

High Speed Rail (Crewe – Manchester)

Supplementary Environmental Statement 2 and Additional Provision 2 Environmental Statement

Volume 5: Appendix WR-003-0MA08

Water resources and flood risk

Water resources assessment

MA08: Manchester Piccadilly Station

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Department for Transport

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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 Manchester Piccadilly Station (MA08) 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 on 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: Manchester Piccadilly Station area (MA08) and Volume 5, Appendix: WR-003-0MA08) 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-003-0MA08 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 In order to differentiate between the original scheme and the subsequent changes, the following terms are used:
- ‘the original scheme’ – the hybrid 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;

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>.

- ‘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.

1.1.7 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.

1.1.8 The route-wide Water Framework Directive (WFD) preliminary 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)³.

³ High Speed Two Ltd (2022), 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 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 receptors or change existing receptors for water resources and flood risk topic in the Manchester Piccadilly Station (MA08) community 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 baseline updates, 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 There are no SES2 baseline updates, design changes or construction assumptions that are relevant to the assessment of the water environment. Therefore, there are no 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 changes, 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 is one AP2 amendment that will involve construction activities of a nature and scale that could have potential implications for the water environment. This amendment is additional land permanently required for modifications to the multi-modal transport hub (AP2-008-003).
- 6.1.2 The construction activities associated with the redesign of offline retaining walls associated with the multi-modal transport hub modifications (AP2-008-003) is the only AP2 amendment that could result in new or changed temporary and permanent impacts on the groundwater environment and groundwater fed waterbodies. There are no potential impacts on the surface water environment that could result from this amendment; therefore, the surface water assessment has been scoped out and has not been considered further.
- 6.1.3 This part of the assessment presents consideration of the potential new or changed impacts and effects associated with the proposed AP2 amendment. 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 SES2 information is required for assessment of AP2 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: Manchester Piccadilly Station (MA08) of the main ES. No additional avoidance and mitigation measures are relevant to these amendments.

8.2 Additional land permanently required for modifications to the multi-modal transport hub (AP2-008-003)

- 8.2.1 This amendment has the potential to result in new or different significant effects on groundwater only. Therefore, there is no assessment for surface water in this report.

Temporary effects

- 8.2.2 The impacts of temporary works on groundwater quality in the glacial till Secondary (Undifferentiated) aquifer and the Chester Formation Principal Aquifer due to the construction of the offline retaining walls at Manchester Piccadilly High Speed station, were assessed in the main ES to be minor and localised following the application of the draft Code of Construction Practice (CoCP)⁴, leading to a negligible effect which is not significant.
- 8.2.3 In addition, the main ES reported negligible temporary effects, which are not significant, on groundwater flow in the Chester Formation Principal Aquifer due to the offline retaining walls at Manchester Piccadilly High Speed station.
- 8.2.4 The multi-modal transport hub modifications (AP2-008-003) amendment leads to changes in the lateral extent and location of some of these retaining walls. However, the assessment identifies no new or different temporary effects on groundwater quality or flow in either of these aquifers due to the revised alignment of the offline retaining walls.
- 8.2.5 The main ES reported no temporary effects on groundwater abstractions, discharges to groundwater or groundwater – surface water interactions as a result of the construction of offline retaining walls at Manchester Piccadilly High Speed station. The AP2 amendment will

⁴ High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Environmental Statement, Draft Code of Construction Practice, Volume 5*, Appendix: CT-002-00000. Available online at: <https://www.gov.uk/government/collections/hs2-phase2b-crewe-manchester-environmental-statement>.

not lead to any new or different temporary significant effects on groundwater abstractions, discharges to groundwater or groundwater – surface water interactions.

Permanent effects

- 8.2.6 The main ES reported permanent, moderate adverse effects, which are significant, on the glacial till Secondary (Undifferentiated) aquifer due to the offline retaining walls altering groundwater flow. The main ES also reported a potential increase in groundwater flood risk due to mounding of groundwater on the upgradient side of retaining walls. The main ES reported that site investigations should be carried out to assess the need for drainage behind the retaining walls to ensure maintenance of groundwater flow.
- 8.2.7 Negligible effects, which are not significant, were reported on groundwater flows in the Chester Formation Principal Aquifer from deeper excavations, including offline retaining walls, in the main ES. This was due to the limited depth to which these features penetrated the aquifer and their limited lateral extent in comparison to the aquifer's overall area.
- 8.2.8 The multi-modal transport hub modifications (AP2-008-003) amendment leads to changes in the lateral extent and location of some of these retaining walls and inclusion of additional attenuation tanks. However, the assessment identifies no new or different permanent effects on either of these aquifers due to the proposed revised alignment of the offline retaining walls and additional attenuation tanks.
- 8.2.9 The main ES reported no permanent effects on groundwater abstractions, discharges to groundwater or groundwater – surface water interactions as a result of the construction of offline retaining walls at Manchester Piccadilly High Speed station. The AP2 amendment will not lead to any new or different permanent significant effects on groundwater abstractions, discharges to groundwater or groundwater – surface water interactions due to the revised alignment of these offline retaining walls.

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 amendment described in Part 2.

Part 3: Combined effects of changes and amendments in the Manchester Piccadilly Station (MA08) community 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 traffic effects on water resources, as a result of changes in construction 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 Manchester Piccadilly Station (MA08) 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 MA08.

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 (DMRB)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 – LA 113 Road Drainage and the Water Environment Revision 1⁵) 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 Road Drainage and the Water Environment Revision 1⁵).

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/search/d6388f5f-2694-4986-ac46-b17b62c21727>.

12 Detailed assessment

12.1 Screening results

- 12.1.1 A screening exercise has not identified the need for routine runoff and pollution risk assessments or spillage pollution risk assessment in MA08 during the operational phase of the SES2 scheme and AP2 revised scheme.

Annex A: Revised detailed impact assessment table

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Water resources and flood risk

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Water resources assessment

Table A1: Revised detailed impact assessment table 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 (Undifferentiated) aquifer	Moderate	Below ground elements including: <ul style="list-style-type: none">offline retaining walls (AP2- 008-003)	The temporary works have the potential to affect shallow 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)
			The offline retaining walls may alter groundwater flow and could lead to an increase in groundwater flood risk. The amended configuration of retaining walls will not change impacts relative to the original design	Magnitude of impact – Moderate Significance of effect – Moderate adverse, significant	None required	Magnitude of impact – Moderate Significance of effect – Moderate adverse, significant	Following site investigation, if needed drainage will be incorporated behind the retaining walls to ensure groundwater movement is maintained.	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
			presented in the main ES.						
Sherwood Sandstone Group – Chester Formation – Principal aquifer	High	Deeper excavation (>1mbgl) including: • offline retaining walls (AP2- 008-003)	The construction works have the potential to affect groundwater quality, although this is likely to be localised and temporary.	Magnitude of impact – Minor 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 flow may occur around retaining wall piles. The retaining wall piles will extend into the Sherwood Sandstone Group Principal Aquifer. However, the	Magnitude of impact – Negligible Significance of effect – Negligible, not significant		Magnitude of impact – Negligible Significance of effect – Negligible, not significant		Magnitude of impact – Negligible Significance of effect – Negligible, 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
			extent of the piling is not significant in comparison to the area of the aquifer.						
River Medlock	High	Deeper excavation (>1mbgl) including: <ul style="list-style-type: none"> offline retaining walls (AP2-008-003) 	Potential for groundwater flow to the watercourse to be intercepted by the below ground structures of the retaining walls. Considering the scale of the features compared to the River Medlock catchment, the impact of groundwater interception on the river flow is likely to be negligible.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None required.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None required	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (temporary and 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
Shooters Brook Downstream	Low	Deeper excavation (>1mbgl) including: <ul style="list-style-type: none"> offline retaining walls (AP2- 008-003) 	Potential for groundwater flow to the watercourse to be intercepted by below ground structures of the retaining walls. Considering the watercourse is culverted in proximity to these features, the impact of groundwater interception of river flow is likely to be negligible.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None required though the draft CoCP will be implemented throughout construction.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None required	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (temporary and permanent)

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