

High Speed Rail (Crewe – Manchester)

Supplementary Environmental Statement 2 and Additional Provision 2 Environmental Statement

Volume 5: Appendix WR-003-0MA06

Water resources and flood risk

Water resources assessment

MA06: Hulseheath to Manchester Airport

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Department for Transport

High Speed Two (HS2) Limited has been tasked by the Department for Transport (DfT) with managing the delivery of a new national high speed rail network. It is a non-departmental public body wholly owned by the DfT.

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1 Introduction

1.1 Structure of this appendix

- 1.1.1 This report is an appendix to the water resources and flood risk assessment which forms part of Volume 5 of the Supplementary Environmental Statement 2 (SES2) and Additional Provision 2 Environmental Statement (AP2 ES) for the Hulseheath to Manchester Airport (MA06) community area.
- 1.1.2 This appendix provides details of changes to the water resources assessment since the production of the High Speed Two (HS2) High Speed Rail (Crewe – Manchester) Environmental Statement (ES)¹ (the main ES) and the HS2 High Speed Rail (Crewe – Manchester) Background Information and Data (BID)² (the main BID report) which accompanied the main ES published in 2022.
- 1.1.3 An assessment of the impact of the original scheme on water resources was undertaken as part of the water resources and flood risk assessment reported in the main ES (Volume 2, Community Area report: Hulseheath to Manchester Airport (MA06) and Volume 5, Appendix: WR-003-0MA06) referred to hereafter as ‘the original water resources assessment’.
- 1.1.4 This appendix should be read in conjunction with the Volume 5, Appendix: WR-003-0MA06 which accompanied the main ES.
- 1.1.5 The watercourses and other surface water features are shown in the SES2 and AP2 ES Volume 5, Water resources and flood risk Map Book: Map Series WR-01 – Surface Water Baseline.
- 1.1.6 Additional information relevant to this assessment is set out in the BID report accompanying SES2 and AP2 ES, Water resources assessment baseline data (BID WR-004-0MA06 SES2 and AP2 ES)³.
- 1.1.7 In order to differentiate between the original scheme and subsequent changes, the following terms are used:

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), *Background Information and Data*. Available online at: <https://www.gov.uk/government/collections/hs2-phase2b-crewe-manchester-environmental-statement>.

³ High Speed Two Ltd (2023), High Speed Rail (Crewe – Manchester), *Background Information and Data accompanying Supplementary Environmental Statement 2 and Additional Provision 2 Environmental Statement, Water resources assessment baseline data*, BID WR-004-0MA06 SES2 and AP2 ES. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-supplementary-environmental-statement-2-and-additional-provision-2-environmental-statement>.

- ‘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.

1.1.8 The purpose of this document is to report any changes or updates to environmental information and scheme design or assumptions that have occurred since the main ES, which will result in a change in effects and/or the introduction of new effects on water resources receptors.

1.1.9 The route-wide Water Framework Directive (WFD) compliance assessment (see Volume 5, Appendix: WR-001-00000 of the main ES) has also been updated to take into account the SES2 changes and AP2 amendments. This is presented in the SES2 and AP2 ES Volume 5, Appendix: WR-001-00000.

1.2 Assessment and methodology

1.2.1 The scope, assumptions and limitations for the water resources assessment are as set out in the main ES Environmental Impact Assessment Scope and Methodology Report (SMR)⁴. In the main ES, the study area was extended to include the entire catchment of Rostherne Brook that feeds Rostherne Mere Ramsar site, Site of Special Scientific Interest (SSSI) and National Nature Reserve (NNR). For the purposes of this assessment, this spatial scope is defined as the study area. This extended study area applies to the assessment of the AP2 revised scheme.

⁴ High Speed Two Ltd (2021), High Speed Rail (Crewe – Manchester), *Environmental Statement, Environmental Impact Assessment Scope and Methodology Report*, 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 water resources

- 2.1.1 New environmental baseline data of relevance to this assessment are provided in the SES2 and AP2 ES BID, Water resources assessment baseline data (BID WR-004-0MA06³). This new baseline information includes the results of groundwater features surveys conducted since publication of the original ES and water quality sampling results for watercourses within the Hulseheath to Manchester Airport (MA06) community area.
- 2.1.2 In the main ES, no groundwater features survey had been undertaken at the potential spring at Keepers Cottage, Sunbank Lane (north). On a precautionary basis, this receptor was therefore included as a high value receptor in the main ES. Surveys undertaken since the main ES show no evidence of a spring emergence, watercourse channel or culvert in this area. Therefore, this feature has been removed from the assessment.
- 2.1.3 In the BID SES2 and AP2 ES, WR-004-0MA06 report, Wood Near Chapel Lane Site of Biological Importance (SBI) (including Hennesley Bank Ancient Woodland Inventory (AWI) site) was identified as a potential water dependent habitat. National vegetation classification (NVC) surveys have been undertaken since the main ES. These surveys indicate that this site is an ash woodland and not dependent on groundwater flows. Therefore, this feature is not considered be a water dependent habitat and has been removed from the assessment.
- 2.1.4 Water quality data has been collected for River Bollin, Tributary of River Bollin 2 (in two locations), Tributary of River Bollin 3 (in two locations), Tributary of River Bollin 5, Timperley Brook and Tributary of Timperley Brook 1 to better understand the implications of highways drainage discharges on water quality. This data is presented in the BID SES2 and AP2 ES, WR-004-0MA06 report.
- 2.1.5 The Manchester Airport High Speed station is located over Timperley Brook, and an inverted siphon is proposed to allow the watercourse to pass beneath the station footprint. In the original scheme a 330m permanent realignment of Timperley Brook was included to realign the watercourse away from an assumed existing 300m long culvert thought to be positioned along Brooks Drive. Since the main ES was prepared, a site visit by the Environment Agency has identified that the Brook Drive culvert, reported in the main ES, does not exist. It is now understood that Timperley Brook crosses the HS2 route from Davenport Green Wood, passes perpendicular beneath Brooks Drive in an approximately 60m long culvert and then re-emerges on the western side of Brooks Drive at the boundary of Ringway Golf Club golf course.

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- 2.1.6 Since the main ES, the Environment Agency has issued updated datasets for groundwater source protection zones (SPZ), discharge consents and licensed water abstractions. However, these updated datasets do not introduce any new water resources receptors or change existing receptors in this area. For the SES2 scheme, the additional data does not result in any new or different significant effects compared to the main ES.

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

- 3.1.1 There are no SES2 design changes or construction assumptions that are relevant to the assessment of impacts and effects to the water environment.

4 Assessment of impacts and effects during construction

- 4.1.1 The potential spring at Keepers Cottage, Sunbank Lane (north) was considered a groundwater receptor on a precautionary basis, pending survey, in the main ES. The main ES reported a potential permanent moderate adverse effect on the potential spring due to the presence of the cuttings around Manchester Airport High Speed station. Since the main ES, surveys have confirmed that there is no spring feature in this location, as there is no evidence of a spring emergence, culvert or water channel in this location. This feature is therefore no longer considered a receptor. The removal of this receptor will result in the removal of this significant effect.
- 4.1.2 Wood Near Chapel Lane SBI (including Hennersley Bank AWI site) was considered a potential water dependent habitat, pending surveys, in the main ES. The main ES reported a potential permanent minor impact on the SBI due to the presence of the Ringway cutting to the south of the Manchester Airport High Speed station. Since the main ES, surveys have confirmed that this site is not groundwater dependent. This feature is therefore no longer considered a water dependent habitat. The removal of this water dependent habitat will result in the removal of this hydrological impact.
- 4.1.3 The Manchester Airport High Speed station is located over Timperley Brook, and an inverted siphon was included in the original scheme to allow the watercourse to pass beneath the station footprint. This siphon will lead to the loss of open channel to Timperley Brook which will cause permanent changes to the river's flow and morphology. In the main ES, this loss of open channel was assessed as a moderate impact on a moderate value receptor, resulting in a moderate adverse effect, which is significant.
- 4.1.4 In the original scheme, to mitigate for this significant effect, 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 impact, resulting in a minor adverse effect which is not significant.
- 4.1.5 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. It is now understood that Timperley Brook crosses the HS2 route from Davenport Green Wood, passes perpendicular beneath Brooks Drive in an approximately 60m long culvert and then re-emerges on the western side of Brooks Drive at the boundary of Ringway Golf Club golf course. Therefore, the channel realignment proposed in the original scheme would not remove an existing culvert and would not create an additional open channel or mitigation of the significant effect from the station footprint. Therefore, the new SES2 baseline means that the impact of the loss of open channel on Timperley Brook would increase to a moderate impact on a

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moderate value receptor leading to a moderate effect, which is significant. Alternative mitigation for this significant effect has been proposed in the AP2 design (see Section 8.5).

- 4.1.6 There are no other SES2 baseline updates that are relevant to the assessment of the water environment. Therefore, there are no other changes to construction impacts and effects reported for the water environment.

5 Assessment of impacts and effects during operation

- 5.1.1 There are no SES2 baseline updates, design changes or operational assumptions that are relevant to the assessment of the water environment. Therefore, there are no changes to operational impacts and effects reported for the water environment.

Part 2: Additional Provision 2 Environmental Statement

6 Summary of amendments to scheme design and construction assumptions relevant to water resources

- 6.1.1 There are five AP2 amendments that will involve construction activities of a nature and scale that could have potential implications for water resources. These are as follows:
- additional land permanently required for watercourse diversions (Tributary of Birkin Brook 1, 2 and 3) at Mobberley Road (AP2-006-010);
 - additional land permanently required for the revised realignment of Tributary of Birkin Brook 2 south of Thorns Green embankment (AP2-006-012);
 - additional land permanently required to reconfigure M56 Junction 6 (AP2-006-014);
 - additional land permanently required for modifications to WFD mitigation for Timperley Brook (AP2-006-018); and
 - additional land temporarily required for the provision of surface water drainage at Manchester tunnel south portal main compound (AP2-006-024).
- 6.1.2 The construction activities could result in impacts on the surface water and groundwater environment and are discussed in this section.
- 6.1.3 These construction activities could result in temporary and permanent impacts on groundwater quality, groundwater flow and risk of groundwater flooding, affecting groundwater abstractions, and groundwater-fed water bodies and ecosystems. The following amendments have been considered as having the potential to affect the groundwater environment:
- additional land permanently required for watercourse diversions (Tributary of Birkin Brook 1, 2 and 3) at Mobberley Road (AP2-006-010); and
 - additional land permanently required to reconfigure M56 junction 6 (AP2-006-014).
- 6.1.4 The construction activities could result in temporary and permanent impacts on surface water quality, flow and hydromorphology, in surface water bodies and aquatic ecosystems. The following amendments have been considered as having the potential to affect the surface water environment:
- additional land permanently required for watercourse diversions (Tributary of Birkin Brook 1, 2 and 3) at Mobberley Road (AP2-006-010);

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- additional land permanently required for the amended realignment of Tributary of Birkin Brook 2 to the south of Thorns Green embankment (AP2-006-012);
- additional land permanently required to reconfigure M56 junction 6 (AP2-006-014); and
- changes to WFD mitigation for Timperley Brook (AP2-006-018); and
- additional land temporarily required for the provision of surface water drainage at Manchester tunnel south portal main compound (AP2-006-024).

6.1.5 This part of the assessment presents consideration of the potential new or changed impacts and effects associated with the proposed AP2 amendments. New or changed impacts and effects associated with the design changes, as well as those that are unchanged and were assessed in the main ES, are presented in Annex A.

7 Water resources baseline

- 7.1.1 No additional baseline information related to water resources supplemental to the SES information is required for assessment of Additional Provision amendments.

8 Assessment of impacts and effects during construction

8.1 Avoidance and mitigation

- 8.1.1 The avoidance and mitigation measures specific to water resources and flood risk are set out in the Volume 2, Community Area report: Hulseheath to Manchester Airport (MA06). No additional avoidance and mitigation measures are relevant to these amendments.
- 8.1.2 A revised detailed impact table (revision of Table 1 and Table 2 of main ES Volume 5, Appendix: WR-003-0MA06) is presented in Annex A.

8.2 Additional land permanently required for watercourse diversions at Mobberley Road (AP2-006-010)

- 8.2.1 The original scheme proposed that Tributary of Birkin Brook 1 be realigned to the north, to pass beneath the Mid-Cheshire Railway and the Ashley temporary railhead. The main ES reported significant effects to flood risk due to this realignment (see Volume 5, Appendix: WR-005-0MA06 of the main ES for details). Therefore, this amendment has been put forward to remove these significant effects on flood risk. Figure 1 shows the watercourses, realignments and culverts associated with the amendment.

Temporary effects

Aquifers

- 8.2.2 The main ES reported temporary, moderate adverse effects, which are significant, on groundwater quality in the glacial till Secondary (Undifferentiated) aquifer due to the deeper excavations involved in construction of the Ashley railhead. It was reported in the main ES that these effects could be reduced to negligible, not significant, by implementation of the Code of Construction Practice (CoCP). The watercourse diversions (AP2-006-010) introduces the excavation of an overflow channel for the Tributary of Birkin Brook 1 in the vicinity of Ashley railhead, that could result in a similar impact to the glacial till. However, no new or different temporary significant effects on groundwater flow or quality are anticipated due to the watercourse diversions.

Abstractions

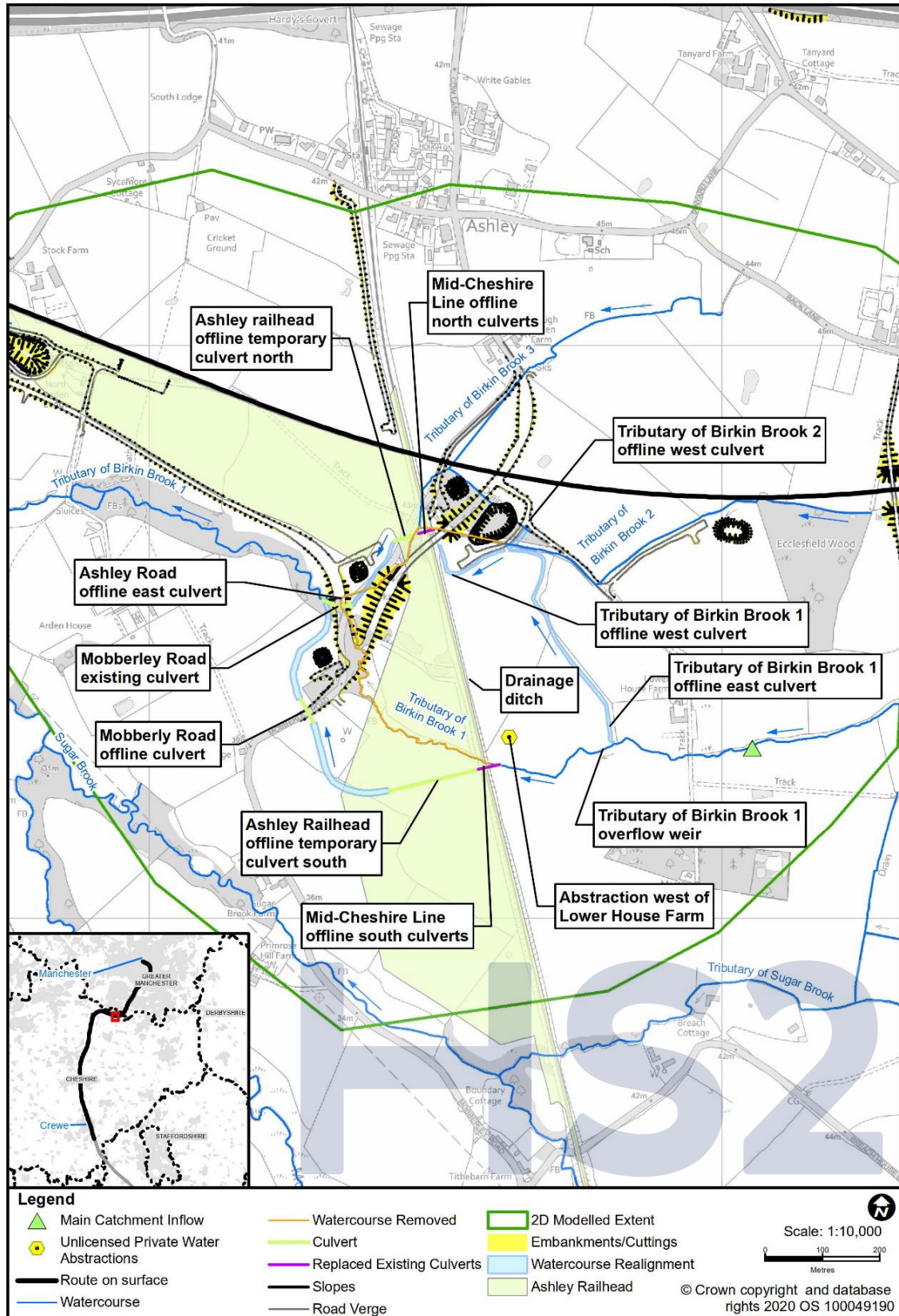
- 8.2.3 In the main ES, it was reported that above ground elements and shallow excavations would have the potential to lead to a temporary impact on groundwater quality at the unlicensed 'Abstraction west of Lower House Farm', which is a moderate value receptor. This was predicted to lead to a minor adverse effect, which is not significant. Through implementation of the draft CoCP, this was reduced to a negligible effect, which is not significant.
- 8.2.4 The watercourse diversions (AP2-006-010) includes an additional 340m section of land required for construction of the AP2 revised scheme. This new land is located on the eastern side of the Mid-Cheshire Railway in which a 1.5m deep drainage ditch will be excavated (see Figure 1). This feature will be 32m from the 'Abstraction west of Lower House Farm' at its closest point. Implementation of the draft CoCP will mitigate temporary effects on groundwater quality at this receptor due to the construction of the new design, and no further temporary significant effects are anticipated.

Permanent effects

Watercourses

- 8.2.5 In the main ES, moderate adverse significant permanent effects were reported on water quality for the Tributary of Birkin Brook 1 due to the diversion of the watercourse by 910m around the proposed Ashley railhead. Through the application of mitigation measures, these effects were assessed to be negligible and not significant.
- 8.2.6 The watercourse diversions (AP2-006-010) includes a new overflow channel, which will be constructed along the line of the existing Tributary of Birkin Brook 1 channel (see Figure 1). Culverting of Tributary of Birkin Brook 1, at both the northern end of Ashley railhead (Ashley railhead offline temporary culvert north) and the southern end of Ashley railhead, (Ashley railhead offline temporary culvert south) will be required during construction to convey the watercourse beneath Ashley railhead. These culverts will be removed and replaced with an open channel at the end of the construction period. Although these culverts are temporary, they are likely to be in place for up to 8 years and therefore their impact is considered permanent.
- 8.2.7 When the culverts are removed the new open channel will be designed so as to replace the existing channel morphology and habitat diversity, and where reasonably practicable, to enhance the environmental and ecological qualities of the water body. The culverts and their subsequent removal may result in a minor adverse effect on water quality in Tributary of Birkin Brook 1, which is not significant. These impacts will be reduced to negligible due to the implementation of the measures embedded in the design or set out in the draft CoCP. Changes to impacts and effects due to this amendment are set out in Annex A.

Figure 1: Watercourse diversions and culverts associated with the watercourse diversions at Moberley Road (AP2-006-010) (WR-01-308b G6 to H7)



- 8.2.8 As part of the watercourse diversions (AP2-006-010), two additional permanent culverts are required on Tributary of Birkin Brook 1 (Tributary of Birkin Brook 1 offline east culvert and Tributary of Birkin Brook 1 offline west culvert) that have the potential to cause permanent changes to the flow. Measures will be introduced to design the diversions with appropriate hydraulic capacity, as well as incorporating appropriate features to retain, and where reasonably practicable enhance the hydromorphological condition of the watercourses. The two new culverts are assessed as having a minor impact on this moderate value receptor, leading to a minor adverse effect, which is not significant.
- 8.2.9 The watercourse diversions (AP2-006-010) will also require a realignment of Tributary of Birkin Brook 2, and one additional culvert at Lower House Lane (Tributary of Birkin Brook 2 offline west culvert). These changes are assessed as minor impacts on this low value receptor, resulting in negligible effects, which are not significant. Measures will be introduced to design the diversions with appropriate hydraulic capacity, as well as incorporating appropriate features to retain, and where reasonably practicable enhance the watercourses hydromorphological condition.
- 8.2.10 The watercourse diversions (AP2-006-010) also introduce an overflow channel, new south culverts beneath the Mid-Cheshire Railway (Mid-Cheshire Line offline south culverts) and a weir (Tributary of Birkin Brook 1 overflow weir) to provide flood mitigation. As part of the proposed overflow channel, a new culvert will be installed under Mobberley Road (Mobberley Road offline culvert). These changes have the potential to cause a minor impact resulting in minor adverse effects, which are not significant.

Aquifers

- 8.2.11 No significant permanent effects on the glacial till (Secondary (Undifferentiated) aquifer) due to the deeper excavations involved in construction of the Ashley railhead were reported in the main ES.
- 8.2.12 The proposed addition of an unlined overflow channel for Tributary of Birkin Brook 1 has the potential to have permanent impacts on the flow of groundwater in the glacial till by disrupting flow pathways and potentially acting as a drain for shallow groundwater in its proximity. This could lead to a minor impact on the moderate value glacial till resulting in a minor adverse effect, which is not significant.
- 8.2.13 It was reported in the main ES that there is significant thickness of glacial till overlying the bedrock aquifer in this area. Below ground features will only extend into the glacial till, so no new impacts on the bedrock aquifer are predicted as a result of the proposed AP2 amendment.

Abstractions

- 8.2.14 No permanent impacts on the 'Abstraction at Lower House Farm' were reported in the main ES due to design elements in the area. The construction of a drainage ditch 340m long, 3m

wide and 1.5m deep on the eastern side of the Mid-Cheshire Railway has the potential to permanently alter local shallow groundwater flows in the glacial till. It is unknown which aquifer the 'Abstraction at Lower House Farm' draws from, and whether the ditch will be within the zone of influence of the abstraction. On a precautionary basis, it is considered that without mitigation, there is the potential for a moderate adverse effect on this moderate value abstraction as a result of the proposed AP2 design changes, which is a significant effect.

- 8.2.15 As design progresses, further investigation through stakeholder engagement should be conducted to confirm whether this abstraction remains in use. If it is found to be in current use, and that the supply could be derogated by the alteration of groundwater flows due to the proposed amendment, mitigation will be considered. This might include deepening of the abstraction or provision of alternative water supply. If mitigation is required, this will be designed in consultation with the Environment Agency and other stakeholders to ensure no significant adverse effect on groundwater.

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

Temporary effects

- 8.3.1 No temporary significant effects on surface water were reported in the main ES.
- 8.3.2 The construction works required for the realignment of Tributary of Birkin Brook 2 (AP2-006-012) have the potential to cause minor impacts on water quality from uncontrolled site runoff, disturbance of silt and changes in flow characteristics. For this low value watercourse, this will result in a negligible effect, which is not significant (see Annex A). These impacts will be reduced to negligible due to the implementation of the measures embedded in the design or set out in the draft CoCP.

Permanent effects

- 8.3.3 The main ES reported a moderate impact, resulting in a minor adverse effect, which is not significant, due to the loss of the upper reaches of Tributary of Birkin Brook 2, from the construction of Thorns Green embankment. This amendment involves the realignment of Tributary of Birkin Brook 2 to replace the lost section of watercourse. A culvert will be constructed to pass the watercourse realignment under the maintenance access road for the attenuation pond.

- 8.3.4 This realignment of Tributary of Birkin Brook 2 (AP2-006-012) will remove the effects due to the loss of the watercourse as reported in the main ES.
- 8.3.5 However, the realignment and culvert have the potential to cause permanent changes to flow and morphology. This is assessed to be a minor impact, resulting in a negligible effect, which is not significant (see Annex A). The detailed design of permanent watercourse realignments will aim where reasonably practicable, to incorporate measures to improve the watercourse's hydromorphological condition.

8.4 Additional land permanently required to reconfigure M56 Junction 6 (AP2-006-014)

Temporary effects

Watercourses

- 8.4.1 The reconfiguration of M56 Junction 6 (AP2-006-014) will include extension of the existing motorway crossing of the River Bollin and numerous crossings (with associated culverts) of the tributaries of River Bollin 2, 3, 4, 5, 6 and 7, as shown in the SES2 and AP2 ES Water resources and flood risk map book: map series WR-01, Map WR-01-309a A5 to D7. The details of the watercourses and proposed realignments in this area are shown in Figure 2 and the additional culverts are presented in Figure 3.
- 8.4.2 During construction, there is the potential for minor impacts on water quality from uncontrolled site runoff, disturbance of silt and changes in flow characteristics in the high value River Bollin. This impact leads to a temporary moderate adverse effect, which is significant. These impacts will be reduced to negligible due to the implementation of the measures embedded in the design or set out in the draft CoCP.
- 8.4.3 During construction, including construction of the culverts and watercourse realignments, there is the potential for moderate impacts on water quality from uncontrolled site runoff, disturbance of silt and changes in flow characteristics in the tributaries of River Bollin 2, 3, 4, 5, 6 and 7. These impacts lead to moderate adverse effects, which are significant (see Annex A). These impacts will be reduced to negligible due to the implementation of the measures embedded in the design or set out in the draft CoCP.

Figure 2: Existing watercourses associated with the reconfiguration of M56 Junction 6 (AP2-006-014)

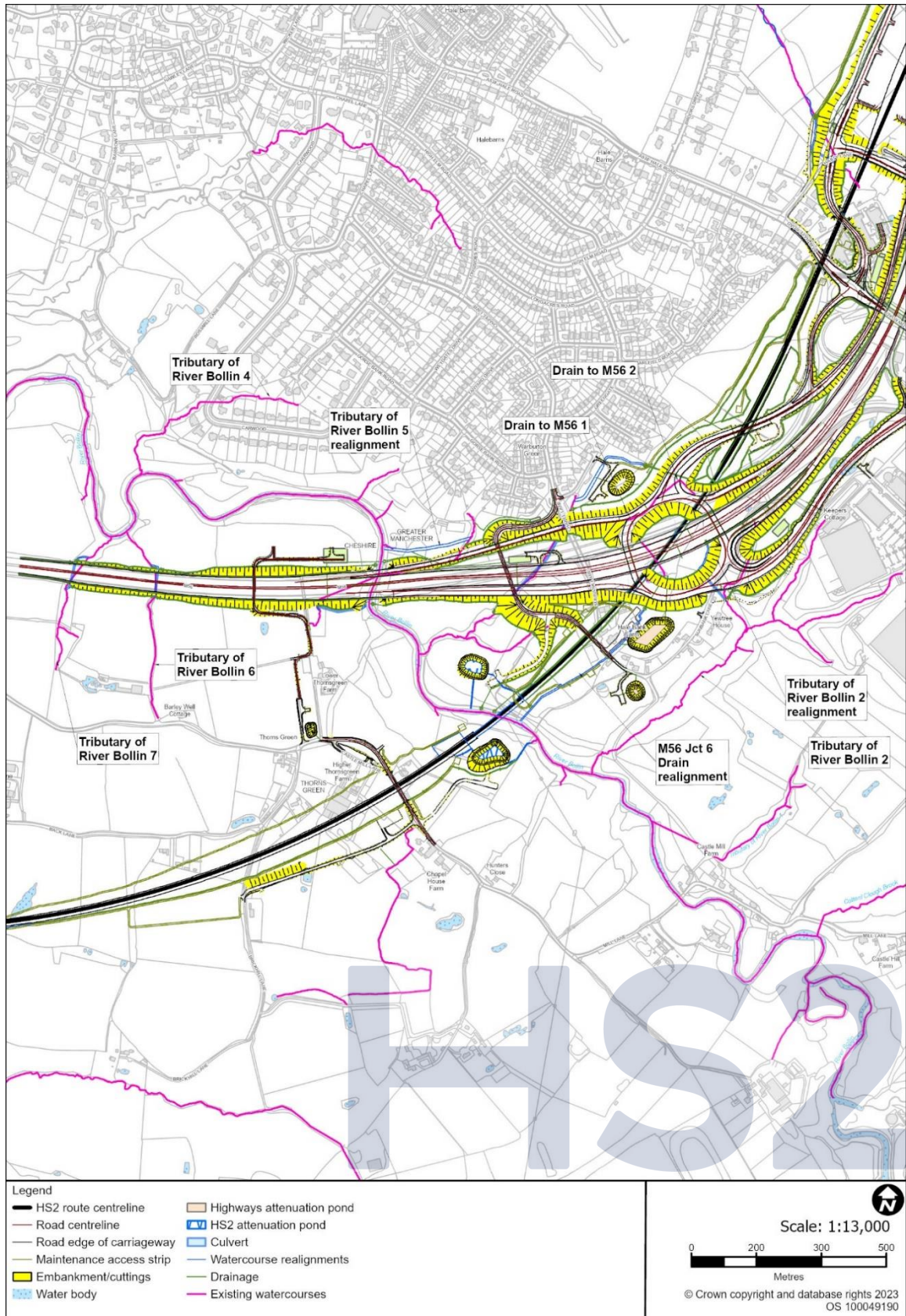
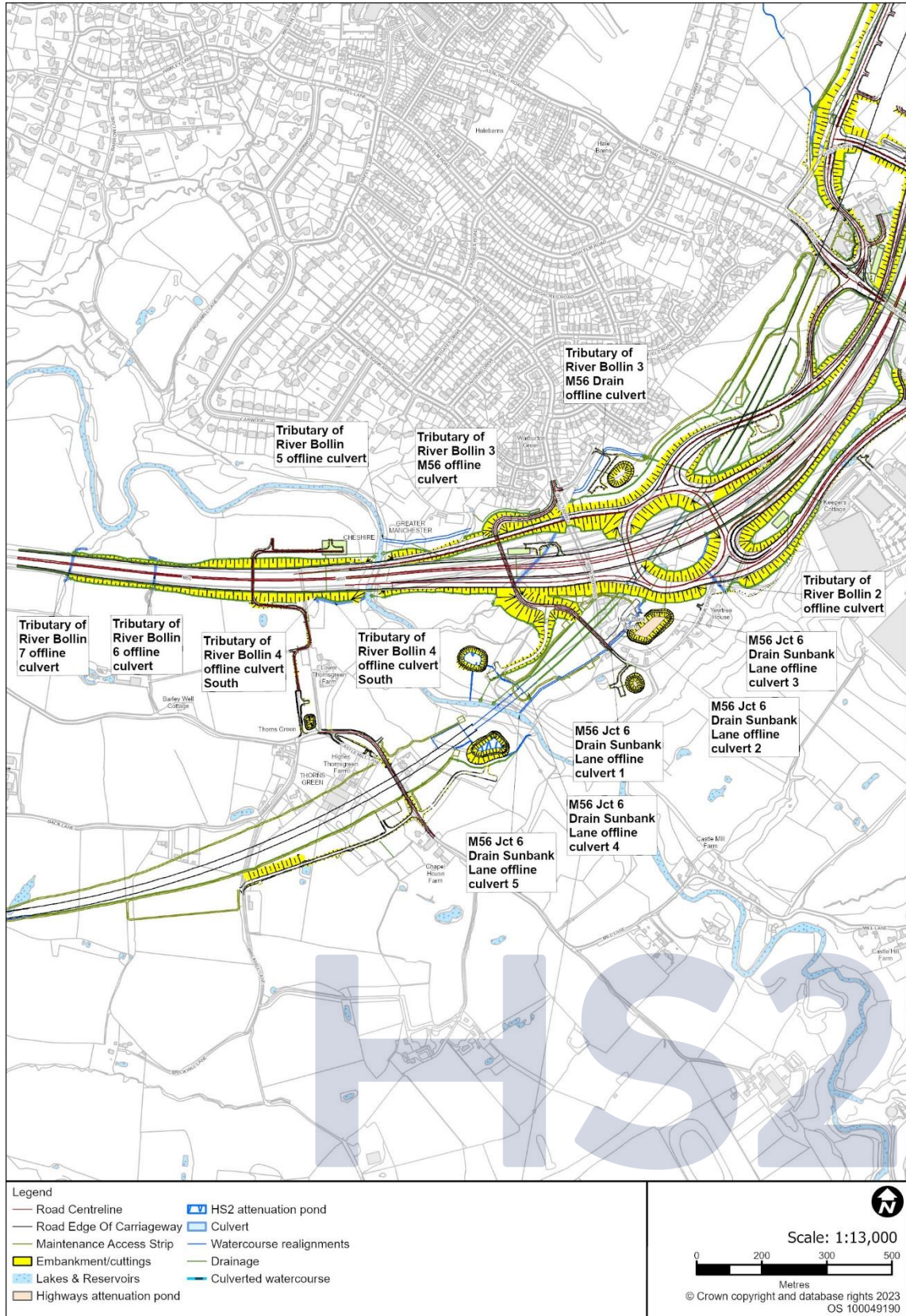


Figure 3: New culverts associated with the reconfiguration of M56 Junction 6 (AP2-006-014)



Aquifers

- 8.4.4 In the main ES, temporary moderate adverse effects were reported on groundwater quality in the superficial glacial till (Secondary (Undifferentiated) aquifer) due to the construction of various shallow and deeper excavation features including tunnels, embankments, overbridges, viaducts, cuttings and retaining walls in the area of this design change. Through the application of the draft CoCP, these effects were assessed to be negligible and not significant.
- 8.4.5 It was also reported in the main ES that groundwater quality in the underlying Sidmouth Mudstone Formation (Secondary B aquifer) could be affected during construction. Through the application of the draft CoCP, any significant effects were reduced to negligible and not significant.
- 8.4.6 Where the main ES reported dewatering would be required for the construction of a cutting or cutting retaining wall, this was reported to have the potential to temporarily affect groundwater levels and flows. However, no significant effects were reported after application of the draft CoCP.
- 8.4.7 The reconfiguration of M56 Junction 6 (AP2-006-014) includes new culverts, overbridges, underbridges and retaining walls that will be constructed above and/or within the glacial till and Sidmouth Mudstone Formation aquifers and have the potential to affect the quality, levels and flow of groundwater in the same way as reported in the main ES. No new cuttings or retained cuttings are proposed. The changes to the cuttings and retained cuttings in this area, will not lead to new or different significant effects on groundwater quality, levels or flow.

Groundwater – surface water interactions

- 8.4.8 The reconfiguration of M56 Junction 6 (AP2-006-014) includes the following elements which could affect water quality at the spring 90m north of Lower Thorns Green Farm during their construction (see Annex A):
- River Bollin south embankment;
 - Tributary of River Bollin 4 offline culvert north;
 - Tributary of River Bollin 4 offline culvert south; and
 - Thorns Green accommodation offline overbridge.
- 8.4.9 However, no new or different significant effects are anticipated from those presented in the main ES.
- 8.4.10 The 'Potential spring 120m east of Keepers Cottage, Sunbank Lane' and the 'Potential spring 127m south-east of Keepers Cottage, Sunbank Lane' were included in the main ES for the assessment of the potential for construction activities to impact water quality. New design elements are proposed in the areas of these potential springs. The construction of these

elements could impact water quality as well as locally alter groundwater flows as temporary dewatering may be required during shallow excavations. These new design elements are:

- M56 Junction 6 westbound exit retaining wall;
- M56 Junction 6 northbound access offline retaining wall;
- M56 Junction 6 westbound access retaining wall;
- M56 Junction 6 Wilmslow Road link road retaining wall; and
- M56 Junction 6 Wilmslow Road link road attenuation tank retaining wall.

8.4.11 The assessments for these five design elements are presented in Annex A. However, no new or different significant effects are anticipated compared to those presented in the main ES.

Permanent effects

Watercourses

8.4.12 The reconfiguration of M56 Junction 6 (AP2-006-014) will include extension of the existing M56 River Bollin underbridge and numerous crossings (with associated culverts) of the tributaries of River Bollin 2, 3, 4, 5, 6 and 7. The watercourses and proposed realignments in this area are shown in Figure 2 and the culverts are presented in Figure 3.

8.4.13 The widening of the M56 River Bollin underbridge has the potential to lead to minor impacts on the high value River Bollin related to increased shading, resulting in moderate adverse effects, which is significant.

8.4.14 In order to facilitate the new M56 Junction 6 layout, a proposed realignment of Tributary of River Bollin 3 will require a new 298m long culvert to pass beneath the junction, a short section of realignment (22m) and a new section of open channel (223m). The presence of this new culvert has the potential to lead to permanent changes to the watercourse flow and morphology. This is assessed to be a moderate impact, on this moderate value receptor, resulting in a moderate adverse effect, which is significant. Where reasonably practicable, measures will be introduced to improve the channel morphology and water quality.

8.4.15 The various realignment of tributaries of River Bollin 2, 4, 6 and 7 have the potential to cause permanent changes to the watercourses flow and morphology. These minor impacts on the moderate value watercourses of Tributary of River Bollin 2, 4, 6 and 7 will result in minor adverse effects, which are not significant. The detailed design of permanent watercourse realignments will aim to incorporate appropriate features to retain, and, where reasonably practicable, enhance the watercourse's hydromorphological condition.

8.4.16 The realignment of Tributary of River Bollin 5 will allow a new open channel to be constructed, replacing the existing culverted section of watercourse. This is assessed to have a minor impact on the flow and morphology of this moderate value watercourse, leading to a minor beneficial effect, which is not significant.

- 8.4.17 The Drain to M56 1 and 2 will be lost beneath the new M56 junction. The approximately 300m of open channel of these watercourses will be replaced by a new 354m long open channel (with 5 short culverts). This is assessed to be a minor impact on watercourse flow and morphology, resulting in negligible effects, which are not significant.
- 8.4.18 The AP2 revised scheme crosses numerous tributaries of the River Bollin. The effects of these culvert crossings on the hydromorphology of the individual watercourses are generally not significant. However, the combination of these watercourse crossings; leads to the loss of approximately 450 to 500m of open channel. Between 500 to 550m of watercourse realignments are proposed which could help offset the impacts of these culverts. 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. Therefore, the combined impact of these numerous culverts is assessed to be minor on the hydromorphology of the high value River Bollin catchment, leading to a moderate adverse effect, which is significant.
- 8.4.19 Additional mitigation options for the permanent impact on the hydromorphology of the River Bollin catchment will be identified, discussed and agreed with the Environment Agency, in order to ensure no deterioration of the River Bollin catchment, as far as reasonably practicable. Mitigation options could include the improvement of existing watercourse habitats or full/partial removal of existing culverts in other parts of the River Bollin catchment. On a precautionary basis, until these investigations are complete, a residual cumulative significant effect will remain.

Aquifers

- 8.4.20 Below ground features have the potential to permanently affect groundwater flow paths. No significant permanent effects on aquifers were reported in the main ES as a result of deep excavations for the M56 cutting retaining wall and M56 East tunnel.
- 8.4.21 The reconfiguration of M56 Junction 6 (AP2-006-014) includes new culverts, overbridges, underbridges and retaining walls. Some elements of these may be constructed within the superficial and bedrock aquifers and have the potential to affect the groundwater flows in the same way as reported in the main ES. Therefore, no new or different significant effects are anticipated on these aquifers over those reported in the main ES.

Groundwater – surface water interactions

- 8.4.22 A permanent moderate adverse, significant effect on Spring at Keepers Cottage, Sunbank Lane (south) was reported in the main ES. This effect was identified as the spring is located within the zone of influence of the original scheme M56 East tunnel and Manchester Airport High Speed station cutting and retaining wall.
- 8.4.23 The proposed reconfiguration of M56 Junction 6 (AP2-006-014) includes the M56 Junction 6 westbound exit that will be built over the Spring at Keepers Cottage, Sunbank Lane (south).

This will lead to the loss of this feature. The loss of this feature is assessed to be a new permanent major impact, resulting in a major adverse effect, which is significant.

- 8.4.24 Spring at Keepers Cottage, Sunbank Lane (south) forms the headwaters of Tributary of River Bollin 2. The M56 Junction 6 westbound exit offline retaining wall is proposed to be located 25m north-west of the Tributary of River Bollin 2. This will form a permanent barrier to shallow groundwater flow up hydraulic gradient of the spring, which could lead to groundwater flooding up gradient of the retaining wall and a reduction in groundwater flow to Tributary of River Bollin 2. The combination of the loss of the spring due to the location of the proposed M56 Junction 6 westbound exit and the reduction in groundwater flow due to the retaining wall may lead to a reduction in flow in the Tributary of River Bollin 2.
- 8.4.25 The reconfiguration of M56 Junction 6 (AP2-006-014) includes land filter drainage along the upstream side of the M56 Junction 6 westbound exit offline retaining wall that will capture the groundwater flow that feeds the Spring at Keepers Cottage, Sunbank Lane (south) and Tributary of River Bollin 2. This land drainage is captured by the new open channel in the centre of the gyratory, before entering a culvert which discharges back into Tributary of River Bollin 2. This provides mitigation for potential reduction in flow in Tributary of River Bollin 2, reducing the impact to negligible, resulting in a negligible effect, which is not significant. This land drainage system will also reduce the impact of groundwater flooding upgradient of the retaining wall to minor, leading to a new minor adverse effect, which is not significant.
- 8.4.26 The main ES reported no permanent effects on the Potential spring 120m east of Keepers Cottage, Sunbank Lane or the Potential spring 127m south-east of Keepers Cottage, Sunbank Lane due to any features of the original scheme. The reconfiguration of M56 Junction 6 (AP2-006-014) includes a 40m long attenuation tank retained cut, which is located immediately adjacent to the springs and is likely to be in their respective groundwater capture zones. The retaining wall will form a partial barrier to natural groundwater flow and permanently alter groundwater flow to these springs. It is assumed that local groundwater flow is likely to be in the direction of the River Bollin. Therefore, the retained cut will be parallel to the assumed groundwater flow, which will reduce the impact it will have on groundwater flow. However, due to the proximity of the AP2 revised scheme to the springs, on a precautionary basis it is assessed that a minor impact on these high value springs will occur, leading to a moderate adverse effect, which is significant.

8.5 Additional land permanently required for modifications to WFD mitigation for Timperley Brook (AP2-006-018)

Temporary effects

- 8.5.1 No temporary, significant effects on surface water were reported in the main ES.

8.5.2 The modification of mitigation for Timperley Brook (AP2-006-018) has the potential to cause minor impacts on surface water quality from uncontrolled site runoff, disturbance of silt and changes in flow characteristics to Timperley Brook and Tributary of Timperley Brook 1. This results in a minor adverse effect that is not significant (see Annex A). These impacts will be reduced to negligible due to the implementation of the measures embedded in the design or set out in the draft CoCP.

Permanent effects

8.5.3 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. It is now understood that Timperley Brook crosses the HS2 route from Davenport Green Wood, passes perpendicular beneath Brooks Drive in an approximately 60m long culvert and then re-emerges on the western side of Brooks Drive at the boundary of Ringway Golf Club golf course. Therefore, the channel realignment proposed in the original scheme, to bypass this culvert, would not create additional open channel or mitigation of the significant effect from the station footprint.

8.5.4 The modification of mitigation for Timperley Brook (AP2-006-018) includes several mitigation strategies, to provide alternative mitigation of the loss of open channel on Timperley Brook. These include:

- de-culverting of sections of Tributary of Timperley Brook 1 to the north and south of Flaxhigh Covert;
- the re-meandering of a section of Timperley Brook to the north of Brooks Drive, to provide a more natural channel and improve habitat; and
- further mitigation will be provided by re-meandering Tributary of Timperley Brook 1 and Timperley Brook where they run alongside Shay Lane. This work will include offsetting and re-meandering both watercourses away from the highway boundary.

8.5.5 With the inclusion of all the mitigation set out in this amendment, the remaining impact on Timperley Brook due to the station footprint, is assessed to be minor, resulting in a minor adverse effect, which is not significant. This amendment will, therefore, remove the significant effect set out in the SES2 (Section 4).

8.6 Additional land temporarily required for the provision of surface water drainage at Manchester Tunnel South Portal main compound (AP2-006-024)

8.6.1 This amendment (AP2-006-024) is to include a surface water drainage outfall from the Manchester tunnel south portal main compound to Fairywell Brook, for use during

construction. After construction is complete, the drainage outfall will be removed, and the land restored to its previous use.

- 8.6.2 The construction works required for this surface water drainage outfall have the potential to cause minor impacts on water quality from uncontrolled site runoff, disturbance of silt and changes in flow characteristics to the Fairywell Brook. For this low value watercourse, this will result in a negligible effect, which is not significant (see Annex A). These impacts will be reduced to negligible due to the implementation of the measures embedded in the design or set out in the draft CoCP.
- 8.6.3 The new discharge point into the Fairywell Brook has the potential to lead to minor hydromorphological impacts on the watercourse and create a potential new pathway for pollutants. Mitigation measures embedded in the design include a surface water drainage strategy, which will reduce discharge rates to equivalent greenfield runoff rates and the requirement to incorporate any required pollution removal measures. With these measures in place, this impact is assessed to be negligible, leading to a negligible effect, which is not significant (see Annex A).

9 Assessment of impacts and effects during operation

- 9.1.1 No new or different operational effects to the water environment will result from the AP2 amendments described in Part 2.

Part 3: Combined effects of changes and amendments in the MA06: Hulseheath to Manchester Airport area due to changes in construction traffic flows

10 Introduction

- 10.1.1 This section sets out the combined assessment of new or different significant construction and operational traffic effects, as a result of changes in construction and operational traffic flows. These relate to situations where the change in traffic flows cannot be directly attributed to an SES2 change or an AP2 amendment. The assessment has considered any impacts in the Hulseheath to Manchester Airport (MA06) community area associated with SES2 changes and AP2 amendments in the adjoining community areas.
- 10.1.2 Roads are designed to drain freely to prevent the build-up of standing water on the carriageway whilst avoiding exposure to or causing flooding. Contaminants deposited on the road surface are quickly washed off during rainfall. Where traffic levels are high, the level of contamination increases and therefore the potential for unacceptable harm being caused to the receiving water also increases. There are many circumstances in which runoff from roads is likely to have no discernible effect; however, a precautionary and best practice approach indicates the need for the assessment of the possible impact of pollutant discharges on the water environment from roads affected by the SES2 scheme and AP2 revised scheme. These effects can either be through spillage and routine runoff pollution from new roads that are used during the operational phase or changes in traffic movements on the existing road network.
- 10.1.3 The AP2 revised scheme makes provision for two methods for draining new sections of highway: direct runoff to soakaway and drainage via an attenuation pond to an existing watercourse. Where changes in traffic volumes have been identified along the existing road network, steps have been taken to identify the type of drainage in place and an assessment has been made of whether the highway works proposed have implications for pollution risk within the Hulseheath to Manchester Airport (MA06) community area.

11 Methodology and assessment criteria

11.1 Routine runoff pollution risk

- 11.1.1 Where highway drainage is discharged to local watercourses, the assessment for determining whether routine runoff is likely to have a detrimental impact on water quality uses the Highways England Water Risk Assessment Tool (HEWRAT), part of the Design Manual for Roads and Bridges LA 113 Road Drainage and the Water Environment Revision 1 (DMRB – LA113)⁵. Where highway realignments are to discharge to kerb side ditches which do not have a baseflow, the Groundwater Assessment (Appendix C of the DMRB – LA113) is used.
- 11.1.2 The significance of the impact of the predicted effects on surface water and groundwater receptors has been assessed in accordance with the methodology described in the SMR in the main ES.

11.2 Spillage pollution risk

- 11.2.1 In addition to assessing the potential for adverse effects of routine surface water runoff from highways, an assessment of the potential spillage risk to water quality has been undertaken for highway realignments. The methodology for assessing spillage risk follows the Spillage Risk Assessment (Appendix D of the DMRB – LA 113).

⁵ Standards for Highways (2020), *Design Manual for Roads and Bridges (DMRB) – LA 113 Road Drainage and the Water Environment Revision 1*. Available online at: <https://standardsforhighways.co.uk/tses/attachments/d6388f5f-2694-4986-ac46-b17b62c21727?inline=true>.

12 Detailed assessment

12.1 Screening results

- 12.1.1 A screening exercise identified the need for routine runoff and pollution risk assessments in the Hulseheath to Manchester Airport (MA06) community area during the construction phase of the SES2 scheme and AP2 revised scheme. This construction phase screening identified potential risk of pollution related to the changes in construction traffic flows from the AP2 revised scheme on the M56.
- 12.1.2 A screening exercise identified the need for routine runoff and pollution risk assessments in the Hulseheath to Manchester Airport (MA06) community area during the operational phase of the SES2 scheme and AP2 revised scheme. This is related to the modifications to the:
- A538 Hale Road and Hasty Lane to the A538 Hale Road and station access (eastbound traffic), see Figure 4;
 - Manchester Airport High Speed station access road (east), Manchester Airport High Speed station access road (west) and Runger Lane, see Figure 5; and
 - realignment of the M56 and relocation and reconfiguration of junction 6, see Figure 6.
- 12.1.3 The operational phase screening exercise shows no new or different effects relating to the modifications to the A538 Hale Road and Hasty Lane to the A538 Hale Road/station access (eastbound traffic) and Manchester Airport High Speed station access road (east), Manchester Airport High Speed station access road (west) and Runger Lane to those reported in the main ES. However, there is a potential risk for pollution to lead to new or different significant effects within the receiving watercourses, associated with the realignment of the M56 and relocation and reconfiguration of Junction 6.

Supplementary Environmental Statement 2 and Additional Provision 2 Environmental Statement
 SES2 and AP2 ES Volume 5, Appendix: WR-003-OMA06
 Water resources and flood risk
 MA06
 Water resources assessment

Figure 4: A538 Hale Road and Hasty Lane to the A538 Hale Road/station access (eastbound traffic)

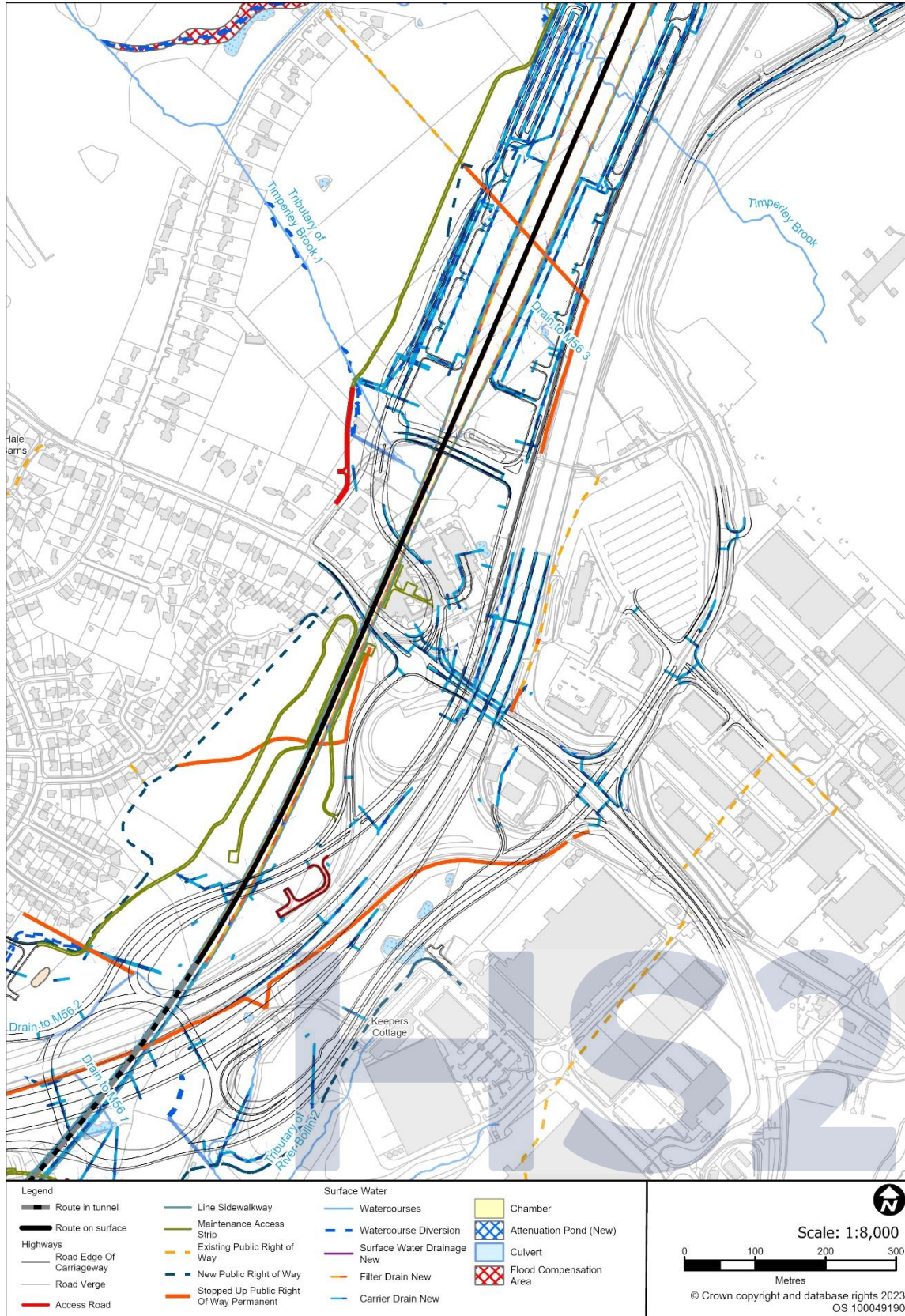
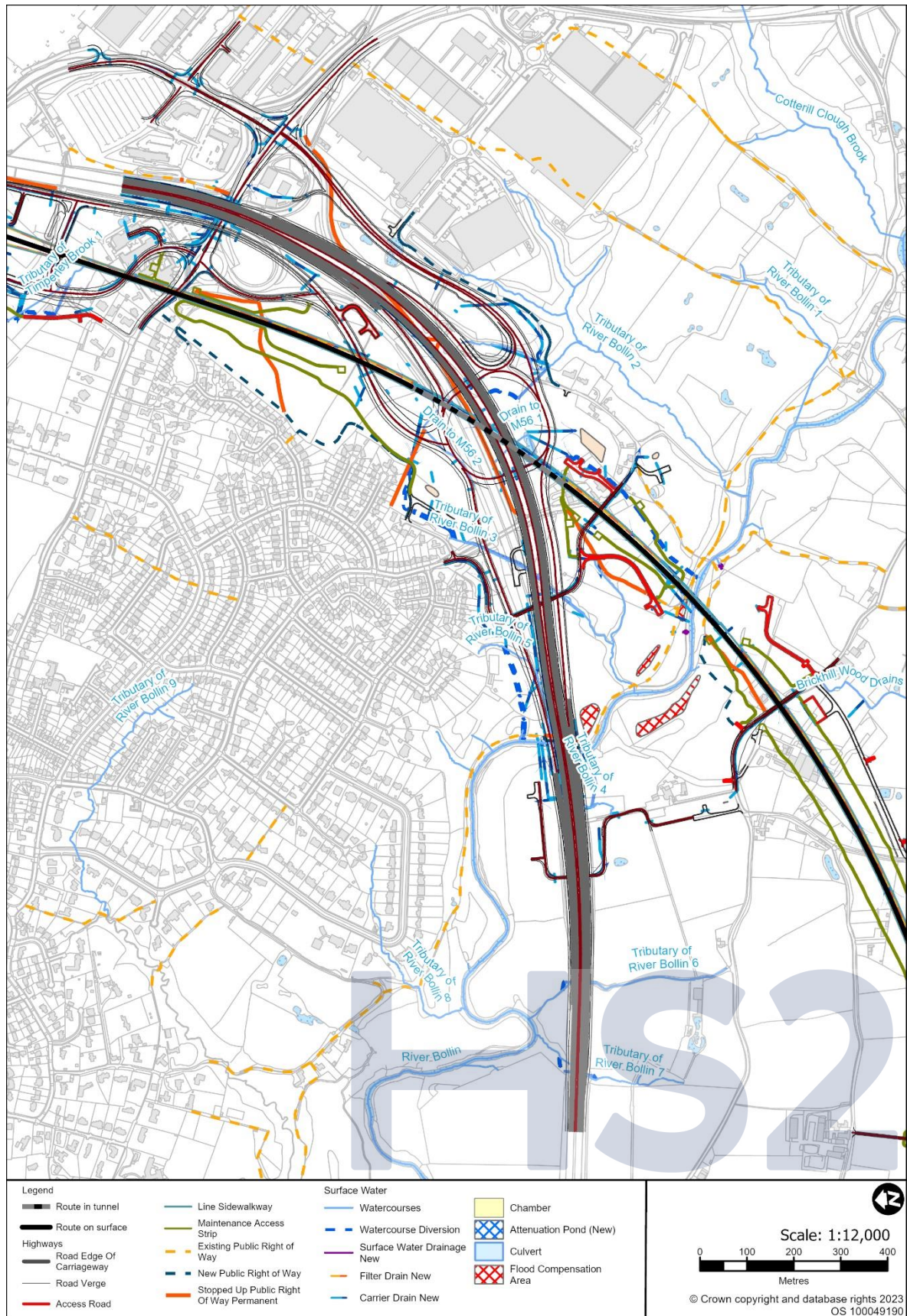


Figure 5: Manchester Airport High Speed station access road (east), Manchester Airport High Speed station access road (west) and Runger Lane



Figure 6: Realignment of the M56 and relocation and reconfiguration of Junction 6



12.2 Routine runoff pollution risk

Construction traffic

- 12.2.1 The main ES did not identify the need for a routine runoff and pollution risk assessment or a spillage pollution risk assessment in the Hulseheath to Manchester Airport (MA06) community area during the construction phase. The outfalls for the M56 are to the River Bollin, Tributary of River Bollin 6, Tributary of River Bollin 7 and Birkin Brook.

River Bollin

- 12.2.2 Water quality monitoring data has been collected for the River Bollin. This data is presented in the SES2 and AP2 ES BID WR-004-0MA06 report. The data indicates that under baseline conditions (prior to the AP2 revised scheme), the concentration of copper varies between 0.8µg/l and 3.2µg/l in the period March 2022 to September 2022. The majority of the time this is higher than the Environmental Quality Standard (EQS) of 1µg/l. Applying the average background copper concentration into the HEWRAT tool (2.45µg/l), the assessment has been carried out for the River Bollin to assess the cumulative effects on the watercourse.
- 12.2.3 The tier 2 HEWRAT assessment, taking into account the existing mitigation, identified that the outfall passes the acute soluble and sediment-bound pollutants assessments. However, an EQS exceedance for copper is assessed due to the background concentration being higher than the EQS.
- 12.2.4 In line with WFD best practice guidance and the DMRB assessment principles, where the HEWRAT assessment fails and water quality data is available, a metal bioavailability assessment has been carried out using the Environment Agency metal bioavailability assessment tool (M-BAT)⁶. This assessment uses average concentrations of calcium and pH along with a median concentration of dissolved organic carbon, to estimate the concentrations of copper which would be bioavailable (i.e. in a form which could impact on the biology in the watercourse).
- 12.2.5 For the outfall assessed at River Bollin, under the baseline conditions (prior to the scheme), the average concentration of copper from the monitoring is 2.45µg/l. The HEWRAT assessment for the watercourse shows that the changes in construction traffic data associated with the AP2 revised scheme, would lead to an increase in average concentration of copper to 2.46µg/l. These concentrations have been input to the M-BAT to estimate the bioavailable concentration of copper. The M-BAT estimates the concentration of bioavailable copper as 0.06µg/l in baseline conditions and 0.06µg/l for the AP2 revised scheme. The values are below the EQS of 1µg/l. Therefore, this additional assessment shows that the

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>.

impact of the changes in traffic due to construction on highways discharges to River Bollin are negligible, leading to a negligible effect which is not significant.

Tributary of River Bollin 6 and 7

- 12.2.6 No water quality monitoring data has been collected for Tributary of River Bollin 6 or 7. Due to the proximity with the River Bollin, the sampling data collected for the River Bollin was used for Tributary of River Bollin 6 and 7. Therefore, for this assessment, the data from the River Bollin has been used. This data is presented in the SES2 and AP2 ES BID WR-004-OMA06 report and discussed in the section above. The data indicates that under baseline conditions (prior to the AP2 revised scheme), the concentration of copper varies between 0.8µg/l and 3.2µg/l in the period March 2022 and September 2022. The majority of the time this is higher than the EQS of 1µg/l. Applying the average background copper concentration into the HEWRAT tool (2.45µg/l), the assessment has been carried out for Tributary of River Bollin 6 and 7 to assess the cumulative effects on these watercourses.
- 12.2.7 The existing mitigation and tier 2 HEWRAT assessment, identified that the outfall passes the acute soluble and sediment-bound pollutants assessments. However, in both watercourses an EQS exceedance for copper is assessed due to the background concentration being higher than the EQS. In line with the WFD best practice guidance and the DMRB assessment principles, where the HEWRAT assessment fails and water quality data is available, a metal bioavailability assessment has been carried out using the Environment Agency M-BAT.
- 12.2.8 For the outfall assessed at Tributary of River Bollin 6, under the baseline conditions (prior to the scheme), the average concentration of copper is assumed to be 2.45µg/l. The HEWRAT assessment for the watercourse shows that the changes in construction traffic data associated with the AP2 revised scheme, would lead to an increase in average concentration of copper to 2.53µg/l. These concentrations have been input to the M-BAT to estimate the bioavailable concentration of copper. The M-BAT estimates the concentration of bioavailable copper as 0.06µg/l in baseline conditions and 0.06µg/l for the AP2 revised scheme. The values are below the EQS of 1µg/l. Therefore, this additional assessment shows that the impact of the changes in traffic due to construction on highways discharges to Tributary of River Bollin 6 are negligible, leading to a negligible effect which is not significant.
- 12.2.9 For the outfall assessed at Tributary of River Bollin 7, under the baseline conditions (prior to the scheme), the average concentration of copper from the monitoring is 2.45µg/l. The HEWRAT assessment for the watercourse shows that the changes in construction traffic data associated with the AP2 revised scheme, would lead to an increase in average concentration of copper to 2.58µg/l. These concentrations have been input to the M-BAT to estimate the bioavailable concentration of copper. The M-BAT estimates the concentration of bioavailable copper as 0.06µg/l in baseline conditions and 0.07µg/l for the AP2 revised scheme. The values are below the EQS of 1µg/l. Therefore, this additional assessment shows that the impact of the changes in traffic due to construction on highways discharges to Tributary of River Bollin 7 are negligible, leading to a negligible effect which is not significant.

Birkin Brook

- 12.2.10 No water quality monitoring data has been collected for Tributary of River Bollin 6 or 7. Due to the proximity with the River Bollin, the sampling data collected for the River Bollin was used for Birkin Brook. This data is presented in the SES2 and AP2 ES BID WR-004-0MA06 report and discussed in the River Bollin section above. The data indicates that under baseline conditions (prior to the AP2 revised scheme), the concentration of copper varies between 0.8µg/l and 3.2µg/l in the period March 2022 and September 2022, more frequently being higher than the EQS of 1µg/l. Applying the average background copper concentration into the HEWRAT tool (2.45µg/l), the assessment has been carried out for the Birkin Brook to assess the cumulative effects on the watercourse.
- 12.2.11 The existing mitigation and tier 2 HEWRAT assessment, identified that the outfall passes the acute soluble and sediment-bound pollutants assessments. However, an EQS exceedance for copper is assessed due to the background concentration being higher than the EQS. In line with WFD best practice guidance and the DMRB assessment principles, where the HEWRAT assessment fails and water quality data is available, a metal bioavailability assessment has been carried out using the Environment Agency M-BAT.
- 12.2.12 For the outfall assessed at Birkin Brook, under the baseline conditions (prior to the scheme), the average concentration of copper is assumed to be 2.45µg/l. The HEWRAT assessment for the watercourse shows that the changes in construction traffic data associated with the AP2 revised scheme, would lead to an increase in average concentration of copper to 2.46µg/l. These concentrations have been input to the M-BAT to estimate the bioavailable concentration of copper. The M-BAT estimates the concentration of bioavailable copper as 0.06µg/l in baseline conditions and 0.06µg/l for the AP2 revised scheme. The values are below the EQS of 1µg/l. Therefore, this additional assessment shows that the impact of the changes in traffic due to construction on highways discharges to Birkin Brook are negligible, leading to a negligible effect which is not significant.
- 12.2.13 Based on a number of precautionary assumptions, this assessment has not identified any significant effects due to changes in traffic flows arising from construction of the AP2 revised scheme. During the passage of the Bill further investigations will be carried out, where reasonably practicable, to validate these assumptions. These investigations may include the collection of existing highways drainage data, to validate the presence/location of the drainage outfalls, the presence of any existing pollution prevention measures and the collection of additional background water quality data.

Operational traffic

A538 Hale Road and Hasty Lane to the A538 Hale Road and station access (eastbound traffic)

- 12.2.14 In the main ES, HEWRAT assessments were carried out for discharges to Tributary of Timperley Brook 1 from the A538 Hale Road and Hasty Lane to the A538 Hale Road and station access gyratory. A cumulative assessment, taking into account mitigation included in the design, reported a precautionary exceedance of copper EQS. This was reported as a precautionary moderate impact on this low value watercourse leading to a minor adverse effect which were not significant.
- 12.2.15 The SES2 baseline data has led to a change in the value of this watercourse from low to moderate. In addition, the AP2 revised scheme leads to some changes in the drainage outfalls to the watercourse (see Figure 4). Therefore, the HEWRAT assessment has been re-run on the AP2 revised scheme.
- 12.2.16 Water quality monitoring data has been collected for Tributary of Timperley Brook 1. This data is presented in the SES2 and AP2 ES BID WR-004-0MA06 report. The data indicates that the background concentration of copper during the monitoring period (August 2021 to March 2022) in Tributary of Timperley Brook 1 is above the EQS of 1µg/l and varies between 3.6µg/l and 16µg/l).
- 12.2.17 Applying the average background copper concentration of 8.5µg/l into the HEWRAT tool, the assessment has been carried out for Tributary of Timperley Brook 1 to assess the cumulative effects on the watercourse. The tier 2 HEWRAT assessment, taking into account the mitigation included in the design, identified that the outfall passes the acute soluble and sediment-bound pollutants assessments; however, an EQS exceedance for copper is assessed due to the background concentration being higher than the EQS. However, the assessment shows that the copper concentration for the AP2 revised scheme (8.47µg/l) is lower than the baseline concentration (8.5µg/l). This suggests that the copper concentration in the drainage discharge will be less than the background concentrations in this watercourse, and that the highways drainage will provide a small degree of dilution. Therefore, the impact of highways drainage on water quality in this watercourse is assessed to be negligible, leading to a negligible effect, which is not significant.

Manchester Airport High Speed station access road (east), Manchester Airport High Speed station access road (west) and Runger Lane

- 12.2.18 In the main ES, HEWRAT assessments were carried out for discharges to Timperley Brook from the Manchester Airport High Speed station access road (east), Manchester Airport High Speed station access road (west) and Runger Lane. A cumulative assessment, taking into

account mitigation included in the design, reported a precautionary exceedance of copper EQS. This was reported as a precautionary moderate impact on this moderate value watercourse leading to a moderate adverse effect which is significant.

- 12.2.19 The AP2 revised scheme leads to some changes in the drainage outfalls to the watercourse (see Figure 5). Therefore, the HEWRAT assessment has been re-run on the AP2 revised scheme.
- 12.2.20 Three rounds of water quality sampling have been collected for Timperley Brook. This data is presented in the SES2 and AP2 ES BID WR-004-0MA06 report. The data indicates that the background concentration of copper in Timperley Brook varied between 3.1µg/l and 16µg/l in the period March 2022 and September 2022. Applying the average background copper concentration of 11.7µg/l into the HEWRAT tool, the assessment has been carried out for Timperley Brook to assess the cumulative effects on the watercourse.
- 12.2.21 The tier 2 HEWRAT assessment, taking into account the mitigation included in the design, identified that the outfall passes the acute soluble and sediment-bound pollutants assessments; however, an EQS exceedance for copper is assessed due to the background concentration being higher than the EQS.
- 12.2.22 In line with WFD best practice guidance and the DMRB assessment principles, a metal bioavailability assessment has been carried out using the Environment Agency M-BAT. This assessment uses average concentrations of calcium and pH along with a median concentration of dissolved organic carbon, to estimate the concentrations of copper and zinc which would be bioavailable (i.e. in a form which could impact on the biology in the watercourse).
- 12.2.23 For Timperley Brook, the water quality data used in the M-BAT are set out in SES2 and AP2 ES BID WR-004-0MA06 report. Under the baseline conditions (prior to the scheme), the average concentration of copper from the monitoring is 11.7µg/l. The HEWRAT assessment for Timperley Brook, shows that the changes in traffic data associated with the AP2 revised scheme, would lead to an increase in average concentration of copper to 11.72µg/l in Timperley Brook. These concentrations have been input to the M-BAT to estimate the bioavailable concentration of copper. The M-BAT estimates the concentration of bioavailable copper as 0.22µg/l in baseline conditions and 0.22µg/l for the AP2 revised scheme. The values are below the EQS of 1µg/l. Therefore, this additional assessment would reduce the impact to minor on water quality in Timperley Brook, leading to a minor adverse effect, which is not significant.

M56 realignment and reconfiguration of junction 6

- 12.2.24 The M56 realignment and reconfiguration of junction 6 will require new drainage to be provided. The screening exercise has identified three discharge locations to the River Bollin, and one discharge each to Tributary of River Bollin 2 and Tributary of River Bollin 3, which required HEWRAT assessment.

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- 12.2.25 Environment Agency water quality monitoring data is available for the River Bollin, for the monitoring point at Ashley bridge, which is approximately 3.5km downstream of the AP2 revised scheme. This indicates that the background concentration of copper in the River Bollin is above the EQS of 1µg/l and varies between 2.3µg/l and 6.2µg/l (in the period 2004 and 2013).
- 12.2.26 Applying the average background concentration into the HEWRAT tool, the assessment has been carried out for the three discharge locations to the River Bollin, both individually and in combination, to assess the cumulative effects on the watercourse.
- 12.2.27 The tier 2 HEWRAT assessment for outfall 1, outfall 2 and outfall 3, identified that all three outfalls have passed the acute soluble and sediment-bound pollutants assessments; however, an EQS exceedance for copper is assessed due to the background concentration being higher than the EQS.
- 12.2.28 The cumulative assessment for the River Bollin identified that the sediment and acute soluble pollutants aspect of the assessment is passed; however, an EQS exceedance of copper is recorded due to higher than EQS background concentration. The combined discharges to the River Bollin are assessed to have a moderate impact on this high value receptor, leading to a major adverse effect, which is significant.
- 12.2.29 In line with the WFD best practice guidance and the DMRB assessment principles, a metal bioavailability assessment has been carried out using the Environment Agency's M-BAT assessment tool. This assessment uses average concentrations of calcium and pH along with a median concentration of dissolved organic carbon, to estimate the concentrations of copper and zinc which would be bioavailable (i.e. in a form which could impact on the biology in the watercourse).
- 12.2.30 For the River Bollin, the water quality data used in the M-BAT are set out in SES2 and AP2 ES BID WR-004-0MA06 report. Under the baseline conditions (prior to the scheme), the average concentration of copper from the monitoring is 2.45µg/l. The HEWRAT assessment for the River Bollin, shows that the changes in traffic data associated with the AP2 revised scheme, would lead to an increase in average concentration of copper to 2.47µg/l in River Bollin. These concentrations have been input to the M-BAT to estimate the bioavailable concentration of copper. The M-BAT estimates the concentration of bioavailable copper as 0.06µg/l in baseline conditions and 0.06µg/l for the AP2 revised scheme. The values are below the EQS of 1µg/l. Therefore, this additional assessment would reduce the impact to negligible on water quality in the River Bollin, leading to a minor adverse effect which is not significant.
- 12.2.31 Both Tributary of River Bollin 2 and 3 are expected to have a low flow and could be dry in some climatic conditions, and therefore the discharge is considered to be to the underlying moderate value glacial till aquifer. Therefore, a groundwater assessment using the HEWRAT tool has been carried out for both discharge locations. The assessment results identified that the magnitude of the impacts of routine runoff from the proposed highway realignment to

the moderate value glacial till aquifer would be negligible, leading to a negligible effect, which is not significant.

12.3 Highways spillage risk assessment

Construction traffic

12.3.1 The evaluation of spillage risk to the River Bollin from M56 drainage is presented in Table 1. The risk of a serious pollution incident occurring is identified as negligible. The changes in construction traffic on the M56 will not result in significant effects related to spillage risk and no further mitigation is required.

Table 1: Spillage risk assessment for M56 to River Bollin

Assessment criteria	Data	Notes
Water body type	Surface	
Is outfall associated with a sensitive area?	No	
Length of road draining to outfall (km)	0.565	The length of the road was measured based on AP2 general arrangement drawings.
Road type (A-road or motorway)	A-road	
If A road, is site urban or rural?	Rural	
Junction type	No junction	
Response time to reach emergency services location	<1 hour	A response time of less than 1 hour is expected for emergency services.
Traffic flow (annual average daily traffic (AADT) two-way)	77,452	The highest traffic flow (AADT two-way) along the road was selected which represents a conservative approach.
% HGV	3.8	The corresponding HGV percentage value to the selected AADT value was chosen to represent the road. This represents a conservative approach.
Spillage factor (no/10 ⁹ HGVkm/year)	0.36	This spillage factor was taken from Table D.1 as presented in LA 113 Road Drainage and the Water Environment Revision 1 ⁶ .
Risk of accidental spillage	0.00022	This represents the total annual probability of a spillage.
Risk of pollution incident	0.00013	This represents the total annual probability of a spillage causing a pollution incident (where the spillage does not affect a sensitive area, the risk of a serious pollution incident is deemed acceptable if the annual probability is less than 0.01 (or 1%)).
Is risk greater than an annual probability of 1%?	No	Is there an overall risk for the length of the road draining to this outfall?
Total probability	0.6	
Return period (years)	7,268	

12.3.2 The evaluation of spillage risk to Tributary of River Bollin 6 from M56 drainage is presented in Table 2. The risk of a serious pollution incident occurring is identified as negligible. The

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changes in construction traffic on the M56 will not result in significant effects related to spillage risk and no further mitigation is required.

Table 2: Spillage risk assessment for M56 to Tributary of River Bollin 6

Assessment criteria	Data	Notes
Water body type	Surface	
Is outfall associated with a sensitive area?	No	
Length of road draining to outfall (km)	0.340	The length of the road was measured based on AP2 general arrangement drawings.
Road type (A-road or motorway)	Motorway	
If A road, is site urban or rural?	N/A	
Junction type	No junction	
Response time to reach emergency services location	<1 hour	A response time of less than 1 hour is expected for emergency services.
Traffic flow (annual average daily traffic (AADT) two-way)	77,452	The highest traffic flow (AADT two-way) along the road was selected which represents a conservative approach.
% HGV	3.8	The corresponding HGV percentage value to the selected AADT value was chosen to represent the road. This represents a conservative approach.
Spillage factor (no/10 ⁹ HGVkm/year)	0.36	This spillage factor was taken from Table D.1 as presented in LA 113 Road Drainage and the Water Environment Revision 1 ⁶ .
Risk of accidental spillage	0.00013	This represents the total annual probability of a spillage.
Risk of pollution incident	0.00008	This represents the total annual probability of a spillage causing a pollution incident (where the spillage does not affect a sensitive area, the risk of a serious pollution incident is deemed acceptable if the annual probability is less than 0.01 (or 1%)).
Is risk greater than an annual probability of 1%?	No	Is there an overall risk for the length of the road draining to this outfall?
Total probability	0.6	
Return period (years)	12,675	

12.3.3 The evaluation of spillage risk to Tributary of River Bollin 7 from the M56 drainage is presented in Table 3. The risk of a serious pollution incident occurring is identified as negligible. The changes in construction traffic on M56 will not result in significant effects related to spillage risk and no further mitigation is required.

Table 3: Spillage risk assessment for M56 to Tributary of River Bollin 7

Assessment criteria	Data	Notes
Water body type	Surface	
Is outfall associated with a sensitive area?	No	

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Assessment criteria	Data	Notes
Length of road draining to outfall (km)	0.270	The length of the road was measured based on AP2 general arrangement drawings.
Road type (A-road or motorway)	Motorway	
If A road, is site urban or rural?	N/A	
Junction type	No junction	
Response time to reach emergency services location	<1 hour	A response time of less than 1 hour is expected for emergency services.
Traffic flow (annual average daily traffic (AADT) two-way)	77,452	The highest traffic flow (AADT two-way) along the road was selected which represents a conservative approach.
% HGV	3.8	The corresponding HGV percentage value to the selected AADT value was chosen to represent the road. This represents a conservative approach.
Spillage factor (no/10 ⁹ HGVkm/year)	0.36	This spillage factor was taken from Table D.1 as presented in LA 113 Road Drainage and the Water Environment Revision 1 ⁶ .
Risk of accidental spillage	0.0001	This represents the total annual probability of a spillage.
Risk of pollution incident	0.00006	This represents the total annual probability of a spillage causing a pollution incident (where the spillage does not affect a sensitive area, the risk of a serious pollution incident is deemed acceptable if the annual probability is less than 0.01 (or 1%).
Is risk greater than an annual probability of 1%?	No	Is there an overall risk for the length of the road draining to this outfall?
Total probability	0.6	
Return period (years)	15,962	

12.3.4 The evaluation of spillage risk to Birkin Brook from the M56 drainage is presented in Table 4. The risk of a serious pollution incident occurring is identified as negligible. The changes in construction traffic on the M56 will not result in significant effects related to spillage risk and no further mitigation is required.

Table 4: Spillage risk assessment for M56 Realignment to Birkin Brook

Assessment criteria	Data	Notes
Water body type	Surface	
Is outfall associated with a sensitive area?	No	
Length of road draining to outfall (km)	0.845	The length of the road was measured based on AP2 general arrangement drawings.
Road type (A-road or motorway)	Motorway	
If A road, is site urban or rural?		
Junction type	No junction	
Response time to reach emergency services location	<1 hour	A response time of less than 1 hour is expected for emergency services.

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Assessment criteria	Data	Notes
Traffic flow (annual average daily traffic (AADT) two-way)	77,452	The highest traffic flow (AADT two-way) along the road was selected which represents a conservative approach.
% HGV	3.8	The corresponding HGV percentage value to the selected AADT value was chosen to represent the road. This represents a conservative approach.
Spillage factor (no/10⁹HGVkm/year)	0.36	This spillage factor was taken from Table D.1 as presented in LA 113 Road Drainage and the Water Environment Revision 1 ⁶ .
Risk of accidental spillage	0.00033	This represents the total annual probability of a spillage.
Risk of pollution incident	0.0002	This represents the total annual probability of a spillage causing a pollution incident (where the spillage does not affect a sensitive area, the risk of a serious pollution incident is deemed acceptable if the annual probability is less than 0.01 (or 1%).
Is risk greater than an annual probability of 1%?	No	Is there an overall risk for the length of the road draining to this outfall?
Total probability	0.6	
Return period (years)	51,000	

Operational traffic

12.3.5 The evaluation of spillage risk to the River Bollin from the M56 Junction 6 realignment – outfall 1 is presented in Table 5. The risk of a serious pollution incident occurring is identified as negligible. The highway realignment will not result in significant effects related to spillage risk and no further mitigation is required.

Table 5: Spillage risk assessment for M56 Junction 6 realignment – outfall 1 River Bollin

Assessment criteria	Data	Notes
Water body type	Surface	
Is outfall associated with a sensitive area?	No	
Length of road draining to outfall (km)	0.419	The length of the road was measured based on AP2 general arrangement drawings.
Road type (A-road or motorway)	Motorway	
If A road, is site urban or rural?	N/A	
Junction type	No junction	
Response time to reach emergency services location	<20 mins	A response time of less than 20 minutes is expected for emergency services.
Traffic flow (annual average daily traffic (AADT) two-way)	62,509	The highest traffic flow (AADT two-way) along the whole road realignment was selected which represents a conservative approach.
% HGV	3	The corresponding HGV percentage value to the selected AADT value was chosen to represent the whole road realignment. This represents a conservative approach.

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Assessment criteria	Data	Notes
Spillage factor (no/10⁹HGVkm/year)	0.36	This spillage factor was taken from Table D.1 as presented in LA 113 Road Drainage and the Water Environment Revision 1 ⁶ .
Risk of accidental spillage	0.00010	This represents the total annual probability of a spillage.
Risk of pollution incident	0.00005	This represents the total annual probability of a spillage causing a pollution incident (where the spillage does not affect a sensitive area, the risk of a serious pollution incident is deemed acceptable if the annual probability is less than 0.01 (or 1%).
Is risk greater than an annual probability of 1%?	No	Is there an overall risk for the length of the road draining to this outfall?
Total probability	<0.0001	
Return period (years)	21,524	

12.3.6 The evaluation of spillage risk to the River Bollin from the M56 Junction 6 realignment – outfall 2 is presented in Table 6. The risk of a serious pollution incident occurring is identified as negligible. The highway realignment will not result in significant effects related to spillage risk and no further mitigation is required.

Table 6: Spillage risk assessment for M56 Junction 6 realignment – outfall 2 River Bollin

Assessment criteria	Data	Data	Data	Notes
Water body type	Surface water	Surface water	Surface water	
Is outfall associated with a sensitive area?	No	No	No	
Length of road draining to outfall (km)	0.908	1.249	0.645	The length of the road was measured based on AP2 general arrangement drawings.
Road type (A-road or motorway)	Motorway	Motorway	Motorway	
If A road, is site urban or rural?	N/A	N/A	N/A	Not applicable
Junction type	No junction	Slip Road	Slip Road	
Response time to reach emergency services location	<20 mins	<20 mins	<20 mins	A response time of less than 20 minutes is expected for emergency services.
Traffic flow (AADT two-way)	75,109	15,413	12,600	The highest traffic flow (AADT two-way) along the whole road realignment was selected which represents a conservative approach.
% HGV	3	3	3	The corresponding HGV percentage value to the selected AADT value was chosen to represent the whole road realignment. This represents a conservative approach.

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Assessment criteria	Data	Data	Data	Notes
Spillage factor (no/10⁹HGVkm/year)	0.36	0.43	0.43	This spillage factor was taken from Table D.1 as presented in LA 113 Road Drainage and the Water Environment Revision 1 ⁶ .
Risk of accidental spillage	0.00027	0.00009	0.00004	This represents the total annual probability of a spillage.
Risk of pollution incident	0.00012	0.00004	0.00002	This represents the total annual probability of a spillage causing a pollution incident (where the spillage does not affect a sensitive area, the risk of a serious pollution incident is deemed acceptable if the annual probability is less than 0.01 (or 1%)).
Is risk greater than an annual probability of 1%?	No	No	No	Is there an overall risk for the length of the road draining to this outfall?
Total probability				0.0002
Return period (years)				5,587

12.3.7 The evaluation of spillage risk to the River Bollin from the M56 Junction 6 realignment - outfall 3 is presented in Table 7. The risk of a serious pollution incident occurring is identified as negligible. The highway realignment will not result in significant effects related to spillage risk and no further mitigation is required.

Table 7: Spillage risk assessment for M56 Junction 6 realignment – outfall 3 River Bollin

Assessment criteria	Data	Data	Data	Data	Notes
Water body type	Surface water	Surface water	Surface water	Surface water	
Is outfall associated with a sensitive area?	No	No	No	No	
Length of road draining to outfall (km)	0.776	0.665	0.530	0.745	The length of the road was measured based on AP2 general arrangement drawings.
Road type (A-road or Motorway)	Motorway	Motorway	Motorway	Motorway	
If A road, is site urban or rural?	N/A	N/A	N/A	N/A	Not applicable
Junction type	No Junction	Slip Road	Slip Road	Roundabout	
Response time to reach emergency services location	<20 mins	<20 mins	<20 mins	<20 mins	A response time of less than 20 minutes is expected for emergency services.
Traffic flow (AADT two-way)	62,509	18,174	19,508	34,206	The highest traffic flow (AADT two-way) along the whole road realignment was selected which represents a conservative approach.

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Assessment criteria	Data	Data	Data	Data	Notes
% HGV	3	3	2	2	The corresponding HGV percentage value to the selected AADT value was chosen to represent the whole road realignment. This represents a conservative approach.
Spillage factor (no/10⁶HGVkm/year)	0.36	0.43	0.43	3.09	This spillage factor was taken from Table D.1 as presented in LA 113 Road Drainage and the Water Environment Revision 1 ⁶ .
Risk of accidental spillage	0.00019	0.00006	0.00003	0.00057	This represents the total annual probability of a spillage.
Risk of pollution incident	0.00009	0.00003	0.00001	0.00026	This represents the total annual probability of a spillage causing a pollution incident (where the spillage does not affect a sensitive area, the risk of a serious pollution incident is deemed acceptable if the annual probability is less than 0.01 (or 1%)).
Is risk greater than an annual probability of 1%?	No	No	No	No	Is there an overall risk for the length of the road draining to this outfall?
Total probability	0.0004				
Return period (years)	2,598				

12.3.8 The evaluation of spillage risk to Tributary of River Bollin 2 from the M56 Junction 6 realignment outfall is presented in Table 8. The risk of a serious pollution incident occurring is identified as negligible. The highway realignment will not result in significant effects related to spillage risk and no further mitigation is required.

Table 8: Spillage risk assessment for M56 Junction 6 realignment – Tributary of River Bollin 2

Assessment criteria	Data	Notes
Water body type	Surface water	
Is outfall associated with a sensitive area?	No	
Length of road draining to outfall (km)	0.50	The length of the road was measured based on AP2 general arrangement drawings.
Road type (A-road or Motorway)	Motorway	
If A road, is site urban or rural?	N/A	Not applicable
Junction type	Slip road	
Response time to reach emergency services location	<20 mins	A response time of less than 20 minutes is expected for emergency services.

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Assessment criteria	Data	Notes
Traffic flow (AADT two-way)	24,044	The highest traffic flow (AADT two-way) along the whole road realignment was selected which represents a conservative approach.
% HGV	1	The corresponding HGV percentage value to the selected AADT value was chosen to represent the whole road realignment. This represents a conservative approach.
Spillage factor (no/10⁹HGVkm/year)	0.45	This spillage factor was taken from Table D.1 as presented in LA 113 Road Drainage and the Water Environment Revision 1 ⁶ .
Risk of accidental spillage	0.00002	This represents the total annual probability of a spillage.
Risk of pollution incident	0.00001	This represents the total annual probability of a spillage causing a pollution incident (where the spillage does not affect a sensitive area, the risk of a serious pollution incident is deemed acceptable if the annual probability is less than 0.01 (or 1%)).
Is risk greater than 0.01?	No	Is there an overall risk for the length of the road draining to this outfall?
Total probability	<0.0001	
Return period (years)	117,774	

Annex A: Revised detailed impact assessment table

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Table A1: Revised surface water detailed impact assessment for new impacts

Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
Tributary of Birkin Brook 2	Low	<ul style="list-style-type: none"> temporary works such as compounds, stockpiles and access routes; realignment (approx. 200m); realignment (approx. 330m); Tributary of Birkin Brook 2 offline west culvert (23m); and Tributary of Birkin Brook 2 offline east culvert (23m). 	<p>Uncontrolled site runoff could impact the flow dynamics and water quality of the receiving watercourse. Mobilised contaminants could typically include hydrocarbons related to fuel oils and high alkaline substances such as cement and concrete.</p> <p>Deterioration, loss or change to the existing water environment and the ecology supported, through the disturbance of silt or direct contamination by polluting materials.</p>	<p>Magnitude of impact – Minor.</p> <p>Significance of effect – Negligible, not significant.</p>	Implementation of measures described in the draft CoCP.	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	None required.	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	Construction (temporary).
		<ul style="list-style-type: none"> realignment (approx. 200m); 	<p>Deterioration, loss or change to the existing water environment, flow characteristics and morphology from the</p>	<p>Magnitude of impact – Minor.</p> <p>Significance</p>	Mitigation measures will include appropriate watercourse	<p>Magnitude of impact – Negligible.</p> <p>Significance</p>	None required.	<p>Magnitude of impact – Negligible.</p> <p>Significance</p>	Construction (permanent).

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Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
		<ul style="list-style-type: none"> realignment (approx. 330m); Tributary of Birkin Brook 2 offline west culvert (23m); and Tributary of Birkin Brook 2 offline east culvert (23m). 	<p>presence of the design elements.</p> <p>Deterioration of water quality due to contamination of surface water from both routine discharges from the AP2 revised scheme and associated infrastructure or from accidental spillages.</p>	<p>of effect – Negligible, not significant.</p>	<p>design to include a range of habitats appropriate to this water body and to improve river morphology as far as reasonably practicable.</p> <p>Measures to manage water quality will be adopted during the design process.</p>	<p>of effect – Negligible, not significant.</p>		<p>of effect – Negligible, not significant.</p>	
Tributary of Birkin Brook 1	Moderate	<ul style="list-style-type: none"> temporary works such as compounds, stockpiles and access routes; overflow channel (200m); offline east culvert (34m); overflow weir (0.3m high); 	<p>Uncontrolled site runoff could impact the flow dynamics and water quality of the receiving watercourse. Mobilised contaminants could typically include hydrocarbons related to fuel oils and high alkaline substances such as cement and concrete.</p> <p>Deterioration, loss or change to the existing water environment and the</p>	<p>Magnitude of impact – Minor.</p> <p>Significance of effect – Minor adverse, not significant.</p>	<p>Implementation of measures described in the draft CoCP.</p>	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	<p>None required.</p>	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	<p>Construction (temporary).</p>

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Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
		<ul style="list-style-type: none"> offline west culvert (7.5m); Mid-Cheshire Line offline south culvert (26.5m); and Mobberley Road offline culvert (45m). 	ecology supported, through the disturbance of silt or direct contamination by polluting materials.						
		<ul style="list-style-type: none"> offline east culvert (34m); and offline west culvert (7.5m). 	<p>Deterioration, loss or change to the existing water environment, flow characteristics and morphology from the presence of the design elements.</p> <p>Deterioration of water quality due to contamination of surface water from both routine discharges from the AP2 revised scheme and associated infrastructure or from accidental spillages.</p>	<p>Magnitude of impact – Minor.</p> <p>Significance of effect – Minor adverse, not significant.</p>	<p>Mitigation measures will include appropriate watercourse design to include a range of habitats appropriate to this water body and to improve river morphology as far as reasonably practicable. Measures to manage water quality will be adopted during the design process.</p>	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	None required.	<p>Magnitude of impact – Negligible</p> <p>Significance of effect – Negligible, not significant.</p>	Construction (permanent).

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Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
		<ul style="list-style-type: none"> overflow weir (0.3m high); overflow channel (200m); Mid-Cheshire Line offline south culvert (26.5m); and Mobberley Road offline culvert (45m). 	<p>Deterioration, loss or change to the existing water environment, flow characteristics and morphology from the presence of the design elements.</p> <p>Deterioration of water quality due to contamination of surface water from both routine discharges from the AP2 revised scheme and associated infrastructure or from accidental spillages.</p>	<p>Magnitude of impact – Minor.</p> <p>Significance of effect – Minor adverse, not significant.</p>	<p>Mitigation measures will include appropriate watercourse design to include a range of habitats appropriate to this water body and to improve river morphology as far as reasonably practicable. Measures to manage water quality will be adopted during the design process.</p>	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	<p>None required.</p>	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	<p>Construction (permanent).</p>
Tributary of River Bollin 7	Moderate	<ul style="list-style-type: none"> temporary works such as compounds, stockpiles and access routes; realignment (48m); and offline culvert (68m) 	<p>Uncontrolled site runoff could impact the flow dynamics and water quality of the receiving watercourse. Mobilised contaminants could typically include hydrocarbons related to fuel oils and high alkaline substances such as cement</p>	<p>Magnitude of impact – Minor.</p> <p>Significance of effect – Minor adverse, not significant.</p>	<p>Implementation of measures described in the draft CoCP.</p>	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	<p>None required.</p>	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	<p>Construction (temporary).</p>

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Water feature/ receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
		replacing existing culvert.	and concrete. Deterioration, loss or change to the existing water environment and the ecology supported, through the disturbance of silt or direct contamination by polluting materials.						
		<ul style="list-style-type: none"> realignment (48m); and offline culvert (68m) replacing existing culvert. 	<p>Deterioration, loss or change to the existing water environment, flow characteristics and morphology from the presence of the design elements.</p> <p>Deterioration of water quality due to contamination of surface water from both routine discharges from the AP2 revised scheme and associated infrastructure or from accidental spillages.</p>	<p>Magnitude of impact – Minor.</p> <p>Significance of effect – Minor adverse, not significant.</p>	<p>Measures to manage water quality will be adopted during the design process.</p>	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	<p>None required.</p>	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	<p>Construction (permanent).</p>
Tributary of River Bollin 6	Moderate	<ul style="list-style-type: none"> temporary works such as compounds; 	Uncontrolled site runoff could impact the flow dynamics and water quality	Magnitude of impact – Minor.	Implementation of measures	Magnitude of impact – Negligible.	None required.	Magnitude of impact – Negligible.	Construction (temporary).

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Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
		<ul style="list-style-type: none"> stockpiles and access routes; realignment (22m); and offline culvert (75m) replacing existing culvert. 	<p>of the receiving watercourse. Mobilised contaminants could typically include hydrocarbons related to fuel oils and high alkaline substances such as cement and concrete.</p> <p>Deterioration, loss or change to the existing water environment and the ecology supported, through the disturbance of silt or direct contamination by polluting materials.</p>	Significance of effect – Minor adverse, not significant.	described in the draft CoCP.	Significance of effect – Negligible, not significant.		Significance of effect – Negligible, not significant.	
		<ul style="list-style-type: none"> realignment (22m); and offline culvert (75m) replacing existing culvert. 	<p>Deterioration, loss or change to the existing water environment, flow characteristics and morphology from the presence of the design elements.</p> <p>Deterioration of water quality due to contamination of surface water from both routine discharges from the AP2</p>	<p>Magnitude of impact – Minor.</p> <p>Significance of effect – Minor adverse, not significant.</p>	Measures to manage water quality will be adopted during the design process.	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	None required.	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	Construction (permanent).

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Water feature/ receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
			revised scheme and associated infrastructure or from accidental spillages.						
Tributary of River Bollin 4	Moderate	<ul style="list-style-type: none"> temporary works such as compounds, stockpiles and access routes; realignment (12m); offline culvert north (102m); and offline culvert south (7.5m). 	<p>Uncontrolled site runoff could impact the flow dynamics and water quality of the receiving watercourse. Mobilised contaminants could typically include hydrocarbons related to fuel oils and high alkaline substances such as cement and concrete.</p> <p>Deterioration, loss or change to the existing water environment and the ecology supported, through the disturbance of silt or direct contamination by polluting materials</p>	<p>Magnitude of impact – Minor.</p> <p>Significance of effect – Minor adverse, not significant.</p>	Implementation of measures described in the draft CoCP.	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	None required.	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	Construction (temporary).
		<ul style="list-style-type: none"> realignment (12m), steep topography – cascade; 	<p>Deterioration, loss or change to the existing water environment, flow characteristics and morphology from the presence of the design</p>	<p>Magnitude of impact – Minor.</p> <p>Significance of effect –</p>	Measures to manage water quality will be adopted during the design process.	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect –</p>	None required.	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect –</p>	Construction (permanent).

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Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
		<ul style="list-style-type: none"> offline culvert north (102m); and offline culvert south (7.5m). 	<p>elements.</p> <p>Deterioration of water quality due to contamination of surface water from both routine discharges from the AP2 revised scheme and associated infrastructure or from accidental spillages.</p>	Minor. adverse, not significant.		Negligible, not significant.		Negligible, not significant.	
River Bollin	Very High	<ul style="list-style-type: none"> temporary works such as compounds, stockpiles and access routes; and widening of M56 River Bollin underbridge (13m upstream and 13m downstream, total increase in length 26m). 	<p>Uncontrolled site runoff could impact the flow dynamics and water quality of the receiving watercourse. Mobilised contaminants could typically include hydrocarbons related to fuel oils and high alkaline substances such as cement and concrete.</p> <p>Deterioration, loss or change to the existing water environment and the ecology supported, through the disturbance of silt or</p>	<p>Magnitude of impact – Minor.</p> <p>Significance of effect – Moderate adverse, significant.</p>	Implementation of measures described in the draft CoCP.	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	None required.	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	Construction (temporary).

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			direct contamination by polluting materials						
		<ul style="list-style-type: none"> Widening of bridge (19m upstream and 13m downstream, total increase in length 32m). 	Deterioration, loss or change to the existing river banks and morphology from the presence of the design elements. Deterioration of water quality due to contamination of surface water from both routine discharges from the AP2 revised scheme and associated infrastructure or from accidental spillages.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant.	Floodplain compensation. Measures to manage water quality will be adopted during the design process.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	None required.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	Construction (permanent).
Tributary of River Bollin 5	Moderate	<ul style="list-style-type: none"> temporary works such as compounds, stockpiles and access routes; and realignment via new open channel (205m). 	Uncontrolled site runoff could impact the flow dynamics and water quality of the receiving watercourse. Mobilised contaminants could typically include hydrocarbons related to fuel oils and high alkaline substances such as cement and concrete. Deterioration, loss or	Magnitude of impact – Minor Significance of effect – Minor adverse, not significant.	Implementation of measures described in the draft CoCP.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	None required.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	Construction (temporary).

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Water feature/ receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
			change to the existing water environment and the ecology supported, through the disturbance of silt or direct contamination by polluting materials.						
		<ul style="list-style-type: none"> Realignment via new open channel (205m) 	Change to the existing water environment, flow characteristics and morphology from the presence of the design elements.	Magnitude of impact – Minor. Significance of effect – Minor beneficial, not significant.	Measures to manage water quality will be adopted during the design process. Mitigation measures will include appropriate watercourse design to include a range of habitats appropriate to this water body and to improve river morphology as far as reasonably practicable	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	None required.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	Construction (permanent).
Tributary of River Bollin 3	Moderate	<ul style="list-style-type: none"> temporary works such as compounds; 	Uncontrolled site runoff could impact the flow dynamics and water quality	Magnitude of impact – Minor.	Implementation of measures	Magnitude of impact – Negligible.	None required.	Magnitude of impact – Negligible.	Construction (temporary).

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Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
		<ul style="list-style-type: none"> stockpiles and access routes; realignment (22m); M56 offline culvert (298m); M56 drain offline culvert (8m); and new open channel upstream of M56 offline culvert (223m). 	<p>of the receiving watercourse. Mobilised contaminants could typically include hydrocarbons related to fuel oils and high alkaline substances such as cement and concrete.</p> <p>Deterioration, loss or change to the existing water environment and the ecology supported, through the disturbance of silt or direct contamination by polluting materials</p>	Significance of effect – Minor adverse, not significant.	described in the draft CoCP.	Significance of effect – Negligible, not significant.		Significance of effect – Negligible, not significant.	
		<ul style="list-style-type: none"> realignment (22m); M56 offline culvert (298m); M56 drain offline culvert (8m); and new open channel 	<p>Deterioration, loss or change to the existing water environment, flow characteristics and morphology from the presence of the design elements.</p> <p>Deterioration of water quality due to</p>	<p>Magnitude of impact – Moderate.</p> <p>Significance of effect – Moderate adverse, significant.</p>	<p>Measures to manage water quality will be adopted during the design process. Mitigation measures will include appropriate watercourse</p>	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	None required.	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	Construction (permanent).

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Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
		upstream of M56 offline culvert (223m).	contamination of surface water from both routine discharges from the AP2 revised scheme and associated infrastructure or from accidental spillages.		design to include a range of habitats appropriate to this water body and to improve river morphology as far as reasonably practicable.				
Drain to M56 1 and 2	Low	<ul style="list-style-type: none"> temporary works such as compounds, stockpiles and access routes; realignment (354m); Sunbank Lane offline culvert 1 (14.5m); Sunbank Lane offline culvert 2 (5m); Sunbank Lane offline 	<p>Uncontrolled site runoff could impact the flow dynamics and water quality of the receiving watercourse. Mobilised contaminants could typically include hydrocarbons related to fuel oils and high alkaline substances such as cement and concrete.</p> <p>Deterioration, loss or change to the existing water environment and the ecology supported, through the disturbance of silt or direct contamination by polluting materials</p>	<p>Magnitude of impact – Minor.</p> <p>Significance of effect – Negligible, not significant.</p>	Implementation of measures described in the draft CoCP.	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	None required.	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	Construction (temporary).

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Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
		<ul style="list-style-type: none"> culvert 3 (8m); Sunbank Lane offline culvert 4 (4.5m); and Sunbank Lane offline culvert 5 (4.5m). 							
		<ul style="list-style-type: none"> Realignment (354m); Sunbank Lane offline culvert 1 (14.5m); Sunbank Lane offline culvert 2 (5m); Sunbank Lane offline culvert 3 (8m); Sunbank Lane offline 	<p>Change to the existing water environment, flow characteristics and morphology from the presence of the design elements.</p> <p>Approximately 300m of open channel will be replaced by a new open channel approximately 354m in length.</p>	<p>Magnitude of impact – Minor</p> <p>Significance of effect – negligible beneficial, not significant.</p>	<p>Measures to manage water quality will be adopted during the design process. Mitigation measures will include appropriate watercourse design to include a range of habitats appropriate to this water body and to improve river morphology as far as reasonably practicable.</p>	<p>Magnitude of impact – Minor</p> <p>Significance of effect – negligible beneficial, not significant.</p>	<p>None required.</p>	<p>Magnitude of impact – Minor</p> <p>Significance of effect – negligible beneficial, not significant.</p>	<p>Construction (permanent).</p>

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Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
		culvert 4 (4.5m); and <ul style="list-style-type: none"> Sunbank Lane offline culvert 5 (4.5m). 							
Tributary of River Bollin 2	Moderate	<ul style="list-style-type: none"> temporary works such as compounds, stockpiles and access routes; realignment (64m); and offline culvert (96m). 	<p>Uncontrolled site runoff could impact the flow dynamics and water quality of the receiving watercourse. Mobilised contaminants could typically include hydrocarbons related to fuel oils and high alkaline substances such as cement and concrete.</p> <p>Deterioration, loss or change to the existing water environment and the ecology supported, through the disturbance of silt or direct contamination by polluting materials</p>	<p>Magnitude of impact – Minor.</p> <p>Significance of effect – Minor adverse, not significant.</p>	Implementation of measures described in the draft CoCP.	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	None required.	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	Construction (temporary).
		<ul style="list-style-type: none"> realignment (64m); and 	Deterioration, loss or change to the existing water environment, flow	<p>Magnitude of impact – Minor.</p>	Measures to manage water quality will be	<p>Magnitude of impact – Negligible.</p>	None required.	<p>Magnitude of impact – Negligible.</p>	Construction (permanent).

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Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
		<ul style="list-style-type: none"> offline culvert (96m). 	<p>characteristics and morphology from the presence of the design elements.</p> <p>Deterioration of water quality due to contamination of surface water from both routine discharges from the AP2 revised scheme and associated infrastructure or from accidental spillages.</p>	<p>Significance of effect – Minor adverse, not significant.</p>	<p>adopted during the design process.</p>	<p>Significance of effect – Negligible, not significant.</p>		<p>Significance of effect – Negligible, not significant.</p>	
Tributary of Timperley Brook 1	Low	<ul style="list-style-type: none"> temporary works such as compounds, stockpiles and access routes; realignment (128m); realignment (122m); realignment (91m); 	<p>Uncontrolled site runoff could impact the flow dynamics and water quality of the receiving watercourse. Mobilised contaminants could typically include hydrocarbons related to fuel oils and high alkaline substances such as cement and concrete.</p> <p>Deterioration, loss or change to the existing water environment and the ecology supported, through</p>	<p>Magnitude of impact – Minor.</p> <p>Significance of effect – Negligible, not significant.</p>	<p>Implementation of measures described in the draft CoCP.</p>	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	<p>None required.</p>	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	<p>Construction (temporary).</p>

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		<ul style="list-style-type: none"> offline culvert South (82m); and offline culvert north (8m). 	the disturbance of silt or direct contamination by polluting materials.						
		<ul style="list-style-type: none"> realignment (128m); realignment (122m); realignment (91m); offline culvert South (82m); and offline culvert north (8m). 	<p>Change to the existing water environment, flow characteristics and morphology from the presence of the design elements.</p> <p>Deterioration of water quality due to contamination of surface water from both routine discharges from the AP2 revised scheme and associated infrastructure or from accidental spillages.</p>	<p>Magnitude of impact – Moderate.</p> <p>Significance of effect – Minor beneficial, not significant.</p>	<p>De-culverting and creation of open watercourse.</p> <p>Mitigation measures will include appropriate watercourse design to include a range of habitats appropriate to this water body and to improve river morphology as far as reasonably practicable.</p>	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	None required.	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	Construction (permanent).
Timperley Brook	Moderate	<ul style="list-style-type: none"> temporary works such as compounds, stockpiles and access routes; 	Uncontrolled site runoff could impact the flow dynamics and water quality of the receiving watercourse. Mobilised contaminants could typically include	<p>Magnitude of impact – Minor.</p> <p>Significance of effect – Minor</p>	Implementation of measures described in the draft CoCP.	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible,</p>	None required.	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible,</p>	Construction (temporary).

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Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
		<ul style="list-style-type: none"> realignment (193m); realignment (136m); and Brooks Drive offline culvert (20m). 	<p>hydrocarbons related to fuel oils and high alkaline substances such as cement and concrete.</p> <p>Deterioration, loss or change to the existing water environment and the ecology supported, through the disturbance of silt or direct contamination by polluting materials</p>	adverse, not significant.		not significant.		not significant.	
		<ul style="list-style-type: none"> realignment (193m); realignment (136m); and Brooks Drive offline culvert (20m). 	<p>Loss / change to the existing water environment, flow characteristics and morphology from the presence of the design elements.</p> <p>Deterioration of water quality due to contamination of surface water from both routine discharges from the AP2 revised scheme and associated infrastructure or from accidental spillages.</p>	<p>Magnitude of impact – Moderate.</p> <p>Significance of effect – Moderate beneficial, significant.</p>	<p>Diversion (329m) to account for habitat loss and flood attenuation.</p> <p>Measures to manage water quality will be adopted during the design process.</p> <p>Mitigation measures will include appropriate watercourse design to include a</p>	<p>Magnitude of impact – Moderate.</p> <p>Significance of effect – Moderate beneficial, significant.</p>	None required.	<p>Magnitude of impact – Moderate.</p> <p>Significance of effect – Moderate beneficial, significant.</p>	Construction (permanent).

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Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
					range of habitats appropriate to this water body and to improve river morphology as far as reasonably practicable.				
Fairywell Brook	Low	<ul style="list-style-type: none"> new surface water drainage outfall from Manchester tunnel south portal main compound. 	<p>Uncontrolled site runoff could impact the flow dynamics and water quality of the receiving watercourse. Mobilised contaminants could typically include hydrocarbons related to fuel oils and high alkaline substances such as cement and concrete.</p> <p>Deterioration, loss or change to the existing water environment and the ecology supported, through the disturbance of silt or direct contamination by polluting materials.</p>	<p>Magnitude of impact – Minor.</p> <p>Significance of effect – Negligible, not significant.</p>	Implementation of measures described in the draft CoCP.	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	None required.	<p>Magnitude of impact – Negligible.</p> <p>Significance of effect – Negligible, not significant.</p>	Construction (temporary).

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Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
			Potential for hydromorphological impacts to watercourse from new outfall and new pathway for pollutants.	Magnitude of impact – Minor. Significance of effect – Negligible, not significant.	Surface water drainage strategy will ensure runoff is restricted to greenfield rates and pollutants are removed before entering the drainage outfall.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	None required.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	Construction (temporary).
Discharges to surface water									
Discharge 016993775	Low	None	Located upstream of the AP2 revised scheme, however discharging into a watercourse considered within this assessment. Therefore, the discharge has been included on a precautionary basis.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	Implementation of measures described in the draft CoCP.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	None required.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	Construction (temporary).
Discharge 01TRA030	Low	None	Located upstream of the AP2 revised scheme; however, discharging into a watercourse considered within this assessment. Therefore, the discharge has been included on a precautionary basis.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	Implementation of measures described in the draft CoCP.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	None required.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	Construction (temporary).

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Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
Discharge 016891948 Discharge 01TRA0018	Low	None	Both discharges are located upstream of the AP2 revised scheme; however, discharging into watercourses considered within this assessment. Therefore, these discharges have been included on a precautionary basis.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	Implementation of measures described in the draft CoCP.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	None required.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	Construction (temporary).
Discharge 016992264	Low	None	Located upstream of the AP2 revised scheme; however, discharging into a watercourse considered within this assessment. Therefore, the discharge has been included on a precautionary basis.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	Implementation of measures described in the draft CoCP.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	None required.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	Construction (temporary).

Table A2: Revised groundwater detailed impact assessment for new impacts

Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
Glacial till – Secondary (Undifferent	Moderate	Deeper excavation (>1mbgl) including:	Temporary works have the potential to affect groundwater quality,	Magnitude of impact – Moderate.	Implementation of measures	Magnitude of impact – Negligible.	None required.	Magnitude of impact – Negligible.	Construction (temporary).

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Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
iated) aquifer		<ul style="list-style-type: none"> • Tributary of Birkin Brook 1 overflow channel; • Sunbank Lane offline overbridge; • M56 Junction 6 Hale Road link overbridge; • Hale Road Station link overbridge; • Station access cross link overbridge; • M56 Junction 6 westbound access offline retaining wall; • M56 Junction 6 gyratory offline overbridge west; • M56 Junction 6 Wilmslow Road link offline retaining wall; 	although this is likely to be localised and temporary.	Significance of effect – Moderate adverse, significant.	described in the draft CoCP.	Significance of effect – Negligible, not significant.		Significance of effect – Negligible, not significant.	
			Excavation of an overflow channel for Tributary of Birkin Brook 1 may alter shallow groundwater flow pathways and create an artificial drain for shallow groundwater in its proximity.	Magnitude of impact – Minor.	None required.	Magnitude of impact – Minor.	None required.	Magnitude of impact – Minor.	Construction (permanent).
				Significance of effect – Minor adverse, not significant.		Significance of effect – Minor adverse, not significant.		Significance of effect – Minor adverse, not significant.	

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Water feature/ receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
		<ul style="list-style-type: none"> • M56 Junction 6 westbound access retaining wall; • M56 Junction 6 northbound access offline retaining wall; • M56 Junction 6 westbound exit offline retaining wall; • A538 Wilmslow Road offline overbridge; • M56 junction 6 Hale Road link overbridge retaining wall; • M56 Junction 6 Wilmslow Road link road attenuation tank retaining wall; and • 13 culverts. 							

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Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
Glaciofluvial deposits – Secondary A aquifer	Moderate	Deeper excavation (>1mbgl) including: <ul style="list-style-type: none"> • Thorns Green cutting; • Thorns Green accommodation offline overbridge; and • 13 culverts. 	Potential alteration of shallow groundwater flow pathways may occur around below ground structures.	Magnitude of impact – Minor. Significance of effect – Minor adverse, not Significant.	None required.	Magnitude of impact – Minor. Significance of effect – Minor adverse, not Significant.	None required.	Magnitude of impact – Minor. Significance of effect – Minor adverse, not significant.	Construction (permanent).
			The temporary works have the potential to affect groundwater quality, although this is likely to be localised and temporary.	Magnitude of impact – Moderate. Significance of effect – Moderate adverse, Significant.	Implementation of measures described in the draft CoCP.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	None required.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	Construction (temporary).
			Potential temporary impacts on groundwater flow as a result of dewatering for cutting construction.	Magnitude of impact – Minor. Significance of effect – Minor adverse, not significant.	None required.	Magnitude of impact – Minor. Significance of effect – Minor adverse, not significant.	None required.	Magnitude of impact – Minor. Significance of effect – Minor adverse, not significant.	Construction (temporary).

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Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
Alluvium – Secondary A aquifer	Moderate	Deeper excavation (>1mbgl) including: <ul style="list-style-type: none"> • M56 River Bollin offline bridge widening south – underbridge; and • M56 River Bollin offline bridge widening north – underbridge. 	Potential alteration of shallow groundwater flow pathways may occur around below ground structures.	Magnitude of impact – Minor. Significance of effect – Minor adverse, not significant.	None required.	Magnitude of impact – Minor. Significance of effect – Minor adverse, not significant..	None required.	Magnitude of impact – Minor. Significance of effect – Minor adverse, not significant.	Construction (permanent).
			The temporary works have the potential to affect groundwater quality, although this is likely to be localised and temporary.	Magnitude of impact – Moderate. Significance of effect – Moderate adverse, significant.	Implementation of measures described in the draft CoCP.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	None required.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	Construction (temporary).
			Potential alteration of shallow groundwater flow pathways may occur around below ground structures.	Magnitude of impact – Minor. Significance of effect – Minor adverse, not significant.	None required.	Magnitude of impact – Minor. Significance of effect – Minor adverse, not significant.	None required.	Magnitude of impact – Minor. Significance of effect – Minor adverse, not significant.	Construction (permanent).

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Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
Mercia Mudstone Group – Sidmouth Mudstone Formation – Bollin Mudstone Member – Secondary B aquifer	Moderate	Deeper excavation (>1mbgl) including: <ul style="list-style-type: none"> • Sunbank Lane offline overbridge; • M56 Junction 6 Hale Road link overbridge; • Hale Road Station link overbridge; • Station access cross link overbridge; • Thorns Green accommodation offline overbridge; • M56 River Bollin underbridge; • M56 Junction 6 westbound access offline retaining wall; 	The construction works, including excavations, bridge foundations and piles that may fully penetrate the glacial till, have the potential to affect groundwater quality. Impacts are likely to be localised and temporary.	Magnitude of impact – Moderate. Significance of effect – Moderate adverse, significant.	Implementation of measures described in the draft CoCP.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	None required.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	Construction (temporary).
			Potential alteration of groundwater levels and flow pathways may occur around foundations and piles. The design elements are small relative to the size of the aquifer and groundwater would be expected to flow around the design element via extended routes.	Magnitude of impact – Minor. Significance of effect – Minor adverse, not significant.	None required.	Magnitude of impact – Minor. Significance of effect – Minor adverse, not significant.	None required.	Magnitude of impact – Minor. Significance of effect – Minor adverse, not significant.	Construction (permanent).

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		<ul style="list-style-type: none"> • M56 Junction 6 gyratory offline overbridge west; • M56 Junction 6 Wilmslow Road link offline retaining wall; • M56 Junction 6 westbound access retaining wall; • M56 Junction 6 northbound access offline retaining wall; • M56 Junction 6 westbound exit offline retaining wall; • A538 Wilmslow Road offline overbridge; • M56 Junction 6 Hale Road link overbridge retaining wall; • M56 Junction 6 Wilmslow Road 							

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Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
		link road attenuation tank retaining wall; and • 13 culverts.							
Abstraction West of Lower House Farm	Moderate	Deeper excavation (>1mbgl) including Drainage ditch east of Ashley Railhead.	Construction of a ditch on the eastern side of the Mid-Cheshire Railway, 32m from abstraction. Temporary works have the potential to affect groundwater quality.	Magnitude of impact – Minor. Significance of effect – Minor adverse, not significant.	Implementation of measures described in the draft CoCP.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	None required.	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	Construction (temporary).
			Construction of a ditch on the eastern side of the Mid-Cheshire Railway, 32m from abstraction. Potential to alter shallow groundwater flows in the superficial aquifer that could supply this abstraction. This could potentially lead to a reduction in flow to the borehole and available water for abstraction.	Magnitude of impact – Moderate. Significance of effect – Moderate adverse, significant.	None required.	Magnitude of impact – Moderate. Significance of effect – Moderate adverse, significant.	Investigation into the use of this well – if detailed investigations by the nominated undertaker confirm a risk of impact on the abstraction,	Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	Construction (permanent).

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Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
							mitigation measures will be agreed with the owner. Mitigation measures may include provision of a new borehole or connection to mains water.		
Spring 90m north of Lower Thornsgreen Farm	Low	Above ground elements and shallow excavation (<1mbgl) including River Bollin South embankment. Deeper excavation (>1mbgl) including: <ul style="list-style-type: none"> River Bollin South embankment; 	The spring is within the land required for construction of the AP2 scheme. The temporary works have the potential to affect groundwater quality, although this is likely to be localised and temporary.	Magnitude of impact - Minor. Significance of effect - Minor adverse, not significant.	Implementation of measures described in the draft CoCP.	Magnitude of impact - Negligible. Significance of effect - Negligible, not significant.	None required.	Magnitude of impact - Negligible. Significance of effect - Negligible, not significant.	Construction (temporary).

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Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
		<ul style="list-style-type: none"> • Tributary of River Bollin 4 offline culvert north; • Tributary of River Bollin 4 offline culvert south; and • Thorns Green Accommodation offline overbridge. 							
Spring at Keepers Cottage, Sunbank Lane (south)	High	Deeper excavation (>1mbgl) including: <ul style="list-style-type: none"> • M56 Junction 6 westbound exit offline retaining wall; • M56 Junction 6 northbound access offline retaining wall; • M56 Junction 6 westbound access retaining wall; and • M56 Junction 6 Wilmslow Road 	The spring is within the CCB for construction of the new M56 junction 6 and is directly below the proposed M56 junction 6 westbound exit slip road. The spring will therefore be lost.	Magnitude of impact – Major. Significance of effect – Major adverse, significant.	None.	Magnitude of impact – Major. Significance of effect – Major adverse, significant.	None possible.	Magnitude of impact – Major. Significance of effect – Major adverse, significant.	Construction (permanent).

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Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
		link offline retaining wall.							
Tributary of River Bollin 2	Moderate	Deeper excavation (>1mbgl) including: <ul style="list-style-type: none"> • M56 Junction 6 westbound exit offline retaining wall; • M56 Junction 6 northbound access offline retaining wall; • M56 Junction 6 westbound access retaining wall; and • M56 Junction 6 Wilmslow Road link offline retaining wall. 	Reduction in flow in Tributary of River Bollin 2 due to loss of spring at Keepers Cottage, Sunbank Lane (south).	Magnitude of impact – Major. Significance of effect – Major adverse, significant.	The flow from the spring will be captured and channelled downstream to Tributary of River Bollin 2, to the east of the realigned public right of way.	Magnitude of impact – Minor. Significance of effect – Minor adverse, not significant.	None required.	Magnitude of impact – Minor. Significance of effect – Minor adverse, not significant.	Construction (permanent).
Potential spring 120m east of Keepers cottage, Sunbank Lane	High	Deeper excavation (>1mbgl) including: <ul style="list-style-type: none"> • M56 Junction 6 westbound exit offline retaining wall; 	Dewatering may be required during excavation, which may alter groundwater flows. However, this will be temporary and localised.	Magnitude of impact – Minor. Significance of effect – Moderate	Implementation of measures as described in the draft CoCP	Magnitude of impact – Negligible Significance of effect – Negligible,	None required.	Magnitude of impact – Negligible Significance of effect – Negligible,	Construction (temporary)

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Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
Potential spring 127m south-east of Keepers Cottage, Sunbank Lane		<ul style="list-style-type: none"> M56 Junction 6 northbound access offline retaining wall; M56 Junction 6 westbound access retaining wall; M56 Junction 6 Wilmslow Road link offline retaining wall; and M56 Junction 6 Wilmslow Road link road attenuation tank retaining wall. 	The potential springs are within the land required for construction of the AP2 revised scheme. The temporary works have the potential to affect groundwater quality although this is likely to be localised and temporary.	adverse, significant. Magnitude of impact – Minor. Significance of effect – Moderate adverse, significant.	Implementation of measures described in the CoCP.	not significant. Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	None required.	not significant. Magnitude of impact – Negligible. Significance of effect – Negligible, not significant.	Construction (temporary).
		Deeper excavation (>1mbgl) including M56 Junction 6 Wilmslow Road link road attenuation tank retaining wall.	The 216m long retaining wall will be as close as 27m from the springs and is likely to be within their groundwater capture zones. The retaining wall will form a barrier to shallow groundwater flow, potentially reducing groundwater flow to the	Magnitude of impact – Minor. Significance of effect – Moderate adverse, significant.	None required.	Magnitude of impact – Minor. Significance of effect – Moderate adverse, significant.	-	Magnitude of impact – Minor. Significance of effect – Moderate adverse, significant.	Construction (permanent).

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Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
			spring. Groundwater flow is anticipated to be parallel to the retaining wall, which will reduce the impact on groundwater flow to the springs, but some impact is still anticipated.						

Table A3: Revised detailed impact assessment table for removed impacts

Water feature/receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect reported in main ES	Magnitude of potential impact and effect reported in main ES post avoidance and mitigation measures	New magnitude of potential impact and effect reported in SES2	Duration of effect
Potential spring at Keepers Cottage, Sunbank Lane (north)	High	Above ground elements and shallow excavation (<1mbgl) including: <ul style="list-style-type: none"> • ground level track and roads; • temporary works such as stockpiles and compounds; and • utilities diversions. Deeper excavation (>1mbgl) including: <ul style="list-style-type: none"> • M56 East tunnel; 	This receptor has been surveyed and confirmed to not be a spring. It has therefore been removed from the assessment.	Magnitude of impact – Minor.	Magnitude of impact – Negligible.	No receptor, effect removed.	Construction (temporary).
				Significance of effect – Moderate adverse, significant.	Significance of effect – Negligible, not significant.		
				Magnitude of impact – Moderate.	Magnitude of impact – Minor.	No receptor, effect removed.	Construction (permanent).

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Water feature/ receptor	Receptor value	Design element	Discussion of potential impact to water receptor	Magnitude of potential impact and effect reported in main ES	Magnitude of potential impact and effect reported in main ES post avoidance and mitigation measures	New magnitude of potential impact and effect reported in SES2	Duration of effect
		<ul style="list-style-type: none"> Manchester Airport High Speed station cutting retaining wall south; and Manchester Airport High Speed station cutting. 		Significance of impact – Moderate adverse, significant.	Significance of effect – Moderate adverse, significant.		

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