proposed Scheme			Timperley Brook (Moderate)				Cumulative effects - effects on RNAG / Measure from scheme component(s) located in other WFD water bodies	Overall effect at water body scale	Additional mitigation requirements	Residual overall effect at water body scale following consideration of additional mitigation	WFD compliance outcome - potential to prevent future attainment of status objective of quality element.
	RNAG / Measure ID	Relevant WFD Quality Element / RNAG(s)	Title / Details	Timperley Brook Inverted Siphon (GB112069061260-MW-01-IS-01)	Timperley Brook Realignment (GB112069061260-MW-02-IS-01)	Manchester Airport High Speed Station Cutting Retaining Wall (GB112069061260-MW-01-RW-01)	Highway Drainage - M56 East and West Link Realignment/ Access to Manchester Airport High Speed Station/ Runger Lane Realignment (GB112069061260-MW-01-HD-01)					
Reasons for not achieving good (RNAG)	572020 / 572021	Mitigation Measures Assessment	Physical modification	Risk to RNAG - Additional physical modification pressure on the waterbody due to siphon although localised to short section of upper catchment which is partly already impacted by culvert.	Scheme element does not directly affect any RNAG	Scheme element does not directly affect this RNAG		None	Localised risk to RNAG	Proposed mitigation is a new open channel (linked with floodplain to create flood storage), which will reduce an existing culverted length downstream of Brooks Drive.	N/A	Compliant - no prevention of future attainment of quality element status objective.
RBMP Programme of measures (PoM)	19708	Various	Timperley Brook 46 - diffuse urban: Reduce diffuse pollution pathways (i.e. control entry to water environment). Deliver package of measures to address diffuse urban pollution. Work with Trafford Council and United Utilities to identify and remediate cross-connections in the above areas. Identify and rank all major road outfalls in the catchment and determine their impact and work with Trafford Council to address any issues.	Scheme element does not directly affect any POMs			Risk to POM - Additional contribution to urban diffuse pollution pressure due to road runoff (as calculated by HEWRAT) - requires mitigation over and above standard drainage design.	None	Risk to POM delivery	Additional mitigation identified through HEWRAT includes swale and holding tank, however further water quality baseline data and assessment is to be completed before the impacts and mitigation can be confirmed.	Widespread adverse effect anticipated until mitigation is confirmed. Potential deterioration in status of quality element at water body scale.	Non Compliant - risk of preventing future attainment of quality element status objective.
A/HMWB Mitigation Measures	TPB15	480146 - Mitigation Measures Assessment	TPB15: Open up Timperley Brook culvert parallel to Brooks Drive. Open up the 285-metre long Timperley Brook culvert parallel to Brooks Drive to restore natural riverine processes and improve the waterbody's ecological value. High ecological benefit. High cost. Medium complexity.	Scheme element does not directly affect delivery of any identified HMWB mitigation measures	Benefit to HMWB MM - watercourse realignment is in section of watercourse identified for delivery of this measure	Scheme element does not directly affect delivery of any identified HMWB mitigation measures		None	Localised beneficial effect	N/A	N/A	Compliant - no prevention of future attainment of quality element status objective.

Table A27: Medlock (Lumb Brook to Irwell) (GB112069061152) detailed impact assessment - effects on future status objectives

Medlock (Lumb Brook to Irwell) (GB112069061152)				Effects on attainment of status objectives (Test B)			Outcome				
WFD status objective element	RNAGs / Measures scoped in as potentially at risk from Proposed Scheme			River Medlock (High)			Cumulative effects - effects on RNAG / Measure from scheme component(s) located in other WFD water bodies	Overall effect at water body scale	Additional mitigation requirements	Residual overall effect at water body scale following consideration of additional mitigation	WFD compliance outcome - potential to prevent future attainment of status objective of quality element.
	RNAG/measure ID	Relevant WFD quality element/RNAG(s)	Title/details	Piccadilly approach viaduct (GB112069061152-MW-01-VD-01)	New Fairfield Street offline overbridge (GB112069061152-MW-01-OB-01)	Daylighting of existing culvert (GB112069061152-MW-01-DY-01)					
Reasons for not achieving good (RNAG)	480131 / 480132	Mitigation Measures Assessment	Physical Modification			Removal of existing culvert helps reduce morphological pressure	N/A	Localised beneficial effect	N/A	N/A	Compliant - no prevention of future attainment of quality element status objective.
RBMP Programme of measures (PoM)	No POMS affected by scheme proposals						N/A				Compliant - no prevention of future attainment of quality element status objective.
A/HMWB Mitigation Measures	No specific measures	Mitigation Measures Assessment	No specific HMWB MMs identified at the location on the Medlock or related to culvert removal				N/A				Compliant - no prevention of future attainment of quality element status objective.

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