

High Speed Rail (Crewe – Manchester)

Supplementary Environmental Statement 2 and Additional Provision 2 Environmental Statement

Volume 5: Appendix MA-001-00000

Major accidents and disasters

Major accidents and disasters risk screening

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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

- 1.1.1 This report is an appendix to the major accidents and disasters assessment which forms part of Volume 5 of the Supplementary Environmental Statement 2 (SES2) and Additional Provision 2 Environmental Statement (AP2 ES).
- 1.1.2 This appendix provides details of changes to the major accidents and disasters assessment since the production of the High Speed Two (HS2) High Speed Rail (Crewe – Manchester) Environmental Statement (ES) published in January 2022¹ (the main ES) and the Supplementary Environmental Statement 1 (SES1) and Additional Provision 1 Environmental Statement (AP1 ES) published in July 2022².
- 1.1.3 This report supports the route-wide assessment of major accidents and disasters, covering the following community areas and off-route works:
- Hough to Walley’s Green (MA01);
 - Wimboldsley to Lostock Gralam (MA02);
 - Pickmere to Agden and Hulseheath (MA03);
 - Hulseheath to Manchester Airport (MA06);
 - Davenport Green to Ardwick (MA07);
 - Manchester Piccadilly Station (MA08); and
 - Off-route works - Annandale depot.
- 1.1.4 This appendix should be read in conjunction with:
- Volume 3, Route-wide effects of the main ES, the SES1 and AP1 ES and the SES2 and AP2 ES;
 - Volume 5, Appendices: MA-001-00000 of the main ES³ and the SES1 and AP1 ES⁴; and

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

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

³ High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Environmental Statement, Major accidents and disasters risk screening*, Volume 5, Appendix: MA-001-00000. Available online at: <https://www.gov.uk/government/collections/hs2-phase2b-crewe-manchester-environmental-statement>.

⁴ High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Supplementary Environmental Statement 1 and Additional Provision 1 Environmental Statement, Major accidents and disasters risk screening*, Volume 5, Appendix: MA-001-00000. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-supplementary-environmental-statement-1-and-additional-provision-1-environmental-statement>.

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- the Background Information and Data (BID) report, External sources of hazard (see BID MA-002-00000⁵), which accompanied the main ES.

1.1.5 In addition, details of external sources of hazard pertinent to this assessment are set out in the accompanying SES2 and AP2 ES BID report External sources of hazard (see BID MA-002-00000 SES2 and AP2 ES)⁶.

1.1.6 In order to differentiate between the original scheme and the subsequent changes, the following terms are used:

- ‘the original scheme’ – the Bill scheme submitted to Parliament in 2022, which was assessed in the main ES;
- ‘the SES1 scheme’ – the original scheme with any changes described in SES1 that are within the existing powers of the Bill;
- ‘the AP1 revised scheme’ – the original scheme as amended by SES1 changes and AP1 amendments;
- ‘the SES2 scheme’ – the original scheme with any changes described in SES1 (submitted in July 2022) and the SES2; and
- ‘the AP2 revised scheme’ – the original scheme as amended by SES1 and SES2 changes (as relevant) and AP2 amendments.

1.2 Methodology

1.2.1 The process undertaken for this major accidents and disasters environmental risk review is set out in the main ES Environmental Impact Assessment (EIA) Scope and Methodology Report (SMR)⁷.

1.2.2 For the original scheme and as presented in the main ES, a screening exercise of all identified project risks from the source documents (versions as applicable at the time of the main ES) listed in Section 3 of this report was first undertaken to determine if they had the potential to give rise to an impact which meets the definition of a significant adverse effect

⁵ High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background Information and Data, External sources of hazard*, BID MA-002-00000. Available online at: <https://www.gov.uk/government/collections/hs2-phase2b-crewe-manchester-environmental-statement>.

⁶ 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, External sources of hazard*, BID MA-002-00000. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-supplementary-environmental-statement-2-and-additional-provision-2-environmental-statement>.

⁷ 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>.

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to an environmental receptor⁸, including members of the public. The risks that remained in scope were then grouped into high level 'risk events' which have the same potential consequence. For example, all hazard sources and pathways that could lead to a train derailment are combined into a single risk event, since it is the derailment of the train that has the potential to cause harm to an environmental receptor, regardless of the cause.

- 1.2.3 For the AP1 revised scheme, a review of changes made to the source documents (current at the time of producing the SES1 and AP1 ES) listed in Section 2 of this report since the main ES was undertaken. This review identified whether any of the changes had the potential to give rise to any revisions to the environmental risk review as presented in Volume 5, Appendix: MA-001-00000 of the main ES.
- 1.2.4 For the AP2 revised scheme, a review of changes made to the source documents (current at the time of producing this report) listed in Section 2 of this report since the main ES has been undertaken. This review has identified whether any of the changes have the potential to give rise to any revisions to the environmental risk review as presented in Volume 5, Appendix: MA-001-00000 of the main ES and Volume 5, Appendix: MA-001-00000 of the SES1 and AP1 ES.
- 1.2.5 For the AP2 revised scheme, a review has been undertaken of changes made to the source documents (current at the time of producing this report) listed in Section 2 since the SES1 and AP1 ES. This review has identified whether any of the changes have the potential to give rise to any revisions to the environmental risk review as presented in Volume 5, Appendix: MA-001-00000 of the main ES and Volume 5, Appendix: MA-001-00000 of the SES1 and AP1 ES.

⁸ Receptors include: members of the public and local communities; infrastructure and the built environment; the natural environment, including ecosystems, land and soil quality, air quality, surface and groundwater resources and landscape; and the historic environment, including archaeology and built heritage.

2 Legal and regulatory framework

- 2.1.1 Details on the UK legislation and EU regulations that HS2 Ltd and its supply chain must comply with in relation to its design, management, operation and maintenance are outlined in Volume 5, Appendix: MA-001-00000 of the main ES. The measures set out the requirements, duties, and in some cases establishes the mechanisms for identifying, assessing and mitigating risks associated with major accidents and disasters. The list of UK legislation and EU regulations HS2 Ltd and its supply chain must comply with was updated within the SES1 and AP1 ES Volume 5, Appendix: MA-001-00000. The list of UK legislation and EU regulations HS2 Ltd and its supply chain must comply with remains unchanged from the SES1 and AP1 ES Volume 5, Appendix: MA-001-00000.

3 Identification of project risks

3.1 Risk screening

- 3.1.1 The following sources of information, current at the time of producing this report, have been reviewed to inform the environmental risk screening:
- HS2 Phase 2b Construction, Design and Management (CDM) risk registers⁹ (live working documents);
 - HS2 Ltd's System Safety Hazard Record¹⁰ (live working document); and
 - BID MA-002-00000 SES2 and AP2 ES, which presents external sources of hazard that interact with the AP2 revised scheme.
- 3.1.2 A review of traffic-related effects as reported in the SES2 and AP2 ES, Volume 5: Appendices TR-003 has also been undertaken, in relation to major hazard sites identified by the Health and Safety Executive (HSE) where the consultation zone interacts with land required for the AP2 revised scheme as presented in BID MA-002-00000 SES2 and AP2 ES.
- 3.1.3 Table 1 presents a summary of traffic-related effects which correlate with roads used as emergency response routes for these sites, summarised as new or different effects from those reported in the main ES and effects reported in the main ES which are no longer present as a result of the AP2 revised scheme. Where '(2039 or 2051)' are referred to in the table, this relates to operational traffic assessment years.
- 3.1.4 As part of the of the review of traffic-related effects, consideration has been given to two planning applications in relation to Crewe Fire Station (MA01/467S and MA01/466S), as presented in SES2 and AP2 ES, Volume 5: Appendix: CT-004-00000 Planning data. From review of these applications, it is assumed that there will be continuous provision of emergency response from the Crewe Fire Station site with temporary fire station accommodation (MA01/467S) provided adjacent the existing fire station for the duration of the demolition of the existing fire station and construction of the new fire station (MA01/466S). It is also assumed that no changes to emergency response routes taken from the Crewe Fire Station site to the major hazard sites presented in BID MA-002-00000 will arise as a result of these applications.

⁹ MWJV CDM risk register dated P05 16 Dec 2022, version P04, WSP CDM Risk Register dated 07 February 2023, version P03.

¹⁰ HS2 Ltd System Safety Hazard Record, version P02.

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Table 1: Traffic-related effects in relation to major hazard sites

Site name	Effect type	Phase	Effect(s) reported
New or different effects from those reported in the main ES			
Air Products PLC	Traffic congestion	Construction	Moderate Adverse - temporary effect on A534 Nantwich Road/A5019 Mill Street/B5071 South Street
Air Products PLC	Traffic-related severance	Construction	Major Adverse - Temporary effect on Sydney Road (between Hungerford Road and Shakespeare Drive)
Hole House Farm	Traffic congestion	Construction	Minor Adverse - temporary effect on A533 London Road/B5079 Station Road. Minor Adverse - temporary effect on A534 / Crewe Road. Moderate Adverse - temporary effect on A534 / A533 Old Mill Road. Minor Adverse - Temporary effect at A533 Middlewich Road/A533 Old Mill Road/Crewe Road/Hightown
Hole House Farm	Traffic-related severance	Construction	Major Adverse - Temporary effect on Sydney Road (between Shakespeare Drive and Lansdowne Road) Moderate Adverse - Temporary effect on Sydney Road (between Herbert Street and Maw Green Road) Moderate Adverse - Temporary effect on Maw Green Road (between Sydney Road and Maw Lane) Major Adverse - Temporary effect on Groby Road (between Stoneley Road and Warmingham Road) Major Adverse - Temporary effect on Warmingham Road (between Broughton Road and Waldron's Lane) Major Adverse - Temporary effect on Warmingham Road (between Waldron's Lane and Groby Road)
BRITISH SALT LTD	Traffic congestion	Construction	Moderate Adverse - temporary effect on A54 St Michaels Way/A54 Kinderton Street/A533 Leadsmithy Street. Minor Adverse - temporary effect on A533 London Road/Moss Lane. Minor Adverse - temporary effect on A533 Middlewich Road/A533 Old Mill Road/Crewe Road/Hightown Major Adverse - Temporary effect on A54 New High Street/A54 Winsford Bypass/A5018 Wharton Road/Weaver Street
BRITISH SALT LTD	Traffic-related severance	Construction	Moderate Adverse - Temporary effect on A530 Nantwich Road (between A530 Newton Bank and A54 St Michael's Way) Moderate Adverse - Temporary effect on A54 St Michael's Way (between A54 Chester Road and The Bull Ring) Moderate Adverse - Temporary effect on A530 Newton Bank (between A530 Nantwich Road and A54 Chester Road) Moderate Adverse - Temporary effect on A54 Middlewich Road realignment (between Birch Lane and Coalpit Lane) Moderate Adverse - Temporary effect on A54 Middlewich Road realignment (between A533 Northwich Road diversion and Birch Lane)
BRITISH SALT LTD	Traffic congestion	Operation	Major Adverse - permanent effect on A54 Middlewich Road/Clive Lane/Road One (2039 and 2051). Minor Beneficial (2039 and 2051)- permanent effect on A54 Chester Road/A530 St. Michael's Way/A530 Nantwich Road.

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Site name	Effect type	Phase	Effect(s) reported
			<p>Minor Adverse (2039) – permanent effect on A533 Booth Lane/St Annes Avenue</p> <p>Moderate Adverse (2051) - permanent effect on A54 New High Street/A54 Winsford Bypass/A5018 Wharton Road/Weaver Street</p> <p>Minor Beneficial (2039) and Moderate Beneficial (2051) - permanent effect on A54 Chester Road/A530 Croxton Lane</p>
BRITISH SALT LTD	Traffic-related severance	Operation	<p>Major Beneficial (2039 and 2051) - permanent effect on A533 Lewin Street (between St Annes Avenue and Sutton Lane)</p> <p>Major Beneficial (2039 and 2051) - permanent effect on A54 Middlewich Road realignment (between Clive Lane and A533 Northwich Road diversion)</p> <p>Moderate Adverse (2039) - permanent effect on A54 Middlewich Road (between Clive Lane and A54 Winsford Bypass)</p> <p>Moderate Beneficial (2039 and 2051) - permanent effect on A533 Lewin Street (between Sutton Lane and Hightown)</p> <p>Moderate Beneficial (2039 and 2051) - permanent effect on A530 Nantwich Road (between A530 Newton Bank and A54 St Michael's Way)</p> <p>Moderate Adverse (2051) - permanent effect on A54 St Michael's Way (between A54 Chester Road and The Bull Ring)</p> <p>Moderate Beneficial (2039 and 2051) - permanent effect on A54 Chester Road (between A530 Newton Bank and A54 St Michael's Way)</p> <p>Moderate Beneficial (2039 and 2051) - permanent effect on A54 Chester Road (between A530 Croxton Lane and A530 Newton Bank)</p> <p>Moderate Beneficial (2039 and 2051) - permanent effect on A54 Chester Road (between Coal Pit Lane and A530 Croxton Lane)</p> <p>Major Beneficial (2039 and 2051) - permanent effect on A54 Middlewich Road realignment (between Birch Lane and Coalpit Lane)</p> <p>Major Adverse (2039 and 2051) - permanent effect on A54 Middlewich Road realignment (between A533 Northwich Road diversion and Birch Lane)</p>
Henkel Ltd	Traffic congestion	Construction	<p>Moderate Beneficial - temporary effect on A5018 Wharton Road/B5355 Wharton Road/A5018 Wharton Park Road/Collingtree Avenue.</p> <p>Major Adverse - Temporary effect at A54 New High Street/A54 Winsford Bypass/A5018 Wharton Road/Weaver Street</p>
Henkel Ltd	Traffic-related severance	Construction	<p>Moderate Adverse - Temporary effect on Road One (between A54 Middlewich Road and A533 Bostock Road)</p>
Henkel Ltd	Traffic congestion	Operation	<p>Major Adverse - permanent effect on A54 Middlewich Road/Clive Lane/Road One (2039 and 2051).</p> <p>Major Adverse - permanent effect on A533 Bostock Road/Road One/A5018 Bostock Road/A533 Davenham Road (2051).</p> <p>Moderate Adverse (2051) - permanent effect at A54 New High Street/A54 Winsford Bypass/A5018 Wharton Road/Weaver Street</p>
Henkel Ltd	Traffic-related severance	Operation	<p>Moderate Adverse (2039) - permanent effect on A54 Middlewich Road (between Clive Lane and A54 Winsford Bypass)</p>

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Site name	Effect type	Phase	Effect(s) reported
			Moderate Adverse (2051) - permanent effect on Road One (between A54 Middlewich Road and A533 Bostock Road)
Holford Brine Field	Traffic congestion	Construction	<p>Moderate Beneficial - temporary effect on A5018 Wharton Road/B5355 Wharton Road/A5018 Wharton Park Road/Collingtree Avenue.</p> <p>Moderate Adverse - temporary effect on A54 St Michaels Way/A54 Kinderton Street/A533 Leadsmithy Street.</p> <p>Major Adverse - temporary effect on A556 Shurlach/A530 King Street.</p> <p>Moderate Adverse - temporary effect on A54 Holmes Chapel Road/Pochin Way/Centurion Way.</p> <p>Major Adverse - Temporary effect at A534 Congleton Road/A534 Old Mill Road/Congleton Road</p> <p>Major Adverse - Temporary effect at A54 New High Street/A54 Winsford Bypass/A5018 Wharton Road/Weaver Street</p> <p>Major Adverse - Temporary effect at A54 Holmes Chapel Road/Brereton Lane</p> <p>Minor Adverse - Temporary effect at A533 Kingsmead/A533 London Road</p> <p>Major Adverse - Temporary effect at A556 Shurlach Road/Shurlach Lane</p> <p>Minor Adverse - Temporary effect at A556 Shurlach Road/Gadbrook Road</p> <p>Minor Adverse - Temporary effect at A556 Shurlach Road/B5082 Pennys Lane</p>
Holford Brine Field	Traffic congestion	Operation	<p>Major Adverse - permanent effect on A54 Middlewich Road/Clive Lane/Road One (2039 and 2051).</p> <p>Major Adverse - permanent effect on A533 Bostock Road/Road One/A5018 Bostock Road/A533 Davenham Road (2051).</p> <p>Minor Beneficial - permanent effect on A54 Chester Road/A530 St. Michael's Way/A530 Nantwich Road (2039 and 2051).</p> <p>Moderate Adverse (2051) - permanent effect at A54 New High Street/A54 Winsford Bypass/A5018 Wharton Road/Weaver Street</p> <p>Minor Beneficial (2039) and Moderate Beneficial (2051) - permanent effect at A54 Chester Road/A530 Croxton Lane</p> <p>Major Adverse (2051) - permanent effect at A54 Holmes Chapel Road/B5309 Centurion Way/Pochin Way</p> <p>Minor Beneficial (2039) - permanent effect at A54 Holmes Chapel Road/Brereton Lane</p> <p>Minor Adverse (2051) - permanent effect at A533 Bostock Road/London Road</p> <p>Minor Adverse (2039) - permanent effect at A556 Shurlach Road/Gadbrook Road</p> <p>Major Adverse (2039 and 2051) - permanent effect at A556 Shurlach Road/A530 King Street</p>
Holford Brine Field	Traffic-related severance	Construction	<p>Moderate Adverse - Temporary effect on A54 Middlewich Road realignment (between A533 Northwich Road diversion and Birch Lane)</p> <p>Moderate Adverse - Temporary effect on A530 Nantwich Road (between A530 Newton Bank and A54 St Michael's Way)</p>

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Site name	Effect type	Phase	Effect(s) reported
			<p>Moderate Adverse - Temporary effect on A54 St Michael's Way (between A54 Chester Road and The Bull Ring)</p> <p>Moderate Adverse - Temporary effect on A530 Newton Bank (between A530 Nantwich Road and A54 Chester Road)</p> <p>Moderate Adverse - Temporary effect on A54 Middlewich Road realignment (between Birch Lane and Coalpit Lane)</p> <p>Moderate Adverse - Temporary effect on A54 Holmes Chapel Road (between B5309 Centurion Way and Brereton Lane)</p> <p>Moderate Adverse - Temporary effect on A54 Holmes Chapel Road (between Brereton Lane and Poolford Lane)</p> <p>Moderate Adverse - Temporary effect on A50 Knutsford Road (between A535 Macclesfield Road and B5308 Middlewich Road)</p> <p>Moderate Adverse - Temporary effect on A533 Bostock Road (between A533 Northwich Road diversion and London Road)</p> <p>Moderate Adverse - Temporary effect on B5082 Pennys Lane diversion (between Pennys Lane and A556 Shurlach Road)</p> <p>Major Adverse - Temporary effect on A556 Shurlach Road (between A530 King Street and B5082 Pennys Lane)</p> <p>Major Adverse - Temporary effect on B5081 Byley Road (between Moss Lane and B5082 Holmes Chapel Road)</p>
Holford Brine Field	Traffic-related severance	Operation	<p>Moderate beneficial - permanent effect on A556 Shurlach Road (between A530 King Street and B5082 Pennys Lane) (2039 and 2051).</p> <p>Moderate adverse (2051) - permanent effect on A533 Bostock Road (between A5018 Bostock Road and London Road).</p> <p>Major Beneficial (2039 and 2051) - permanent effect on A54 Middlewich Road realignment (between Clive Lane and A533 Northwich Road diversion)</p> <p>Moderate Adverse (2039) - permanent effect on A54 Middlewich Road (between Clive Lane and A54 Winsford Bypass)</p> <p>Moderate Beneficial (2039 and 2051) - permanent effect on A533 Lewin Street (between Sutton Lane and Hightown)</p> <p>Moderate Adverse (2051) - permanent effect on A54 Kinderton Street (between A533 Leadsmithy Street and King Street)</p> <p>Moderate Beneficial (2039 and 2051) - permanent effect on A530 Nantwich Road (between A530 Newton Bank and A54 St Michael's Way)</p> <p>Moderate Beneficial (2039 and 2051) - permanent effect on King Street (between A54 Kinderton Street and B5309 Centurion Way)</p> <p>Moderate Adverse (2051) - permanent effect on A54 St Michael's Way (between A54 Chester Road and The Bull Ring)</p> <p>Moderate Beneficial (2039 and 2051) - permanent effect on A54 Chester Road (between A530 Newton Bank and A54 St Michael's Way)</p> <p>Moderate Beneficial (2039 and 2051) - permanent effect on A54 Chester Road (between A530 Croxton Lane and A530 Newton Bank)</p> <p>Moderate Adverse (2051) - permanent effect on A54 Holmes Chapel Road (between King Street and B5309 Centurion Way)</p> <p>Moderate Beneficial (2039 and 2051) - permanent effect on A54 Chester Road (between Coal Pit Lane and A530 Croxton Lane)</p>

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Site name	Effect type	Phase	Effect(s) reported
			<p>Major Beneficial (2039 and 2051) - permanent effect on A54 Middlewich Road realignment (between Birch Lane and Coalpit Lane)</p> <p>Major Adverse (2039 and 2051) - permanent effect on A54 Middlewich Road realignment (between A533 Northwich Road diversion and Birch Lane)</p> <p>Major Adverse (2039 and 2051) - permanent effect on A533 Northwich Road diversion (between A54 Middlewich Road realignment and A533 Northwich Road)</p> <p>Moderate Adverse (2039) - permanent effect on B5309 King Street (between B5309 Centurion Way and A530 Croxton Lane)</p> <p>Moderate Adverse (2039) and Major Adverse (2051) - permanent effect on A533 Bostock Road (between A533 Northwich Road diversion and London Road)</p> <p>Major Beneficial (2039) and Moderate Beneficial (2051) - permanent effect on B5081 Byley Road (between B5309 Centurion Way and Moss Lane)</p> <p>Major Adverse (2039 and 2051) - permanent effect on B5082 Holmes Chapel Road (between B5081 Byley Lane and Birches Lane)</p> <p>Major Adverse (2039 and 2051) - permanent effect on B5082 Pennys Lane diversion (between Pennys Lane and A556 Shurlach Road)</p> <p>Major Adverse (2039) - permanent effect on A556 southbound on-slip (between Gadbrook Road and A556 Shurlach Road)</p>
Holford H165 Gas Storage Cavity	Traffic congestion	Construction	<p>Minor Adverse - Temporary effect at A533 Kingsmead/A533 London Road</p> <p>Major Adverse - Temporary effect at A556 Shurlach Road/Shurlach Lane</p> <p>Minor Adverse - Temporary effect at A556 Shurlach Road/Gadbrook Road</p> <p>Major Adverse - Temporary effect at A556 Shurlach Road/A530 King Street</p> <p>Minor Adverse - Temporary effect at A556 Shurlach Road/B5082 Pennys Lane</p>
Holford H165 Gas Storage Cavity	Traffic congestion	Operation	<p>Minor Adverse (2039) - permanent effect at A556 Shurlach Road/Gadbrook Road</p> <p>Major Adverse (2039 and 2051) - permanent effect at A556 Shurlach Road/A530 King Street</p>
Holford H165 Gas Storage Cavity	Traffic-related severance	Construction	<p>Moderate Adverse - Temporary effect on Birches Lane diversion (between A556 Shurlach Road and B5082 Holmes Chapel Road)</p> <p>Moderate Adverse - Temporary effect on B5082 Pennys Lane diversion (between Pennys Lane and A556 Shurlach Road)</p> <p>Major Adverse - Temporary effect on A556 Shurlach Road (between A530 King Street and B5082 Pennys Lane)</p>
Holford H165 Gas Storage Cavity	Traffic-related severance	Operation	<p>Major Adverse (2039 and 2051) - permanent effect on B5082 Pennys Lane diversion (between Pennys Lane and A556 Shurlach Road)</p> <p>Major Adverse (2039) - permanent effect on A556 southbound on-slip (between Gadbrook Road and A556 Shurlach Road)</p>

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Site name	Effect type	Phase	Effect(s) reported
			Moderate Beneficial (2039) and Major Beneficial (2051) - permanent effect on Birches Lane diversion (between A556 Shurlach Road and B5082 Holmes Chapel Road) Moderate Beneficial (2039 and 2051) - permanent effect on A556 Shurlach Road (between A530 King Street and B5082 Pennys Lane)
HW Coates Ltd	Traffic congestion	Construction	Major Adverse - Temporary effect at A54 Middlewich Road/Clive Lane/Road One Major Adverse - Temporary effect at A54 New High Street/A54 Winsford Bypass/A5018 Wharton Road/Weaver Street Moderate Adverse - Temporary effect at A54 Kinderton Street/A54 St Michael's Way/A533 Leadsmithy Street Major Adverse - Temporary effect at A54 Chester Road/A54 St Michael's Way/A530 Nantwich Road Major Adverse - Temporary effect at A54 Chester Road/A530 Newton Bank Major Adverse - Temporary effect at A54 Chester Road/A530 Croxton Lane
HW Coates Ltd	Traffic congestion	Operation	Major Adverse (2039 and 2051) - permanent effect at A54 Middlewich Road/Clive Lane/Road One Moderate Adverse (2051) - permanent effect at A54 New High Street/A54 Winsford Bypass/A5018 Wharton Road/Weaver Street Minor Beneficial (2039 and 2051) - permanent effect at A54 Chester Road/A54 St Michael's Way/A530 Nantwich Road Minor Beneficial (2039) and Moderate Beneficial (2051) - permanent effect at A54 Chester Road/A530 Croxton Lane
HW Coates Ltd	Traffic-related severance	Construction	Moderate Adverse - Temporary effect on A54 Middlewich Road realignment (between A533 Northwich Road diversion and Birch Lane) Moderate Adverse - Temporary effect on A530 Nantwich Road (between A530 Newton Bank and A54 St Michael's Way) Moderate Adverse - Temporary effect on A54 St Michael's Way (between A54 Chester Road and The Bull Ring) Moderate Adverse - Temporary effect on A530 Newton Bank (between A530 Nantwich Road and A54 Chester Road) Moderate Adverse - Temporary effect on A54 Middlewich Road realignment (between Birch Lane and Coalpit Lane)
HW Coates Ltd	Traffic-related severance	Operation	Major Beneficial (2039 and 2051) - permanent effect on A54 Middlewich Road realignment (between Clive Lane and A533 Northwich Road diversion) Moderate Adverse (2039) - permanent effect on A54 Middlewich Road (between Clive Lane and A54 Winsford Bypass) Moderate Beneficial (2039 and 2051) - permanent effect on A533 Lewin Street (between Sutton Lane and Hightown) Moderate Adverse (2051) - permanent effect on A54 Kinderton Street (between A533 Leadsmithy Street and King Street) Moderate Beneficial (2039 and 2051) - permanent effect on A530 Nantwich Road (between A530 Newton Bank and A54 St Michael's Way)

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Site name	Effect type	Phase	Effect(s) reported
			<p>Moderate Beneficial (2039 and 2051) - permanent effect on King Street (between A54 Kinderton Street and B5309 Centurion Way)</p> <p>Moderate Adverse (2051) - permanent effect on A54 St Michael's Way (between A54 Chester Road and The Bull Ring)</p> <p>Moderate Beneficial (2039 and 2051) - permanent effect on A54 Chester Road (between A530 Newton Bank and A54 St Michael's Way)</p> <p>Moderate Beneficial (2039 and 2051) - permanent effect on A54 Chester Road (between A530 Croxton Lane and A530 Newton Bank)</p> <p>Moderate Adverse (2051) - permanent effect on A54 Holmes Chapel Road (between King Street and B5309 Centurion Way)</p> <p>Moderate Beneficial (2039 and 2051) - permanent effect on A54 Chester Road (between Coal Pit Lane and A530 Croxton Lane)</p> <p>Major Beneficial (2039 and 2051) - permanent effect on A54 Middlewich Road realignment (between Birch Lane and Coalpit Lane)</p> <p>Major Adverse (2039 and 2051) - permanent effect on A54 Middlewich Road realignment (between A533 Northwich Road diversion and Birch Lane)</p>
INEOS Chlor Enterprises Ltd.	Traffic congestion	Construction	<p>Minor Adverse - temporary effect on A530 Griffiths Road/A559 Manchester Road.</p> <p>Major Adverse - temporary effect on A556 Shurlach Road/Shurlach Lane.</p> <p>Major Adverse - temporary effect on A556 Shurlach Road/A530 King Street.</p> <p>Minor Adverse – Temporary effect at A533 Kingsmead/A533 London Road</p> <p>Minor Adverse - Temporary effect at A556 Shurlach Road/Gadbrook Road</p> <p>Minor Adverse - Temporary effect at A556 Shurlach Road/B5082 Pennys Lane</p> <p>Minor Adverse - Temporary effect at A533 London Road/A5509 Chester Way</p> <p>Moderate Adverse - Temporary effect at A533 Town Bridge/A533 Dane Street/Weaver Way</p> <p>Minor Adverse - Temporary effect at A559 Chester Way/Crum Hill</p> <p>Moderate Adverse - Temporary effect at A559 Chester Way/B5075 New Warrington Road/B5082 Station Road/Leicester Street</p> <p>Minor Beneficial - Temporary effect at A559 Manchester Road/Stubbs Lane</p>
INEOS Chlor Enterprises Ltd.	Traffic congestion	Operation	<p>Minor Adverse - permanent effect on A559 Manchester Road/A559 Hall Lane/Station Road (2051).</p> <p>Minor Adverse (2039) and Moderate Adverse (2051) - permanent effect on A530 Griffiths Road/A559 Manchester Road.</p> <p>Minor Adverse (2039) - permanent effect at A556 Shurlach Road/Gadbrook Road</p> <p>Major Adverse (2039 and 2051) - permanent effect at A556 Shurlach Road/A530 King Street</p>

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Site name	Effect type	Phase	Effect(s) reported
			<p>Minor Adverse (2039 and 2051) - permanent effect at A533 London Road/A533 Kingsmead</p> <p>Minor Adverse (2039 and 2051) - permanent effect at A530 Griffiths Road/A530 King Street/B5082 Middlewich Road</p> <p>Minor Adverse (2051) - permanent effect at A533 London Road/A5509 Chester Way</p> <p>Moderate Adverse (2051) - permanent effect at A533 Town Bridge/A533 Dane Street/Weaver Way</p> <p>Minor Adverse (2039) - permanent effect at A559 Chester Way/Crum Hill</p> <p>Moderate Adverse (2051) - permanent effect at A559 Chester Way/B5075 New Warrington Road/B5082 Station Road/Leicester Street</p> <p>Minor Adverse (2051) - permanent effect at A559 Manchester Road/Fryer Road</p>
INEOS Chlor Enterprises Ltd.	Traffic-related severance	Construction	<p>Major adverse - temporary effect on A556 Shurlach Road (between A530 King Street and B5082 Pennys Lane).</p> <p>Major Adverse - Temporary effect on A556 Shurlach Road (between B5082 Pennys Lane and Birches Lane)</p> <p>Major Adverse - Temporary effect on A556 Shurlach Road (between Birches Lane and A559 Manchester Road)</p>
INEOS Chlor Enterprises Ltd.	Traffic-related severance	Operation	<p>Moderate beneficial - permanent effect on A556 Shurlach Road (between A530 King Street and B5082 Pennys Lane) (2039 and 2051).</p> <p>Major Adverse (2039) - permanent effect on A556 southbound on-slip (between Gadbrook Road and A556 Shurlach Road)</p> <p>Moderate Adverse (2051) - permanent effect on A559 Chester Way (between B5082 Station Road and A559 Manchester Road)</p> <p>Major Beneficial (2039 and 2051) - permanent effect on A530 Griffiths Road (between A559 Manchester Road and B5082 Middlewich Road)</p> <p>Moderate Adverse (2039) and Major Adverse (2051) - permanent effect on A559 Manchester Road (between A530 Griffiths Road and A559 Hall Lane)</p> <p>Moderate Adverse (2039 and 2051) - permanent effect on A559 Manchester Road (between A559 Hall Lane and Stubbs Lane)</p> <p>Moderate Adverse (2039) and Major Adverse (2051) - permanent effect on A559 Hall Lane (between A559 Manchester Road and Townshend Road)</p> <p>Moderate Adverse (2051) - permanent effect on A559 Manchester Road (between Stubbs Lane and Fryer Road)</p>
King Street Energy (Cheshire) Ltd	Traffic congestion	Construction	<p>Major Adverse - temporary effect on A556 Shurlach Road/Shurlach Lane.</p> <p>Major Adverse - temporary effect on A556 Shurlach Road/A530 King Street.</p> <p>Minor Adverse - Temporary effect at A533 Kingsmead/A533 London Road.</p> <p>Minor Adverse - Temporary effect at A556 Shurlach Road/Gadbrook Road.</p>

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Site name	Effect type	Phase	Effect(s) reported
			<p>Minor Adverse - Temporary effect at A533 London Road/A5509 Chester Way</p> <p>Moderate Adverse - Temporary effect at A533 Town Bridge/A533 Dane Street/Weaver Way</p> <p>Minor Adverse - Temporary effect at A559 Chester Way/Crum Hill</p>
King Street Energy (Cheshire) Ltd	Traffic congestion	Operation	<p>Minor Adverse - permanent effect on A530 Griffiths Road/A530 King Street/B5082 Middlewich Road/Pennys Lane (2039 and 2051).</p> <p>Minor Adverse (2039) - permanent effect at A556 Shurlach Road/Gadbrook Road</p> <p>Major Adverse (2039 and 2051) - permanent effect at A556 Shurlach Road/A530 King Street</p> <p>Minor Adverse (2039 and 2051) - permanent effect at A533 London Road/A533 Kingsmead</p> <p>Minor Adverse (2051) - permanent effect at A533 London Road/A5509 Chester Way</p> <p>Moderate Adverse (2051) - permanent effect at A533 Town Bridge/A533 Dane Street/Weaver Way</p> <p>Minor Adverse (2039) - permanent effect at A559 Chester Way/Crum Hill</p> <p>Moderate Adverse (2051) - permanent effect at B5082 Station Road/B5062 Middlewich Road/Manchester Road/Victoria Road</p> <p>Minor Beneficial (2039 and 2051) - permanent effect at A559 Chester Way/B5082 Station Road/B5075 New Warrington Road</p>
King Street Energy (Cheshire) Ltd	Traffic-related severance	Construction	<p>Major adverse - temporary effect on A530 King Street (between B5082 Pennys Lane diversion and A556 Shurlach Road).</p>
King Street Energy (Cheshire) Ltd	Traffic-related severance	Operation	<p>Major adverse - permanent effect on A530 King Street (between B5082 Pennys Lane diversion and A556 Shurlach Road) (2039 and 2051).</p> <p>Major Adverse (2039) - permanent effect on A556 southbound on-slip (between Gadbrook Road and A556 Shurlach Road)</p> <p>Moderate Adverse (2039 and 2051) - permanent effect on B5082 Middlewich Road (between East Avenue and A530 Griffiths Road)</p> <p>Moderate Adverse (2039) and Major Adverse (2051) - permanent effect on B5082 Middlewich Road (between Shipbrook Road and East Avenue)</p> <p>Moderate Adverse (2039 and 2051) - permanent effect on B5082 Middlewich Road (between Parkfield Road and Shipbrook Road)</p> <p>Moderate Adverse (2051) - permanent effect on B5082 Middlewich Road (between Victoria Road and Parkfield Road)</p> <p>Moderate Adverse (2039 and 2051) - permanent effect on B5082 Station Road (between A559 Chester Way and Victoria Road)</p>
Manchester Airport	Traffic congestion	Construction	<p>Moderate Adverse - Temporary effect at A538 Altrincham Road/Hawthorn Street</p> <p>Moderate Beneficial - Temporary effect at A538 Manchester Road/A538 Alderley Road/Station Road/Swan Street</p> <p>Major Adverse - Temporary effect at A538 Altrincham Road/Mobberley Road</p>

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Site name	Effect type	Phase	Effect(s) reported
			<p>Major Adverse - Temporary effect at A538 Wilmslow Road/Mill Lane</p> <p>Major Adverse - Temporary effect at M56 junction 6/A538 Wilmslow Road/Runger Lane</p> <p>Major Adverse - Temporary effect at M56 Junction 6/A538 Wilmslow Road/A538 Hale Road</p> <p>Major Adverse - Temporary effect at Thorley Lane/Sydney Avenue</p> <p>Major Beneficial - Temporary effect at Runger Lane/Thorley Lane</p> <p>Moderate Adverse - Temporary effect at B5166 Styal Road/Finney Lane/Simonsway</p> <p>Major Beneficial - Temporary effect at Portway/Selstead Road</p> <p>Minor Adverse - Temporary effect at Greenwood Road/Royalhorn Road</p>
Manchester Airport	Traffic congestion	Operation	<p>Major Adverse (2051) - permanent effect at A538 Altrincham Road/Hawthorn Street</p> <p>Major Adverse (2039) and Moderate Adverse (2051) - permanent effect at A538 Manchester Road/A538 Alderley Road/Station Road/Swan Street</p> <p>Major Adverse (2039 and 2051) - permanent effect at A538 Altrincham Road/Mobberley Road</p> <p>Major Adverse (2039 and 2051) - permanent effect at A538 Wilmslow Road/Mill Lane</p> <p>Major Adverse (2039 and 2051) - permanent effect at A538 Wilmslow Road/Sunbank Lane</p> <p>Moderate Adverse (2039) and Major Adverse (2051) - permanent effect at Thorley Lane/Enterprise Way</p> <p>Major Adverse (2039 and 2051) - permanent effect at Runger Lane/Thorley Lane</p> <p>Moderate Adverse (2039 and 2051) - permanent effect at A555 Ringway Road/B5166 Styal Road</p> <p>Major Adverse (2051) - permanent effect at A555 Ringway Road West/Enterprise Way</p> <p>Minor Beneficial (2051) - permanent effect at B5166 Styal Road/Finney Lane/Simonsway</p> <p>Moderate Beneficial (2039 and 2051) - permanent effect at Portway/Selstead Road</p> <p>Minor Adverse (2039) - permanent effect at B5166 Styal Road/Hollyhedge Road</p> <p>Minor Adverse (2051) - permanent effect at M56 junction 2/A560 Altrincham Road/B5168 Sharston Road</p>
Manchester Airport	Traffic-related severance	Construction	<p>Major Adverse - Temporary effect on A538 Wilmslow Road (between Sunbank Lane and Runger Lane)</p> <p>Major Adverse - Temporary effect on Hawley Lane (between Broad Lane and Wicker Lane)</p> <p>Moderate Adverse - Temporary effect on Greenwood Road (between Simonsway and Gladeside Road)</p> <p>Major Adverse - Temporary effect on Greenwood Road (between Hollyhedge Road and A560 Altrincham Road)</p>

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Site name	Effect type	Phase	Effect(s) reported
Manchester Airport	Traffic-related severance	Operation	<p>Moderate Adverse (2039) and Major Adverse (2051) - permanent effect on A538 Wilmslow Road (between Mill Lane and Altrincham Road)</p> <p>Major Adverse (2039 and 2051) - permanent effect on A538 Wilmslow Road (between Sunbank Lane and Mill Lane)</p> <p>Major Adverse (2039 and 2051) - permanent effect on A538 Wilmslow Road (between Sunbank Lane and Runger Lane)</p> <p>Major Beneficial (2039 and 2051) - permanent effect on A538 Hale Road (between station access gyratory and Runger Lane)</p> <p>Major Beneficial (2039 and 2051) - permanent effect on A538 Wilmslow Road (between Runger Lane and A538 Hale Road)</p> <p>Moderate Adverse (2039 and 2051) - permanent effect on Runger Lane (between A538 Wilmslow Road and Avro Way)</p> <p>Major Beneficial (2039 and 2051) - permanent effect on Runger Lane (between Avro Way and Thorley Lane)</p> <p>Moderate Adverse (2039) and Moderate Beneficial (2051) - permanent effect on Thorley Lane (between Runger Lane and Sydney Avenue)</p> <p>Moderate Beneficial (2039) and Major Beneficial (2051) - permanent effect on Bailey Lane/Selstead Road (between Thorley Lane and Portway)</p> <p>Moderate Adverse (2051) - permanent effect on Ruddpark Road (between Portway and Simonsway)</p> <p>Moderate Adverse (2039) - permanent effect on Portway (between Oatlands Road and Cornishway)</p> <p>Moderate Beneficial (2039) and Major Beneficial (2051) - permanent effect on Portway (between Selstead Road and Simonsway)</p> <p>Moderate Adverse (2051) - permanent effect on Simonsway (between Portway and Greenwood Road)</p> <p>Major Adverse (2039 and 2051) - permanent effect on Greenwood Road (between Simonsway and Gladeside Road)</p> <p>Moderate Adverse (2039) - permanent effect on Greenwood Road (between Gladeside Road and Hollyhedge Road Road)</p> <p>Moderate Beneficial (2039) and Moderate Adverse (2051) - permanent effect on Brownley Road (between Hollyhedge Road and Royalthorn Road)</p> <p>Moderate Beneficial (2039 and 2051) - permanent effect on Greenwood Road (between Hollyhedge Road and A560 Altrincham Road)</p> <p>Moderate Adverse (2051) - permanent effect on Brownley Road (between Royalthorn Road and A560 Altrincham Road)</p> <p>Moderate Adverse (2051) - permanent effect on A560 Altrincham Road (between A560 Altrincham Road and M56 junction 2)</p> <p>Moderate Adverse (2051) - permanent effect on B5168 Sharston Road (between M56 junction 2 and B5166 Longley Lane)</p> <p>Major Adverse (2039) - permanent effect on B5166 Longley Lane (between A560 Altrincham Road and B5168 Sharston Road)</p> <p>Major Adverse (2051) - permanent effect on A560 Altrincham Road (between M56 junction 3a and Greenwood Road)</p>

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Site name	Effect type	Phase	Effect(s) reported
Stublach Gas Storage Site	Traffic congestion	Construction	Major Adverse - Temporary effect at London Road/Church Street Major Adverse - Temporary effect at A530 King Street/Davenham Road/Crowders Lane Minor Adverse - Temporary effect at A533 Kingsmead/A533 London Road Major Adverse - Temporary effect at A556 Shurlach Road/Shurlach Lane Minor Adverse - Temporary effect at A556 Shurlach Road/Gadbrook Road Major Adverse - Temporary effect at A556 Shurlach Road/A530 King Street
Stublach Gas Storage Site	Traffic diversion	Construction	Major adverse - temporary effect on Davenham Road
Stublach Gas Storage Site	Traffic congestion	Operation	Minor Adverse (2051) - permanent effect at London Road/Hartford Road Minor Adverse (2039) - permanent effect at A556 Shurlach Road/Gadbrook Road Major Adverse (2039 and 2051) - permanent effect at A556 Shurlach Road/A530 King Street
Stublach Gas Storage Site	Traffic-related severance	Construction	Major Adverse - Temporary effect on A530 King Street (between B5082 Pennys Lane diversion and A556 Shurlach Road) Major Adverse - Temporary effect on Davenham Road (between Shurlach Lane and A530 King Street) Major Adverse - Temporary effect on A530 King Street (between Whatcroft Hall Lane and Davenham Road)
Stublach Gas Storage Site	Traffic-related severance	Operation	Moderate Beneficial (2039 and 2051) - permanent effect on Church Street/Shipbrook Road (between London Road and Shurlach Lane) Major Beneficial (2039) and Moderate Beneficial (2051) - permanent effect on Davenham Road (between Shurlach Lane and A530 King Street) Moderate Beneficial (2039 and 2051) - permanent effect on A530 King Street (between Crowder's Lane and B5082 Pennys Lane diversion) Major Adverse (2039 and 2051) - permanent effect on A530 King Street (between B5082 Pennys Lane diversion and A556 Shurlach Road) Major Adverse (2039) - permanent effect on A556 southbound on-slip (between Gadbrook Road and A556 Shurlach Road)
Wincham	Traffic congestion	Construction	Minor Adverse - Temporary effect at A533 Kingsmead/A533 London Road Major Adverse - Temporary effect at A556 Shurlach Road/Shurlach Lane Minor Adverse - Temporary effect at A556 Shurlach Road/Gadbrook Road Major Adverse - Temporary effect at A556 Shurlach Road/A530 King Street Minor Adverse - Temporary effect at A556 Shurlach Road/B5082 Pennys Lane

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Site name	Effect type	Phase	Effect(s) reported
			<p>Minor Adverse - Temporary effect at A533 London Road/A5509 Chester Way</p> <p>Moderate Adverse - Temporary effect at A533 Town Bridge/A533 Dane Street/Weaver Way</p> <p>Minor Adverse - Temporary effect at A559 Chester Way/Crum Hill</p> <p>Minor Adverse - Temporary effect at A530 Griffiths Road/A559 Manchester Road</p> <p>Major Adverse - Temporary effect at A559 Manchester Road/A559 Hall Lane/Station Road</p> <p>Minor Beneficial - Temporary effect at A559 Manchester Road/Stubbs Lane</p> <p>Moderate Adverse - Temporary effect at B5075 Ollershaw Lane/B5075 New Warrington Road/Chapel Street</p> <p>Moderate Adverse - Temporary effect at A559 Marston Lane/A559 Hall Lane/B5391 Church Street/Wincham Lane</p>
Wincham	Traffic congestion	Operation	<p>Minor Adverse (2039) - permanent effect at A556 Shurlach Road/Gadbrook Road</p> <p>Major Adverse (2039 and 2051) - permanent effect at A556 Shurlach Road/A530 King Street</p> <p>Minor Adverse (2039 and 2051) - permanent effect at A533 London Road/A533 Kingsmead</p> <p>Minor Adverse (2039 and 2051) - permanent effect at A530 Griffiths Road/A530 King Street/B5082 Middlewich Road</p> <p>Minor Adverse (2051) - permanent effect at A533 London Road/A5509 Chester Way</p> <p>Moderate Adverse (2051) - permanent effect at A533 Town Bridge/A533 Dane Street/Weaver Way</p> <p>Minor Adverse (2039) - permanent effect at A559 Chester Way/Crum Hill</p> <p>Moderate Adverse (2051) - permanent effect at A559 Chester Way/B5075 New Warrington Road/B5082 Station Road/Leicester Street</p> <p>Minor Adverse (2039) and Moderate Adverse (2051) - permanent effect at A530 Griffiths Road/A559 Manchester Road</p> <p>Minor Adverse (2051) - permanent effect at A559 Manchester Road/A559 Hall Lane/Station Road</p> <p>Minor Beneficial (2039) and Moderate Beneficial (2051) - permanent effect at B5075 Ollershaw Lane/B5075 New Warrington Road/Chapel Street</p> <p>Minor Adverse (2051) - permanent effect at A559 Manchester Road/Fryer Road</p> <p>Moderate Beneficial (2039) and Moderate Adverse (2051) - permanent effect at A559 Marston Lane/A559 Hall Lane/B5391 Church Street/Wincham Lane</p>
Wincham	Traffic-related severance	Construction	<p>Major Adverse - Temporary effect on A556 Shurlach Road (between Birches Lane and A559 Manchester Road)</p> <p>Major Adverse - Temporary effect on A556 Shurlach Road (between A530 King Street and B5082 Pennys Lane)</p> <p>Major Adverse - Temporary effect on A556 Shurlach Road (between B5082 Pennys Lane and Birches Lane)</p>

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Site name	Effect type	Phase	Effect(s) reported
Wincham	Traffic-related severance	Operation	<p>Major Adverse (2039) - permanent effect on A556 southbound on-slip (between Gadbrook Road and A556 Shurlach Road)</p> <p>Moderate Beneficial (2039 and 2051) - permanent effect on A556 Shurlach Road (between A530 King Street and B5082 Pennys Lane)</p> <p>Major Beneficial (2039 and 2051) - permanent effect on A530 Griffiths Road (between A559 Manchester Road and B5082 Middlewich Road)</p> <p>Moderate Adverse (2039) and Major Adverse (2051) - permanent effect on A559 Manchester Road (between A530 Griffiths Road and A559 Hall Lane)</p> <p>Moderate Adverse (2039 and 2051) - permanent effect on A559 Manchester Road (between A559 Hall Lane and Stubbs Lane)</p> <p>Moderate Adverse (2039) and Major Adverse (2051) - permanent effect on A559 Hall Lane (between A559 Manchester Road and Townshend Road)</p> <p>Moderate Adverse (2051) - permanent effect on A569 Hall Lane (between Townshend Road and Green Lane)</p> <p>Moderate Adverse (2051) - permanent effect on A559 Manchester Road (between Stubbs Lane and Fryer Road)</p> <p>Moderate Adverse (2051) - permanent effect on A559 Hall Lane (between Green Lane and B5391 Church Street)</p>
Sandbach Site	Traffic congestion	Operation	<p>Major Adverse - Temporary effect at Remer Street/Groby Road/Sydney Road/Elm Drive/Maw Green Road (proposed layout)</p> <p>Major Adverse - Temporary effect at Warmingham Road/Groby Road</p> <p>Major Adverse - Temporary effect at Warmingham Road/Hall Lane</p> <p>Minor Adverse - Temporary effect at A533 Middlewich Road/A533 Old Mill Road/Crewe Road/Hightown</p> <p>Minor Adverse - Temporary effect at A533 London Road/B5079 Station Road</p>
Sandbach Site	Traffic-related severance	Construction	<p>Major Adverse - Temporary effect on Sydney Road (between Hungerford Road and Shakespeare Drive)</p> <p>Moderate Adverse - Temporary effect on Elm Drive (between B5076 Middlewich Street and Coronation Street)</p> <p>Moderate Adverse - Temporary effect on Elm Drive (between Coronation Street and Sycamore Avenue)</p> <p>Moderate Adverse - Temporary effect on B5076 Middlewich Road (between Elm Drive and Stamp Avenue)</p> <p>Moderate Adverse - Temporary effect on Elm Drive (between Sycamore Avenue and Lime Tree Avenue)</p> <p>Major Adverse - Temporary effect on Groby Road (between Remer Street and Stoneley Road)</p> <p>Major Adverse - Temporary effect on Stoneley Road (between Waldron's Lane and Groby Road)</p> <p>Major Adverse - Temporary effect on Groby Road (between Stoneley Road and Warmingham Road)</p>

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Site name	Effect type	Phase	Effect(s) reported
Effects reported in the main ES and no longer present as a result of the AP2 revised scheme			
Air Products PLC	Traffic congestion	Construction	Minor Beneficial - temporary effect on A532 Vernon Way/A532 Earle Street/A5019 Vernon Way/Earle Street. Major Adverse - temporary effect on A532 Earle Street/A532 Manchester Bridge/William Street/Grand Junction Way (A532 Earle Street Roundabout). Moderate Adverse - temporary effect on A534/A534 Crewe Green Road/A5020 University Way/B5077 Crewe Road/Sydney Road.
BRITISH SALT LTD	Traffic congestion	Construction	Moderate Adverse - temporary effect on A533 London Road/B5079 Station Road. Minor Adverse - temporary effect on A533 Booth Lane/Cledford Lane/Cross Lane.
BRITISH SALT LTD	Traffic congestion	Operation	Minor Adverse – permanent effect on A54 St Michaels Way/A54 Kinderton Street/A533 Leadsmithy Street (2046).
Hole House Farm	Traffic congestion	Construction	Moderate Adverse - temporary effect on A533 London Road/Moss Lane. Moderate Adverse - temporary effect on Warmingham Road/Waldrons Lane. Moderate Adverse - temporary effect on Forge Mill Lane/Dragons Lane/ Tetton Lane/White Hall Lane. Moderate Adverse - temporary effect on B5076 Middlewich Street/B5076 North Street/Broad Street/Stoneley Road. Minor Adverse - temporary effect on Badger Ave/Broad Street. Minor Adverse - temporary effect on Broad Street/Davenport Street/McLaren Street. Minor Adverse - temporary effect on B5076 Bradfield Road/B5076 North Street/Broughton Road.
Hole House Farm	Traffic-related severance	Construction	Major adverse - temporary effect on Elm Drive (between Lime Tree Avenue and Remer Street). Moderate adverse - temporary effect on Lansdowne Road (between Coleridge Way and Pelican Close).
Henkel Ltd	Traffic congestion	Construction	Moderate Adverse - temporary effect on A533 Bostock Road/Road One/A5018 Bostock Road/A533 Davenham Road.
Holford Brine Field	Traffic congestion	Construction	Minor Beneficial - temporary effect on A533 Davenham Bypass/Jack Lane. Major Adverse - temporary effect on A556 Chester Road/Shurlach Lane. Major Adverse - temporary effect on A533 Davenham Bypass/Jack Lane. Moderate Adverse - temporary effect on A534/Congleton Road. Minor Adverse - temporary effect on A556 Chester Road/A556 Chester Road/A533 London Road/London Road. Minor Adverse - temporary effect on A556 Shurlach Road/A533 Davenham Bypass.
Holford Brine Field	Traffic congestion	Operation	Moderate Adverse - permanent effect on A556 Chester Road/Shurlach Lane (2038 and 2046). Minor Adverse - permanent effect on A54 St Michaels Way/A54 Kinderton Street/A533 Leadsmithy Street (2046).

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Site name	Effect type	Phase	Effect(s) reported
Holford Brine Field	Traffic-related severance	Construction	Major adverse - temporary effect on B5309 Centurion Way (between King Street Industrial Estate and B5309 Centurion Way). Major adverse - temporary effect on B5081 Byley Road (between B5309 Centurion Way and Moss Lane). Major adverse - temporary effect on B5309 King Street (between B5309 Centurion Way and Yatehouse Lane). Moderate adverse - temporary effect on A533 Davenham Bypass (between London Road and A556 Shurlach Road). Moderate adverse - temporary effect on A556 Shurlach Road (between A530 King Street and Birches Lane).
INEOS Chlor Enterprises Ltd.	Traffic congestion	Construction	Moderate Adverse - temporary effect on A559 Watling Street/Apple Market Street. Minor Adverse - temporary effect on A533 London Road/A533 Kingsmead. Minor Adverse - temporary effect on A556 Chester Road/A556 Chester Road/A533 London Road/London Road.
INEOS Chlor Enterprises Ltd.	Traffic congestion	Operation	Moderate Adverse - permanent effect on A556 Chester Road/Shurlach Lane (2038 and 2046).
INEOS Chlor Enterprises Ltd.	Traffic-related severance	Construction	Moderate adverse - temporary effect on Gadbrook Road (between East Avenue and A556 Shurlach Road). Moderate adverse - temporary effect on Station Road (between School Lane and A559 Manchester Road).
INEOS Chlor Enterprises Ltd.	Traffic-related severance	Operation	Major beneficial - permanent effect on Old Hall Road (between Granville Road and Clifton Drive) (2046). Major beneficial - permanent effect on Old Hall Road (between London Road and Granville Road) (2046). Major beneficial - permanent effect on London Road (between Old Hall Road and Lime Avenue) (2046). Moderate beneficial - permanent effect on London Road (between Dunham Road and Old Hall Road) (2046). Major adverse - permanent effect on Station Road (between School Lane and A559 Manchester Road) (2038 and 2046).
King Street Energy (Cheshire) Ltd	Traffic congestion	Construction	Moderate Adverse - temporary effect on A559 Watling Street/Apple Market Street. Moderate Adverse - temporary effect on A559 Chester Way/B5082 Station Road/B5075 New Warrington Road. Moderate Adverse - temporary effect on A530 Griffiths Road/A530 King Street/B5082 Middlewich Road/Pennys Lane. Minor Adverse - temporary effect on A533 London Road/A533 Kingsmead. Minor Adverse - temporary effect on B5082 Station Road/Manchester Road/B5062 Middlewich Road/Victoria Road. Minor Adverse - temporary effect on A556 Chester Road/A556 Chester Road/A533 London Road/London Road.
King Street Energy (Cheshire) Ltd	Traffic congestion	Operation	Moderate Adverse - permanent effect on A556 Chester Road/Shurlach Lane (2038 and 2046).

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Site name	Effect type	Phase	Effect(s) reported
King Street Energy (Cheshire) Ltd	Traffic-related severance	Construction	Moderate adverse - temporary effect on Gadbrook Road (between East Avenue and A556 Shurlach Road).
King Street Energy (Cheshire) Ltd	Traffic-related severance	Operation	Major beneficial - permanent effect on Old Hall Road (between Granville Road and Clifton Drive) (2046). Major beneficial - permanent effect on Old Hall Road (between London Road and Granville Road) (2046). Major beneficial - permanent effect on London Road (between Old Hall Road and Lime Avenue) (2046). Moderate beneficial - permanent effect on London Road (between Durnham Road and Old Hall Road) (2046). Moderate adverse - permanent effect on A530 King Street (between B5082 Middlewich Road and A556 Shurlach Road) (2038 and 2046).
Aston Way - Middlewich	Traffic congestion	Construction	Major Adverse - temporary effect on A54 St Michaels Way/A54 Kinderton Street/A533 Leadsmithy Street. Major Adverse - temporary effect on A54 Chester Road/A530 Croxton Lane. Major Adverse - temporary effect on A54 Chester Road/A530 Newton Bank. Major Adverse - temporary effect on A54 Chester Road/A530 St. Michael's Way/A530 Nantwich Road. Major Adverse - temporary effect on A54 Middlewich Road/Clive Lane/Road One. Minor Adverse - temporary effect on A533 Booth Lane/Cledford Lane/Cross Lane.
Aston Way - Middlewich	Traffic congestion	Operation	Moderate Adverse - permanent effect on A54 Middlewich Road/Clive Lane/Road One (2038 and 2046). Minor Adverse - permanent effect on A54 Chester Road/A530 St. Michael's Way/A530 Nantwich Road (2046). Minor Adverse - permanent effect on A54 St Michaels Way/A54 Kinderton Street/A533 Leadsmithy Street (2046).

3.2 Review of risks

3.2.1 The objective of this environmental risk review is to determine, since the main ES and the SES1 and AP1 ES, whether:

- additional grouped risk events are introduced;
- grouped risk events are removed;
- additional, different, or removed hazard-source-pathway models are presented;
- different reasonable worst consequence outcomes could arise if the grouped risk event were to occur;
- additional or different embedded mitigation measures are required to manage risks 'as low as reasonably practicable' (ALARP);

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- grouped risk events can be considered to be managed ALARP with embedded mitigation measures; and
- additional mitigation measures may be required to ensure that the identified risks to environmental receptors can be reduced to ALARP. This has been done in consultation with the other environmental topics.

3.2.2 In accordance with the detail outlined in Section 2, and best practice including design standards, 'embedded mitigation' comprises those measures that have not yet been implemented, but will be at the appropriate stage of the HS2 scheme, i.e. any measures that will be undertaken during detailed design, construction planning, construction and during the life of the HS2 scheme.

3.2.3 Table 2 presents changes to the environmental risk review of the original scheme and AP1 revised scheme as a result of SES2 design changes and AP2 amendments and changes to the source documents listed in Section 3.1.1 of this report current at the time of producing this appendix. Text presented in **bold** in Table 2 represents a change to the environmental risk review presented in Volume 5, Appendix: MA-001-00000 of the main ES or Volume 5, Appendix: MA-001-00000 of the SES1 and AP1 ES. Changes include:

- the introduction of an additional risk event (OM20 - Spillage or longer-term seepage of pollutants into groundwater);
- a new pathway and environmental receptors in relation to risk event C12 - Fatality/injury to member of public i.e. pedestrians, equestrians, Network Rail train occupants and operatives on Network Rail main line;
- a new hazard source in relation to risk event OM1A - Train derailment or collision (on HS2 route);
- a new pathway in relation to risk event OM3 - Major road traffic incident;
- a new hazard source, pathway and associated embedded mitigation measures in relation to risk event OM16 - Exposure to live conductor/arc;
- a new hazard source, pathway and associated embedded mitigation measures in relation to risk event OM17 - Impact upon emergency response/evacuation procedure, including for hazardous facilities; and
- a new hazard source, environmental receptors and associated embedded mitigation measures in relation to risk event OM19 - Electromagnetic interference.

3.2.4 Table 2 sets out these grouped risk events with the identified hazard sources and pathways and describes the reasonable worst consequence if the event did occur in relation to environmental receptors.

3.2.5 Table 2 also summarises the necessary risk management and mitigation measures which are currently embedded within the AP2 revised scheme, through legislation, standards, policy, and other measures. It concludes whether each risk event can be considered to be managed to be ALARP. These measures are to be considered as commitments under the hybrid Bill and will be implemented prior to construction and authorisation to place HS2 into service by the Regulator.

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Table 2: Environmental risk review

ID	Risk event	Hazard sources and/or pathways	Reasonable worst consequence if event did occur	Embedded mitigation	Is this ALARP with embedded mitigation ¹¹ ?	Clarification
C12	Fatality/injury to member of public i.e. pedestrians, equestrians, Network Rail train occupants and operatives on Network Rail mainline.	Construction activity and traffic above/adjacent to areas members of the public are present, causing items falling from height etc. Interface between construction activities and/or construction traffic and members of the public/Network Rail staff and passengers.	Fatality/injury to member(s) of public/ Network Rail staff and passengers.	Managed via CDM - Construction planning/sequencing and site controls to be in place. Construction sequencing to be further developed during detailed design. Consultation with Network Rail, other rail service providers/operators, local authorities, utility providers, Hanson and Peel Ports to identify key areas of interface and identification of control measures, for instance use of possessions/closures/diversions, as well as clear signage and routing. Station evacuation strategy, and station fire strategy to identify rendezvous points and through routes. HS2 Ltd's Supply Chain Health and Safety Standard states: 'There are a number of legal agreements in place to facilitate works for the Proposed Scheme whilst protecting the interests of Network Rail. These agreements and Network Rail's standards provide the framework for notifying and planning activities and scopes of work. All members of our supply chain will comply with these agreements. Our supply chain is also expected to cooperate with us, as we will act as the initial contact for all activities planned with Network Rail.'	Yes	Considered to be ALARP if all mitigation measures outlined are correctly implemented.

¹¹ 'Embedded mitigation' is considered as the measures outlined in the column adjacent, compliance with the UK legislation and EU regulations outlined in the main ES and the SES1 and AP1 ES, and implementation of best practice including design standards.

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ID	Risk event	Hazard sources and/or pathways	Reasonable worst consequence if event did occur	Embedded mitigation	Is this ALARP with embedded mitigation ¹¹ ?	Clarification
				<p>Physical construction barriers/hoarding to separate members of the public and Network Rail staff from construction works. Appropriate construction boundary distances to be used to allow adequate construction working space.</p> <p>Network Rail level crossings to be manned during possession of Network Rail lines when operations are affected by the construction of the Proposed Scheme.</p> <p>1.8m high parapets provided over bridges to reduce likelihood of contact with overhead line equipment (OLE).</p> <p>A CoCP and necessary management plans, including local environmental management plans (LEMP) will be in place to control potential environmental impacts of construction works, including how community relations will be managed and requirements for traffic management.</p> <p>Stakeholder engagement/community consultation will elaborate where works are occurring and what stakeholders can do if they have a grievance. A mechanism will be in place to address any grievances raised.</p>		
OM1A	Train derailment or collision (on HS2 route)	Object on the line including unauthorised third-party access, animals, vehicle incursion, falling trees, landslide material or other material causing HS2 train derailment.	Off-track and outside boundary derailment causing severe disruption to rail transportation, major accident	Risks identified and managed via CSM-RA - See Volume 3, Route-wide effects, Section 11 which states the measures in place, required by legislation, to manage all train accident risks, in accordance with the CSM-RA. Measures have to be accepted by the regulator to manage risks to be ALARP in order for licence to be granted.	No	Mitigation to achieve ALARP will be fully defined as part of the detailed design stage. The rail safety regulations and standards outlined in

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ID	Risk event	Hazard sources and/or pathways	Reasonable worst consequence if event did occur	Embedded mitigation	Is this ALARP with embedded mitigation ¹¹ ?	Clarification
		<p>Bridge strike causing HS2 train derailment.</p> <p>Vandalism/terrorism incident (including cyber-attacks) causing HS2 train derailment.</p> <p>Failure of safety critical functions and control systems, including that caused by cyber terrorism leading to train failure, runaway train, rolling stock failure, signal failure, or mismanagement of train services causing HS2 train derailment or collision.</p> <p>Risk of EMI from airport air traffic control equipment and radar causing interference to HS2 signalling and train control systems.</p> <p>Human factors, including driver error, leading to HS2 train travelling at wrong speed, in wrong direction; signalling errors, mismanagement of train services, bright lights from vehicles on access track leads to unsafe decision, and points wrongly set causing</p>	<p>causing injury/fatality to Network Rail staff, passengers and adjacent receptors. Severe disruption to rail transportation, major accident resulting in fatality/injury to member(s) of public, to Network Rail staff/passengers and adjacent receptors.</p> <p>Spillage of pollutants resulting in irreversible damage to an environmental receptor.</p> <p>Off-track and outside boundary derailment involving maintenance train travelling at low speed, but potentially carrying flammable fuel.</p>	<p>Consultation with Network Rail regarding any interface with their network. All interfaces to be defined and all issues addressed/mitigated for. Proposed Scheme to comply with industry design and safety standards, including line side features and vegetation planting/maintenance regimes, and where necessary demonstrate other means of mitigating risk from hazard. Design for clearance, signage, bollards to mitigate bridge strike.</p> <p>All new infrastructure designed would be subject to detailed design and safety audit processes to seek to minimise the risk of derailment. Use of derailment containment measures where reasonably practicable. High integrity of safety critical functions required in reference and detailed design. Any safety critical system must have a Safety-Integrity-Level.</p> <p>Desk study and geotechnical investigation undertaken to highlight specific locations of below ground risk/hazard and inform design and construction methods used for the Proposed Scheme, including any further mitigation that may be required.</p> <p>Design to appropriate environmental parameters (wind, water etc.), including climate change. Consider human factors throughout design.</p> <p>Include requirement for provision of adequate barriers/protection in compliance with industry standards at overbridges and parallel roads to</p>		<p>Section 2 require the risks associated with the operation and maintenance of the Proposed Scheme to be identified, planned and managed.</p> <p>Risks associated with the operation of the wind turbines on the Crewe to Lily Lane leg identified and to be taken into account in the detailed design.</p> <p>Construction of NPR railway over and in close proximity to operational HS2 railway assumes a reasonable worst case of derailment of HS2 trains.</p>

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ID	Risk event	Hazard sources and/or pathways	Reasonable worst consequence if event did occur	Embedded mitigation	Is this ALARP with embedded mitigation ¹¹ ?	Clarification
		<p>HS2 train derailment or collision.</p> <p>Interfaces with existing railway.</p> <p>Ground collapse/settlement/ landslide leads to track deformation causing HS2 train derailment.</p> <p>Track defects including due to vandalism, inadequate drainage, and inadequate maintenance and monitoring of settlement causing HS2 train derailment or collision.</p> <p>Insufficient adherence (or other poor wheel rail interface).</p>		<p>protect railway from incursion by objects or vehicles.</p> <p>Limit track gradients in accordance with National Technical Specification Notices (NTSN).</p> <p>Manage vegetation in accordance with NTSN maintenance requirements.</p> <p>Track bed interfaces have been designed to include stiffness strengthening or sub-base improvement under ballast track at approaches to slab track structure.</p> <p>Minimise use of switches and crossings. Use of single, unified and modern signalling system on the Proposed Scheme network.</p> <p>Earthing and bonding at sub-stations and other at-risk locations (lightning risk assessment).</p> <p>Grid supply point and auto-transformer feeder station locations have been moved outside of floodplains and adequate space has been allocated between the Proposed Scheme and the strategic road network for protection measures. Ensure integrity of safety related power systems.</p> <p>Suite of design considerations related to monitoring and control of electrical infrastructure. Monitor electrical infrastructure and manage asset information.</p> <p>Appropriate rolling stock design standards employed, ensuring resilience to object incursion at the Proposed Scheme operating speeds. Adequate braking specifications as requirement/design consideration. Real time</p>		

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ID	Risk event	Hazard sources and/or pathways	Reasonable worst consequence if event did occur	Embedded mitigation	Is this ALARP with embedded mitigation ¹¹ ?	Clarification
				<p>monitoring and integrated communication for rolling stock. Real time monitoring and integrated communication takes account of speed, headway conditions and performance and safety requirements.</p> <p>Safe system of working to be in place. Staff training for the operation and maintenance of the Proposed Scheme.</p> <p>Sufficient resources to be in place.</p> <p>Operation and maintenance manuals to be robust, complete, communicated early and maintained. To ensure these consider cyber-crime and viruses.</p> <p>Good asset information practice and high integrity of configuration control, data links and protocols. Appropriate back up procedures. Integrity of communications and processes.</p> <p>Where appropriate, an increased working area has been provided in the design in order that any future third party works in close proximity to the Proposed Scheme, are minimised.</p> <p>HS2 signalling and train control systems will comply with relevant electromagnetic compatibility (EMC) standards i.e. BS EN 50121 parts 4 and 5.</p> <p>HS2 signalling and train control systems will be designed and installed applying good EMC engineering practice as specified in the HS2 EMC Strategy.</p> <p>Engagement with Manchester Airport Group (MAG) is ongoing to better understand the</p>		

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ID	Risk event	Hazard sources and/or pathways	Reasonable worst consequence if event did occur	Embedded mitigation	Is this ALARP with embedded mitigation ¹¹ ?	Clarification
				transmission power and operating frequency of Air Traffic Control and radar equipment used. This information will be used to identify whether additional, specific, design and/or installation measures will be required.		
OM3	Major road traffic incident	Presence of new infrastructure (e.g. new junctions, alignments, cuttings etc.) causes driver confusion/error leading to major road traffic incident. HS2 infrastructure (including emission of smoke associated with fire event from HS2 infrastructure) or passing HS2 train causes visual distraction/ impairment to road users leading to major road traffic incident.	Fatality/injury to motorist(s)/non-motorised user(s) or other member(s) of public.	The traffic and transport sections in the ES, Volumes 2, 3 and 5, describe the baseline environment. Traffic surveys are undertaken for all roads with the potential to be affected by the Proposed Scheme supplemented by other available data. The Transport Assessment (Volume 5: TR-001 – TR-003 and TR-005) also considers public transport (buses) and non-motorised users on PRow and cycle paths. There will be no significant effects on accidents and safety risk as there are no locations where there are both existing accident clusters and substantial changes in traffic due to the operation of the Proposed Scheme. Further detail is provided in traffic and transport section of the ES, Volumes 2, 3 and 5. Stage 1 Road Safety Audit undertaken with no road safety related issues identified. Road realignments and new road alignments designed in accordance with design codes and in consultation with Highways England and local authorities. Junction improvements to be designed for expected traffic flows as required. Barriers to be installed to mitigate glare and visual distraction risk, along with errant vehicle	Yes	Considered to be ALARP if all mitigation measures outlined are correctly implemented.

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ID	Risk event	Hazard sources and/or pathways	Reasonable worst consequence if event did occur	Embedded mitigation	Is this ALARP with embedded mitigation ¹¹ ?	Clarification
				<p>protection to shield view where road and rail are immediately adjacent. Vehicle restraint systems to be installed in accordance with relevant standards.</p> <p>Where necessary, the design has sought to minimise crossings/conflict with the Proposed Scheme, reducing risk of vehicle intrusion.</p> <p>Segregation made for service and private vehicles to the on-site access roads and service areas where practical (e.g. central concourse).</p> <p>Appropriate signage and road markings.</p> <p>Risk to public road users addressed via consultation on design with Highways England, and subsequently through design, including seeking to increase distances between merging lanes at adjacent junctions.</p> <p>Engagement with Highways England with regards to the operation of the ventilation shaft to ensure active traffic management is used to inform drivers of the potential hazard. Any smoke from the ventilation shaft will be discharged vertically and away from the M56 motorway. In addition, barriers installed along the corresponding section of M56 motorway will prevent the smoke layer from drifting directly onto the motorway.</p> <p>Landscape mitigation proposals avoid impact on 'lines of sight.'</p> <p>All new infrastructure designed would be subject to detailed design and safety audit processes to seek to minimise the risk of</p>		

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ID	Risk event	Hazard sources and/or pathways	Reasonable worst consequence if event did occur	Embedded mitigation	Is this ALARP with embedded mitigation ¹¹ ?	Clarification
				<p>accidents. Stopping distances and sightlines of highways to be checked post-construction and modifications proposed, as necessary. Provide sufficient headroom clearance at structures. Overbridge piers to be located with sufficient lateral clearances to carriageway/railway and underbridges to have 5.7m minimum headroom clearance.</p> <p>An operational work force travel plan will be implemented to manage travel demand.</p> <p>Pedestrian routes to stations identified.</p> <p>During maintenance, traffic management to be implemented. Alternate locations for equipment in need of maintenance to be considered away from the strategic road network.</p>		
OM6	Fire and/or explosion	<p>Depot activities trigger fire/explosion.</p> <p>Fire in or adjacent to HS2 facilities.</p>	<p>Drift of fire to/from facility (e.g. depot, Ardwick Box Structure) associated with the Proposed Scheme.</p> <p>Damage to property.</p> <p>Irreversible damage to environmental receptor (listed building, ecological site etc.)</p> <p>Fatality/injury to</p>	<p>The CSM-RA mitigates the risk of fire to be ALARP.</p> <p>The design of the Proposed Scheme has sought to limit works in proximity to hazards above or below ground that could cause a source of fire/explosion as far as reasonably practicable.</p> <p>Ground investigation, LiDAR and InSAR surveys undertaken, along with installation of instrumentation to monitor ground movements and identification of trigger values and responses to breaches.</p> <p>Tunnels/buildings have been designed to relevant standards so that any system and operational response is coordinated including HS2's fire strategy and provision for</p>	No	<p>Mitigation to achieve ALARP will be fully defined as part of the detailed design stage.</p> <p>Mitigation measures to be defined in accordance with CDM for hazard storage near HS2 alignment - Hole House Farm.</p> <p>Engagement to be undertaken to establish location and cavern size, extents and conditions</p>

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ID	Risk event	Hazard sources and/or pathways	Reasonable worst consequence if event did occur	Embedded mitigation	Is this ALARP with embedded mitigation ¹¹ ?	Clarification
			<p>member(s) of public.</p>	<p>evacuation/emergency escape passages and emergency refuge areas. Evacuation strategy to be developed.</p> <p>Assessment of ventilation and heating/cooling requirements in tunnels/buildings as a design consideration. Heating, ventilation, and air conditioning equipment to be designed for appropriate environmental conditions.</p> <p>Tunnel vent to be designed for appropriate range of conditions.</p> <p>Design consideration to include detection and inspection for degradation of tunnels.</p> <p>A fire risk assessment must be carried out under legislation, to ensure the safety of the occupants of tunnels and those in the immediate vicinity who are at risk.</p> <p>A fire management strategy will be drawn up during detailed design in line with the NTSN.</p> <p>Fire and emergency response equipment and systems will be in place.</p> <p>Design reviews undertaken with local fire and rescue services in development of fire strategies.</p> <p>The fire safety objectives of the Proposed Scheme include the protection of the environment. Any drainage contaminated by firefighting operations will be discharged into a balancing pond and discharged safely in agreement with the Environment Agency, avoiding sensitive environmental receptors. The point of discharge for the balancing ponds into</p>		<p>proximal to the Proposed Scheme and mitigation measures defined.</p>

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ID	Risk event	Hazard sources and/or pathways	Reasonable worst consequence if event did occur	Embedded mitigation	Is this ALARP with embedded mitigation ¹¹ ?	Clarification
				<p>the wider water environment would be agreed with either the Environment Agency, Lead Local Flood Authority, Internal Drainage Board and any other relevant stakeholders, as necessary. Ensure adequate isolation of power is available. Trains will be electric (except maintenance), removing the need to carry fuel. Maintenance trains are diesel fuelled, but do not carry other flammable materials. They travel at low speed and do not share track with passenger trains at the same time. The Proposed Scheme shall not carry hazardous (combustible/explosive) freight. However, it is expected that off-route sections associated with the Proposed Scheme will carry freight (which could carry hazardous materials), alongside HS2 services. However, in these instances freight will be carried on Network Rail owned and operated infrastructure, and as such falls under Network Rail's operating licence and safety plans. No significant quantities of fuel etc. will be stored in maintenance depots. Ensure HS2 Ltd is a statutory consultee on neighbouring activities that have the potential to increase the risk of fire and/or explosion. Working with stakeholders in immediately adjacent facilities to ensure a 'joined up' fire strategy, i.e. with Network Rail.</p>		

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ID	Risk event	Hazard sources and/or pathways	Reasonable worst consequence if event did occur	Embedded mitigation	Is this ALARP with embedded mitigation ¹¹ ?	Clarification
				Railway systems fire strategy and system design updated to incorporate the section of track that includes Ardwick Box Structure. Tunnel Systems will be designed such that any system and operational response is coordinated.		
OM16	Exposure to live conductor/arcing	Working railway corridor electrification hazard/inadvertent contact with live conductor by member of public/Network Rail staff. Electrification / inadvertent contact with live conductor by member of the public associated with the presence of existing and HS2 substations.	Fatality/injury to member(s) of public/Network Rail staff.	Earthing and bonding undertaken in line with relevant industry standards. Earthing and Bonding strategy in place and testing will be carried out. 1.8m high parapets provided over bridges to reduce likelihood of contact with OLE. Supervisory control and data acquisition (SCADA) system. Return Screening Conductor System is installed. Isolation and earthing procedures in place. Provision of a secure barrier/separation between OLE and members of public. OLE designed to appropriate parameters, including adverse weather and climate change. OLE to have sufficient protection from flashover. Risk assessment of the proximity of the Overhead Catenary System (OCS)/Pantograph to the extended platform at Carlisle Station. Risk assessment in consultation with Electricity North West to establish if a defined separation allowance is required or whether the substations need to be relocated.	Yes	Considered to be ALARP if all mitigation measures outlined are correctly implemented.

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ID	Risk event	Hazard sources and/or pathways	Reasonable worst consequence if event did occur	Embedded mitigation	Is this ALARP with embedded mitigation ¹¹ ?	Clarification
				<p>Design of noise fence barriers and security fencing to consider the potential for exposure to electrical current. The detailed design will specifically consider the materials to be used and the separation distances between fencing.</p> <p>Consideration will be given during the detailed design to the utilisation of noise fence barriers as a security fence / site segregation to prevent the requirement for two or more fences in close proximity to each other.</p> <p>Earthing and bonding to be undertaken in line with HS2 Ltd’s latest electromagnetic compatibility and earthing and bonding strategies in addition to current industry standards.</p>		
OM17	Impact upon emergency response/evacuation procedure, including for hazardous facilities.	Permanent closure/diversion of an emergency response route making routes inaccessible/delaying response time for emergency services to deal with incident and/or those evacuating. Inadequate spacing between emergency access/egress points in tunnels causes delay to those responding to an incident/those evacuating. Presence of the Proposed Scheme and multiple	Delay to emergency response leading to fatality/injury to member(s) of public. Irreversible damage to environmental receptor (listed building, ecological site, watercourse etc.).	Consultation with the emergency services, Transport for Greater Manchester and owners/operators of hazardous facilities, Health and Safety Executive, local authorities and utility providers to understand locations of hazardous sites/assets, with mitigation incorporated into design as appropriate. Operational conflicts to be avoided or minimised where possible. Early engagement with emergency services and affected sites so that emergency response strategies can be revised, if required. Permanent diversions/alternative routes to be identified, communicated and agreed with the relevant parties and implemented.	Yes	Considered to be ALARP if all mitigation measures outlined are correctly implemented.

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ID	Risk event	Hazard sources and/or pathways	Reasonable worst consequence if event did occur	Embedded mitigation	Is this ALARP with embedded mitigation ¹¹ ?	Clarification
		<p>operators at Manchester Airport High Speed Station results in a delay to emergency service response.</p>		<p>Traffic-related effects in relation to Major hazard sites are outlined in Table 1 above.</p> <p>Vent shaft spacing has been based on the Common Safety Method. However, where this distance cannot be achieved, HS2 Ltd have consulted with the emergency services to agree acceptable spacing distances.</p> <p>In accordance with HS2 Standards, cross passages are provided at least every 500m, with separate passages for emergency services and passengers.</p> <p>Engagement with Transport for Greater Manchester to agree the design of the Manchester Airport High Speed Station to ensure fire protection measures are included in the design and dedicated emergency access is provided.</p> <p>Early engagement with emergency services and operators to ensure coordinated response in the event of an emergency.</p>		
OM19	Electromagnetic interference	<p>Failure of safety critical functions and systems (control systems etc.), including cyber terrorism leading to train failure, signal failure, runaway train, failure in controlling the train service, high winds.</p> <p>Interference with safety monitoring systems or broadcasts</p>	<p>Severe disruption to rail transportation.</p> <p>Major accident causing injury/fatality to member of the public/Network Rail staff/Metrolink Staff, and adjacent</p>	<p>Signalling and telecommunications designs have and will continue to follow the appropriate standards to mitigate the risk of failure of safety critical functions and systems.</p> <p>Engagement with Metrolink to review electromagnetic compatibility.</p>	Yes	<p>Considered to be ALARP if all mitigation measures outlined are correctly implemented.</p>

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ID	Risk event	Hazard sources and/or pathways	Reasonable worst consequence if event did occur	Embedded mitigation	Is this ALARP with embedded mitigation ¹¹ ?	Clarification
			receptors, Spillage of pollutants.			
OM20	Spillage or longer-term seepage of pollutants into groundwater	Loss of containment of fuel/oil/chemical associated with depot activities results in ground water contamination.	Harm to environmental receptor in the vicinity of the event.	<p>The depot will be designed to incorporate appropriate primary, secondary and tertiary mitigation measures (including appropriate drainage systems and interceptors) containment measures to minimise the risk of a loss of containment event impacting on water and ecological resources.</p> <p>Operating and maintenance procedures will set out pollution prevention measures and measures to reduce potential impacts to water resources.</p> <p>Necessary management plans will be developed and communicated to control potential environmental impacts during operation.</p> <p>Risks of leaks and spills addressed in water resources and flood risk sections of the main ES, the SES1 and AP1 ES, and the SES2 and AP2 ES, Volume 3 and Volume 5.</p>	Yes	Considered to be ALARP if all mitigation measures outlined are correctly implemented.

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