

# High Speed Rail (Crewe – Manchester) Environmental Statement

## Volume 2: Community Area reports

MA03: Pickmere to Agden and Hulseheath

# HS2

## **High Speed Rail (Crewe – Manchester) Environmental Statement**

**Volume 2: Community Area reports**

MA03: Pickmere to Agden and Hulseheath



## 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.

High Speed Two (HS2) Limited  
Two Snowhill  
Snow Hill Queensway  
Birmingham B4 6GA

Telephone: 08081 434 434

General email enquiries: [HS2enquiries@hs2.org.uk](mailto:HS2enquiries@hs2.org.uk)

Website: [www.hs2.org.uk](http://www.hs2.org.uk)

A report prepared for High Speed Two (HS2) Limited:

**ARUP+** ERM | FOSTER + PARTNERS | JACOBS  
RAMBOLL | TYPISA | COSTAIN

**MWJV**

Mott MacDonald | WSP

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## Preface

### The Environmental Statement

This document forms part of Volume 2 of the Environmental Statement (ES) that accompanies the deposit of the High Speed Rail (Crewe – Manchester) hybrid Bill (hereafter referred to as the Bill). This Bill would authorise:

- the Phase 2b Western Leg, which comprises the section of the proposed High Speed Two (HS2) rail network from Crewe to Manchester, with connections onto the West Coast Main Line;
- a number of works that are required beyond the route, such as to the existing conventional rail network, to enable the operation of the Western Leg; and
- provision for future Northern Powerhouse Rail services to connect with HS2.

Collectively, these are referred to in this ES as ‘the Proposed Scheme’. The ES describes the Proposed Scheme and reports its likely significant environmental effects and the measures proposed to mitigate adverse effects.

The hybrid Bill for Phase One of the HS2 network, between London and the West Midlands, was the subject of an ES deposited in November 2013. The Phase One hybrid Bill received Royal Assent in February 2017. The main works on Phase One commenced in April 2020.

The hybrid Bill for Phase 2a of the HS2 network, between the West Midlands and Crewe, was the subject of an ES deposited in July 2017. The Phase 2a Bill received Royal Assent in February 2021.

### Consultation on the Environmental Statement

The public has an opportunity to comment on this ES which accompanies the deposit of the Bill. The period of public consultation on the ES extends for at least 56 days (eight weeks) after the first newspaper notices that follow deposit of Bill documents in Parliament.

### Structure of the Environmental Statement

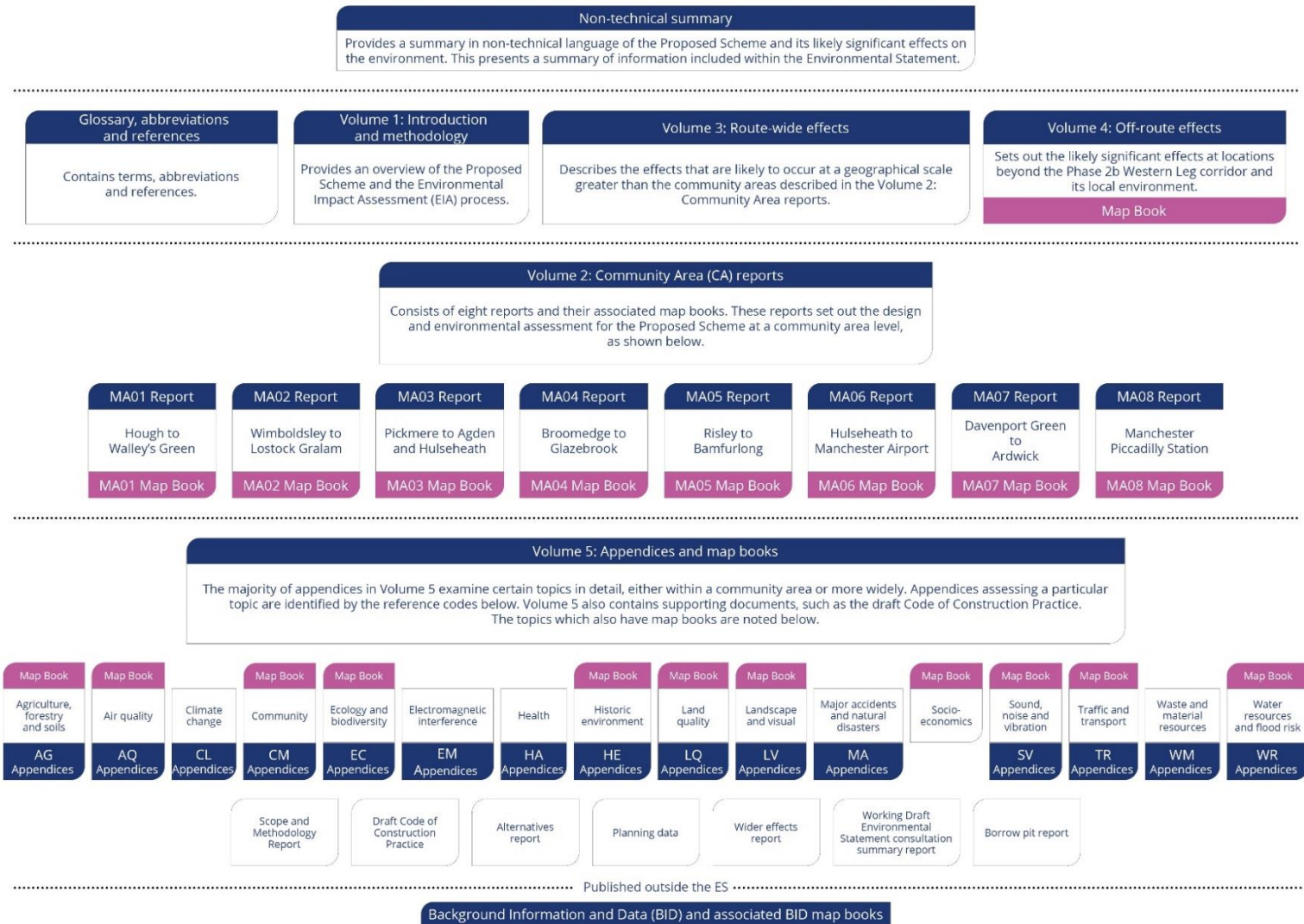
This report is part of the suite of documents that make up the ES for the Proposed Scheme. The structure of the ES is shown in Figure 1 and described in more detail in Volume 1. The ES has been prepared by persons who have sufficient expertise to ensure the completeness and technical quality of the statement.

# Environmental Statement

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**Figure 1: Structure of the Environmental Statement**



# 1 Introduction

## 1.1 Introduction to HS2

- 1.1.1 High Speed Two (HS2) is a new high speed railway proposed by the Government to connect major cities in Britain. It will transform intercity and long distance passenger rail travel in the UK, providing the first major increase in intercity rail capacity for over a century and freeing up substantial capacity for rail travel and freight on the conventional rail network. London, Birmingham, Manchester and cities in the Midlands, the North and Scotland will be served by high speed trains running at speeds of up to 360kph (225mph) on HS2 lines and on the existing conventional rail network. As part of the Proposed Scheme, new stations will be built at Manchester Piccadilly and Manchester Airport, in addition to the new stations in London and the West Midlands included in HS2 Phase One.
- 1.1.2 The Proposed Scheme that is the subject of this ES consists of:
- the HS2 Western Leg from Crewe to Manchester, including:
    - new stations at Manchester Airport and Manchester Piccadilly;
    - a depot north of Crewe;
    - maintenance facilities north of Crewe and at Ashley; and
    - a connection onto the West Coast Main Line (WCML) near Bamfurlong;
  - the Crewe Northern Connection, connecting the route of the Proposed Scheme with the WCML and enabling future Northern Powerhouse Rail (NPR) services to connect with HS2;
  - provision for the NPR London to Liverpool, Manchester to Liverpool, and Manchester to Leeds junctions, to enable these future NPR routes to connect with HS2; and
  - a number of works at locations beyond the Western Leg route corridor, referred to as 'off-route works', which include:
    - works to enable HS2 trains to call at existing stations further north on the WCML; and
    - construction of depots to provide overnight stabling for HS2 trains serving the north of England and Scotland.
- 1.1.3 The Proposed Scheme will connect with HS2 Phase 2a at Hough, to the south of Crewe.
- 1.1.4 Construction of the Proposed Scheme is assumed to commence in 2025, with operation assumed to start in 2038.
- 1.1.5 The environmental effects of the Proposed Scheme have been assessed. The findings of the assessment are reported in the ES, of which this Volume 2 report forms a part. The ES has been deposited alongside the Bill, in accordance with the requirements of Parliamentary

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Standing Order 27A (SO27A)<sup>1</sup>. A working draft ES was consulted on during the development of the Phase 2b proposals to help inform the design and assessment of the Proposed Scheme.

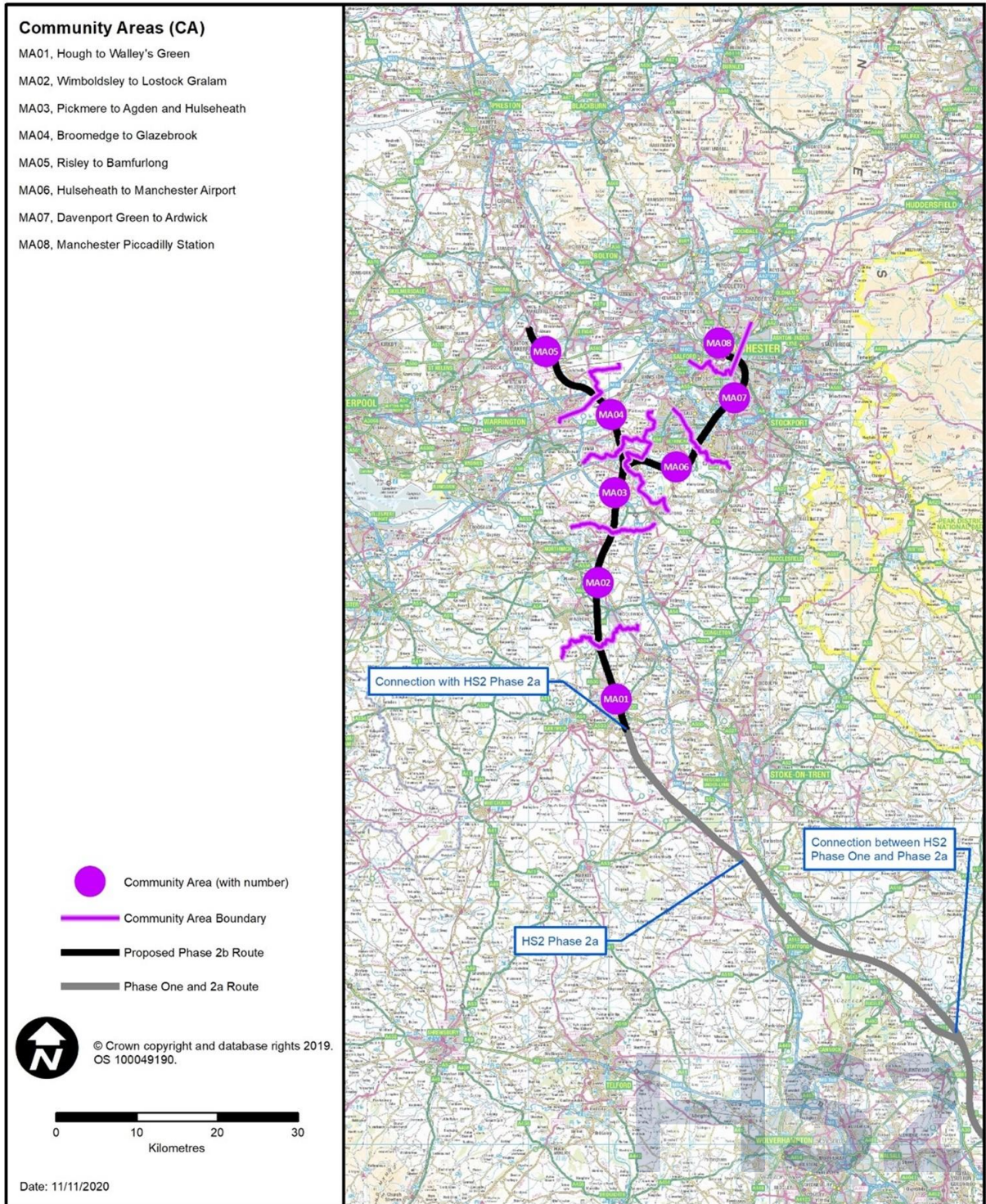
- 1.1.6 For environmental assessment and community engagement purposes, the Proposed Scheme has been divided into eight community areas (CA). These are shown in Figure 2. This CA report relates to the Pickmere to Agden and Hulseheath area (MA03).

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<sup>1</sup> House of Commons (2019), *Standing Order 27A of the Standing Orders of the House of Commons relating to private business (environmental assessment)*, House of Commons. Available online at: <https://www.parliament.uk/business/publications/commons/sessional-orders-private1/>.

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**Figure 2: The HS2 Phase 2b Western Leg route and community areas**



## 1.2 Purpose of this report

- 1.2.1 This report presents the likely significant effects of the construction and operation of the Proposed Scheme on the environment within the Pickmere to Agden and Hulseheath area. The report also describes the proposed means to avoid, prevent, reduce or, if possible, offset the likely significant effects of the Proposed Scheme on the environment within the area, along with any proposed monitoring measures.

## 1.3 Structure of this report

- 1.3.1 This report is divided into the following sections:
- Section 1: an introduction to HS2 and the purpose and structure of this report;
  - Section 2: overview of the community area, description of the Proposed Scheme within the community area and its construction and operation, and a list of the local alternatives considered;
  - Section 3: consultation and stakeholder engagement; and
  - Sections 4 to 15: an assessment of the following environmental topics:
    - agriculture, forestry and soils (Section 4);
    - air quality (Section 5);
    - community (Section 6);
    - ecology and biodiversity (Section 7);
    - health (Section 8);
    - historic environment (Section 9);
    - land quality (Section 10);
    - landscape and visual (Section 11);
    - socio-economics (Section 12);
    - sound, noise and vibration (Section 13);
    - traffic and transport (Section 14); and
    - water resources and flood risk (Section 15).
- 1.3.2 Each environmental topic section (Sections 4 to 15) comprises:
- an introduction to the topic;
  - a description of the existing and future environmental baseline within the community area;
  - a description of the impacts and likely significant environmental effects arising during construction and operation of the Proposed Scheme, including cumulative effects; and
  - a description of proposed mitigation and monitoring measures that have been identified to address any significant adverse effects.

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- 1.3.3 Environmental effects have been assessed in accordance with the scope, methodology, assumptions and limitations set out in Volume 1 and the EIA Scope and Methodology Report (SMR)<sup>2</sup>. Volume 1 also sets out assumptions relating to the impact of Covid-19 on the environmental baseline.
- 1.3.4 The maps relevant to the Pickmere to Agden and Hulseheath area are provided in a separate corresponding document entitled Volume 2: MA03 Map Book, which should be read in conjunction with this report. The maps contain grid references that are referred to in this report to enable features to be located.
- 1.3.5 The Proposed Scheme described in this report is that shown on the Map Series CT-05 (construction) and CT-06 (operation) (Volume 2: MA03 Map Book). There is some flexibility during detailed design to alter the horizontal and vertical alignments and other details within the limits shown on the plans and sections submitted to Parliament and as set out in the Bill, and this flexibility is included within the scope of the environmental assessment. Further explanation is provided in Volume 1, Section 1.
- 1.3.6 In addition to the environmental topics covered in Sections 4 to 15 of this report, climate change, electromagnetic interference, major accidents and disasters, and waste and material resources are addressed in Volume 3 on a route-wide basis. An assessment of potential environmental effects beyond the route corridor and its associated local environment has also been undertaken and this 'off-route' assessment is reported in Volume 4.
- 1.3.7 Supporting technical information, including technical appendices and map books, relating to the assessment in this Volume 2 report is provided in Volume 5 of the ES.
- 1.3.8 In addition to the technical appendices and map books in Volume 5, certain reports and maps containing Background Information and Data (BID) have been produced, which do not form part of the ES. These documents are available on the HS2 Ltd website ([www.hs2.org.uk](http://www.hs2.org.uk)). The BID reports and maps present survey information, collated from published and unpublished sources, and other background data, and are referenced at various places within the ES.

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<sup>2</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.



## 2 Overview of the area and description of the Proposed Scheme

### 2.1 Overview of the area

#### General

- 2.1.1 The Proposed Scheme in the Pickmere to Agden and Hulseheath area will comprise three main components:
- the HS2 WCML connection (referred to in this report as the route of the Proposed Scheme) which will be 10.6km in length in this area;
  - a section of the HS2 Manchester spur, which will be 3.3km in length in this area; and
  - provision for a connection between HS2 and a future Northern Powerhouse Rail (NPR) route between London and Liverpool, referred to as the NPR London to Liverpool junction.
- 2.1.2 The HS2 Manchester spur and NPR London to Liverpool junction will diverge from the route of the Proposed Scheme west of Hulseheath and east of High Legh, respectively.
- 2.1.3 The Proposed Scheme through the Pickmere to Agden and Hulseheath area will be within the local authority area of Cheshire East Council (CEC). The Proposed Scheme will pass through the parishes of Tabley Inferior, Pickmere, Tabley Superior, Mere, High Legh and Agden.
- 2.1.4 The boundary between Tabley Inferior Parish and Plumley Parish forms the southern boundary of this section. The northern boundary of this section on the route of the Proposed Scheme lies in Agden Parish, whilst the northern boundary on the HS2 Manchester spur lies on the boundary between High Legh Parish and Millington Parish.
- 2.1.5 The Wimboldsley to Lostock Gralam area (MA02) lies to the south and the Broomedge to Glazebrook area (MA04) lies to the north on the route of the Proposed Scheme and the Hulseheath to Manchester Airport area (MA06) lies to the east on the HS2 Manchester spur, as shown in Figure 3.

#### Settlement, land use and topography

- 2.1.6 The Pickmere to Agden and Hulseheath area is predominantly rural in character, with agriculture being the main land use. There are several isolated farms throughout the area.
- 2.1.7 The main settlements are Knutsford, Pickmere and High Legh. The village of Pickmere lies within the southern part of the area, and the town of Knutsford lies in the south-east. The village of High Legh lies within the central part of the area. There are also a number of villages in the area including Tabley, Mere, and Little Bollington.

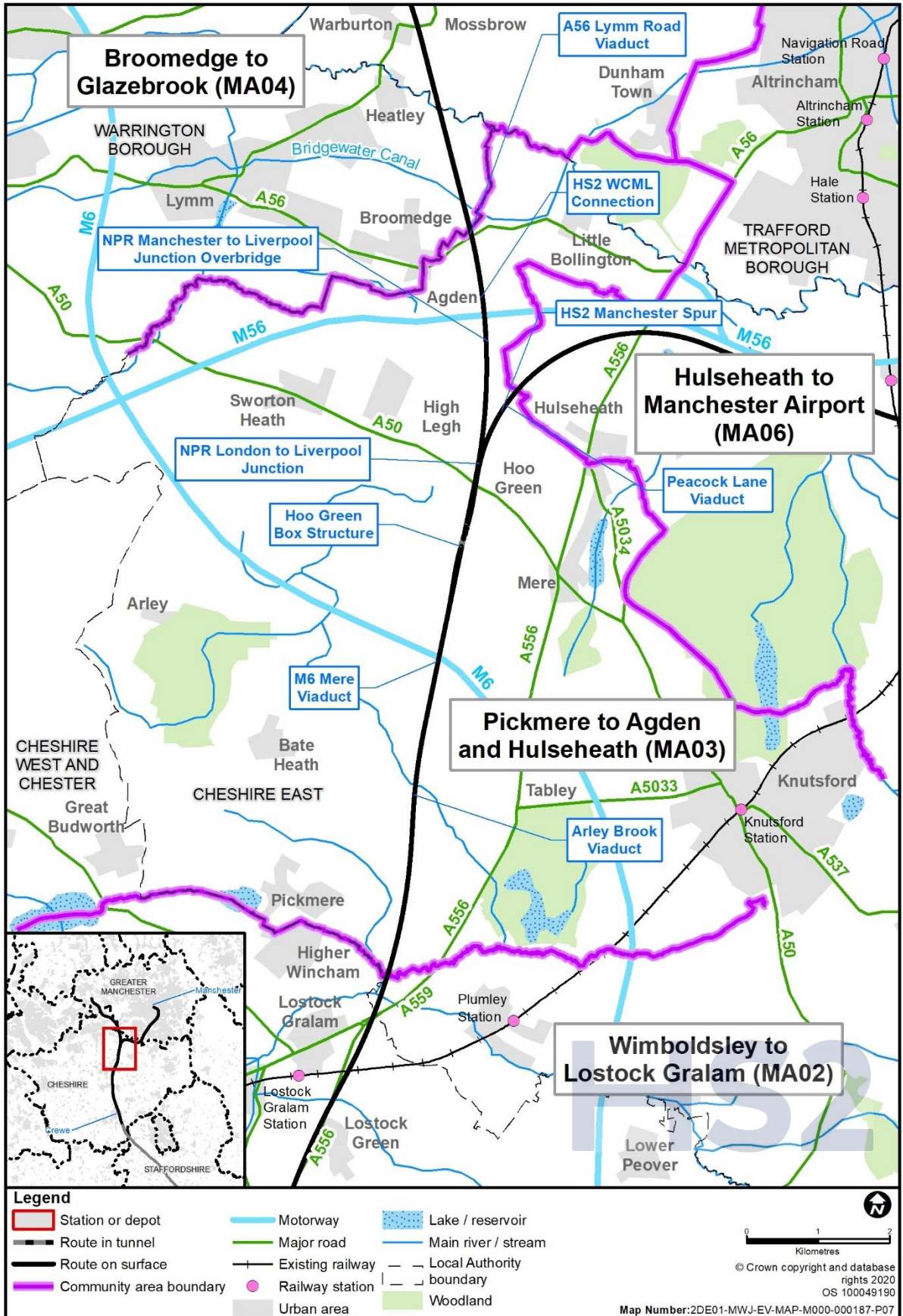
## **Environmental Statement**

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- 2.1.8 An area of ancient woodland, Leonard's and Smoker Wood, is located in the southern part of the area.
- 2.1.9 The area is generally flat. The highest point is located to the north of the M6 near Hoo Green at approximately 70m AOD (above Ordnance Datum). The lowest point is located to the north of the M56 at Agden Hall, where the land falls to approximately 25m AOD.

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**Figure 3: Community area context map**



## Key transport infrastructure

- 2.1.10 Principal highways within the Pickmere to Agden and Hulseheath area include the M6 and the M56. Other major highways in the area include the A50 Cliff Lane/Warrington Road/Knutsford Road, the A56 Lymm Road and the A556 Chester Road.
- 2.1.11 A section of the Bridgewater Canal, close to Agden Brook, is located in the north-east of the area. The Mid-Cheshire Line runs in a north-east and south-west direction through Knutsford Station, which is located in the eastern part of the area. This railway line provides connections from Knutsford to Mobberley, Ashley and Manchester.
- 2.1.12 The Proposed Scheme will cross several public rights of way (PRoW) including local access roads, bridleways and public footpaths, which provide important links between scattered dwellings, farms and villages.

## Socio-economic profile

- 2.1.13 The professional, scientific and technical sector accounts for the largest proportion of businesses within the CEC area (19%), followed by the construction (9%) sector and the business administration and support services (9%) sector<sup>3</sup>.
- 2.1.14 According to the Annual Population Survey (2020)<sup>4</sup>, the employment rate (the proportion of residents aged 16-64 in employment) within the CEC area was 76% (171,300 people). The unemployment rate was 4% in the CEC area in 2020.
- 2.1.15 The same survey indicates that 42% of residents aged 16-64 in the CEC area were qualified to National Vocational Qualification Level 4 (NVQ4) and above, while 5% of residents had no qualifications.

## Notable community facilities

- 2.1.16 The main concentrations of community facilities are in the town of Knutsford and the larger villages of Pickmere and High Legh. Tabley, Mere and Little Bollington are smaller villages and hamlets, which provide fewer local services.
- 2.1.17 The town of Knutsford is the settlement with the largest concentration of community facilities in the Pickmere to Agden and Hulseheath area. These include the Tatton Park National Trust property, Sanctuary Moor wetland, Knutsford Academy and Knutsford Leisure Centre.

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<sup>3</sup> Office for National Statistics (2020), *UK Business Counts - Local units by industry and employment size band*. Available online at: <https://www.nomisweb.co.uk/datasets/idbrlu>.

<sup>4</sup> Office for National Statistics (2020), *Annual Population Survey*. Available online at: <http://www.nomisweb.co.uk/datasets/apsnew>. This number includes the jobs held by residents of CEC irrespective of where they work.

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- 2.1.18 Notable community facilities within the village of Pickmere include the Pickmere and Wincham Methodist Church and the Red Lion public house.
- 2.1.19 Community facilities in High Legh include High Legh Village Hall, High Legh Primary School and St John's Church.
- 2.1.20 Community facilities in Tabley include Tabley House, which is a Grade I listed stately home currently used as a nursing home. Tabley House provides support to adults with a range of different needs including those living with dementia. In the area surrounding Tabley is the Cheshire Showground. The showground hosts the annual Royal Cheshire Show and several other events throughout the year.
- 2.1.21 Notable community facilities within Mere village include the Mere Day Nursery and the Kilton Inn public house.
- 2.1.22 Community facilities within the village of Little Bollington include Little Bollington Church of England Primary School, the Holy Trinity Church and two public houses: Ye Old No.3 and the Swan with Two Nicks. The Dunham Massey National Trust property, located north of the A56 Lymm Road, can be accessed from Little Bollington.

## **Recreation, leisure and open space**

- 2.1.23 There are two promoted routes in the area; the North Cheshire Way and the Cheshire Ring Canal Walk on the Bridgewater Canal towpath, which passes north-east of the A56 Lymm Road. There are also recreational cycle routes in this area, which include the Cheshire Cycleway – Regional Route 70 of the National Cycle Network, a 280km cycle route through Cheshire.
- 2.1.24 Other open spaces and recreational facilities in the area include the Cheshire Showground, the Dunham Massey National Trust property, Heyrose Golf Club, Mere Golf Resort and Spa, High Legh Park Golf Club, High Legh Bowling Club, Sanctuary Moor wetland and fishing and sailing facilities at the Mere.

## **Policy and planning context**

- 2.1.25 Volume 1 provides an overview of the case for HS2.

## **Planning framework**

- 2.1.26 Relevant development plan documents and other planning policies have been considered in relation to environmental topics, as part of considering the Proposed Scheme in the local context. Development plan documents and other planning policies relevant to the Pickmere to Agden and Hulseheath area are listed in Volume 5: Appendix CT-004-00000, Planning data. These have been considered and referred to where appropriate to the assessment described in Sections 4 to 15 of this Volume 2 report.

## Committed development

- 2.1.27 Committed developments are defined as developments with planning permission and sites allocated for development, or safeguarded for minerals in adopted development plans, on or close to the land required for the Proposed Scheme. Section 7 of Volume 1 sets out the approach to identifying and considering committed developments in the assessment. The committed developments relevant to the assessment of the Proposed Scheme in the Pickmere to Agden and Hulseheath area are listed in Volume 5: Appendix CT-004-00000, Planning data and are shown in Volume 5, Planning Data/Committed Development Map Book: maps CT-13-309b to CT-13-312a.
- 2.1.28 These have been considered to determine whether they would result in a material change to the future baseline or have the potential to give rise to cumulative effects for each environmental topic. The committed developments considered in the assessment for the Pickmere to Agden and Hulseheath area are reported in the relevant topic sections of this report.

## Changes to the design since the working draft ES

- 2.1.29 A number of changes have been introduced to the Proposed Scheme in this area since the working draft ES was published. The key changes in this area (including approximate dimensions where appropriate) are as follows:
- changes to NPR London to Liverpool junction to accommodate the Proposed Scheme including:
    - introduction of Hoo Green South embankment No.2 and Hoo Green box structure to accommodate the route of the Proposed Scheme (see Volume 2: MA03 Map Book, map CT-06-319, C6 to J6 and map CT-06-320, A6 to B6);
    - replacement of High Legh box structure with Hoo Green tunnel, a structure to accommodate the HS2 Manchester spur (northbound) (see Volume 2: MA03 Map Book, map CT-06-320, B6 to C6);
    - introduction of Hoo Green South cutting retaining wall to accommodate the HS2 Manchester spur (northbound) (see Volume 2: MA03 Map Book, map CT-06-319, I5 to J6 to map CT-06-320, A6 to B6);
    - introduction of Hoo Green North cutting retaining wall to accommodate the HS2 Manchester spur (northbound) (see Volume 2: MA03 Map Book, map CT-06-320, C6 to F6);
    - introduction of earthworks and associated infrastructure to allow future provision for NPR services. These features include Hoo Green South embankment No.1, Hoo Green South embankment No.3, Hoo Green box structure, Hoo Green North embankment No.1, Hoo Green North embankment retaining wall No.1 and Hoo Green West cutting (see Volume 2: MA03 Map Book, maps CT-06-319, E6 to CT-06-321, B4);
  - changes to the route of the Proposed Scheme comprising:

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- increase in length of Arley Brook viaduct from 102m to 201m (see Volume 2: MA03 Map Book, map CT-06-318, A6 to B6);
- increase in length of M6 Mere viaduct from 50m to 97m (see Volume 2: MA03 Map Book, map CT-06-319, B6 to C6);
- replacement of Over Tabley embankment with Hoo Green South embankment No.2 and reduction in length from 1.6km to 1.2km (see Volume 2: MA03 Map Book, map CT-06-319, C6 to I6);
- reduction in length of High Legh cutting from 1.9km to 197m, and an increase in width to 150m (see Volume 2: MA03 Map Book, map CT-06-321, H5 to I4);
- changes to the PRoW network and the road network as a result of the changes to the route of the Proposed Scheme comprising:
  - introduction of Footpath Pickmere 9/1 underbridge (see Volume 2: MA03 Map Book, map CT-06-317, H7);
  - introduction of Frog Lane realignment (see Volume 2: MA03 Map Book, map CT-06-318-L1, A9 to C8);
  - replacement of Tabley Inferior Footpath 3 and 4 accommodation overbridge with Cheshire Showground North access diversion and Cheshire Showground South access diversion (see Volume 2: MA03 Map Book, map CT-06-317, E7 to H6);
  - replacement of Pickmere Lane overbridge with B5391 Pickmere Lane realignment (see Volume 2: MA03 Map Book, map CT-06-317, I5 to J7 to map CT-06-318, A5 to B7);
  - replacement of A56 Lymm Road underbridge with A56 Lymm Road viaduct (see Volume 2: MA03 Map Book, map CT-06-322a, F4);
  - removal of Tabley Inferior Footpath 4 accommodation overbridge (see Volume 2: MA03 Map Book, map CT-06-317, I6 to I7);
  - removal of Agden Footpath 2 accommodation overbridge (see Volume 2: MA03 Map Book, map CT-06-322a, C4 to C5);
- changes to HS2 Manchester spur comprising:
  - introduction of Hoo Green North embankment No.2 (see Volume 2: MA03 Map Book, map CT-06-320, B6 to C6);
  - replacement of Hoo Green cutting with Hoo Green North cutting and reduction in length from 1.1km to 905m (see Volume 2: MA03 Map Book, map CT-06-320, D6 to J7);
  - replacement of Hulseheath embankment and Peacock Lane East overbridge with Hulseheath South embankment, Peacock Lane viaduct and Hulseheath North embankment (see Volume 2: MA03 Map Book, map CT-06-321, A5 to D8);
  - introduction of Budworth Road auto-transformer station (see Volume 2: MA03 Map Book, map CT-06-318, D6 to D7);
  - replacement of Hoo Green auto-transformer feeder station and Hoo Green grid supply point with Peacock Lane auto-transformer feeder station and Peacock Lane grid supply point (see Volume 2: MA03 Map Book, map CT-06-320, J7 to J8 and map CT-06-321, A6 to B7);

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- introduction of Peacock Lane auto-transformer feeder station disconnecter (see Volume 2: MA03 Map Book, map CT-06-321, C6);
- introduction of NPR Manchester to Liverpool junction overbridge including earthworks, foundations, abutments and the deck/parapets, to enable provision for future NPR connection between Manchester and Liverpool (see Volume 2: MA03 Map Book, map CT-06-321, G4 to G5);
- introduction of utilities works including the diversion of National Grid, Scottish Power and Cadent Gas assets, throughout the Pickmere to Agden and Hulseheath area, as described in Section 2.2; and
- introduction of three telecommunications sites in the Pickmere to Agden and Hulseheath area, as described in Section 2.2 (see Volume 2: MA03 Map Book, map CT-06-317, B7, map CT-06-319, H5 to I5 and map CT-06-322a, F4 to F5).

2.1.30 In addition, the location and layout of construction compounds, stockpiles and site haul routes have been considered as part of the development of the design. Mitigation such as noise barriers, landscape earthworks, compensatory planting and replacement ponds and wetlands have also been included throughout the Pickmere to Agden and Hulseheath area to reduce adverse effects from the Proposed Scheme.

## 2.2 Description of the Proposed Scheme

### General

- 2.2.1 The following section describes the main features of the Proposed Scheme in the Pickmere to Agden and Hulseheath area, including the proposed environmental mitigation measures that have been identified. Further general information on typical permanent features is provided in Volume 1, Section 5. Similarly, a general description of the approach to mitigation is explained in Volume 1, Section 9. Some of the ecological mitigation described in this section has been provided on a precautionary basis. This is described in, Section 7 Ecology and biodiversity.
- 2.2.2 Land required for operation of the Proposed Scheme is described in this section and is shown on Volume 2: Map Series CT-06. Land required for construction is described in Section 2.3 and shown on Volume 2: Map Series CT-05.

### Overview

- 2.2.3 The Proposed Scheme within the Pickmere to Agden and Hulseheath area has three main components (as illustrated on Figure 4):
- the route of the Proposed Scheme: approximately 10.6km in length, continuing from the boundary of the Wimboldsley to Lostock Gralam area (MA02) northwards towards Agden;



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- HS2 Manchester spur: approximately 3.3km in length, which will diverge from the route of the Proposed Scheme west of Hulseheath and continue to Manchester; and
- NPR London to Liverpool junction: provision for a connection between HS2 and a future NPR route between London and Liverpool.

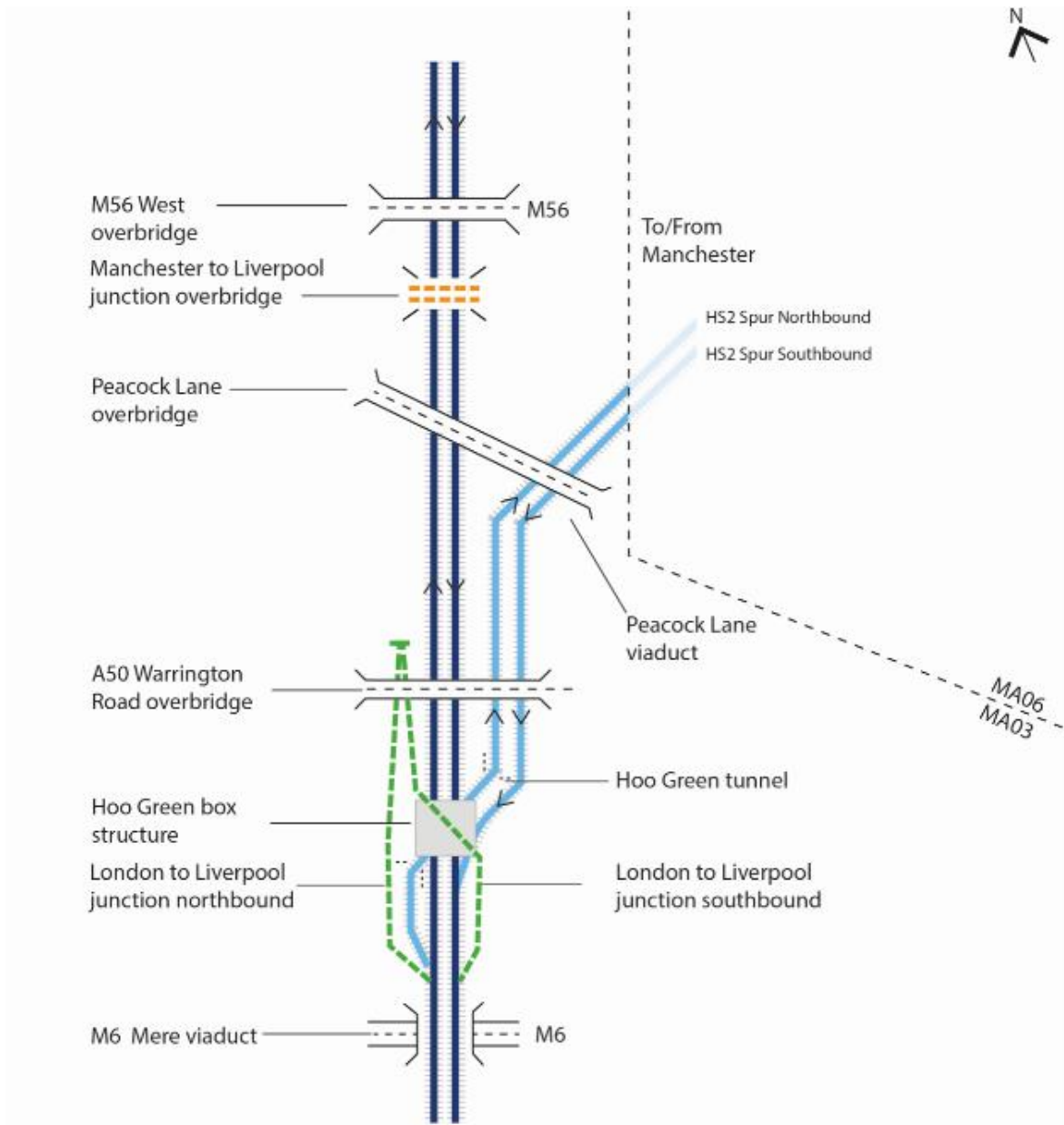
2.2.4 Each of these components and their associated key features are set out in the following sections. Where key features are associated with more than one component of the Proposed Scheme, they are described within the section they are first associated with.

2.2.5 Where reference is made to the Proposed Scheme, this includes two or more of the components listed above. The components are also described individually, where relevant.

2.2.6 In addition to the features described below, the Proposed Scheme in the area will also include maintenance access points and routes, and hedgerow planting. There will also be additional utilities works in the area, which may include works to low voltage overhead or underground lines, gas pipes, sewers and telecommunication cables.

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**Figure 4: Schematic showing the interaction between the route of the Proposed Scheme, HS2 Manchester spur and provision for Northern Powerhouse Rail (NPR) London to Liverpool junction and Manchester to Liverpool junction overbridge**



Not to Scale

Legend

- Route of the Proposed Scheme (continuing as the HS2 WCML connection)
- HS2 Manchester Spur
- - - Provision for Northern Powerhouse Rail (NPR) London-Liverpool
- - - Provision for Northern Powerhouse Rail (NPR) Manchester-Liverpool

## The route of the Proposed Scheme

- 2.2.7 The route of the Proposed Scheme through the Pickmere to Agden and Hulseheath area will be approximately 10.6km long. The route will extend from Lostock Gramam to Broomedge.
- 2.2.8 This section of route is illustrated on maps CT-06-316b to CT-06-322a in the Volume 2: MA03 Map Book.
- 2.2.9 All dimensions in the sections below are approximate.
- 2.2.10 The route of the Proposed Scheme will consist of 347m of viaducts, 284m of box structures, 3.5km of cuttings and 5.9km of embankments in the Pickmere to Agden and Hulseheath area.
- 2.2.11 The route of the Proposed Scheme is described in three separate sections below.
- 2.2.12 In general, features are described from south to north.

### Pickmere embankment to Arley Brook viaduct

- 2.2.13 The route of the Proposed Scheme will continue from the Wimboldsley to Lostock Gramam area (MA02), north on Smoker Brook viaduct and continue on Pickmere embankment. It will end this section on Arley Brook viaduct.
- 2.2.14 This section of route is illustrated on maps CT-06-316b to CT-06-318 in the Volume 2: MA03 Map Book.
- 2.2.15 The key features of the 2.6km section will include:
- Pickmere embankment, 2.5km in length and up to 12m in height (see Volume 2: MA03 Map Book, map CT-06-316b, F4 to J3 and map CT-06-317, A7 to J7);
  - landscape mitigation planting to the east of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening for users of Footpath Tabley Inferior 1/1 (see Volume 2: MA03 Map Book, map CT-06-316b, F4 to J4 and map CT-06-317, A7);
  - landscape mitigation planting to the west of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening for users of Footpath Pickmere 5/1 and residents of Pickmere and Providence Farm (see Volume 2: MA03 Map Book, map CT-06-316b, I3 to J3 and map CT-06-317, A6);
  - two areas of woodland habitat creation along the western and eastern sides of Pickmere embankment, 100m and 50m north of Smoker Brook, to provide replacement habitat and increase habitat connectivity (see Volume 2: MA03 Map Book, map CT-06-316b, F4 to G3 and F4 to H4);
  - a balancing pond for railway drainage, within an area of woodland habitat creation, 50m east of Pickmere embankment. Access will be provided via a new access track off the A556 Chester Road (see Volume 2: MA03 Map Book, map CT-06-316b, G4 to G5);

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- nine ecological mitigation ponds to the east and four ecological mitigation ponds to the west of Pickmere embankment, 2.2km north of Smoker Brook viaduct to provide replacement habitat for great crested newt, with surrounding terrestrial habitat (see Volume 2: MA03 Map Book, map CT-06-316b, H4 to I3 and H4 to I5);
- realignment of Footpath Tabley Inferior 1/1, 14m north of its existing alignment for 137m, crossing under the route of the Proposed Scheme through Footpath Tabley Inferior 1/1 accommodation underbridge, with a height clearance of 4m, to provide access for Roses Farm, resulting in a negligible change in journey length (see Volume 2: MA03 Map Book, map CT-06-316b, J4 to J3 and map CT-06-317, A8 to B6);
- diversion of an underground National Grid 900mm high pressure gas pipeline, for 1.3km in length, to relocate the pipeline away from the route of the Proposed Scheme, 150m east of Pickmere embankment (see Volume 2: MA03 Map Book, map CT-06-316b, I5 to J5 and map CT-06-317, A7 to F8);
- landscape mitigation planting to the east of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape and to provide visual screening for users of Footpath Tabley Inferior 1/1, Footpath Tabley Inferior 3/1 and Footpath Tabley Inferior 2/2 (see Volume 2: MA03 Map Book, map CT-06-317, A7 to F7);
- a balancing pond for railway drainage, within an area of landscape mitigation planting, 10m east of Footpath Tabley Inferior 1/1 accommodation underbridge. Access will be provided via a new access track from the A556 Chester Road (see Volume 2: MA03 Map Book, map CT-06-316b, J4 and map CT-06-317, A7 to B7);
- landscape mitigation planting to the west of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape and to provide visual screening for Providence Farm, users of Footpath Tabley Inferior 1/1 and residents of Pickmere (see Volume 2: MA03 Map Book, map CT-06-317, B6 to H6);
- landscape mitigation planting to the west of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape and to provide visual screening for users of Footpath Tabley Inferior 3/1 and Footpath Tabley Inferior 4/1, and residents of School Farm (see Volume 2: MA03 Map Book, map CT-06-317, H6 to J6 and map CT-06-318, A6);
- Pickmere telecommunications site, 49m by 24m in area, to the east of the route of the Proposed Scheme, including a railway telecommunications mast up to 15m in height, within an area of landscape mitigation planting. Access will be provided from a new access track from the A556 Chester Road (see Volume 2: MA03 Map Book, map CT-06-317, B7);
- realignment of Footpath Tabley Inferior 3/1, 384m north of its existing alignment for 667m. Footpath Tabley Inferior 3/1 will connect with the Cheshire Showground South access diversion and the Cheshire Showground North access diversion, and will cross under the route of the Proposed Scheme through the Footpath Pickmere 9/1 underbridge, with a height clearance of 2m, increasing the length of journey by 866m (see Volume 2: MA03 Map Book, map CT-06-317, E7 to H7);

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- diversion of Cheshire Showground South access, 82m to the east of its existing alignment for 155m, crossing under the route of the Proposed Scheme through Footpath Pickmere 9/1 underbridge, decreasing the length of journey by 55m (see Volume 2: MA03 Map Book, map CT-06-317, E7 to H7);
- diversion of Cheshire Showground North access, 60m to the south of its existing alignment for 488m, crossing under the route of the Proposed Scheme through Footpath Pickmere 9/1 underbridge, decreasing the length of journey by 172m (see Volume 2: MA03 Map Book, map CT-06-317, F7 to H7);
- diversion of an underground Tata Chemicals Europe 300mm gas pipeline for 414m in length, to cross the route of the Proposed Scheme 30m south of Footpath Pickmere 9/1 underbridge (see Volume 2: MA03 Map Book, map CT-06-317, H6 to H8);
- realignment of Footpath Pickmere 9/1, 190m south of its existing alignment for 106m, crossing under the route of the Proposed Scheme through Footpath Pickmere 9/1 underbridge, increasing the length of journey by 248m (see Volume 2: MA03 Map Book, map CT-06-317, H8 to I5);
- a balancing pond for railway drainage, partially within an area of woodland habitat creation, 50m north of Footpath Pickmere 9/1 underbridge. Access will be provided via a new access track from Flittogate Lane (see Volume 2: MA03 Map Book, map CT-06-317, H7);
- an area of woodland habitat creation along the eastern side of Pickmere embankment to provide replacement habitat and additional habitat for commuting and foraging bats (see Volume 2: MA03 Map Book, map CT-06-317, H7 to J7 and map CT-06-318, A6 to A7);
- diversion of Flittogate Lane, 260m to the north of its existing alignment for 491m. A new three-arm priority controlled (give way) T- junction will be formed at the connection with the B5391 Pickmere Lane realignment. Flittogate Lane will cross under the route of the Proposed Scheme beneath Arley Brook viaduct, increasing journey length by 372m. The existing Flittogate Lane will be closed where it crosses the route of the Proposed Scheme (see Volume 2: MA03 Map Book, map CT-06-317, H8 to J7 and map CT-06-318, A7 to A6);
- an area of woodland habitat creation along the western side of Pickmere embankment to provide replacement and additional habitat for commuting and foraging bats (see Volume 2: MA03 Map Book, map CT-06-317, I6 to J6 and map CT-06-318, A6);
- Arley Brook viaduct, 201m in length and up to 11m in height (see Volume 2: MA03 Map Book, map CT-06-317, J7 and map CT-06-318, A6 to B6);
- realignment of School Lane, comprising carriageway widening from its current width of 4m to 7.3m. Widening is required to accommodate diverted traffic associated with the permanent closure of Budworth Road, with a negligible change in journey length (see Volume 2: MA03 Map Book, map CT-06-317, I5 to J1 and map CT-06-318, A1 to A2);
- realignment of the B5391 Pickmere Lane, 62m north of its existing alignment for 422m, crossing under the route of the Proposed Scheme beneath Arley Brook viaduct, with a negligible change in journey length (see Volume 2: MA03 Map Book, map CT-06-317, I5 to J7 and map CT-06-318, A5 to B7);

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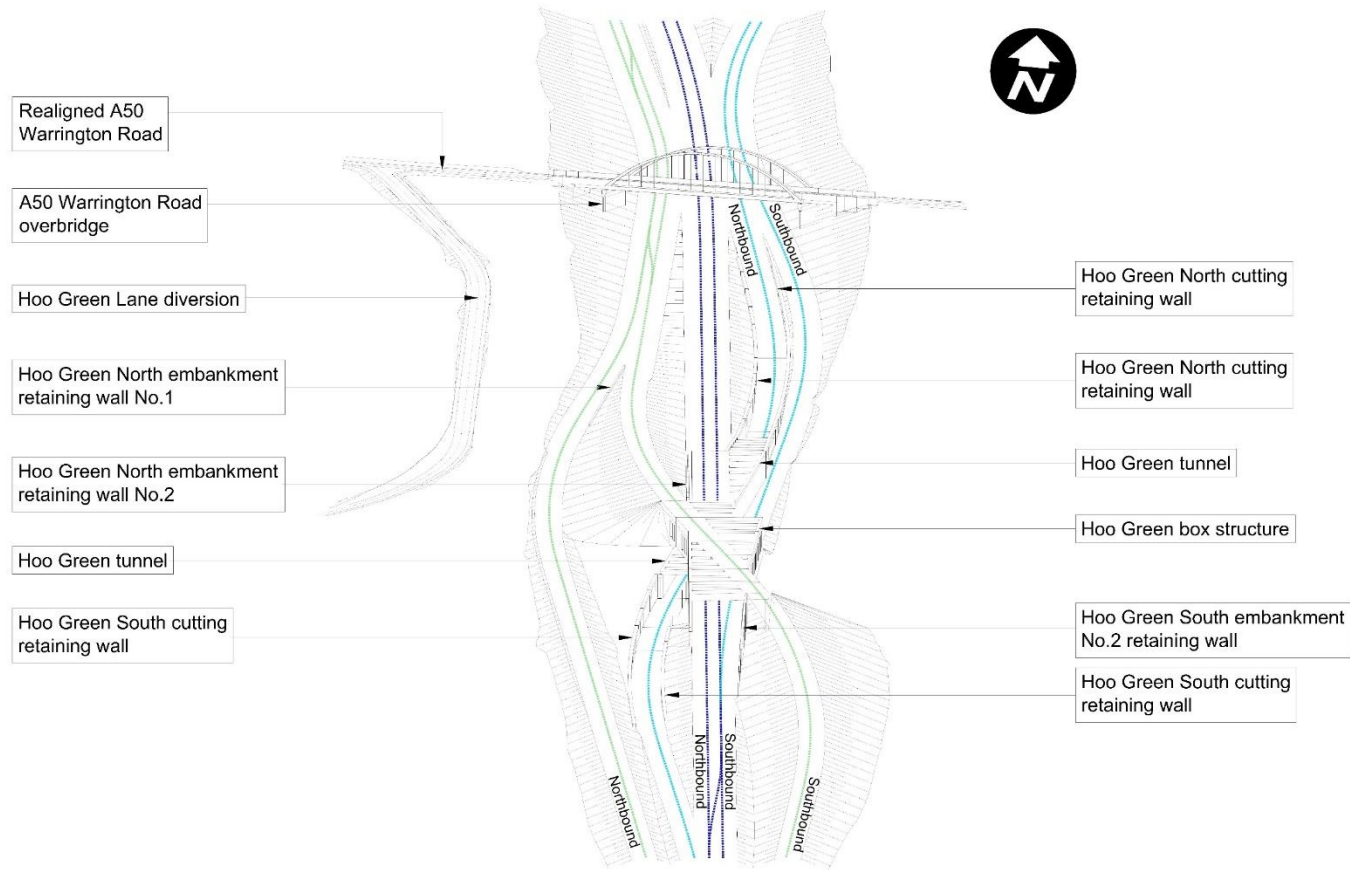
- a balancing pond for highways drainage, 40m north of an area of woodland habitat creation, 70m east of Arley Brook viaduct. Access will be provided via a new access track off the diverted Flittogate Lane (see Volume 2: MA03 Map Book, map CT-06-317, J7 and map CT-06-318, A7);
- an area of wetland habitat creation to the west and east of the route of the Proposed Scheme crossing under Arley Brook viaduct, to provide replacement habitat and reconnect Tabley Brook and Waterless Brook/Arley Brook with the floodplain (see Volume 2: MA03 Map Book, map CT-06-317, J7 to J9 and map CT-06-318, A8 to B5);
- replacement floodplain storage area on the western side of the route of the Proposed Scheme, adjacent to the Arley Brook viaduct, to provide replacement habitat and reconnect Tabley Brook and Waterless Brook/Arley Brook with the floodplain (see Volume 2: MA03 Map Book, map CT-06-318, B6);
- two ecological mitigation ponds to the east of Arley Brook viaduct, 60m west of the B5391 Pickmere Lane to provide replacement habitat for great crested newt, with surrounding terrestrial habitat (see Volume 2: MA03 Map Book, map CT-06-318, B6 to B7);
- realignment of Frog Lane, 50m to the west of its current alignment for 323m. The realignment will result in modifications to the junctions of Budworth Road/Frog Lane and Frog Lane/School Lane, decreasing the length of journey by 30m (see Volume 2: MA03 Map Book, map CT-06-318-L1, A9 to C8); and
- permanent diversion and decommissioning of minor utilities including Level 3 and Openreach telecommunication cables, a Scottish Power overhead power line and United Utilities water mains, located within the area shown on Volume 2: MA03 Map Book, map CT-06-316b to map CT-06-318.

## **Heyrose embankment to Hoo Green North embankment retaining wall No.2**

- 2.2.16 The route of the Proposed Scheme will continue north from Arley Brook viaduct onto Heyrose embankment before passing onto M6 Mere viaduct. The route of the Proposed Scheme will then continue on Hoo Green South embankment No.2, passing Hoo Green South embankment No.2 retaining wall, through Hoo Green box structure (shown on Figure 5 to Figure 10) and passing Hoo Green North embankment retaining wall No.2.

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**Figure 5: Schematic showing the features in the Hoo Green area including Hoo Green box structure and Hoo Green tunnel**



**Legend**

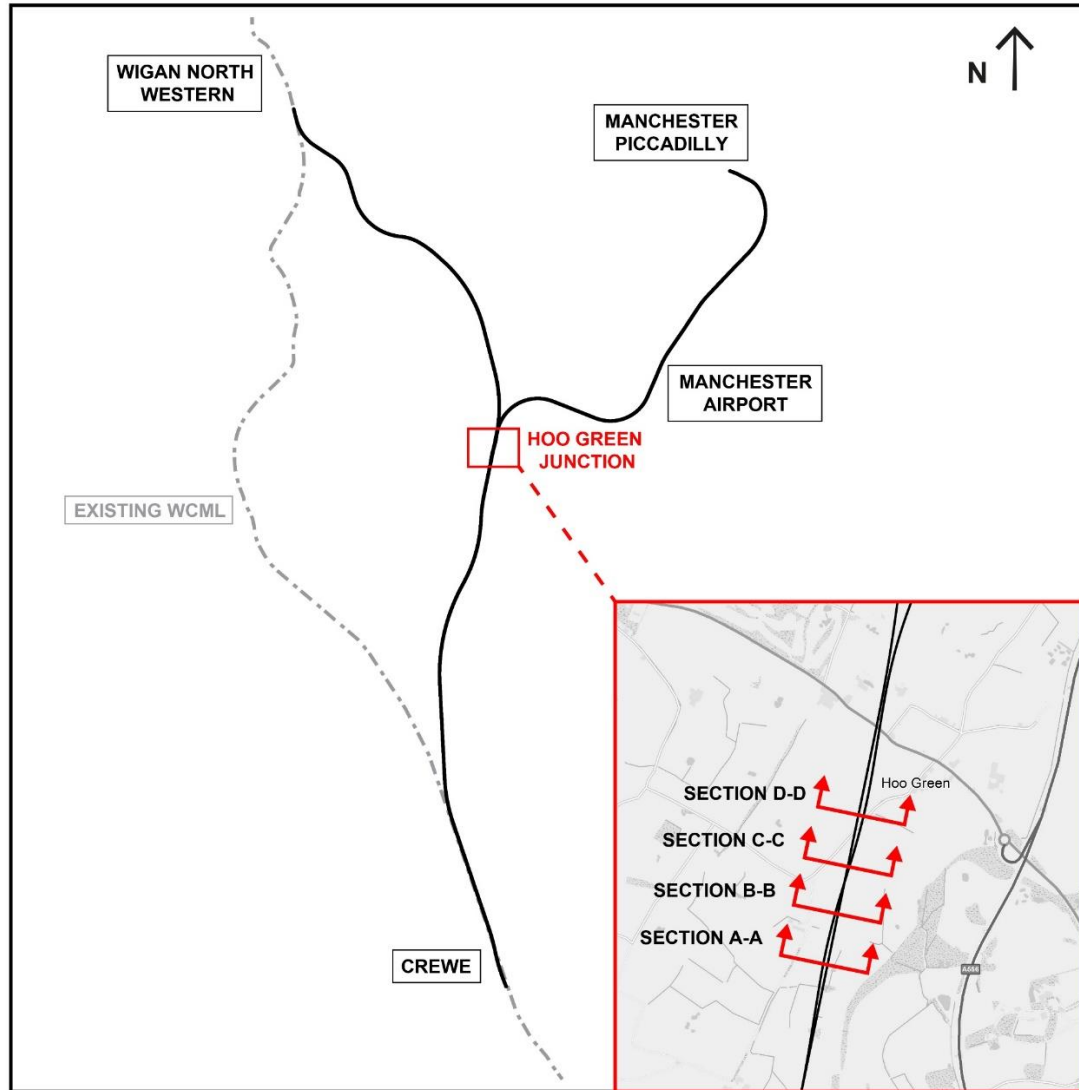
- Route of the Proposed Scheme  
(continuing as the HS2 WCML connection)
- HS2 Manchester Spur
- Provision for Northern Powerhouse Rail (NPR)  
London-Liverpool

**3D View - Looking North**  
(Not to Scale)

Figure shows engineering design without mitigation planting.  
 Please refer to Map CT-06-319 and CT-06-320 for full details.

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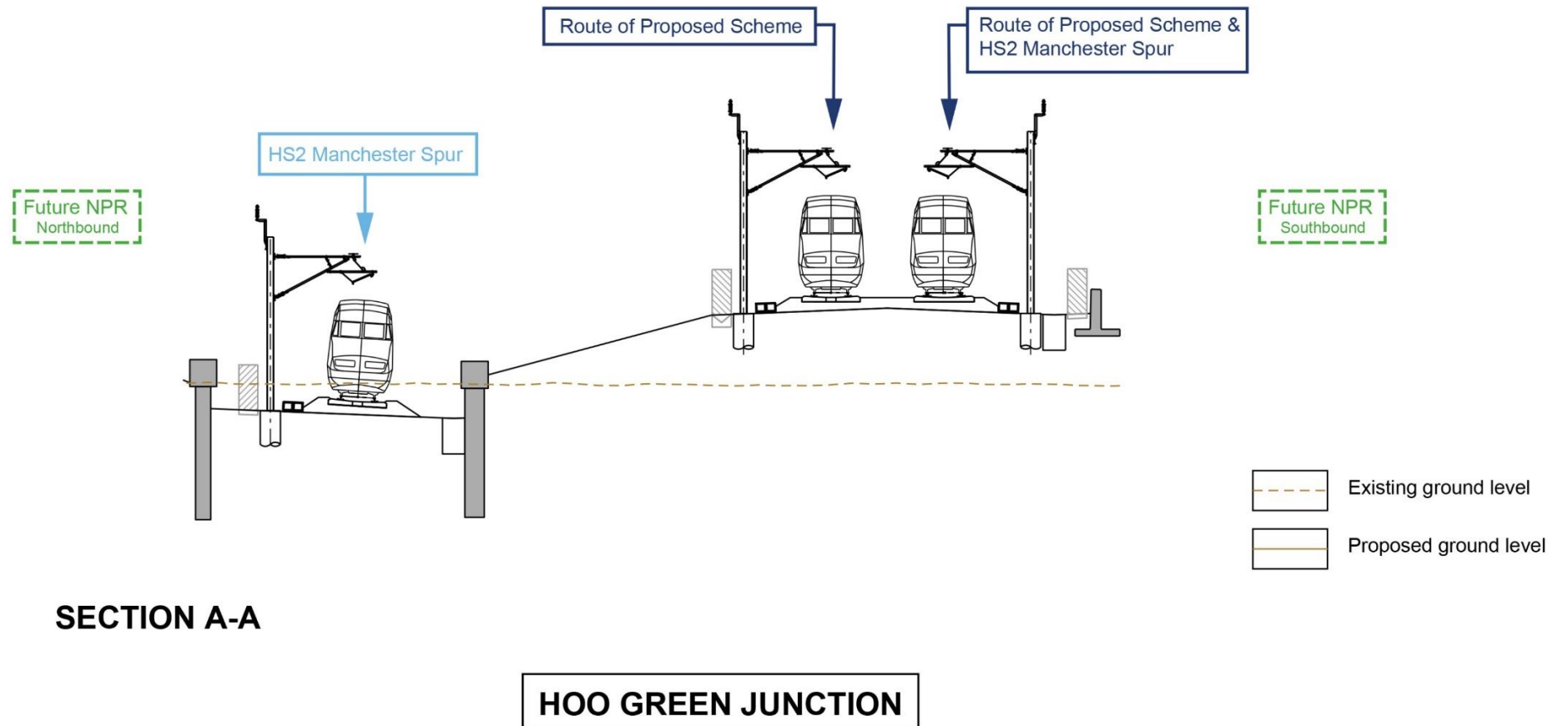
**Figure 6: Schematic showing the cross sectional view of Hoo Green box structure and Hoo Green tunnel**





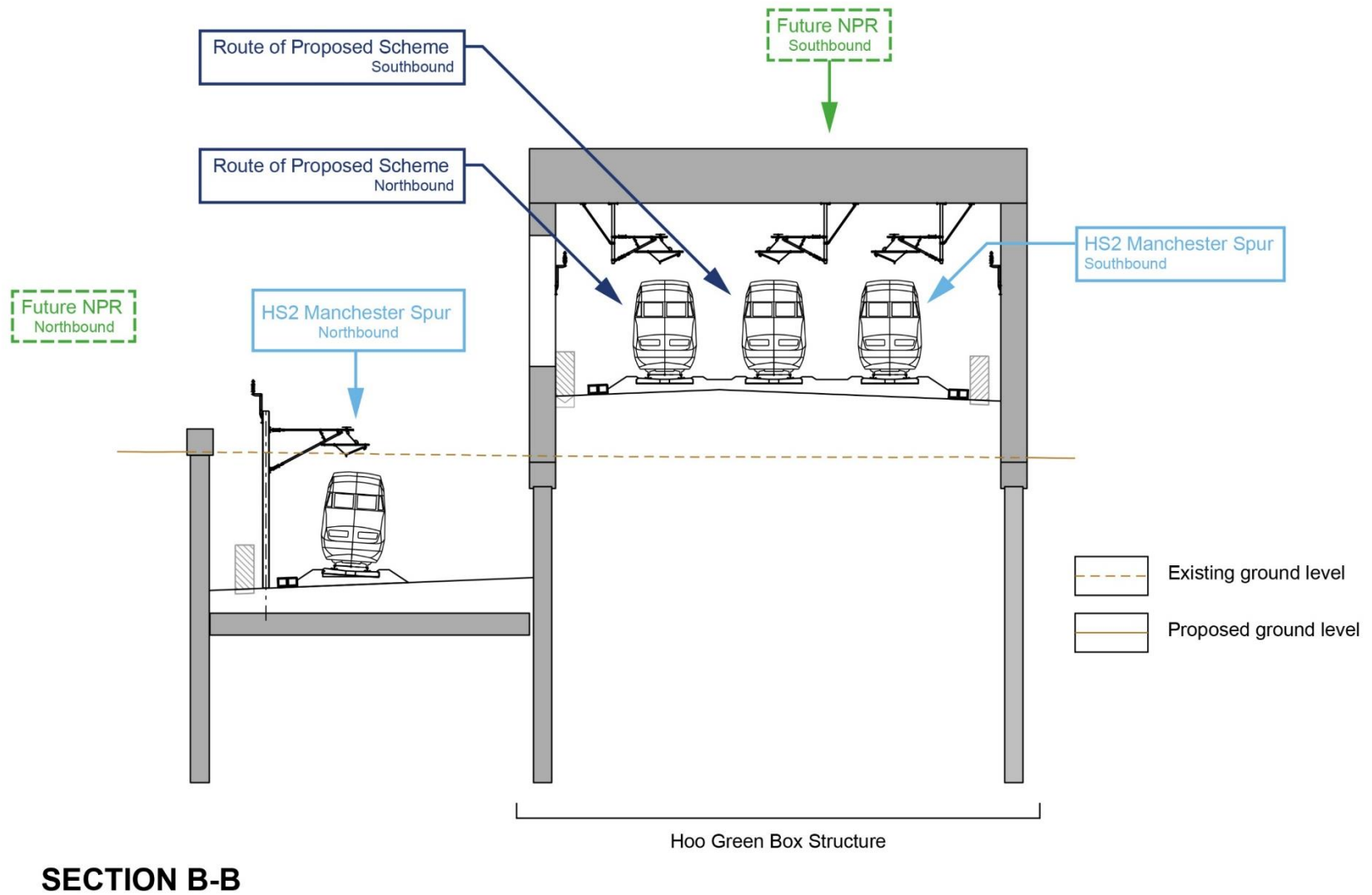
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**Figure 7: Hoo Green box structure and Hoo Green tunnel section A-A**



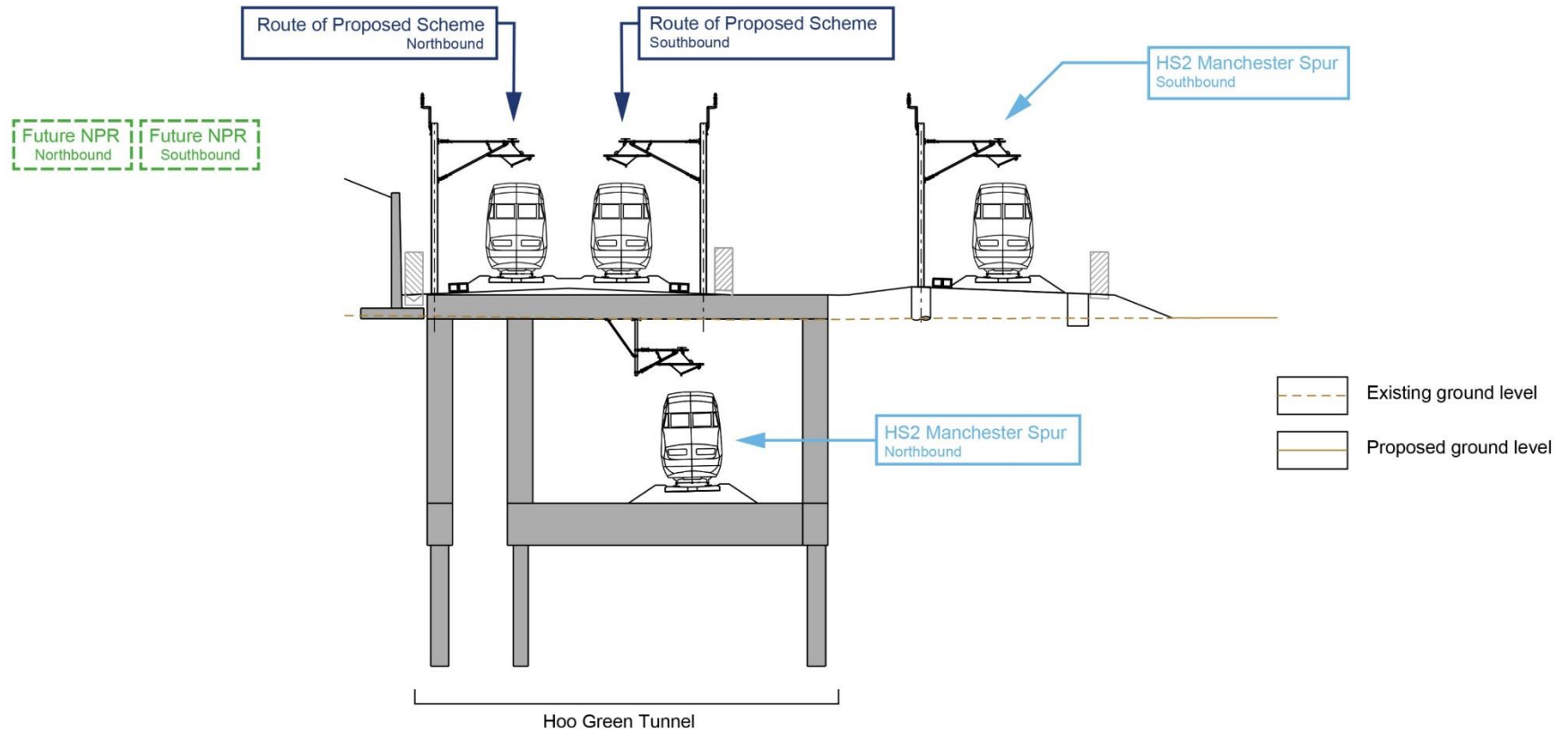
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**Figure 8: Hoo Green box structure and Hoo Green tunnel section B-B**



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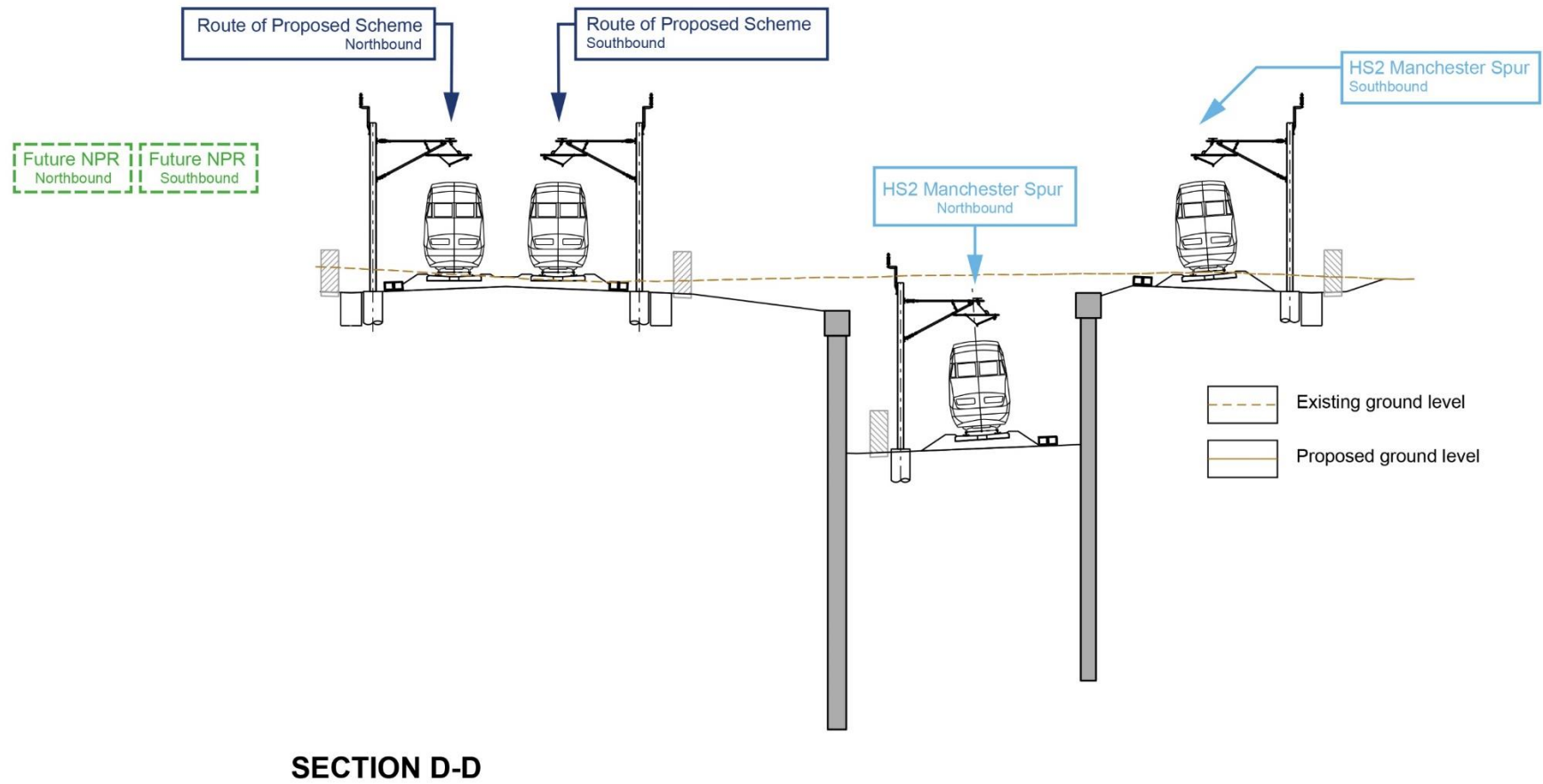
**Figure 9: Hoo Green box structure and Hoo Green tunnel section C-C**



**SECTION C-C**

**HOO GREEN JUNCTION**

Figure 10: Hoo Green box structure and Hoo Green tunnel section D-D



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- 2.2.17 This section of route is illustrated on maps CT-06-318 to CT-06-320 in the Volume 2: MA03 Map Book.
- 2.2.18 The key features of the 3.7km section will include:
- Heyrose embankment, 1.8km in length and up to 10m in height (see Volume 2: MA03 Map Book, map CT-06-318, B6 to J7 and map CT-06-319, A6 to B6);
  - seven ecological mitigation ponds to the west of Heyrose embankment immediately south of Budworth Road to provide replacement habitat for great crested newt, with surrounding terrestrial habitat (see Volume 2: MA03 Map Book, map CT-06-318, B5 to C4);
  - landscape mitigation planting to the west of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening for users of Budworth Road and Heyrose Golf Club (see Volume 2: MA03 Map Book, map CT-06-318, B6 to D6);
  - landscape mitigation planting to the east of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening for users of Footpath Tabley Superior 8/1 and residents of properties on Budworth Road and Old Hall Lane (see Volume 2: MA03 Map Book, map CT-06-318, B6 to F6);
  - a balancing pond for railway drainage, 20m north of an area of wetland and grassland habitat creation, 40m north of Arley Brook viaduct. Access will be provided via a new access track from Budworth Road (see Volume 2: MA03 Map Book, map CT-06-318, B7 to C6);
  - landscape mitigation planting to the west of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening for users of Heyrose Golf Club (see Volume 2: MA03 Map Book, map CT-06-318, D6 to J6 and map CT-06-319, A6);
  - closure of Budworth Road where it crosses the route of the Proposed Scheme, with access to properties retained on both sides of the route. Users will be diverted along Frog Lane realignment, School Lane realignment and the B5391 Pickmere Lane realignment, increasing journey length by 3km (see Volume 2: MA03 Map Book, map CT-06-318, C5 to D6);
  - Budworth Road auto-transformer station, 75m by 26m in area, to the east of the route of the Proposed Scheme and 270m north of Arley Brook, including a railway telecommunications mast up to 25m in height. Access will be provided from the existing Budworth Road (see Volume 2: MA03 Map Book, map CT-06-318, D6 to D7);
  - four ecological mitigation ponds to the east of Heyrose embankment, 170m north of Budworth Road to provide replacement habitat for great crested newt, with surrounding terrestrial habitat (see Volume 2: MA03 Map Book, map CT-06-318, E6 to E7);
  - a balancing pond for railway drainage, 230m north of Budworth Road auto-transformer station. Access will be provided via a new access track from Heyrose Farm South access (see Volume 2: MA03 Map Book, map CT-06-318, E6 to F7);

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- closure of existing Heyrose Farm South access to the south of Heyrose Farm where it crosses the route of the Proposed Scheme, with access to properties retained on both sides of the route. Users will be diverted along Old Hall Lane, the B5391 Pickmere Lane realignment, School Lane realignment, Frog Lane realignment and Budworth Road, increasing journey length by 3.5km (see Volume 2: MA03 Map Book, map CT-06-318, F7 to F9);
- an area of woodland habitat creation along the western and eastern sides of the Heyrose embankment, adjacent to Bongs Wood culvert, to provide replacement habitat and additional habitat for commuting and foraging bats (see Volume 2: MA03 Map Book, map CT-06-318, G5 to H7);
- an area of wetland habitat creation to the west and east of the route of the Proposed Scheme extending along the Tributary of Tabley Brook 2, to provide replacement habitat and reconnect Knicker Brook with the floodplain (see Volume 2: MA03 Map Book, map CT-06-318, G5 to H8);
- Bongs Wood culvert, 440m south of Restricted Byway Tabley Superior 4/1 accommodation underbridge, for a 108m realignment of the Tributary of Tabley Brook 2. The watercourse will be realigned up to the inlet of the culvert for 15m, north of its existing alignment, parallel with the route of the Proposed Scheme, and will cross under Heyrose embankment into a 18m long drain prior to continuing on its existing alignment (see Volume 2: MA03 Map Book, map CT-06-318, G6 to G7);
- six ecological mitigation ponds to the west of Heyrose embankment, immediately north of Bongs Wood culvert to provide replacement habitat for great crested newt, with surrounding terrestrial habitat (see Volume 2: MA03 Map Book, map CT-06-318, G6 to I6);
- a balancing pond for railway drainage, adjacent to an area of woodland habitat creation, 20m east of Bongs Wood culvert. Access will be provided via a new access track from Heyrose Farm South access (see Volume 2: MA03 Map Book, map CT-06-318, G7);
- an area of wetland habitat creation to the west of the route of the Proposed Scheme, 150m north of Bongs Wood culvert, to provide replacement habitat and reconnect Knicker Brook with the floodplain (see Volume 2: MA03 Map Book, map CT-06-318, H5 to I6);
- four balancing ponds for railway drainage, to the east of the route of the Proposed Scheme and north of Bongs Wood culvert. Access will be provided via two new access tracks from Hollowood Farm access (see Volume 2: MA03 Map Book, map CT-06-318, H7 to J7 and map CT-06-319, A6 to B7);
- realignment of Restricted Byway Tabley Superior 4/1, up to 20m north of its existing alignment for 245m, crossing under the route of the Proposed Scheme through Restricted Byway Tabley Superior 4/1 accommodation underbridge, 7m in length, with a height clearance of 6m, to provide access for Hollowood Farm, with a negligible change in journey length (see Volume 2: MA03 Map Book, map CT-06-318, I7 to J6 and map CT-06-319, A5 to A7);
- realignment of Hollowood Farm access through Restricted Byway Tabley Superior 4/1 accommodation underbridge to continue on its existing alignment, with a negligible

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change in journey length (see Volume 2: MA03 Map Book, map CT-06-318, I7 to J6 and map CT-06-319, A5 to A7);

- landscape mitigation planting to the west of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening for users of Footpath Tabley Superior 10/1 and residents of Hollowood Farm (see Volume 2: MA03 Map Book, map CT-06-318, J6 and map CT-06-319, A6 to B6);
- landscape mitigation planting to the east of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening for the Shooting Box and users of Restricted Byway Tabley Superior 4/1 (see Volume 2: MA03 Map Book, map CT-06-318, J7 and map CT-06-319, A6 to B6);
- M6 Mere viaduct, 98m in length and up to 10m in height, to carry the route of the Proposed Scheme over the M6 (see Volume 2: MA03 Map Book, map CT-06-319, B6 to C6);
- widening of the M6 by 2m over a length of 425m, 1.6km to the north-west of junction 19 to accommodate a pier in the central reservation for M6 Mere viaduct, with a negligible change in journey length (see Volume 2: MA03 Map Book, map CT-06-319, B8 to C4);
- landscape mitigation planting along the south and north of the M6 realignment to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening for the Shooting Box, and users of Restricted Byway Tabley Superior 4/1 and Restricted Byway Mere 2/1 (see Volume 2: MA03 Map Book, map CT-06-319, B7 to C4);
- unnamed culvert, immediately north of the M6, for a 95m realignment of the Tributary of Tabley Brook 4 in a west-east direction around M6 Mere viaduct (see Volume 2: MA03 Map Book, map CT-06-319, C6);
- Hoo Green South embankment No.2, 1.2km in length and up to 11m in height (see Volume 2: MA03 Map Book, map CT-06-319, C6 to I6);
- landscape mitigation planting to the east of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening for residents of Bentleyhurst Farm and users of Bridleway Mere 1/1 (see Volume 2: MA03 Map Book, map CT-06-319, C6 to E6);
- landscape mitigation planting to the west of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening for residents of Winterbottom Farm and users of Restricted Byway Mere 2/1 (see Volume 2: MA03 Map Book, map CT-06-319, C6 to E6);
- a balancing pond for railway drainage, 40m east of an area of landscape mitigation planting, 120m north of M6 Mere viaduct. Access will be provided via a new access track from Bridleway Mere 1/1 realignment (see Volume 2: MA03 Map Book, map CT-06-319, C7);
- diversion of an underground Cadent Gas 300mm high pressure gas pipeline, for 3.5km in length, to allow the pipeline to be relocated away from the Proposed Scheme, 200m east of Bridleway Mere 1/1 accommodation underbridge. The diversion will pass partially through the adjacent Hulseheath to Manchester Airport area (MA06) and cross the HS2

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Manchester spur before coming back into the Pickmere to Agden and Hulseheath area (see Volume 2: MA03 Map Book, map CT-06-319, E7 to map CT-06-321, I8);

- realignment of Bridleway Mere 1/1, up to 9m south of its current alignment for 288m, crossing under the route of the Proposed Scheme through Bridleway Mere 1/1 accommodation underbridge, 7m in length, with a height clearance of 5m, to provide access for Knowlspit Farm, Bentleyhurst Farm and Winterbottom Farm, resulting in a negligible change in journey length (see Volume 2: MA03 Map Book, map CT-06-319, E5 to E7);
- landscape mitigation planting to the west of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening for Winterbottom Farm (see Volume 2: MA03 Map Book, map CT-06-319, E6 to G5);
- landscape mitigation planting to the east of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape, in particular the Hoo Green box structure, and provide visual screening for Bentleyhurst Farm and users of Bridleway Mere 1/1 (see Volume 2: MA03 Map Book, map CT-06-319, E6 to J6 and map CT-06-320, A6 to B6);
- diversion of a National Grid 400kV overhead power line for 774m to the north of M6 Mere viaduct. The diverted power line will be carried on four sets of steel towers to cross the Proposed Scheme and reconnect with the existing overhead lines to the east of Hoo Green South embankment No.3 (see Volume 2: MA03 Map Book, map CT-06-319, E5 to H7);
- two balancing ponds for railway drainage, 60m east of Hoo Green South embankment No.2 and 100m north of Bridleway Mere 1/1 accommodation underbridge. Access will be provided via a new access track from Bridleway Mere 1/1 realignment (see Volume 2: MA03 Map Book, map CT-06-319, E7 to F6);
- Winterbottom culvert, 120m north of Bridleway Mere 1/1 accommodation underbridge, for a 140m realignment of the Tributary of Tabley Brook 8. The watercourse will be realigned up to the inlet of the culvert for 40m, north of its existing alignment, parallel with the route of the Proposed Scheme, and will cross under Hoo Green South embankment No.2. The realignment will continue downstream of the outlet of the culvert for 25m, south of the existing alignment, running parallel with the route of the Proposed Scheme to reconnect to the existing Tributary of Tabley Brook 8 (see Volume 2: MA03 Map Book, map CT-06-319, E6 to F6);
- diversion of a Scottish Power 132kV overhead power line for 2.3km to the north of M6 Mere viaduct. The diverted power line will be carried on seven sets of steel towers to a cable sealing end compound. The 132kV power line will then be ducted underground with two cables, each 2.4km in length, along Hulseheath Lane and Peacock Lane, to pass under the HS2 Manchester spur at Peacock Lane viaduct. The underground diversion will pass partially through the adjacent Hulseheath to Manchester Airport area (MA06) and back into the Pickmere to Agden and Hulseheath area (see Volume 2: MA03 Map Book, map CT-06-319, F10 to map CT-06-321 G6);



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- five ecological mitigation ponds to the west of Hoo Green South embankment No.2, 340m north of Bridleway Mere 1/1 accommodation underbridge to provide replacement habitat for great crested newt, with surrounding terrestrial habitat (see Volume 2: MA03 Map Book, map CT-06-319, G5);
- an area of woodland habitat creation along the western side of Hoo Green South embankment No.2, 500m north of Bridleway Mere 1/1 accommodation underbridge, to provide replacement habitat (see Volume 2: MA03 Map Book, map CT-06-319, G5 to H5);
- landscape mitigation planting to the west of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening for residents and users of Yew Tree Farm and Mere Court Hotel (see Volume 2: MA03 Map Book, map CT-06-319, H5 to J5 and map CT-06-320, A5 to F5);
- Winterbottom Lane telecommunications site, 49m by 24m in area, to the west of the route of the Proposed Scheme, including a railway telecommunications mast up to 20m in height, within an area of landscape mitigation planting. Access will be provided from a new access track from Winterbottom Lane (see Volume 2: MA03 Map Book, map CT-06-319, H5 to I5);
- Hoo Green South embankment No.2 retaining wall, 177m in length and up to 5m in height (see Volume 2: MA03 Map Book, map CT-06-319, I6 to J6);
- a balancing pond for railway drainage, 30m east of Hoo Green South embankment No.2 retaining wall and 160m north of Winterbottom Lane telecommunications site. Access will be provided via a new access track from Hoo Green Lane (see Volume 2: MA03 Map Book, map CT-06-319, J6 to J7 and map CT-06-320, A6 to A7);
- six ecological mitigation ponds to the west of Hoo Green box structure, 250m north of Winterbottom Lane telecommunications site to provide replacement habitat for great crested newt, with surrounding terrestrial habitat (see Volume 2: MA03 Map Book, map CT-06-320, A5 to C5);
- Hoo Green box structure, 232m in length and up to 5m in height, to carry the route of the Proposed Scheme over Hoo Green tunnel, with associated landscape earthworks, 6m in height, extending along the eastern side of Hoo Green box structure, and up to 4m in height, extending along the western side of Hoo Green box structure. These earthworks will provide visual screening for residents in Hoo Green and at Daisy Bank Farm. Hoo Green box structure is also described in the HS2 Manchester spur section and NPR London to Liverpool junction section, and shown on Figure 5 to Figure 10 (see Volume 2: MA03 Map Book, map CT-06-319, J6 and map CT-06-320, A6 to B6);
- six ecological mitigation ponds to the east of Hoo Green box structure, 300m north-west of Belt Wood to provide replacement habitat for great crested newt, with surrounding terrestrial habitat (see Volume 2: MA03 Map Book, map CT-06-320, B7 to C6);
- Hoo Green North embankment retaining wall No.2, 172m in length and up to 3m in height (see Volume 2: MA03 Map Book, map CT-06-320, B6 to C6);
- a surface water pumping station and associated storage tank for railway drainage, to the east of the route of the Proposed Scheme, 200m east of Hoo Green Lane. Access will be

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provided via a new access track from Hoo Green Lane (see Volume 2: MA03 Map Book, map CT-06-320, C6);

- a balancing pond for railway drainage, within an area of landscape mitigation planting and adjacent to grassland habitat creation, 350m south of Hoo Green Lane. Access will be provided via a new access track from Hoo Green Lane (see Volume 2: MA03 Map Book, map CT-06-320, B6 to C6); and
- permanent diversion and decommissioning of minor utilities including Openreach telecommunication cables and Scottish Power overhead power lines, located within the area shown on Volume 2: MA03 Map Book, map CT-06-318 to map CT-06-319.

## **Hoo Green North cutting to Lymm North embankment**

- 2.2.19 The route of the Proposed Scheme in this section will continue in Hoo Green North cutting north-west towards Broomedge. It will pass High Legh cutting retaining wall and enter High Legh cutting. The route of the Proposed Scheme will then pass through M56 West overbridge, into Agden cutting and onto Lymm South embankment. Beyond Lymm South embankment, the route will continue over A56 Lymm Road viaduct and then onto Lymm North embankment.
- 2.2.20 This section of route is illustrated on maps CT-06-320 to CT-06-322a in the Volume 2: MA03 Map Book.
- 2.2.21 The key features of the 4.2km section will include:
- Hoo Green North cutting, 2.7km in length, up to 13m in depth and 92m in width, with associated landscape earthworks, 1m in height, beginning at the NPR Manchester to Liverpool junction overbridge and continuing along the western side of the cutting. These earthworks will provide visual screening for nearby residents (see Volume 2: MA03 Map Book, map CT-06-320, C6 to J5 and map CT-06-321, A4 to H5);
  - landscape mitigation planting to the east of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape and screen views from residents of Hoo Green and properties on Oakwood Road, Bowden View Lane and the A50 Knutsford Road (see Volume 2: MA03 Map Book, map CT-06-320, B6 to F6);
  - diversion of Hoo Green Lane, 450m west of its current alignment for 800m, crossing the Proposed Scheme on A50 Warrington Road overbridge, increasing the length of journey by 828m. The existing Hoo Green Lane will be closed where it crosses the Proposed Scheme. It will be retained as access for properties and fields on both sides of the route (see Volume 2: MA03 Map Book, map CT-06-320, B5 to F5 and D6 to E8);
  - realignment of the A50 Warrington Road, 15m south of its current alignment for 550m, crossing the Proposed Scheme on A50 Warrington Road overbridge, with a negligible change in journey length (see Volume 2: MA03 Map Book, map CT-06-320, F7 to G4);
  - A50 Warrington Road overbridge, 107m in length and up to 10m above track level, with arched sides up to 15.5m in height (see Volume 2: MA03 Map Book, map CT-06-320, F6 to F5);

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- closure of Bowden View Lane where it crosses the Proposed Scheme, with access to properties retained on the eastern side of the route. A turning head will be provided to facilitate vehicle access on the retained section of Bowden View Lane, east of the Proposed Scheme. Users will be diverted along the realigned A50 Warrington Road and A50 Warrington Road overbridge, increasing journey length by 783m (see Volume 2: MA03 Map Book, map CT-06-320, F6 to G7);
- landscape mitigation planting to the east of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening for residents of properties on Bowden View Lane (see Volume 2: MA03 Map Book, map CT-06-320, F6 to J7);
- restoration of Mere Court Hotel garden pond to the west of Hoo Green North cutting, 160m north of A50 Warrington Road overbridge to provide replacement habitat for great crested newt (see Volume 2: MA03 Map Book, map CT-06-320, G5);
- one ecological mitigation pond to the west of Hoo Green North cutting, 210m north of A50 Warrington Road overbridge to provide replacement habitat for great crested newt, with surrounding terrestrial habitat (see Volume 2: MA03 Map Book, map CT-06-320, G5);
- landscape mitigation planting to the west of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening for visitors to Mere Court Hotel and High Legh Park Golf Club and residents of properties on Wrenshot Lane (see Volume 2: MA03 Map Book, map CT-06-320, H5 to I5);
- landscape mitigation planting to the west of the Proposed Scheme, adjacent to an area of woodland habitat creation, to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening for residents of properties on Wrenshot Lane (see Volume 2: MA03 Map Book, map CT-06-320, I5);
- diversion of an underground National Grid 900mm high pressure gas pipeline, for 2.8km in length, to pass under the HS2 Manchester spur. The underground diversion will pass partially through the adjacent Hulseheath to Manchester Airport area (MA06) at Hulseheath and back into the Pickmere to Agden and Hulseheath area (see Volume 2: MA03 Map Book, map CT-06-320, H7 to I10 to map CT-06-321, F10 to H7);
- diversion of a National Grid 400kV overhead power line for 775m to the north of A50 Warrington Road overbridge and the east of the Proposed Scheme. The diverted power line will be carried on three sets of steel towers to cross the HS2 Manchester spur and reconnect with the existing overhead power lines to the west of Peacock Lane viaduct (see Volume 2: MA03 Map Book, map CT-06-320, I7 to J7 to map CT-06-321, A6 to D7);
- an area of woodland habitat creation along the eastern side of Hoo Green North cutting, 140m south of Peacock Lane grid supply point, to provide replacement habitat and additional habitat for commuting, foraging and roosting bats (see Volume 2: MA03 Map Book, map CT-06-320, I6 to J8 and map CT-06-321, A5 to B6);
- diversion of an underground National Grid 900mm high pressure gas pipeline, for 4.9km in length, to pass under the HS2 Manchester spur. The underground diversion will pass partially through the adjacent Hulseheath to Manchester Airport area (MA06) at

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Hulseheath and back into the Pickmere to Agden and Hulseheath area (see Volume 2: MA03 Map Book, map CT-06-320, I7 to J9 to map CT-06-322a, A8 to D8);

- an area of woodland habitat creation along the western side of Hoo Green North cutting, 600m south of Peacock Lane overbridge, to provide replacement habitat and increase habitat connectivity (see Volume 2: MA03 Map Book, map CT-06-320, I4 to J5 and map CT-06-321, A3 to A4);
- seven ecological mitigation ponds to the west of Hoo Green North cutting, 520m south of Peacock Lane realignment to provide replacement habitat for great crested newt and lesser silver water beetle, with surrounding terrestrial habitat (see Volume 2: MA03 Map Book, map CT-06-320, J4 to J5 and map CT-06-321, A3 to B4);
- landscape mitigation planting to the west of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening for residents of properties on Wrenshot Lane (see Volume 2: MA03 Map Book, map CT-06-320, J4 and map CT-06-321, A3 to B3);
- Peacock Lane grid supply point, 193m by 121m in area, to the east of the Proposed Scheme, 250m south of Peacock Lane viaduct, within an area of woodland habitat creation and landscape mitigation planting to help integrate Peacock Lane grid supply point into the surrounding landscape. Access will be provided from a new access track from the realigned Peacock Lane (see Volume 2: MA03 Map Book, map CT-06-320, J7 to J8 and map CT-06-321, A6 to B7);
- landscape earthworks immediately north and east of Peacock Lane grid supply point, up to 3m in height. The landscape earthworks will provide visual screening for residents at Broom Manor and Hulse Heath Farm and help integrate Peacock Lane grid supply point into the surrounding landscape (see Volume 2: MA03 Map Book, map CT-06-320, J8 to J9 and map CT-06-321, A7 to B6);
- two ecological mitigation ponds to the west of Hoo Green North cutting, 40m south of Peacock Lane auto-transformer feeder station to provide replacement habitat for great crested newt and lesser silver water beetle, with surrounding terrestrial habitat (see Volume 2: MA03 Map Book, map CT-06-321, B4);
- provision of a new Scottish Power 11kV underground cable, 3.7km in length, to provide a permanent non-traction power supply from Scottish Power's existing primary substation in Mere to the Peacock Lane auto-transformer feeder station (see Volume 2: MA03 Map Book, map CT-06-321, C5 to D7);
- Peacock Lane auto-transformer feeder station 210m by 135m in area, with associated disconnecter 80m by 27m in area, to the east of the route of the Proposed Scheme, 160m south of Peacock Lane overbridge within an area of landscape mitigation planting to screen views of Peacock Lane auto-transformer feeder station from residents of nearby properties. Access will be provided from a new access track off Peacock Lane (see Volume 2: MA03 Map Book, map CT-06-321, B5 to C6);
- landscape earthworks immediately north of Peacock Lane auto-transformer feeder station, up to 3m in height. The landscape earthworks will provide visual screening for residents at Thowler Lane Farm and Ivy House Farm and help integrate Peacock Lane

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auto-transformer feeder station into the surrounding landscape (see Volume 2: MA03 Map Book, map CT-06-321, D5 to C7);

- a balancing pond for railway drainage, 280m south of Peacock Lane overbridge and west of Hoo Green North cutting. Access will be provided via a new access track from the realigned Peacock Lane (see Volume 2: MA03 Map Book, map CT-06-321, C4);
- Millington Clough culvert, 10m west of Peacock Lane auto-transformer feeder station, for a 540m realignment of the Tributary of Millington Clough 2, and for a diversion of the Tributary of Millington Clough 3. The Tributary of Millington Clough 2 will be realigned up to the inlet of the culvert for 25m, north of its existing alignment, parallel with the route of the Proposed Scheme, and will cross under Hoo Green North cutting. The realignment will continue downstream of the outlet of the culvert for 260m, north-west of its existing alignment, running east of the route of the Proposed Scheme. The Tributary of Millington Clough 3 will be diverted for 335m, south of its existing alignment, parallel with the route of the Proposed Scheme (see Volume 2: MA03 Map Book, map CT-06-321, B5 to C5);
- landscape mitigation planting to the west and east of the route of the Proposed Scheme and running along Peacock Lane overbridge to help integrate the Proposed Scheme into the surrounding landscape and screen views from residents of properties on Peacock Lane, Back Lane and Moss Lane, and for users of Footpath High Legh 4/1 (see Volume 2: MA03 Map Book, map CT-06-321, B4 to E3);
- an area of wetland habitat creation to the east of the route of the Proposed Scheme, 20m north of Peacock Lane auto-transformer feeder station, to provide replacement habitat and reconnect the Tributary of Millington Clough 2 with the floodplain (see Volume 2: MA03 Map Book, map CT-06-321, D5 to C7);
- an area of woodland habitat creation, along the eastern side of Hoo Green North cutting, 50m north of Peacock Lane auto-transformer feeder station, to provide replacement habitat for commuting bats and increase habitat connectivity (see Volume 2: MA03 Map Book, map CT-06-321, D5);
- realignment of Peacock Lane, 47m south of its existing alignment for a total of 1.4km, crossing the route of the Proposed Scheme on Peacock Lane overbridge, and 175m north of its existing alignment on an embankment 529m long and up to 8m in height, crossing the HS2 Manchester spur beneath Peacock Lane viaduct, decreasing journey length by 21m. There will also be a diversion of Back Lane to tie-in with Peacock Lane realignment, increasing journey length by 77m (see Volume 2: MA03 Map Book, map CT-06-321, B9 to E2);
- Peacock Lane overbridge, 62m in length, up to 7m above existing ground level and 9m above track level (see Volume 2: MA03 Map Book, map CT-06-321, D6 to D3);
- an area of woodland habitat creation along the eastern side of Hoo Green North cutting, 40m north of Peacock Lane overbridge, to provide replacement habitat (see Volume 2: MA03 Map Book, map CT-06-321, D5 to E5);
- an area of woodland habitat creation along the western side of Hoo Green North cutting, 300m north of Peacock Lane overbridge, to provide replacement habitat and increase habitat connectivity (see Volume 2: MA03 Map Book, map CT-06-321, F4);

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- nine ecological mitigation ponds to the west of Hoo Green North cutting, 360m north of Peacock Lane overbridge to provide replacement habitat for great crested newt, with surrounding terrestrial habitat (see Volume 2: MA03 Map Book, map CT-06-321, F3 to G4);
- realignment of the Tributary of Millington Clough 4 for 435m, south of its existing alignment, crossing over Hoo Green North cutting via the Millington Clough aqueduct, a three span continuous concrete trough 79m in length and 11m above track level (see Volume 2: MA03 Map Book, map CT-06-321, F4 to F5);
- landscape mitigation planting to the west of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening for residents of properties on Moss Lane and Agden Lane (see Volume 2: MA03 Map Book, map CT-06-321, F4 to I4);
- two ecological mitigation ponds to the east of Hoo Green North cutting, 480m north of Peacock Lane overbridge to provide replacement habitat for great crested newt, with surrounding terrestrial habitat (see Volume 2: MA03 Map Book, map CT-06-321, G5);
- landscape mitigation planting to the east of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening for residents of Middle Moss Farm and properties on Thowler Lane (see Volume 2: MA03 Map Book, map CT-06-321, G5 to H5);
- NPR Manchester to Liverpool junction overbridge, 68m in length, up to 2m above existing ground level and 10m above track level (see Volume 2: MA03 Map Book, map CT-06-321, G4 to G5);
- closure of Agden Lane where it crosses the route of the Proposed Scheme, with access to properties retained on the eastern and western sides of the route. Users will be diverted along Moss Lane, Peacock Lane realignment and Peacock Lane overbridge, increasing journey length by 2.2km (see Volume 2: MA03 Map Book, map CT-06-321, G5 to H4);
- High Legh cutting retaining wall, 51m in length, all of which will be below existing ground level, located to the west of the route of the Proposed Scheme, 200m south of M56 West overbridge (see Volume 2: MA03 Map Book, map CT-06-321, H4);
- High Legh cutting, 197m in length, up to 21m in depth and up to 142m in width, with associated landscape earthworks, 1m in height, beginning at High Legh cutting retaining wall and continuing along the western side of the cutting. These landscape earthworks will provide visual screening for residents of Agden Lane Farm and properties on Moss Lane, and users of Footpath Agden 2/3 and Footpath Agden 34/1 (see Volume 2: MA03 Map Book, map CT-06-321, G4 to J5);
- landscape mitigation planting to the west of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening for residents of properties on Moss Lane and Agden Lane (see Volume 2: MA03 Map Book, map CT-06-321, I4 to I3);
- four ecological mitigation ponds to the west of High Legh cutting immediately south of M56 West overbridge to provide replacement habitat for great crested newt, with surrounding terrestrial habitat (see Volume 2: MA03 Map Book, map CT-06-321, I3 to I4);

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- M56 West overbridge, 52m in length, up to 1m above existing ground level and 11m above track level (see Volume 2: MA03 Map Book, map CT-06-321, I4 to I5);
- closure of Footpath Agden 4/1 where it crosses the route of the Proposed Scheme. Users will be diverted along Footpath Agden 1/4, Footpath Agden 1/1, Footpath Agden 2/4 diversion, Agden Brook Farm accommodation underbridge, Footpath Agden 3/3, Footpath Agden 2/4 and Footpath Agden 2/3, increasing the length of journey by 1.4km (see Volume 2: MA03 Map Book, map CT-06-321, I2 to J7 and map CT-06-322a, A1 to A7);
- Agden cutting, 611m in length, up to 21m in depth and up to 139m in width. Landscape earthworks, 1m in height, beginning at M56 West overbridge and continuing along the western side of the cutting will provide visual screening for residents of Agden Hall, Agden Brow and properties on the A56 Lymm Road, and users of Footpath Agden 1/2 and Footpath Agden 3/3 (see Volume 2: MA03 Map Book, map CT-06-322a, A3 to D4);
- landscape mitigation planting to the west of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening for Agden Hall and users of Footpath Agden 2/4 (see Volume 2: MA03 Map Book, map CT-06-321, J4 and map CT-06-322a, A3 to C4);
- three areas of woodland habitat creation along the western and eastern sides of Agden cutting, 120m north of M56 West overbridge, to provide additional habitat for foraging bats (see Volume 2: MA03 Map Book, map CT-06-321, J5, map CT-06-322a, A4 to B5, map CT-06-322a, C3 to C4 and map CT-06-322a, C4 to D6);
- diversion of Footpath Agden 2/4, 40m north of its current alignment for 632m. The footpath will connect with Footpath Agden 3/3 and cross under the route of the Proposed Scheme through the Agden Brook Farm accommodation underbridge, to provide access for Agden Brook Farm, increasing the length of journey by 736m. The existing Footpath Agden 2/4 will be closed where it crosses the route of the Proposed Scheme (see Volume 2: MA03 Map Book, map CT-06-322a, D2 to E5);
- diversion of an underground Cadent Gas 600mm high pressure gas pipeline, for 482m in length, to pass under the route of the Proposed Scheme 160m south of Agden Brook Farm accommodation underbridge (see Volume 2: MA03 Map Book, map CT-06-322a, D3 to F5);
- Lymm South embankment, 450m in length and up to 9m in height, with associated landscape earthworks, up to 2m in height, beginning 350m south of Agden Brook Farm accommodation underbridge and continuing along the western side of the embankment. The landscape earthworks will provide visual screening for residents of Agden Hall, Agden Brow and properties on the A56 Lymm Road, and users of Footpath Agden 1/2 and Footpath Agden 3/3 (see Volume 2: MA03 Map Book, map CT-06-322a, D4 to F4);
- landscape mitigation planting to the west and east of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening for residents of Agden Brook Farm and properties on the A56 Lymm Road, and users of Footpath Agden 1/2, Footpath Agden 1/4, Footpath Agden 3/3 and Footpath Agden 5/1 (see Volume 2: MA03 Map Book, map CT-06-322a, C4 to F4);

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- closure of Footpath Agden 1/2 where it crosses the route of the Proposed Scheme. Users will be diverted along Footpath Agden 2/4 diversion and the Agden Brook Farm accommodation underbridge, increasing the length of journey by 309m (see Volume 2: MA03 Map Book, map CT-06-322a, D4 to D5);
- one ecological mitigation pond to the east of Lymm South embankment, 70m south of Agden Brook Farm accommodation underbridge to provide replacement habitat for great crested newt (see Volume 2: MA03 Map Book, map CT-06-322a, D5 to E4);
- diversion of existing Agden Brook Farm access adjacent to its current alignment for 467m, crossing the route of the Proposed Scheme through Agden Brook Farm accommodation underbridge, with a height clearance of 4m (see Volume 2: MA03 Map Book, map CT-06-322a, D3 to E6);
- A56 Lymm Road telecommunications site, 49m by 24m in area, to the east of the route of the Proposed Scheme, including a railway telecommunications mast up to 15m in height, within an area of landscape mitigation planting. Access will be provided from a new access track from Lymm Road (see Volume 2: MA03 Map Book, map CT-06-322a, F4 to F5);
- four ecological mitigation ponds to the east of Lymm South embankment, 100m north of Agden Brook Farm accommodation underbridge to provide replacement habitat for great crested newt, with surrounding terrestrial habitat (see Volume 2: MA03 Map Book, map CT-06-322a, E5 to F5);
- A56 Lymm Road viaduct, 49m in length and up to 9m in height, to carry the route of the Proposed Scheme over the A56 Lymm Road (see Volume 2: MA03 Map Book, map CT-06-322a, F4);
- a noise fence barrier, 50m in length and 2m in height, extending along the western edge of A56 Lymm Road viaduct to provide acoustic screening for residents of Agden (see Volume 2: MA03 Map Book, map CT-06-322a, F4);
- a noise fence barrier, 180m in length and 2m in height, located along the western side of Lymm North embankment, extending from A56 Lymm Road viaduct to 18m north of Agden Lane in the Broomedge to Glazebrook area (MA04) to provide acoustic screening for residents of Agden (see Volume 2: MA03 Map Book, map CT-06-322a, F4 to G4);
- Lymm North embankment, 330m in length and up to 11m in height, extending into the Broomedge to Glazebrook area (MA04) (see Volume 2: MA03 Map Book, map CT-06-322a, F4 to H4);
- landscape mitigation planting to the west and east of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening for residents of properties on Agden Lane (see Volume 2: MA03 Map Book, map CT-06-322a, F4 to H4);
- a balancing pond for railway drainage, 140m north of A56 Lymm Road telecommunications site, partially in the Broomedge to Glazebrook area (MA04) on the eastern side of the route of the Proposed Scheme. Access will be provided via a new access track from Warrington Lane (see Volume 2: MA03 Map Book, map CT-06-322a, G5 to G6);



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- permanent diversion and decommissioning of utilities including Zayo, Openreach, Virgin and Vodafone telecommunication cables, United Utilities water mains, Scottish Power overhead power lines, a National Grid overhead power line and a Cadent gas main, located within the area shown on Volume 2: MA03 Map Book, maps CT-06-320 to CT-06-321; and
- permanent diversion and decommissioning of Scottish Power overhead lines, an Openreach telecommunication cable and a Cadent gas main, located within the area shown on Volume 2: MA03 Map Book, map CT-06-322a.

## HS2 Manchester spur

- 2.2.22 The HS2 Manchester spur (southbound and northbound) will diverge from the route of the Proposed Scheme as it passes on Hoo Green South embankment No.2, 380m north of Winterbottom culvert. The HS2 Manchester spur (northbound) will initially run along the western side of the route of the Proposed Scheme. The HS2 Manchester spur (northbound) will continue through Hoo Green tunnel, which will pass under Hoo Green box structure (to carry the route of the Proposed Scheme and NPR London to Liverpool junction (southbound), as well as HS2 Manchester spur (southbound) around the Hoo Green tunnel, as shown on Figure 5 to Figure 10). The HS2 Manchester spur (southbound and northbound) will then converge just south of A50 Warrington Road overbridge and continue together along the east side of the route of the Proposed Scheme north-east towards the Hulseheath to Manchester Airport area (MA06).
- 2.2.23 The HS2 Manchester spur through the Pickmere to Agden and Hulseheath area will be approximately 3.3km in length.
- 2.2.24 The HS2 Manchester spur is illustrated on maps CT-06-319 to CT-06-321.
- 2.2.25 The HS2 Manchester spur will comprise the following features in the Pickmere to Agden and Hulseheath area:
- 46m of viaduct;
  - 232m of box structure;
  - 297m of tunnel;
  - 2.6km of cuttings (937m for the northbound spur, 792m for the southbound spur and 828m for the HS2 Manchester spur (southbound and northbound)); and
  - 2.1km of embankments (255m for the northbound spur, 375m for the southbound spur and 1.5km for HS2 Manchester spur (southbound and northbound)).
- 2.2.26 Key features of the 3.3km section will include:
- Hoo Green South embankment No.2, 655m in length and up to 11m in height (see Volume 2: MA03 Map Book, map CT-06-319, E6 to I6);
  - Hoo Green South cutting retaining wall, 359m in length, all of which will be below existing ground level, located to the west and east of the HS2 Manchester spur (northbound),

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120m east of Winterbottom Lane (see Volume 2: MA03 Map Book, map CT-06-319, I5 to J6 to map CT-06-320, A6 to B6);

- Hoo Green box structure, 232m in length and up to 5m in height, to carry the HS2 Manchester spur (southbound) around Hoo Green tunnel, as shown on Figure 5 to Figure 10 (see Volume 2: MA03 Map Book, map CT-06-319, J6 and map CT-06-320, A6 to B6);
- Hoo Green tunnel, 297m in length and up to 6m in depth, with an associated emergency access to the south, 180m east of Hoo Green Lane, to carry the HS2 Manchester spur (northbound) under the route of the Proposed Scheme and NPR London to Liverpool junction (southbound) (see Volume 2: MA03 Map Book, map CT-06-320, B6 to C6);
- Hoo Green North embankment No.2, 205m in length and up to 3m in height (see Volume 2: MA03 Map Book, map CT-06-320, B6 to C6);
- Hoo Green North cutting retaining wall, 501m in length in this section, all of which will be below existing ground level, located to the west and east of the HS2 Manchester spur (northbound), 400m north-west of Belt Wood (see Volume 2: MA03 Map Book, map CT-06-320, C6 to F6);
- landscape earthworks, 1m in height, beginning 340m south of A50 Warrington Road overbridge and continuing along the eastern side of the HS2 Manchester spur. The landscape earthworks will provide visual screening for residents of Hoo Green and properties on Oakwood Road and Bowden View Lane (see Volume 2: MA03 Map Book, map CT-06-320, D6 to F6);
- Hoo Green North cutting, 905m in length, up to 13m in depth and 92m in width. There will be landscape earthworks, 1m in height, beginning 5m north of A50 Warrington Road overbridge and continuing along the eastern side of the cutting. The landscape earthworks will provide visual screening for residents of Hoo Green and properties on Oakwood Road and Bowden View Lane (see Volume 2: MA03 Map Book, map CT-06-320, F6 to J7);
- a surface water pumping station and associated storage tank for railway drainage, to the east of the route of the Proposed Scheme, 60m south of A50 Warrington Road overbridge. Access will be provided via a new access track from the A50 Knutsford Road (see Volume 2: MA03 Map Book, map CT-06-320, E7 to E6);
- a surface water pumping station for railway drainage, to the east of the route of the Proposed Scheme, 20m south of A50 Warrington Road overbridge. Access will be provided via a new access track from the A50 Knutsford Road (see Volume 2: MA03 Map Book, map CT-06-320, F6 to F7);
- one ecological mitigation pond to the east of Hoo Green North cutting, 510m north of A50 Warrington Road overbridge to provide replacement habitat for great crested newt (see Volume 2: MA03 Map Book, map CT-06-320, I6);
- Hulseheath South embankment, 529m in length and up to 8m in height (see Volume 2: MA03 Map Book, map CT-06-320, J6 and map CT-06-321, A5 to D8);
- landscape mitigation planting to the west and east of the HS2 Manchester spur to help integrate the Proposed Scheme into the surrounding landscape and provide visual

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screening for residents at Peacock Lane, Chapel Lane and Millington (see Volume 2: MA03 Map Book, map CT-06-320, I6 to J7 and map CT-06-321, A5 to D8);

- six ecological mitigation ponds to the east of Hulseheath South embankment, 20m north of Peacock Lane grid supply point to provide replacement habitat for great crested newt, with surrounding terrestrial habitat (see Volume 2: MA03 Map Book, map CT-06-321, B6 to B7);
- a balancing pond for railway drainage, within an area of grassland habitat creation, 50m north of Peacock Lane grid supply point. Access will be provided via a new access track off the realigned Peacock Lane (see Volume 2: MA03 Map Book, map CT-06-321, B7);
- Millington Clough offline culvert No. 3, 340m east of Peacock Lane viaduct, for a 240m realignment of the Tributary of Millington Clough 1. The watercourse will be realigned up to the inlet of the culvert for 30m, south of its existing alignment, running east of the HS2 Manchester spur. The realignment will continue downstream of the outlet of the culvert for 180m, north of the existing alignment, running east of the HS2 Manchester spur, along Peacock Lane (see Volume 2: MA03 Map Book, map CT-06-321, B9 to C9);
- Millington Clough offline culvert No. 1, 80m west of Peacock Lane viaduct, to convey a section of the Tributary of Millington Clough 2 under Hulseheath South embankment (see Volume 2: MA03 Map Book, map CT-06-321, D7);
- Millington Clough offline culvert No. 2, 140m east of Peacock Lane viaduct, to divert a section of the Tributary of Millington Clough 1 for 260m under Hulseheath South embankment (see Volume 2: MA03 Map Book, map CT-06-321, C8);
- Peacock Lane viaduct, 46m in length and up to 8m in height, to carry the HS2 Manchester spur over Peacock Lane (see Volume 2: MA03 Map Book, map CT-06-321, D8);
- two areas of woodland habitat creation along the eastern and western sides of Hulseheath North embankment, to provide replacement habitat and bat commuting corridors (see Volume 2: MA03 Map Book, map CT-06-321, C8 to D7);
- a balancing pond for railway drainage, adjacent to an area of grassland habitat creation and woodland habitat creation, 40m north of Peacock Lane viaduct. Access will be provided via a new access track from Peacock Lane realignment (see Volume 2: MA03 Map Book, map CT-06-321, C9 to D8);
- realignment of Peacock Lane, crossing the HS2 Manchester spur beneath the Peacock Lane viaduct, as described in the route of the Proposed Scheme section (see Volume 2: MA03 Map Book, map CT-06-321, C8 to D7);
- Hulseheath North embankment, 596m in length and up to 14m in height, extending into the Hulseheath to Manchester Airport area (MA06) (see Volume 2: Community Area report, Hulseheath to Manchester Airport (MA06), and Volume 2: MA03 Map Book, map CT-06-321, D8); and
- an area of wetland habitat creation to the west and east of the HS2 Manchester spur extending along Millington Clough, to provide replacement habitat and reconnect Millington Clough with the floodplain, extending into the Hulseheath to Manchester Airport area (MA06) (see Volume 2: Community Area report, Hulseheath to Manchester Airport (MA06), and Volume 2: MA03 Map Book, map CT-06-321, D8 to D10).

## **NPR London to Liverpool junction**

- 2.2.27 The Proposed Scheme in the Pickmere to Agden and Hulseheath area makes provision for a future NPR route between London and Liverpool, connecting to HS2. This provision is referred to as NPR London to Liverpool junction.
- 2.2.28 The NPR London to Liverpool junction is illustrated on maps CT-06-319 to CT-06-320. The NPR London to Liverpool junction (northbound) will run along the west side of the route of the Proposed Scheme. The NPR London to Liverpool junction (southbound) will run along the east side of the route of the Proposed Scheme, before crossing the route of the Proposed Scheme and HS2 Manchester spur on top of the roof of Hoo Green box structure (shown on Figure 5 to Figure 10). The NPR London to Liverpool junction through the Pickmere to Agden and Hulseheath area will be approximately 3.1km in length.
- 2.2.29 The NPR London to Liverpool junction will comprise of 2.8km of embankments, 1.2km of cuttings and a 232m long box structure in the Pickmere to Agden and Hulseheath area.
- 2.2.30 The features of the Proposed Scheme associated with NPR London to Liverpool junction comprise:
- Hoo Green South embankment No.1, 1.4km in length and up to 10m in height, with associated landscape earthworks, up to 4m in height, beginning 5m north of Winterbottom Lane telecommunications site and continuing along the western side of the embankment. The landscape earthworks will provide visual screening for Daisy Bank Farm and help integrate Hoo Green box structure into the surrounding landscape (see Volume 2: MA03 Map Book, map CT-06-319, F6 to J5 and map CT-06-320, A5 to D5);
  - Hoo Green South embankment No.3, 895m in length and up to 16m in height, with associated landscape earthworks, 6m in height, beginning 900m north of Bridleway Mere 1/1 accommodation underbridge and continuing along the eastern side of the embankment. The landscape earthworks will provide acoustic and visual screening for residents of Hoo Green and help integrate Hoo Green box structure into the surrounding landscape (see Volume 2: MA03 Map Book, map CT-06-319, E6 to J6);
  - Hoo Green box structure, 232m in length and up to 5m in height, to carry the NPR London to Liverpool junction (southbound) over the Hoo Green tunnel, as shown on Figure 5 to Figure 10 (see Volume 2: MA03 Map Book, map CT-06-319, J6 and map CT-06-320, A6 to B6);
  - Hoo Green North embankment No.1, 415m in length and up to 13m in height (see Volume 2: MA03 Map Book, map CT-06-320, B6 to D6);
  - Hoo Green North embankment retaining wall No.1, 133m in length and up to 1m above ground level, located to the east of the London to Liverpool junction (northbound) and west of the London to Liverpool junction (southbound), 360m south of A50 Warrington Road overbridge (see Volume 2: MA03 Map Book, map CT-06-320, D5 to E6);
  - Hoo Green North cutting, 860m in length, up to 18m in depth and 122m in width (see Volume 2: MA03 Map Book, map CT-06-320, E6 to G6); and

- Hoo Green West cutting, 295m in length, up to 9m in depth and 35m in width (see Volume 2: MA03 Map Book, map CT-06-320, G6 to J5 and map CT-06-321, A4 to B4).

## Demolitions

- 2.2.31 As set out in Volume 1, as the design develops, it is likely that not all the properties identified for demolition would need to be demolished, for example where not all of the land is required for permanent works.
- 2.2.32 The following have been identified for demolition: 10 residential properties, seven commercial/business properties (including farm outbuildings) and three other structures. These will be needed for construction of the permanent features or, in some cases, to enable the construction works for the Proposed Scheme. Demolitions will be managed from the same construction compounds as the permanent features with which they are associated. The identified demolitions are listed in Section 2.3 under the relevant construction compounds.

## 2.3 Construction of the Proposed Scheme

- 2.3.1 This section describes the key construction activities that are envisaged to be needed to build the Proposed Scheme in the Pickmere to Agden and Hulseheath area. It includes:
- an overview of the construction process;
  - a description of the advance works;
  - a description of the engineering works to build the Proposed Scheme;
  - information on construction waste and material resources;
  - a description of how the Proposed Scheme will be commissioned;
  - an indicative construction programme; and
  - monitoring arrangements during the construction period.
- 2.3.2 The construction arrangements described in this section provide the basis for the assessment presented in this ES.
- 2.3.3 Land used only for construction purposes will be restored as agreed with the owner of the land and the relevant planning authority once construction works on that land are complete.
- 2.3.4 Land will be required permanently for the key features of the Proposed Scheme described in Section 2.2.
- 2.3.5 During the construction phase, public roads and PRoW routes will remain open for public use wherever reasonably practicable. Where such routes cross the Proposed Scheme and require diversion, the alternative road or PRoW crossing the Proposed Scheme will be constructed prior to any closure of existing roads or PRoW, wherever reasonably practicable. Where they cross the Proposed Scheme in proximity to their existing alignment, a temporary alternative alignment may be required. In some instances, diverted or realigned roads or

PRoW may need to pass through areas required for construction of the Proposed Scheme. Routes through these areas will be identified by the nominated undertaker and provided where it is safe and reasonably practicable to do so. The routes through these areas may change over the duration of the construction period.

- 2.3.6 Volume 1, Section 5 and Section 6 provide details of the permanent features of the Proposed Scheme and typical construction techniques. For the purposes of the environmental assessment, standard construction techniques as described in Section 6 of Volume 1 have been assumed.

## Code of Construction Practice

- 2.3.7 All contractors will be required to comply with a Code of Construction Practice (CoCP). In addition, Local Environmental Management Plans (LEMPs) will be produced for each local authority area. The CoCP and LEMPs will be the means of controlling the construction works associated with the Proposed Scheme, and set out monitoring requirements, with the objective of ensuring that the effects of the works on people and the natural environment are reduced as far as reasonably practicable. The CoCP will contain generic control measures and standards to be implemented throughout the construction process. The LEMPs will set out how the project will adapt and deliver the required environmental and community protection measures within each area through the implementation of specific measures required to control dust and other emissions from activities in the area.
- 2.3.8 In addition, HS2 Ltd has produced a Community Engagement Framework<sup>5</sup> which sets out how HS2 Ltd and its contractors, as well as their sub-contractors, will undertake community engagement during the construction of the HS2 project. The framework is being implemented on Phase One of HS2 and will apply to all phases of HS2.
- 2.3.9 The objectives of the framework include:
- to set out how HS2 Ltd and its contractors will undertake community engagement during the construction of the project;
  - to provide clarity and reassurance to HS2 Ltd's stakeholders about how community engagement activity will be managed; and
  - to help HS2 Ltd be a good neighbour to local communities, including by providing accurate and timely information about construction works and offering opportunities to influence them, where appropriate.
- 2.3.10 A draft CoCP has been prepared (see Volume 5: Appendix CT-002-00000). It will remain a draft document through the parliamentary process and the CoCP will be finalised at Royal Assent. The CoCP sets out measures to be implemented by the nominated undertaker.

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<sup>5</sup> High Speed Two Ltd (2017), *Community Engagement Framework*. Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/625971/hs2\\_community\\_engagement\\_framework.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/625971/hs2_community_engagement_framework.pdf).

## Overview of the construction process

- 2.3.11 Building and preparing the Proposed Scheme for operation will comprise the following general stages:
- advance works including: site investigations further to those already undertaken; preliminary mitigation works; preliminary enabling works;
  - civil engineering works including: establishment of construction compounds; site haul routes, site preparation and enabling works; main earthworks and structure works; site restoration; removal of construction compounds where the compound is not required for railway installation works; and associated utility diversions;
  - railway installation works including: establishment of construction compounds; infrastructure installation; connections to utilities; site restoration; and removal of construction compounds;
  - site finalisation works; and
  - systems testing and commissioning.
- 2.3.12 General information about the construction process is set out in more detail in Volume 1, Section 6, and the draft CoCP (see Volume 5: Appendix CT-002-00000) including:
- the approach to environmental management during construction and the role of the CoCP (Section 2);
  - working hours (Section 5);
  - management of construction traffic (Section 14); and
  - handling of construction materials (Section 15).

### Advance works

- 2.3.13 General information about advance works can be found in Volume 1, Section 6. Advance works will be required before the main construction works commence and typically include:
- further detailed site investigations and surveys for proposed construction compounds;
  - further detailed environmental surveys;
  - advance mitigation works including, where appropriate, contamination remediation, habitat creation and translocation, landscape planting and built heritage survey and investigation;
  - advance site access works;
  - site establishment with temporary fence construction;
  - removal of vegetation, and stripping and storing of soil; and
  - utility diversions and new utility connections for facilities associated with the Proposed Scheme.

## Engineering works

### Introduction

- 2.3.14 Construction of the Proposed Scheme will require the following broad types of engineering works in the Pickmere to Agden and Hulseheath area, and within land adjacent to the route:
- civil engineering works, including earthworks such as embankments and cuttings, construction of bridges and viaducts and works to public roads; and
  - works to install, test and commission railway systems, including track, overhead line equipment, communications and signalling equipment and traction power supply.
- 2.3.15 The construction of track and railway systems works will include the installation of track form, rails, infill material, minor drainage works, and installation of electrification, signalling and communication equipment.
- 2.3.16 The construction of the Proposed Scheme will be divided into sections, each of which will be managed from compounds. The compounds will act as the main interface between the construction work sites and the public highway, as well as performing other functions as described below. Compounds will either be main compounds or satellite compounds. Satellite compounds are generally smaller than main compounds. Compounds will either be used for civil engineering works, for railway installation works, or for both.

### General overview of construction compounds

- 2.3.17 Main compounds will be used for core project management staff (i.e. engineering, planning and construction delivery) and commercial and administrative staff. These teams will directly manage some works and coordinate the works at the satellite compounds. In general, a main compound will include:
- space for the storage of bulk materials;
  - space for the receipt, storage and loading and unloading of excavated material;
  - an area for the fabrication of temporary works equipment and finished goods;
  - fuel storage;
  - plant and equipment storage including plant maintenance facilities; and
  - office space for management staff, limited car parking for staff and site operatives, and welfare facilities.
- 2.3.18 Satellite compounds will be used to manage specific works along a section of the route. Depending on the nature and extent of the works to be managed, these satellite compounds could include office accommodation for staff, local storage for plant and materials, car parking for staff and site operatives, and welfare facilities.
- 2.3.19 One main civil engineering compound, A50 Warrington Road main compound, will be located in the Pickmere to Agden and Hulseheath area. This will manage 14 civil engineering satellite compounds in the Pickmere to Agden and Hulseheath area.

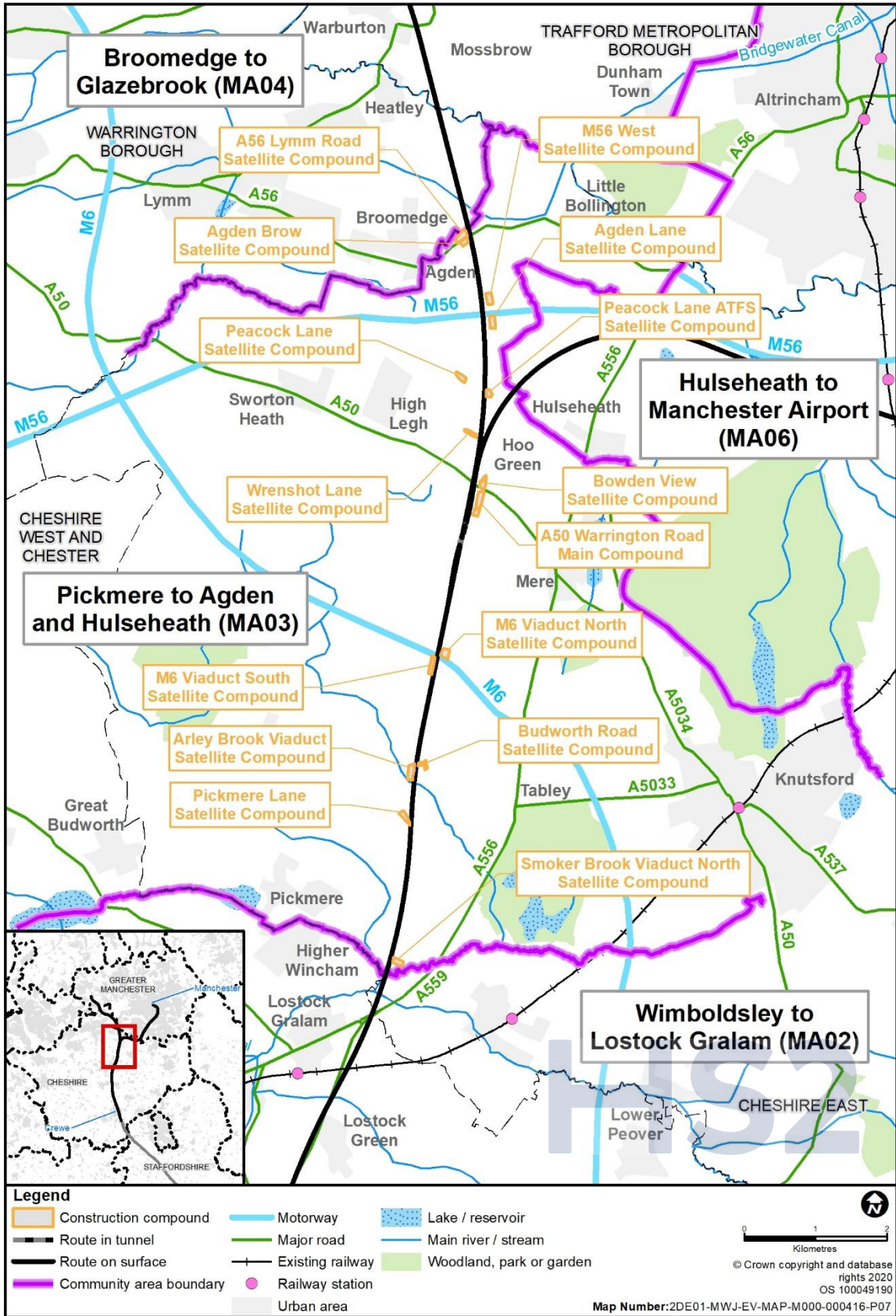


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- 2.3.20 Fourteen civil engineering satellite compounds will be located in the Pickmere to Agden and Hulseheath area, three of which will continue as railway installation satellite compounds following the completion of civil engineering works at those compounds.
- 2.3.21 The location of construction compounds in the Pickmere to Agden and Hulseheath area is shown on Figure 11. Map Series CT-05 (in the Volume 2: MA03 Map Book) show in detail the locations of the construction compounds described below.
- 2.3.22 A number of utility diversions will be required. For the purpose of this assessment, it is assumed that utility diversions in this area will be managed from the compounds listed below.

**Figure 11: Location of construction compounds in the Pickmere to Agden and Hulseheath area**



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- 2.3.23 Figure 12 shows the management relationship for civil engineering works compounds and Figure 13 for the railway installation works. Details of the works associated with individual compounds are provided in subsequent sections of this report.
- 2.3.24 In the Pickmere to Agden and Hulseheath area there will be worker accommodation at A50 Warrington Road main compound for the construction workforce. Details of the location and duration of worker accommodation are provided in the description of the compound.
- 2.3.25 Soil stripped as part of the works, prior to it being used when the land is reinstated, will be stored for the duration of construction. The location of topsoil storage areas will generally be adjacent to compounds and areas of construction activity. These areas are referred to as material stockpiles are shown on maps CT-05-316b to CT-05-322a, in the Volume 2: MA03 Map Book.
- 2.3.26 Some areas will include transfer nodes. Transfer nodes are additional areas of land required to unload, store and load bulk earthworks materials that are moved to and from the site on public highways. These areas will allow material to be transferred between road vehicles and site vehicles during construction to balance traffic movements on the road network. The transfer nodes within the Pickmere to Agden and Hulseheath area are shown on maps CT-05-316b to CT-05-322a in the Volume 2: MA03 Map Book.
- 2.3.27 Further information on the function of compounds is provided in Section 6 of Volume 1 and Section 5 of the draft CoCP. This includes general provisions for the operation of compounds, such as security fencing, lighting, utilities supply, site drainage and codes of worker behaviour.

## **Construction traffic routes, site haul routes and transfer nodes**

- 2.3.28 Construction vehicles, where loaded, will carry materials, plant, other equipment and the workforce. Vehicle movements will take place on public roads, within construction compounds and transfer nodes and between the compounds or transfer nodes and working areas. Where reasonably practicable, movements between the construction compounds or transfer nodes and the working areas will be on designated haul routes within the construction site, often along the line of the route of the Proposed Scheme or running parallel to it.
- 2.3.29 The construction compounds, transfer nodes and railheads will provide the interface between the construction works and the public road or railway network. The likely road routes to access compounds in the Pickmere to Agden and Hulseheath area are described in subsequent sections of this report.

## **Use of borrow pits**

- 2.3.30 The Proposed Scheme will require material with suitable engineering properties for the construction of a high speed railway. This is described as acceptable engineering material

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and will be provided, in part, through excavation of cuttings and other earthworks undertaken to construct the Proposed Scheme. A borrow pit is an area where additional acceptable engineering material will be extracted for use in the construction of the Proposed Scheme.

- 2.3.31 Volume 5: Appendix CT-008-00000 Borrow Pit report sets out the need for and approach to identifying suitable borrow pit locations, as well as the use and restoration strategy for the proposed borrow pits. General information on borrow pits is also provided in Volume 1, Section 6.
- 2.3.32 The borrow pits required for construction of the Proposed Scheme are all located in the Wimboldsley to Lostock Gralam area (MA02). Material from these borrow pits may be used in the construction of earthworks in other areas. Material excavated from tunnels, cuttings and other earthworks as part of the construction of the Proposed Scheme may be used to backfill or restore the borrow pits. This material will, where reasonably practicable, be transported via site haul routes. However, some of the material may be provided from more distant locations across the Proposed Scheme. As such it may be necessary to transport some of this material along public roads.

## **Construction compounds**

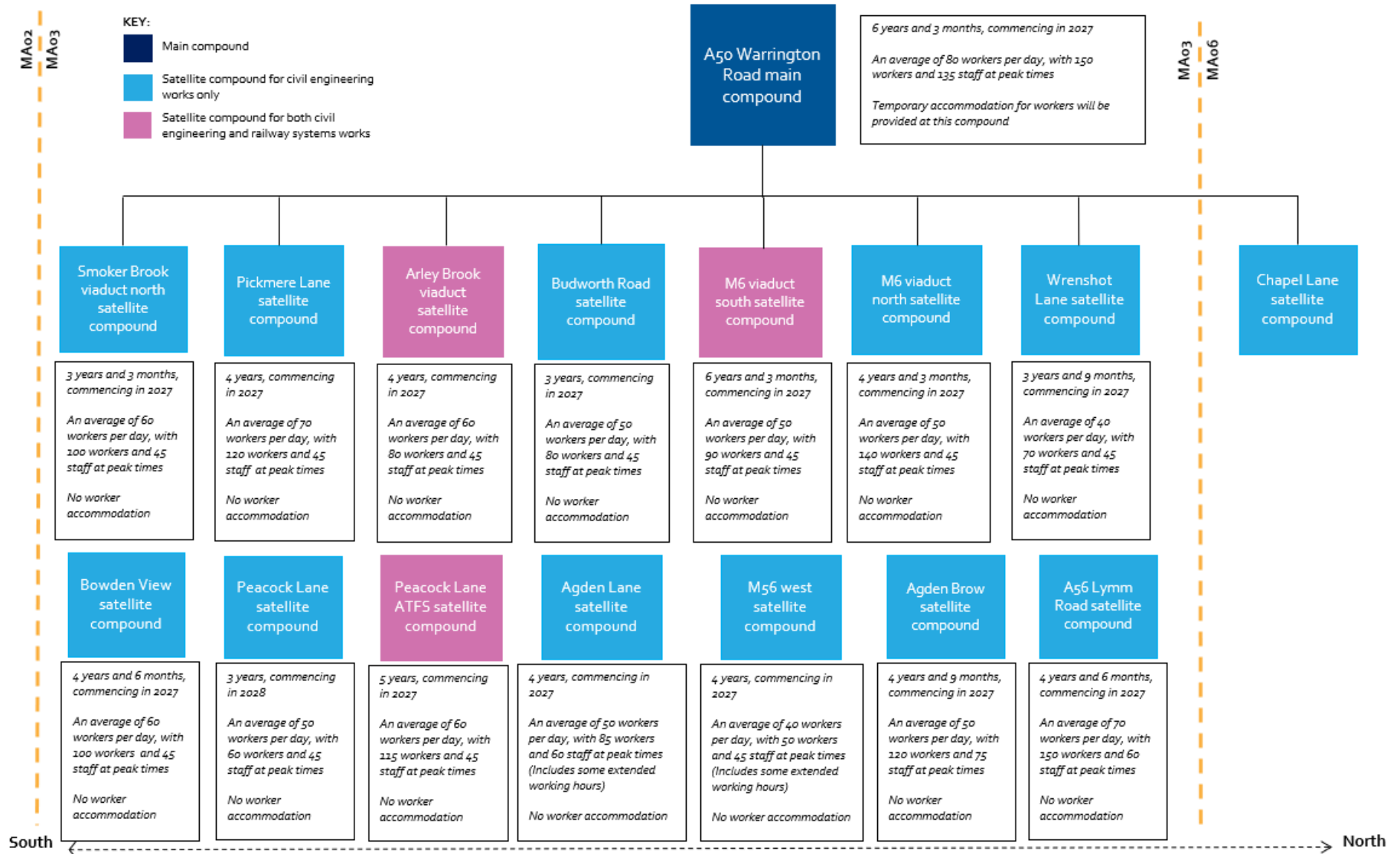
- 2.3.33 This section provides a summary of the works to be managed from the construction compounds in the Pickmere to Agden and Hulseheath area, as illustrated in Figure 12 and Figure 13. All dates and durations of activities and number of workers are indicative. All compounds will undertake initial site set-up works, and at the end of its use, finalisation works including site reinstatement, landscaping and planting (as necessary).

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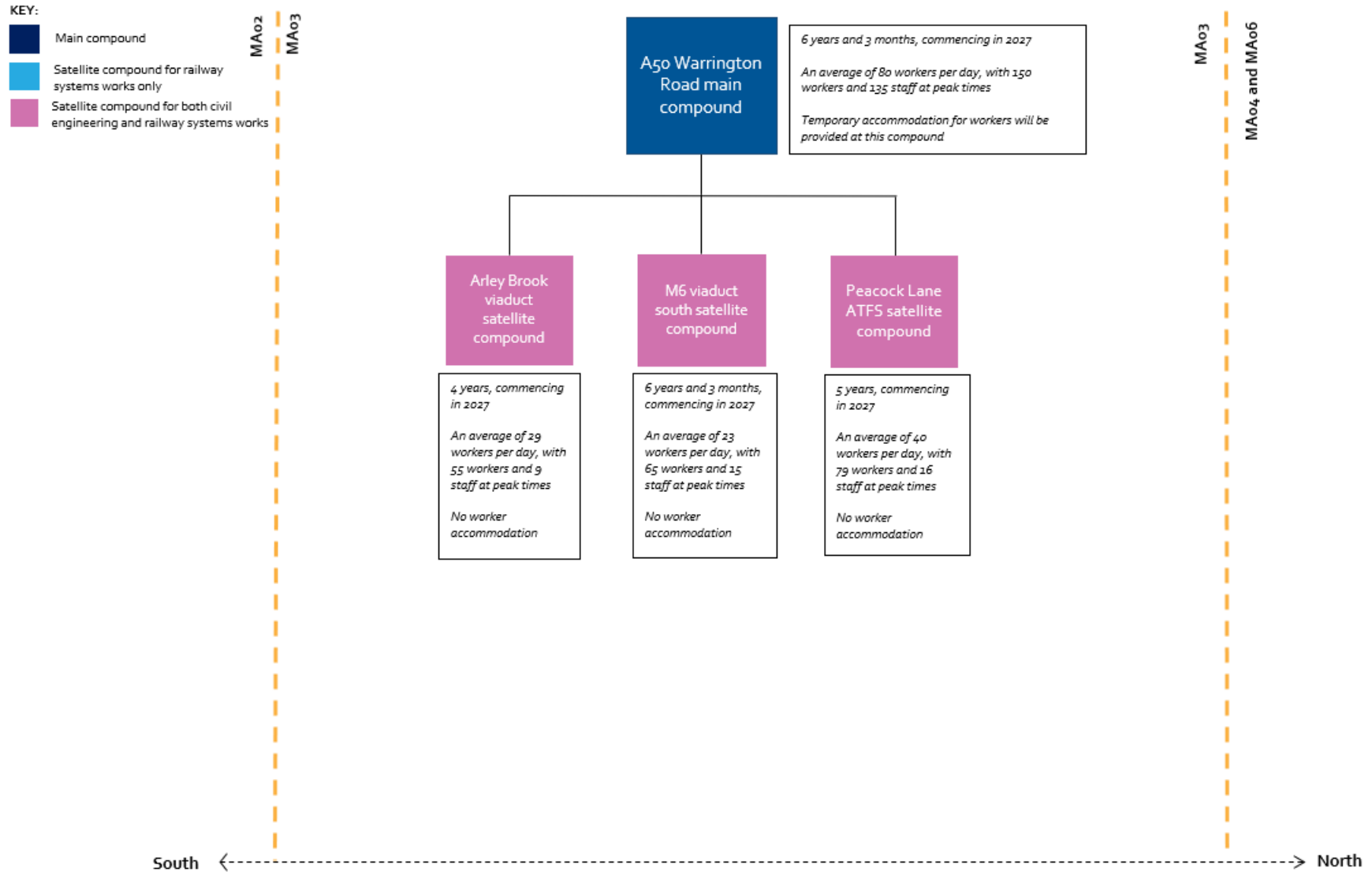
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**Figure 12: Construction compounds for civil engineering works**



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**Figure 13: Construction compounds for railway systems works**



## Smoker Brook viaduct north satellite compound

- 2.3.34 This compound will be used to manage civil engineering works (see Volume 2: MA03 Map Book, map CT-05-316b, G4 to G5). It will:
- provide six temporary material stockpiles immediately to the east and west of the route of the Proposed Scheme (see Volume 2: MA03 Map Book, map CT-05-316b, G4 to J3, H4 to I4 and map CT-05-317, A6, B6 to B7, B7 to D7, C7 to F7 and D7 to F7);
  - provide a transfer node to the north of the compound, accessed from a new access road from the A556 Chester Road (see Volume 2: MA03 Map Book, map CT-05-316b, G5 to I4); and
  - be accessed from a new access road and a site haul route.
- 2.3.35 The works to be managed from this compound will require the demolition of the following buildings and structures, as described in Table 1.

**Table 1: Demolitions required as a result of works to be managed from the Smoker Brook viaduct north satellite compound**

Type	Description	Location	Feature resulting in the demolition
Residential	One residential property	Flittogate Farm, Flittogate Lane, Tabley	Pickmere embankment
Commercial	One commercial property comprising nine farm buildings	Flittogate Farm, Flittogate Lane, Tabley	Pickmere embankment

- 2.3.36 This compound, along with Smoker Brook viaduct south satellite compound in the adjacent Wimboldsley to Lostock Gralam area (MA02), will be used to manage the construction of Smoker Brook viaduct, which will take two years and three months to complete.
- 2.3.37 The compound will also be used to manage the construction of:
- Pickmere embankment, which will take two years and six months to complete; and
  - Footpath Tabley Inferior 1/1 accommodation underbridge, which will take one year and six months to complete.
- 2.3.38 The works to be managed from this compound will require the temporary realignment of Footpath Tabley Inferior 1/1 to the north of its existing alignment for a period of one year and six months, increasing journey length by 206m. On completion of construction, Footpath Tabley Inferior 1/1 will be permanently realigned through Footpath Tabley Inferior 1/1 accommodation underbridge.
- 2.3.39 The works to be managed from this compound will involve the permanent diversion of an underground National Grid 900mm high pressure gas pipeline, which will take one year to complete.
- 2.3.40 In addition, the following utility works will be carried out during the construction period: permanent diversion of minor utilities including a Level 3 telecommunication cable.

## Pickmere Lane satellite compound

- 2.3.41 This compound will be used to manage civil engineering works (see Volume 2: MA03 Map Book, map CT-05-317, H7 to I5). It will:
- provide six temporary material stockpiles immediately to the east and west of the route of the Proposed Scheme (see Volume 2: MA03 Map Book, map CT-05-317, F7 to G6, F7 to H7, G6 to H6, H7 to I6, I7 to J7 and I6 and map CT-05-318, A6 and A7); and
  - be accessed from the B5391 Pickmere Lane, School Lane and a site haul route.
- 2.3.42 No demolitions will be required as a result of the works to be managed from this compound.
- 2.3.43 This compound, along with Arley Brook viaduct satellite compound, will be used to manage the construction of Arley Brook viaduct, which will take one year and six months to complete.
- 2.3.44 The compound will also be used to manage the construction of Footpath Pickmere 9/1 underbridge, which will take one year and nine months to complete.
- 2.3.45 The works to be managed from this compound will require the following works to public roads:
- permanent diversion of Flittogate Lane, 260m to the north of its existing alignment, which will take one year and six months to complete. During the construction period, there will be a temporary realignment of a 210m section of Flittogate Lane. The temporary realignment will enable Flittogate Lane to remain open during construction of the tie-in to the permanent diversion, with a negligible change in journey length. Following the construction period, a new junction will be formed with the realigned B5391 Pickmere Lane at the northern end;
  - permanent realignment of the B5391 Pickmere Lane, 62m to the north of its existing alignment, which will take one year and three months to complete. During the construction period, traffic will be diverted via Flittogate Lane, a section of the permanent Flittogate Lane realignment and the temporary Flittogate Lane realignment, increasing journey length by 358m. Following the construction period, a new junction will be formed with the realigned Flittogate Lane at the eastern end; and
  - permanent realignment of School Lane, which will take one year to complete and will be constructed offline. During the construction period, the road will be temporarily closed and traffic will be diverted via Budworth Road and the B5391 Pickmere Lane, increasing journey length by 2.3km. A new junction will be formed with the realigned B5391 Pickmere Lane and the junction between School Lane realignment and the existing School Lane will be reopened.
- 2.3.46 The works to be managed from this compound will require the following works to PRow:
- temporary realignment of Footpath Tabley Inferior 3/1 to the east and west of the Proposed Scheme for a period of one year, increasing journey length by 1.2km. On completion of construction, Footpath Tabley Inferior 3/1 will be permanently realigned



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through Cheshire Showground South access and Cheshire Showground North access to join Footpath Pickmere 9/1 underbridge; and

- temporary realignment of Footpath Pickmere 9/1 to the west of the Proposed Scheme for a period of one year and six months, increasing journey length by 345m. On completion of construction, Footpath Pickmere 9/1 will be permanently realigned along Flittogate Lane to join the Footpath Pickmere 9/1 underbridge.

2.3.47 The compound will also manage construction of the foundations and building for the Pickmere telecommunications site, which will take one year and six months to complete.

2.3.48 The works to be managed from this compound will involve the permanent diversion of an underground Tata Chemicals Europe 300mm gas pipeline, which will take nine months to complete.

2.3.49 In addition, the following utility works will be carried out during the construction period: permanent diversion or decommissioning of a number of minor utilities including Openreach telecommunication cables, a Scottish Power overhead power line and United Utilities water mains.

## Arley Brook viaduct satellite compound

2.3.50 This compound will be used to manage civil engineering works and railway systems works (see Volume 2: MA03 Map Book, map CT-05-318, B5 to D6). It will:

- be used to manage civil engineering works for a period of three years and three months, and railway systems works for a period of one year and three months;
- provide one temporary material stockpile immediately to the west of the route of the Proposed Scheme (see Volume 2: MA03 Map Book, map CT-05-318, D6 to G6); and
- be accessed from Budworth Road and a site haul route.

2.3.51 The works to be managed from this compound will require demolition of the following buildings and structures, as described in Table 2.

**Table 2: Demolitions required as a result of the works to be managed from the Pickmere Lane satellite compound**

Type	Description	Location	Feature resulting in the demolition
Residential	One residential property comprising one cottage and one outbuilding	Barrhill, Pickmere Lane, Pickmere	Arley Brook viaduct
Residential	One residential property comprising one cottage and one building	Waterless Brook Cottage, Pickmere Lane, Pickmere	Arley Brook viaduct

2.3.52 This compound, along with Pickmere Lane satellite compound, will be used to manage the construction of Arley Brook viaduct, which will take one year and six months to complete.

2.3.53 The compound will also be used to manage the construction of Restricted Byway Tabley Superior 4/1 accommodation underbridge, which will take one year and six months to complete.

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- 2.3.54 The works to be managed from this compound will require the following works to public roads:
- temporary realignment of a 210m section of Flittogate Lane. The temporary realignment will enable Flittogate Lane to remain open during construction of the tie-in to the permanent diversion, with a negligible change in journey length. The temporary realignment will be required for one year and six months; and
  - permanent realignment of Frog Lane, 50m to the west of its existing alignment, which will take six months to complete and will be constructed offline. During the construction period, the road will be temporarily closed and traffic diverted via School Lane and the B5391 Pickmere Lane, increasing journey length by 3km. Following the construction period, a new junction will be formed with Budworth Road and the realigned School Lane.
- 2.3.55 The works to be managed from this compound will require the temporary realignment of Restricted Byway Tabley Superior 4/1 to the south of its existing alignment for a period of one year and six months, increasing journey length by 53m. On completion of construction, Restricted Byway Tabley Superior 4/1 and Hollowood Farm access will be permanently realigned through Restricted Byway Tabley Superior 4/1 accommodation underbridge.
- 2.3.56 The construction of Bongs Wood culvert to realign the Tributary of Tabley Brook 2 under the route of the Proposed Scheme will be managed from this compound, which will take six months to complete.
- 2.3.57 Key railway systems works to be managed from this compound include the construction and installation of Budworth Road auto-transformer station. The construction of the Budworth Road auto-transformer station foundations and building will take one year to complete. The installation of the Budworth Road auto-transformer station railway systems equipment will take one year and three months to complete.
- 2.3.58 In addition, the following utility works will be carried out during the construction period: permanent diversion or decommissioning of a number of minor utilities including Openreach telecommunication cables and Scottish Power overhead power lines.

## **Budworth Road satellite compound**

- 2.3.59 This compound will be used to manage civil engineering works (see Volume 2: MA03 Map Book, map CT-05-318, D6 to C7). It will:
- provide three temporary material stockpiles immediately to the east of the route of the Proposed Scheme (see Volume 2: MA03 Map Book, map CT-05-318, D6 to E6, F6 to G7 and G7);
  - provide a transfer node to the south of the compound, accessed from a new access road from Budworth Road (see Volume 2: MA03 Map Book, map CT-05-318, B6 to D7); and
  - be accessed from Budworth Road and a site haul route.

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2.3.60 The works to be managed from this compound will require demolition of the following buildings and structures, as described in Table 3.

**Table 3: Demolitions required as a result of the works to be managed from the Budworth Road satellite compound**

Type	Description	Location	Feature resulting in the demolition
Residential	One residential property comprising one house and one garage	Windmill House, Budworth Road, Tabley	Heyrose embankment
Residential	One residential property	Cow Lane Cottage (Farm Barn), Heyrose Farm, Heyrose Lane, Tabley	Heyrose embankment
Commercial	One commercial property comprising one glasshouse and one shed	Windmill Nurseries, Budworth Road, Tabley	Heyrose embankment
Commercial	One commercial property comprising eight barns and five silos	Heyrose Farm, Heyrose Lane, Tabley	Heyrose embankment

2.3.61 The compound will be used to manage the construction of Heyrose embankment, which will take two years and nine months to complete.

## M6 viaduct south satellite compound

2.3.62 This compound will be used to manage civil engineering works and railway systems works (see Volume 2: MA03 Map Book, map CT-05-319, A5 to B6). It will:

- be used to manage civil engineering works for a period of three years and nine months commencing in 2027, later followed by railway system works for a period of nine months commencing in 2032;
- provide two temporary material stockpiles immediately to the east and west of the route of the Proposed Scheme (see Volume 2: MA03 Map Book, map CT-05-318, G6 to J6 and H7 to I7); and
- be accessed from a site haul route.

2.3.63 No demolitions will be required as a result of the works to be managed from this compound.

2.3.64 This compound, along with M6 viaduct north satellite compound, will be used to manage the construction of M6 Mere viaduct, which will take three years to complete. The Tributary of Tabley Brook 4 will be realigned around M6 Mere viaduct via an unnamed culvert, which will take up to three months to complete.

2.3.65 This compound, along with M6 viaduct north satellite compound, will be used to manage the temporary closure of all northbound and southbound lanes of the M6 between junctions 19 and 20 for up to six short durations during off peak times, over a period of three years. During these short periods of closure, traffic using the M6 will be diverted via the A556 and the M56, increasing journey length by up to 9.5km. Traffic management will also be required for a period of two years, comprising the narrowing of the existing traffic lanes to achieve enough working space and an access route for construction traffic. The existing three 'live' traffic lanes will be retained in each direction.

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- 2.3.66 Key railway systems installation works to be managed from this compound include switches and crossing works, which will take nine months to complete.
- 2.3.67 The works to be managed from this compound will involve the permanent diversion of a National Grid 400kV overhead line, which will take six months to complete.
- 2.3.68 In addition, the following utility works will be carried out during the construction period: permanent diversion of a number of minor utilities including an Openreach telecommunication cable and Scottish Power overhead power lines.

## M6 viaduct north satellite compound

- 2.3.69 This compound will be used to manage civil engineering works (see Volume 2: MA03 Map Book, map CT-05-319, B7 to C6). It will:
- provide five temporary material stockpiles immediately to the east and west of the route of the Proposed Scheme (see Volume 2: MA03 Map Book, map CT-05-319, C6 to D5, D6 to E6, E6 to F5, E6 to I6 and F5 to H5);
  - provide a transfer node to the east of the compound (see Volume 2: MA03 Map Book, map CT-05-319, B8 to D7); and
  - be accessed from site haul routes connected to the A556 Chester Road via Old Hall Lane.
- 2.3.70 The works to be managed from this compound will require demolition of the following buildings and structures, as described in Table 4.

**Table 4: Demolitions required as a result of the works to be managed from the M6 viaduct north satellite compound**

Type	Description	Location	Feature resulting in the demolition
Residential	One residential property comprising one house	Holly House Farm, Warrington Road, Mere	Hoo Green North cutting
Residential	One residential property comprising one house	Holly House Farm, Warrington Road, Mere	Hoo Green North cutting
Residential	One residential property comprising two buildings	Bowden View Cottage, Bowden View Farm, Bowden View Lane, Mere	Hoo Green North cutting
Residential	One residential property	Willow Barn, Bowden View Farm, Bowden View Lane, Mere	Hoo Green North cutting
Commercial	One commercial property	Lavender Barn, Bowden View Farm, Bowden View Lane, Mere	Hoo Green North cutting
Commercial	One commercial property	Bowden View Farm, Bowden View Lane, Mere	Hoo Green North cutting
Commercial	One commercial property	The Homestead, Bowden View Farm, Bowden View Lane, Mere	Hoo Green North cutting
Commercial	One commercial property	Bowden View Farm (Barn 1), Bowden View Lane, Mere	Hoo Green North cutting
Other	One property comprising four agricultural buildings	Wrenshot House, Wrenshot Lane, High Legh	Hoo Green North cutting

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Type	Description	Location	Feature resulting in the demolition
Other	One property comprising two agricultural buildings	Scandia House Farm, Moss Lane, High Legh	Hoo Green North cutting

- 2.3.71 This compound, along with M6 viaduct south satellite compound, will be used to manage the construction of M6 Mere viaduct, which will take three years to complete.
- 2.3.72 The compound will be used to manage the construction of:
- Hoo Green South embankments No.1, No.2 and No.3, and Hoo Green North embankments No.1 and No.2, each of which will take three years to complete;
  - Bridleway Mere 1/1 accommodation underbridge, which will take one year and three months to complete; and
  - Hoo Green North cutting, which will take four years to complete.
- 2.3.73 The compound will be used to manage the construction of Hoo Green North embankment retaining wall No.1, which will take three years to complete.
- 2.3.74 The works to be managed from this compound will require the temporary realignment of Bridleway Mere 1/1 to the north of its existing alignment for a period of one year, with a negligible change in journey length. On completion of construction, Bridleway Mere 1/1 will be permanently realigned through Bridleway Mere 1/1 accommodation underbridge.
- 2.3.75 This compound, along with M6 viaduct south satellite compound, will be used to manage the temporary closure of all northbound and southbound lanes of the M6 between junctions 19 and 20 for up to six short durations during off peak times, over a period of three years. During these short periods of closure, traffic using the M6 will be diverted via the A556 and the M56, increasing journey length by up to 9.5km. Traffic management will also be required for a period of two years, comprising the narrowing of the existing traffic lanes to achieve enough working space and an access route for construction traffic. The existing three 'live' traffic lanes will be retained in each direction.
- 2.3.76 This compound will be used to manage the construction of Winterbottom culvert to realign the Tributary of Tabley Brook 8 under the route of the Proposed Scheme, which will take nine months to complete.
- 2.3.77 The compound will also manage construction of the foundations and building for Winterbottom Lane telecommunications site, which will take nine months to complete.

## **A50 Warrington Road main compound**

- 2.3.78 This compound (see Volume 2: MA03 Map Book, map CT-05-320, D6 to F7) will be used to manage civil engineering works and railway system works. It will:
- be used to manage civil engineering works for a period of four years and three months commencing in 2027, followed by railway system works for a period of nine months commencing in 2031, and then for a period of six months commencing in 2033;

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- provide five temporary material stockpiles immediately to the east and west of the route of the Proposed Scheme (see Volume 2: MA03 Map Book, map CT-05-319, I5 and map CT-05-320, A5 to B5, C5 to F5, F5 and C6 to D7);
  - provide main compound support to 14 civil engineering satellite compounds and three railway systems compounds in the Pickmere to Agden and Hulseheath area, as illustrated on Figure 12 and Figure 13;
  - be accessed initially via Hoo Green Lane and a new access road from the A50 Knutsford Road, and thereafter from a site haul route; and
  - provide temporary worker accommodation for 155 workers including welfare facilities and parking for three years and nine months (see Volume 2: MA03 Map Book, map CT-05-320, D7).
- 2.3.79 No demolitions will be required as a result of the works to be managed from this compound.
- 2.3.80 The compound will be used to manage the construction of A50 Warrington Road overbridge, which will take two years and nine months to complete.
- 2.3.81 The compound will be used to manage the construction of the following box structure and tunnel:
- Hoo Green box structure, which will take three years and three months to complete; and
  - Hoo Green tunnel, which will take two years and nine months to complete and will be constructed in conjunction with Hoo Green box structure using typical cut and cover construction methods.
- 2.3.82 The compound will be used to manage the construction of the following retaining walls:
- Hoo Green South embankment No.2 retaining wall, which will take one year and three months to complete;
  - Hoo Green South cutting retaining wall, which will take four years to complete; and
  - Hoo Green North embankment retaining wall No.2, which will take one year and nine months to complete.
- 2.3.83 This compound, along with Bowden View satellite compound, will be used to manage the construction of Hoo Green North cutting retaining wall, which will take four years to complete.
- 2.3.84 The works to be managed from this compound will require the following works to public roads:
- permanent diversion of Hoo Green Lane, up to 450m to the west of its existing alignment, which will take two years and six months to complete. During the construction period, Hoo Green Lane will be temporarily diverted, increasing journey length by 792m. The diversion will be constructed in phases. The southern section of the diversion will be completed up to its intersection with the A50 Warrington Road temporary realignment, where it will form the minor arm of a temporary priority-controlled T-junction. The northern section of the Hoo Green Lane diversion will be completed in conjunction with

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the construction of A50 Warrington Road overbridge and the permanent A50 Warrington Road realignment; and

- permanent realignment of the A50 Warrington Road, 15m to the south of its existing alignment, which will take two years and nine months to complete. During construction, a 700m section of the A50 Warrington Road will be temporarily realigned 80m to the south of the existing alignment, increasing journey length by 32m. On completion of construction, the A50 Warrington Road will cross the Proposed Scheme via A50 Warrington Road overbridge.

2.3.85 Key railway systems installation works to be managed from this compound include the installation of Hoo Green box portal building for a period of nine months, followed by installation of switches and crossings for a period of six months.

2.3.86 The works to be managed from this compound will involve the following works to utilities:

- permanent diversion of an underground National Grid 900mm high pressure gas pipeline, which will take two years to complete; and
- permanent diversion of a Scottish Power 132kV overhead power line, which will take nine months to complete.

2.3.87 In addition, the following utility works will be carried out during the construction period: permanent diversion or decommissioning of a number of minor utilities including Zayo, Openreach, Virgin and Vodafone telecommunication cables, United Utilities water mains, Scottish Power overhead power lines and a Cadent gas main.

## **Wrenshot Lane satellite compound**

2.3.88 This compound will be used to manage civil engineering works (see Volume 2: MA03 Map Book, map CT-05-320, J4 to I5 and map CT-05-321, A2 to A4). It will:

- provide four temporary material stockpiles immediately to the west and east of the route of the Proposed Scheme (see Volume 2: MA03 Map Book, map CT-05-320, I5 and map CT-05-321, A4 to B4, A5 to B5, B5 to B6);
- provide a transfer node to the north of the compound (see Volume 2: MA03 Map Book, map CT-05-320, J4 to J5 and map CT-05-321, A2 to B4); and
- be accessed from site haul routes.

2.3.89 No demolitions will be required as a result of the works to be managed from this compound.

2.3.90 The compound will be used to manage the construction of High Legh cutting, which will take three years and three months to complete.

2.3.91 The works to be managed from this compound will involve the following works to utilities:

- permanent diversion of a National Grid 400kV overhead line, which will take six months to complete;

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- permanent diversion of an underground National Grid 900mm high pressure gas pipeline, which will take two years to complete; and
- permanent diversion of an underground Cadent Gas 300mm high pressure gas pipeline, which will take two years to complete.

2.3.92 In addition, the following utility works will be carried out during the construction period: permanent diversion or decommissioning of a number of minor utilities including Zayo, Openreach, Virgin and Vodafone telecommunication cables, United Utilities water mains, Scottish Power overhead power lines, a National Grid overhead power line and a Cadent gas main.

## **Bowden View satellite compound**

2.3.93 This compound will be used to manage civil engineering works (see Volume 2: MA03 Map Book, map CT-05-320, F7 to G7). It will:

- provide three temporary material stockpiles immediately to the east of the HS2 Manchester spur (see Volume 2: MA03 Map Book, map CT-05-320, F6 to I6, map CT-05-320, I6 to map CT-05-321, B6 and map CT-05-321, B7 to C7);
- provide a transfer node to the north of the compound (see Volume 2: MA03 Map Book, map CT-05-320, F6 to J7); and
- be accessed from Bowden View Lane.

2.3.94 The works to be managed from this compound will require demolition of the following buildings and structures, as described in Table 5.

**Table 5: Demolitions required as a result of the works to be managed from the Bowden View satellite compound**

<b>Type</b>	<b>Description</b>	<b>Location</b>	<b>Feature resulting in the demolition</b>
Other	One property comprising three barns/outbuildings	Broom Manor, Peacock Lane, High Legh, Knutsford	Hulseheath South embankment

2.3.95 The compound will be used to manage the construction of:

- Hulseheath South embankment, which will take one year and nine months to complete;
- Hulseheath North embankment, which will take one year and nine months to complete; and
- Hoo Green West cutting, which will take four years to complete.

2.3.96 This compound, along with A50 Warrington Road main compound, will be used to manage the construction of Hoo Green North cutting retaining wall, which will take four years to complete.



## **Chapel Lane satellite compound**

- 2.3.97 This compound will be located within the Hulseheath to Manchester Airport area (MA06). It is described in Volume 2: Community Area report, Hulseheath to Manchester Airport (MA06).
- 2.3.98 The compound will be used to manage the construction of Peacock Lane viaduct within the Pickmere to Agden and Hulseheath area, which will take one year to complete.
- 2.3.99 The compound will be used to manage the permanent realignment of Peacock Lane within the Pickmere to Agden and Hulseheath area, 150m north of its existing alignment, which will take one year to complete. During construction, sections of Peacock Lane will be closed. Closures will be on a rolling and staggered basis to ensure access to properties on Peacock Lane and Back Lane is retained. Users travelling between Hulseheath and High Legh will be temporarily diverted via Chapel Lane, the B5569 Chester Road, the A50 Knutsford Road/Warrington Road, the B5159 West Lane and Peacock Lane, increasing journey length by up to 8.6km. On completion of construction, Peacock Lane will cross beneath the HS2 Manchester spur via Peacock Lane viaduct.
- 2.3.100 No demolitions will be required within the Pickmere to Agden and Hulseheath area as a result of the works to be managed from this compound.
- 2.3.101 This compound, along with Peacock Lane ATFS satellite compound, will be used to manage the following watercourse diversion and drainage works within the Pickmere to Agden and Hulseheath area:
- Millington Clough offline culvert No. 1 to convey the Tributary of Millington Clough 2 under the HS2 Manchester spur, which will take nine months to complete;
  - Millington Clough offline culvert No. 2 to divert the Tributary of Millington Clough 1 under the HS2 Manchester spur, which will take nine months to complete; and
  - Millington Clough offline culvert No. 3 to realign the Tributary of Millington Clough 1 under the HS2 Manchester spur, which will take nine months to complete.

## **Peacock Lane satellite compound**

- 2.3.102 This compound will be used to manage civil engineering works (see Volume 2: MA03 Map Book, map CT-05-321, D2, E1 to E3). It will be accessed primarily via Peacock Lane.
- provide two temporary material stockpiles to the west of the route of the Proposed Scheme (see Volume 2: MA03 Map Book, map CT-05-321, C4 to D4 and D4); and
  - be accessed from Peacock Lane and a site haul route.
- 2.3.103 No demolitions will be required as a result of the works to be managed from this compound.
- 2.3.104 The compound will be used to manage the construction of Peacock Lane overbridge, which will take three years to complete.
- 2.3.105 The works to be managed from this compound will include the construction of Millington Clough culvert to divert the Tributary of Millington Clough 3 and realign the Tributary of

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Millington Clough 2 under the route of the Proposed Scheme, which will take nine months to complete.

- 2.3.106 The works to be managed from this compound will require the permanent realignment of Peacock Lane, which will take three years to complete. During construction, sections of Peacock Lane will be closed. Closures will be on a rolling and staggered basis to ensure access to properties on Peacock Lane and Back Lane is retained. Users travelling between Hulseheath and High Legh will be temporarily diverted via Chapel Lane, the B5569 Chester Road, the A50 Knutsford Road/Warrington Road, the B5159 West Lane and Peacock Lane, increasing journey length by up to 8.6km. On completion of construction, Peacock Lane will cross the route of the Proposed Scheme via Peacock Lane overbridge.

### **Peacock Lane ATFS satellite compound**

- 2.3.107 This compound will be used to manage civil engineering works and railway systems works (see Volume 2: MA03 Map Book, map CT-05-321, C5 to D6). It will:
- be used to manage civil engineering works for a period of three years and six months, and railway systems works for a period of two years;
  - provide four temporary material stockpiles immediately to the east of the route of the Proposed Scheme and to the west of the HS2 Manchester spur (see Volume 2: MA03 Map Book, map CT-05-321, B6 to C6, C6 to C7, C7 to D7 and D5); and
  - be accessed from Peacock Lane.
- 2.3.108 No demolitions will be required as a result of the works to be managed from this compound.
- 2.3.109 The compound will be used to manage the construction of Millington Clough aqueduct, which will take two years and three months to complete. The Tributary of Millington Clough 4 will be realigned over the route of the Proposed Scheme via Millington Clough aqueduct, which will take up to three months to complete.
- 2.3.110 The compound will be used to manage the construction of High Legh cutting retaining wall, which will take one year and three months to complete.
- 2.3.111 Key railway systems works to be managed from this compound include:
- construction and installation of Peacock Lane auto-transformer feeder station with associated disconnecter. The construction of the Peacock Lane auto-transformer feeder station foundations and building will take one year and three months to complete. The construction of the Peacock Lane auto-transformer feeder station disconnecter will take one year and three months to complete. The installation of the Peacock Lane auto-transformer feeder station railway systems equipment will take two years to complete; and
  - the installation of Peacock Lane grid supply point, which will take nine months to complete.

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- 2.3.112 This compound, along with Chapel Lane satellite compound in the adjacent Hulseheath to Manchester Airport area (MA06), will be used to manage the following watercourse diversion and drainage works:
- Millington Clough offline culvert No. 1 to convey the Tributary of Millington Clough 2 under the HS2 Manchester spur, which will take nine months to complete;
  - Millington Clough offline culvert No. 2 to divert the Tributary of Millington Clough 1 under the HS2 Manchester spur, which will take nine months to complete; and
  - Millington Clough offline culvert No. 3 to realign the Tributary of Millington Clough 1 under the HS2 Manchester spur, which will take nine months to complete.
- 2.3.113 The works to be managed from this compound will involve the provision of a new Scottish Power 11kV underground cable, which will take six months to complete.
- 2.3.114 In addition, the following utility works will be carried out during the construction period: permanent diversion or decommissioning of a number of minor utilities including an Openreach telecommunication cable, a United Utilities water main and Scottish Power overhead power lines.

## **Agden Lane satellite compound**

- 2.3.115 This compound will be used to manage civil engineering works (see Volume 2: MA03 Map Book, map CT-05-321, H5 to I6). It will:
- provide three temporary material stockpiles immediately to the east and west of the route of the Proposed Scheme (see Volume 2: MA03 Map Book, map CT-05-321, E4 to H4, E5 to G5 and H5); and
  - be accessed from a site haul route.
- 2.3.116 No demolitions will be required as a result of the works to be managed from this compound.
- 2.3.117 This compound, along with M56 west satellite compound, will be used to manage the construction of M56 West overbridge, which will take three years and six months to complete.
- 2.3.118 The compound will also be used to manage the construction of NPR Manchester to Liverpool junction overbridge, which will take one year to complete.
- 2.3.119 The works to be managed from this compound, along with M56 west satellite compound, will require the temporary realignment of an 800m section of the M56 between junctions 8 and 9, 50m to the north of its existing alignment, for a period of three years and six months, increasing journey length by 20m. Traffic management will be required to construct the crossovers and to reinstate the carriageways at the interface with the existing alignment. Overnight closures will be required during this period. On completion of construction, the M56 will cross the route of the Proposed Scheme via M56 West overbridge.
- 2.3.120 In addition, the following utility works will be carried out during the construction period: permanent diversion or decommissioning of a number of minor utilities including an

Openreach telecommunication cable, United Utilities water mains and Scottish Power overhead power lines.

## **M56 west satellite compound**

- 2.3.121 This compound will be used to manage civil engineering works (see Volume 2: MA03 Map Book, map CT-05-322a, A5 to B5). It will:
- provide four temporary material stockpiles immediately to the east of the route of the Proposed Scheme (see Volume 2: MA03 Map Book, map CT-05-321, J3 and map CT-05-322a, A7 to B5, B5 to D4 and E4 to F5); and
  - be accessed from a site haul route.
- 2.3.122 No demolitions will be required as a result of the works to be managed from this compound.
- 2.3.123 This compound, along with Agden Lane satellite compound, will be used to manage the construction of M56 West overbridge, which will take three years and six months to complete.
- 2.3.124 The works to be managed from this compound, along with Agden Lane satellite compound, will require the temporary realignment of an 800m section of the M56 between junctions 8 and 9, 50m to the north of its existing alignment, for a period of three years and six months, increasing journey length by 20m. Traffic management will be required to construct the crossovers and to reinstate the carriageways at the interface with the existing alignment. Overnight closures will be required during this period. On completion of construction, the M56 will cross the Proposed Scheme via M56 West overbridge.

## **Agden Brow satellite compound**

- 2.3.125 This compound will be used to manage civil engineering works (see Volume 2: MA03 Map Book, map CT-05-322a, E3 and F3 to F4) in the Pickmere to Agden and Hulseheath area, for a period of four years and three months. It will:
- provide one temporary material stockpile immediately to the west of the route of the Proposed Scheme (see Volume 2: MA03 Map Book, map CT-05-322a, B3 to D4);
  - provide a transfer node to the south of the compound (see Volume 2: MA03 Map Book, map CT-05-322a, E4 to F2); and
  - be accessed from the A56 Lymm Road and a site haul route.
- 2.3.126 The works to be managed from this compound will require demolition of the following buildings and structures within the Pickmere to Agden and Hulseheath area, as described in Table 6.

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**Table 6: Demolitions required as a result of the works to be managed from the Agden Brow satellite compound**

Type	Description	Location	Feature resulting in the demolition
Residential	One residential property comprising one house with attached garage	Hollybank House (Four Acres), Lymm Road, Lymm	Lymm South embankment

- 2.3.127 The compound will be used to manage the construction of the following within the Pickmere to Agden and Hulseheath area:
- Agden cutting, which will take three years and nine months to complete;
  - Lymm South embankment, which will take three years and six months to complete; and
  - Lymm North embankment, which will take two years and six months to complete.
- 2.3.128 The works to be managed from this compound will require the permanent closure of Hollybank House access within the Pickmere to Agden and Hulseheath area.
- 2.3.129 The works to be managed from this compound will involve the permanent underground diversion of a Cadent Gas 600mm high pressure gas pipeline within the Pickmere to Agden and Hulseheath area, which will take nine months to complete.
- 2.3.130 In addition, the following utility works will be carried out during the construction period: permanent diversion of minor utilities including a Cadent gas main.

## **A56 Lymm Road satellite compound**

- 2.3.131 This compound (shown on Volume 2: MA03 Map Book, map CT-05-322a, F2 to G4) will be located primarily in the Pickmere to Agden and Hulseheath area. A small section of this compound will extend into the Broomedge to Glazebrook area (MA04). It will be used to manage civil engineering works in the Pickmere to Agden and Hulseheath area for a period of two years commencing in 2027, and then for a period of six months commencing in 2030, and civil engineering works in the Broomedge to Glazebrook area (MA04) for a period of three years and three months, which are described in Volume 2: Community Area report, Broomedge to Glazebrook (MA04).
- 2.3.132 It will provide two temporary material stockpiles immediately to the west of the route of the Proposed Scheme (see Volume 2: MA03 Map Book, map CT-05-322a, F4 to G4 and G4 to H4), and be accessed from the A56 Lymm Road.
- 2.3.133 No demolitions will be required within the Pickmere to Agden and Hulseheath area as a result of the works to be managed from this compound.
- 2.3.134 The compound will be used to manage the construction of the following within the Pickmere to Agden and Hulseheath area:
- Agden Brook Farm accommodation underbridge, which will take one year and three months to complete; and
  - A56 Lymm Road viaduct, which will take two years to complete.

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- 2.3.135 The works to be managed from this compound will require the following works to public roads within the Pickmere to Agden and Hulseheath area:
- permanent diversion of Agden Brook Farm access, which will take one year and three months to complete and will be constructed offline. On completion of construction, Agden Brook Farm access will cross the route of the Proposed Scheme via Agden Brook Farm accommodation underbridge; and
  - temporary realignment of an 800m section of the A56 Lymm Road, 50m to the south-east of its existing alignment, for a period of one year and three months, increasing journey length by 14m. On completion of construction, the A56 Lymm Road will cross the route of the Proposed Scheme via A56 Lymm Road viaduct.
- 2.3.136 The works to be managed from this compound will require the following works to PRow within the Pickmere to Agden and Hulseheath area:
- temporary diversion of Footpath Agden 4/1 along Footpath Agden 1/4, Footpath Agden 1/1, Footpath Agden 2/4, Footpath Agden 2/3 and Agden Lane, increasing journey length by 701m. On completion of construction, users will be permanently diverted along Footpath Agden 1/4, Footpath Agden 1/1, Footpath Agden 2/4 diversion, Footpath Agden 3/3, Footpath Agden 2/3 and Agden Lane;
  - temporary diversion of Footpath Agden 2/4 along Footpath Agden 3/3, Footpath Agden 2/4 diversion and Footpath Agden 1/2, increasing journey length by 500m. On completion of construction, users will be permanently diverted along Footpath Agden 3/3 and Footpath Agden 2/4 diversion; and
  - temporary diversion of Footpath Agden 1/2 along Footpath Agden 2/4 diversion, Footpath Agden 3/3 and Footpath Agden 2/4, increasing journey length by 500m. On completion of construction, users will be permanently diverted along Footpath Agden 2/4 diversion.
- 2.3.137 The compound will also manage construction of the foundations and building for A56 Lymm Road telecommunications site within the Pickmere to Agden and Hulseheath area, which will take six months to complete.
- 2.3.138 In addition, the following utility works will be carried out during the construction period: permanent diversion or decommissioning of a number of minor utilities including an Openreach telecommunication cable and Scottish Power overhead power lines.

## **Construction waste and material resources**

- 2.3.139 Excavated material generated across the Proposed Scheme will be reused as engineering fill material or in the environmental mitigation earthworks of the Proposed Scheme, where suitable and reasonably practicable.
- 2.3.140 Forecasts of the amount of construction, demolition and excavation waste (CDEW) that will be produced during construction of the Proposed Scheme are reported in Volume 3, Route-wide effects.

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- 2.3.141 Local excess or shortfall of excavated material within the Pickmere to Agden and Hulseheath area will be managed through the mitigation earthworks design approach adopted for the Proposed Scheme, as well as the use of borrow pits in other community areas, with the aim of contributing to an overall balance of excavated material on a route-wide basis. The overall balance of excavated material will be presented in Volume 3, Section 15.
- 2.3.142 Forecasts of the amount of waste generated at temporary worker accommodation sites will be reported in Volume 3, Section 15.

## **Commissioning of the railway**

- 2.3.143 Commissioning is the process of testing the infrastructure to ensure that it operates as expected. It will be carried out in the period prior to opening. Further details are provided in Volume 1, Section 6.

## **Construction programme**

- 2.3.144 A construction programme illustrating indicative periods for each of the core construction activities described above is provided in Figure 14.

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**Figure 14: Indicative construction programme between 2025 and 2035**

Pickmere to Agden and Hulseheath area	2025 Quarters				2026 Quarters				2027 Quarters				2028 Quarters				2029 Quarters				2030 Quarters				2031 Quarters				2032 Quarters				2033 Quarters				2034 Quarters				2035 Quarters							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
<b>Construction activity</b>	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Area advance works (MA03)	█	█	█	█	█	█	█	█	█	█	█	█																																				
<b>Smoker Brook Viaduct North satellite compound</b>													█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█																				
Site preparation and setup													█	█	█	█																																
Footpath Tabley Inferior 1/1 accommodation underbridge													█	█	█	█	█	█	█	█																												
Smoker Brook viaduct													█	█	█	█	█	█	█	█	█	█	█	█																								
Pickmere embankment													█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█																				
Site reinstatement																									█	█	█	█																				
<b>Pickmere Lane satellite compound</b>									█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█																				
Site preparation and setup									█	█	█	█																																				
Cheshire Showground North access diversion									█	█	█	█																																				
Cheshire Showground South access diversion									█	█	█	█																																				
School Lane realignment									█	█	█	█																																				
Arley Brook viaduct									█	█	█	█	█	█	█	█																																
Flittogate Lane diversion													█	█	█	█	█	█	█	█																												
B5391 Pickmere Lane realignment																	█	█	█	█	█	█	█	█																								
Footpath Pickmere 9/1 underbridge																	█	█	█	█	█	█	█	█	█	█	█	█																				
Pickmere telecommunications site (civil works)																									█	█	█	█	█	█	█	█																
Site reinstatement																													█	█	█	█																













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Pickmere to Agden and Hulseheath area	2025 Quarters				2026 Quarters				2027 Quarters				2028 Quarters				2029 Quarters				2030 Quarters				2031 Quarters				2032 Quarters				2033 Quarters				2034 Quarters				2035 Quarters							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
<b>Construction activity</b>																																																
Agden Brook Farm accommodation underbridge																																																
A56 Lymm Road viaduct																																																
A56 Lymm Road telecommunications site (civil works)																																																
Site reinstatement																																																
<b>Track laying and testing and commissioning</b>																																																
Area track laying																																																
Testing and commissioning																																																

## Monitoring during construction

- 2.3.145 The appointed contractor will be required to undertake the necessary monitoring for each environmental topic to comply with the requirements of the CoCP, the relevant LEMP and any additional consent requirements. Any actions that may be necessary for compliance will be reported to the nominated undertaker and remedial action identified.
- 2.3.146 The CoCP and the relevant LEMP will set out inspection and monitoring procedures to assess the effectiveness of measures to prevent or reduce environmental effects during construction. Relevant local authorities and consenting authorities, such as the Environment Agency, will be consulted on the monitoring procedures to be implemented prior to construction commencement, as appropriate.

## 2.4 Operation of the Proposed Scheme

### Introduction

- 2.4.1 This section describes the operational characteristics of the Proposed Scheme in the Pickmere to Agden and Hulseheath area. Volume 1, Section 4 describes the envisaged operational characteristics of the Proposed Scheme as a whole, including Phase One, Phase 2a and Phase 2b.

### HS2 services

- 2.4.2 It is anticipated that there will be the following train flows through the Pickmere to Agden and Hulseheath area:
- up to nine trains per hour each way on the route of the Proposed Scheme south of HS2 Manchester spur;
  - up to six trains per hour each way on HS2 Manchester spur; and
  - up to three trains per hour each way on the route of the Proposed Scheme north of HS2 Manchester spur.
- 2.4.3 Services are expected to operate between 05:00 and midnight from Monday to Saturday and between 08:00 and midnight on Sunday.
- 2.4.4 In this area, trains will run at speeds up to 225mph (360kph) except on the route of the Proposed Scheme north of HS2 Manchester spur, where they will run at speeds up to 200mph (320kph). The trains will be either single 200m trains or two 200m trains coupled together, depending on demand and time of day.

### Maintenance

- 2.4.5 Volume 1, Section 4 describes the maintenance regime for the Proposed Scheme.

2.4.6 Provision for railway maintenance vehicles will be made at Crewe North rolling stock depot in the Wimboldsley to Lostock Gralam area (MA02). Further information on this depot can be found in Volume 2: Community Area report: Wimboldsley to Lostock Gralam (MA02).

## **Operational waste and material resources**

2.4.7 The assessment of the likely significant environmental effects associated with the disposal of operational waste has been undertaken for the Proposed Scheme as a whole and is reported in Volume 3, Section 15.

2.4.8 Forecasts of the amount of waste arising from track maintenance and ancillary infrastructure and the associated potential significant environmental effects are provided in Volume 5: Appendix WM-001-00000.

## **Monitoring during operation**

2.4.9 The nominated undertaker will be responsible for monitoring during operation of the Proposed Scheme. General monitoring measures during operation are set out in area-specific monitoring measures for each environmental topic area, which are presented in Sections 4 to 15 of this report.

2.4.10 Relevant local authorities and consenting authorities, such as the Environment Agency, will be consulted on the monitoring procedures to be implemented during operation prior to construction commencement.

## **2.5 Route section alternatives**

### **Introduction**

2.5.1 The Proposed Scheme described in Section 2.2 has been selected following design development, which included consideration of environmental impacts.

2.5.2 The Alternatives Report (Volume 5: Appendix CT-003-00000) describes the local alternatives considered as part of the design development of the Proposed Scheme. Local alternative options for the following elements of the Proposed Scheme in the Pickmere to Agden and Hulseheath area are reported in Volume 5:

- highway alignment at the B5391 Pickmere Lane;
- Hoo Green auto-transformer feeder station;
- highway alignment at Peacock Lane; and
- provision for a connection to a future NPR London to Liverpool junction.



## **3 Stakeholder engagement and consultation**

### **3.1 Introduction**

- 3.1.1 HS2 Ltd's approach to stakeholder engagement and consultation on the Proposed Scheme is set out in Volume 1, Section 3.
- 3.1.2 Since the initial preferred route announcement in November 2016, HS2 Ltd has carried out a programme of stakeholder engagement and consultation with a broad range of stakeholders.
- 3.1.3 A variety of mechanisms have been used to enable an open and inclusive approach to engagement and consultation, reflecting the differing requirements and expectations of stakeholders.
- 3.1.4 Feedback from stakeholder engagement and the consultations on the working draft Environmental Statement (ES) and design refinements has been considered as part of the design and assessment of the Proposed Scheme presented in this ES.

### **3.2 Key stages of Phase 2b engagement and consultation**

- 3.2.1 This section provides a summary of consultation activities and engagement undertaken or underway in the Pickmere to Agden and Hulseheath area since the initial preferred route announcement. This summary of engagement is in addition to the route wide engagement outlined in Volume 1, Section 3.

#### **Draft EIA Scope and Methodology Report (SMR) consultation**

- 3.2.2 The draft EIA SMR (the 2017 SMR) was consulted on between July and September 2017 and was issued to statutory bodies, non-government organisations and local authorities. It was made available on the [gov.uk](https://www.gov.uk) website, allowing comment by local interest groups and the public. A total of 107 responses to the 2017 SMR were received, as a result of which changes were made. A revised EIA SMR was published in October 2018 (the 2018 SMR) as part of the working draft ES (described in the following section).

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3.2.3 The changes between the draft 2017 SMR and the publication of the 2018 SMR were set out in the EIA SMR Consultation Report<sup>6</sup> also published in October 2018. The assessment set out in this ES follows the scope and methodology in the EIA SMR<sup>7</sup> in Volume 5 of this ES.

## Consultation on the working draft ES

- 3.2.4 As set out in Volume 1, Section 3, two parallel consultations were undertaken by HS2 Ltd in 2018: a consultation on the working draft ES and a consultation on the working draft EQIA. These consultations were relating to the full Phase 2b Scheme (including both Eastern Leg and Western Leg). As part of the process of consultation, stakeholders were invited to comment on the full Phase 2b scheme and the working draft ES and working draft EQIA Report. Documents were made available on the [gov.uk](https://www.gov.uk) website.
- 3.2.5 As part of the consultation, information events were held in communities along both the Eastern and Western legs of the full Phase 2b route. Within the Pickmere to Agden and Hulseheath area, events were held at High Legh (June 2018).
- 3.2.6 A total of 37,899 responses were received through the consultation on the working draft ES. These responses were analysed. The themes and issues relevant to the Pickmere to Agden and Hulseheath area included commentary on:
- concern about the impact of drainage of the Proposed Scheme upon local farms and water features;
  - impact of construction traffic on local highways in Pickmere and High Legh, and the impact on other local roads as a result of the permanent closure of Budworth Road and Agden Lane;
  - realignment of local roads such as Peacock Lane and Pickmere Lane (the B5391 Pickmere Lane);
  - potential interference on the operation of the Pickmere Telescope arising from electromagnetic interference (EMI) from the operation of the Proposed Scheme;
  - the operational impact of the Proposed Scheme on the Royal Cheshire Show, particularly parking and general access arrangements;
  - impact on local businesses such as Heyrose Golf Club, Windmill Nurseries and Mere Court Hotel;
  - visual impacts to nearby neighbours of the proposed Hoo Green auto-transformer feeder station (now Peacock Lane auto-transformer feeder station) and Hoo Green grid supply point (now Peacock Lane grid supply point); and

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<sup>6</sup> High Speed Two Ltd (2018), *HS2 Phase 2b: Crewe to Manchester and West Midlands to Leeds, Environmental Impact Assessment Scope and Methodology Report, Consultation Summary Report*. Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/745512/HS2\\_Phase\\_2b\\_EIA\\_Scope\\_and\\_Methodology\\_Report\\_Consultation\\_Summary\\_Report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/745512/HS2_Phase_2b_EIA_Scope_and_Methodology_Report_Consultation_Summary_Report.pdf).

<sup>7</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

- concerns raised by residents near Hoo Green Lane about A50 Warrington Road main compound and Bowden View satellite compound located in proximity to their properties; road safety concerns have also been raised about the siting of these compounds.

3.2.7 A working draft ES Consultation Summary Report<sup>8</sup> has been published as part of the ES detailing how consultation responses have been taken into consideration in the development of the Proposed Scheme design and its assessment.

3.2.8 Feedback from that consultation and ongoing stakeholder engagement have been considered as part of the development of the Proposed Scheme, and the assessment and identification of mitigation opportunities for the Pickmere to Agden and Hulseheath area.

## Consultation on design refinements

3.2.9 Design refinements to the Proposed Scheme in the Pickmere to Agden and Hulseheath area were consulted upon between June and September 2019. These involved the inclusion of passive provision for two junctions at High Legh to enable future use of the Proposed Scheme into Manchester for Northern Powerhouse Rail (NPR) services between Manchester, Warrington and Liverpool; and to also allow HS2 services between London and Liverpool to use future NPR infrastructure. Details of the proposed design refinements, along with supporting information such as visualisations and plan and profile maps, were made available in public locations and online at the [gov.uk](https://www.gov.uk) website. As part of this process, stakeholders were invited to comment on design refinements made to the full Phase 2b scheme since the working draft ES consultation.

3.2.10 As part of the design refinement consultation, information events were held in areas where design refinements were being consulted. Within the Pickmere to Agden and Hulseheath area, information events were held at Mere (June 2019).

3.2.11 A total of 1,307 responses were received through the consultation on the 11 design refinements across the full Phase 2b scheme. These responses were analysed and the themes and issues relevant to the Pickmere to Agden and Hulseheath area included:

- benefits for NPR connectivity and future rail connectivity in general;
- benefits for the local economy, businesses and jobs, and the economies of Liverpool, Warrington, and the north of England;
- the impact on local communities, including the impact on peoples' homes and the value of property in the vicinity of the Proposed Scheme, and impacts on local leisure and recreational facilities;
- concerns regarding the proposed location of NPR London to Liverpool junction and the associated Hoo Green box structure;
- negative consequences on green space, the countryside and the local landscape;
- concern about construction traffic and general traffic congestion, and road safety issues;

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<sup>8</sup> Volume 5: Appendix CT-007-00001, *Working Draft Environmental Statement: Consultation Summary Report*.

- impacts on local ecology and biodiversity in the High Legh area; and
- concern about the generation of noise nuisance during construction and operation.

3.2.12 A summary of the comments received is available at the [gov.uk](https://www.gov.uk) website.

## 3.3 Engagement and consultation with stakeholder groups

### Communities

- 3.3.1 Community stakeholders in the Pickmere to Agden and Hulseheath area include a range of local interest groups, local facility and service providers, places of worship, schools and educational establishments, cultural, leisure and sports stakeholders.
- 3.3.2 The purpose of this engagement has been to provide affected communities with information on the development of the Proposed Scheme and to give the opportunity to raise issues in relation to the design and assessment of the Proposed Scheme. Feedback from communities has helped inform the baseline information and evolving assessment of impacts in this ES and concurrent EQIA, as well as identify opportunities for mitigation within the design.
- 3.3.3 Programmes of public information events were held to share new information with communities and engage them on it. HS2 Ltd notified people of these by sending leaflets to addresses along the route, advertising in local media and via social media. Public information events were held in September 2017, between June and July 2018, October and December 2018, June and July 2019. In October and November 2020, information events were held using online channels including webinars and a virtual exhibition room. Information events were held in June and July 2021 using a combination of in-person information events and online webinars. Members of local communities and other interested parties were invited to engage on issues pertinent to the development of the Proposed Scheme design and its assessment.
- 3.3.4 Engagement has been, and will continue to be, undertaken with community stakeholders, particularly those close to the Proposed Scheme. These stakeholders include educational establishments, organisations with specialist interests or those catering to the needs of vulnerable people within the community. This has informed the assessment of community and health impacts in this ES, whilst also informing the concurrent EQIA.
- 3.3.5 Table 7 summarises key engagement undertaken with community stakeholders to date, including the focus of the engagement and how this has informed the design and assessment of the Proposed Scheme.

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**Table 7: Engagement to date with community stakeholders**

Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Cheshire East Local Access Forum	Meeting to discuss the interface between the Proposed Scheme and use of open space and public rights of way (PRoW).	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required for PRoW.
Cheshire East Voluntary Action	Meeting to provide an update on the Proposed Scheme and discuss consultation activities. Also provided an opportunity to understand their areas of concerns and potential impacts on the wider community group and identify ways of engaging with local community groups.	Information has been used to inform understanding of baseline conditions of the Proposed Scheme as well as potential impacts on the local community.
Cheshire Health Care Partnership	Meeting to discuss the Proposed Scheme through Cheshire and provide an update on consultation activities.	Information has been used to inform understanding of the Proposed Scheme and the consultation process to ensure local issues are considered in the assessment and design development process.
Community and Volunteering Services (CVS) - Cheshire East	Meeting to discuss the Proposed Scheme through Cheshire and provide an update on consultation activities.	Information has been used to inform local understanding of the Proposed Scheme and the consultation process to ensure local issues are considered in the assessment and design development process.
High Legh Primary School	Meeting to discuss the Proposed Scheme and to provide an update on consultation activities. In addition, HS2 Ltd made the school aware of the support and educational opportunities. This also provided an opportunity to inform the EQIA.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
Hoo Green Residents Team	Series of meetings to discuss concerns over the location of A50 Warrington Road main compound as well as safety concerns related to the access to the A50 Warrington Road, the impact of construction traffic on local highways and the proposed locations of Hoo Green auto-transformer feeder station and Hoo Green grid supply point.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
Residents of Chapel Lane and Hulseheath Lane	Meeting to discuss the Proposed Scheme, in particular the proposed locations of Peacock Lane auto-transformer feeder station and Peacock Lane grid supply point and the impacts on the local community.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required. As a result of this engagement, a group of technical specialists was established to meet with residents collectively, provide information about Peacock Lane auto-transformer feeder station and Peacock Lane grid supply point, understand their concerns and review options for relocation of Peacock Lane grid supply point.

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<b>Stakeholder</b>	<b>Area of focus</b>	<b>How this has informed the design and assessment of the Proposed Scheme</b>
School Lane Residents Group	Meeting to discuss the Proposed Scheme and provide an update on consultation activities. Key discussion points included the proposed closure of Budworth Road and the impact of traffic flows on the B5391 Pickmere Lane and School Lane.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
Sustrans	Meetings to discuss the Proposed Scheme and interface with cycle routes with a view to improving connectivity across Cheshire.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
Vale Royal Disability Service	Meeting to discuss the Proposed Scheme, provide an update on consultation activities and understand their areas of concern and interest.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.

## MPs, local authorities and parish councils

- 3.3.6 HS2 Ltd has offered to engage with all relevant MPs during the development of the Proposed Scheme in order to discuss key issues and concerns.
- 3.3.7 Direct engagement has also been offered to and undertaken with unitary and parish councils within the Pickmere to Agden and Hulseheath area. The purpose of this engagement was to collate local baseline information and knowledge to inform the design and assessment, identify and understand local issues and concerns, provide access to wider stakeholders and communities and provide a mechanism for ongoing dialogue and discussion on the assessment and design development.
- 3.3.8 Table 8 summarises key engagement undertaken with MPs, local authorities and parish councils to date, including the focus of the engagement and how this has informed the design and assessment of the Proposed Scheme.

**Table 8: Engagement to date with MPs, local authorities and parish councils**

<b>Stakeholder</b>	<b>Area of focus</b>	<b>How this has informed the design and assessment of the Proposed Scheme</b>
Esther McVey MP for Tatton	Regular engagement to discuss the Proposed Scheme, consultation strategy and seek feedback on areas of concern and interest. Key areas for discussion have included residents, farmers and the local community as well as the management of property acquisitions.	Feedback used to inform understanding of baseline conditions, potential impacts and proposed mitigation concerns and opportunities. Feedback has informed the planning of engagement and consultation in the area. There has been a regular exchange of information with the MP and HS2 Ltd. Engagement measures introduced include the setting up of the Implementation Advisory Group (North).

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Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Cheshire East Council	Series of meetings to discuss the Proposed Scheme, provide updates on consultation activities and understand potential impacts on the local community. Further briefings were held during Design Refinement Consultation. Discussions have also taken place regarding those directly impacted communities, rail infrastructure, impact of construction traffic, highways realignment and integration with the Council's future highways aspirations.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
Cheshire East Council Technical Leads	Meetings with technical leads to collate data and discuss key assessment topics including air quality; geotechnics; highways; land quality; sound, noise and vibration; traffic and transport and waste.	Engagement used to gather feedback on the Proposed Scheme and inform aspects of the design and mitigation proposals.
Cheshire Association of Local Councils	General introductory and project update meeting, including ongoing design development, construction logistics and mitigation design and opportunities.	Feedback informed the planning of engagement and consultation activity in the Pickmere to Agden and Hulseheath area, as well as improving understanding of baseline conditions, potential impacts and proposed mitigation concerns and opportunities.
Great Budworth Parish Council	Meeting to discuss the Proposed Scheme and provide an update on consultation activities, including Design Refinement Consultation and what this may mean to the local community.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
High Legh Parish Council	Meetings have taken place, both with the Parish and the Implementation Advisory Group (North) (see below) regarding the Proposed Scheme and impacts on the local community including the severance of local highways and impacts of construction traffic, the location of the gas pipeline under the route of the Proposed Scheme and concerns regarding visual impacts. Participation in specialist meetings relating to Design Refinement Consultation, construction traffic and water and environment.	Engagement used to gather feedback on the Proposed Scheme and consideration of mitigation proposals. The feedback received from the parish council helped to inform the construction traffic modelling in this area.

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Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Implementation Advisory Group (North) which included representation from MPs for Eddisbury, Tatton and Weaver Vale, Cheshire East Council, Cheshire East Council Ward Members and Parish Councils that the Proposed Scheme will pass through	Series of meetings to update the group on the Proposed Scheme and the consultation process, collate local data and understand their areas of interest and concern.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
Mere Parish Council	Series of briefings provided, both bilaterally with the Parish and at the Implementation Advisory Group (North). The Parish has also participated in specialist meetings relating to Design Refinement Consultation matters, local hydrology and drainage and environment. Discussions have taken place on a number of local key highways such as the A50 Warrington Road, Hoo Green Lane and, Peacock Lane and associated noise mitigation concerns.	Engagement used to gather feedback on the Proposed Scheme and consideration of mitigation proposals. As a result of engagement, the size and the shape of A50 Warrington Road main compound has been revised.
Pickmere Parish Council	Series of meetings to discuss the Proposed Scheme, provide updates on consultation activities and understand potential impacts on the local community. Key discussion points included the routes that construction traffic will use, associated temporary diversions, the rail crossing of Pickmere Lane, and the overall impact on the village of Pickmere.	Engagement used to gather feedback on the Proposed Scheme and consideration of mitigation proposals. The feedback received from the Parish council has informed the construction traffic modelling in this area and redesign of the Pickmere Lane/Flittogate Lane junction.
Tabley Parish Council	Attended Implementation Advisory Group North meetings. Expressed concerns on the closure of Budworth Road and the effects of community severance and the impact on traffic diverting onto local roads.	Engagement used to gather feedback on the Proposed Scheme and consideration of mitigation proposals. The feedback received from the Parish council helped to inform the construction traffic modelling in this area.

3.3.9 Local authorities and parish councils will continue to be engaged as part of the development of the Proposed Scheme with ongoing dialogue on key topics such as highways, PRoW and the draft Code of Construction Practice (CoCP)<sup>9</sup>.

## Expert, technical and specialist groups

3.3.10 Engagement has been undertaken with technical and specialist organisations to provide appropriate specialist input to inform the design and assessment of the Proposed Scheme.

<sup>9</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.



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This includes engagement with statutory bodies, local authorities and utility companies operational within the Pickmere to Agden and Hulseheath area.

- 3.3.11 Engagement with statutory bodies, local authorities and utility companies within the Pickmere to Agden and Hulseheath area has been undertaken in order to :
- collate local baseline information;
  - identify and understand issues and concerns; and
  - provide a mechanism for ongoing dialogue and discussion on the assessment and design development.
- 3.3.12 Engagement has focused on the technical areas that inform the assessment, including air quality, landscape and visual, sound, noise and vibration and traffic and transport. Briefings were offered to specialist and technical stakeholders across the Proposed Scheme during the period of consultation on the working draft ES to provide information on the evolving design and assessment of the Proposed Scheme in their respective areas.
- 3.3.13 Engagement has been offered to blue light emergency service stakeholders including fire and rescue, police force and ambulance service providers, with meetings undertaken to share information on the Proposed Scheme. This has included design review meetings to present design detail on fire engineering and safety design aspects of the Proposed Scheme.
- 3.3.14 Engagement will continue with these stakeholders as the project progresses, including consultation to support the development of local traffic management plans prior to construction starting.
- 3.3.15 Table 9 includes engagement undertaken with technical and specialist groups and how this has informed the design and assessment of the Proposed Scheme in the Pickmere to Agden and Hulseheath area.

**Table 9: Engagement to-date with expert, technical and specialist groups**

Type	Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Statutory and national	British Geological Survey	Geological conditions	Information has been used to improve understanding of baseline geological issues route-wide and provided an opportunity to inform the assessment and consider any proposed mitigation.
Statutory and national	Canal & River Trust	Waterways	Information has been used to inform the historic environment, landscape and visual assessment and improve understanding of baseline conditions for route-wide application, including the water resources and flood risk assessment.
Statutory and national	Coal Authority	Coal mining	Information has been used to improve understanding of baseline conditions for coal mining route-wide, informing the assessment and proposed mitigation.

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Type	Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Statutory and national	Department for Environment, Food and Rural Affairs	Agriculture and land quality issues	Informed agricultural and land quality assessment methodology, baseline conditions for route-wide application, assessment and proposed mitigation.
Statutory and national	Environment Agency	Land quality, ecology and biodiversity and water and flood risk issues	Informed land quality, ecology and biodiversity, water resources, surface water flood risk and Water Framework Directive methodology. Improved understanding of baseline conditions, (including the provision of data), along the route of the Proposed Scheme and the proposed mitigation.
Statutory and national	Animal and Plant Health Agency (APHA)	Land quality issues	Information on the location of farm burial and pyre sites associated with the 1967/8 and 2001 outbreaks of foot and mouth disease as well as anthrax infected cattle burial sites has been obtained from APHA. This has been used to improve understanding of land contamination baseline conditions along the route of the Proposed Scheme and to inform the assessment and proposed mitigation.
Statutory and national	Forestry Commission	Forestry, ecology and landscape issues	Informed the ecological and landscape assessment methodology, improved understanding of baseline conditions and the assessment and proposed mitigation.
Statutory and national	Highways England	Strategic road network, traffic and transport issues	Informed the assessment of road network capacity and identification of proposed future Highways England works that informed the design, including the temporary diversion of the M56.
Statutory and national	Historic England	Nationally designated heritage assets and the heritage assessment methodology	Informed methodology for assessing setting and impacts on historic landscape at national and regional level. Identification and assessment methodology of designated and non-designated heritage assets including the Grade II listed Mere Court Hotel.
Statutory and national	National Farmers Union	Farming issues	Information was used to improve understanding of route-wide issues for farmers and growers.
Statutory and national	Country Land and Business Association	Farming issues	Information was used to improve understanding of route-wide issues for farmers and growers.
Statutory and national	National Trust	Owned assets and related impacts	Informed considerations around National Trust owned assets and factors to be considered in the design and assessment of the Proposed Scheme route-wide.

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Type	Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Statutory and national	Natural England	Ecology, agricultural land quality, surface water, groundwater and landscape and visual related issues	Provided further information regarding the natural environment on a route-wide basis. Informed methodological approach and detailed local conditions and factors to be taken into consideration in the assessment including The Mere, Mere Site of Special Scientific Interest (SSSI) (part of the Midland Meres and Mosses Phase 1 Ramsar site).
Statutory and national	Network Rail	Rail infrastructure	Informed route-wide considerations around rail infrastructure network and factors to be considered in the design and assessment of the Proposed Scheme.
Statutory and national	Public Health England	Public health issues	Informed methodology and factors to be taken into consideration in the health assessment.
Statutory and national	The Woodland Trust	Woodland and ancient woodland issues	Information was used to improve understanding around potential ancient woodland sites and informed methodology and detailed local conditions and factors to be taken into consideration in the assessment.
Statutory sub-national	Transport for the North	Connectivity to Northern Powerhouse Rail	Discussions around integration of HS2 with future NPR proposals including where necessary passive provisions in the Proposed Scheme.
Local Authority technical meetings	Cheshire East Council	Meetings to discuss the air quality and sound, noise and vibration and air including proposed mitigation.	Information used to improve understanding of baseline conditions and inform the design of the Proposed Scheme and the assessment.
Local Authority technical meetings	Cheshire East Council	Meetings to discuss the ecology and biodiversity assessment including the mitigation strategy.	Information used to improve understanding of baseline conditions, support the identification of sensitive ecological sites, and consider appropriate mitigation and compensation for habitat loss associated with the Proposed Scheme.
Local Authority technical meetings	Cheshire East Council	Meetings with technical leads to collate data and discuss the historic environment assessment.	Information used to improve understanding of baseline conditions and inform the design of the Proposed Scheme and the assessment.
Local Authority technical meetings	Cheshire East Council	Meeting to discuss known and potential contaminated land, the proposed assessment and mitigation measures for land quality.	Identified local areas of land contamination, potential impacts and proposed mitigation.
Local Authority technical meetings	Cheshire East Council	Meetings with technical leads to collate data and discuss landscape and visual impacts, viewpoint locations and site walkovers.	Informed the identification of viewpoint locations to be assessed and reported within the ES, as well as the extent of the landscape and visual study area and obtaining information to improve understanding of baseline conditions.

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<b>Type</b>	<b>Stakeholder</b>	<b>Area of focus</b>	<b>How this has informed the design and assessment of the Proposed Scheme</b>
Local Authority technical meetings	Cheshire East Council	Meeting to collate baseline data on socio-economic characteristics.	Information used to improve understanding of baseline conditions and inform the design of the Proposed Scheme and the assessment.
Local Authority technical meetings	Cheshire East Council	Meetings to provide information on the Proposed Scheme and obtain relevant baseline information and discuss transport survey requirements and assessment methodology relating to traffic and transport.	Improved understanding of local traffic flows, highways operations and future proposals and informed the emerging design and assessment of the Proposed Scheme.
Local Authority technical meetings	Cheshire East Council	Meetings with the Lead Local Flood Authorities to provide information on the Proposed Scheme and obtain relevant baseline information related to water resources and flood risk.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required. This includes The Mere, Mere SSSI (part of the Midland Meres and Mosses Phase 1 Ramsar site) and flood risk and associated embedded mitigation around Millington Clough.
Local Authority technical meetings	Cheshire West and Chester Council	Meeting to discuss the air quality and sound, noise and vibration assessment including proposed mitigation.	Information used to improve understanding of baseline conditions and inform the design of the Proposed Scheme and the assessment.
Local Authority technical meetings	Cheshire West and Chester Council	Meeting to discuss the ecology and biodiversity assessment including the mitigation strategy.	Information used to improve understanding of baseline conditions, support the identification of sensitive ecological sites, and consider appropriate mitigation and compensation for habitat loss associated with the Proposed Scheme.
Local Authority technical meetings	Cheshire West and Chester Council	Meetings with technical leads to collate data and discuss the historic environment assessment.	Information used to improve understanding of baseline conditions and inform the design of the Proposed Scheme and the assessment.
Local Authority technical meetings	Cheshire West and Chester Council	Meetings with technical leads to collate data and discuss landscape and visual impacts, viewpoint locations and site walkovers.	Informed the identification of viewpoint locations to be assessed and reported within the ES, as well as the extent of the landscape and visual study area and obtaining information to improve understanding of baseline conditions.
Local Authority technical meetings	Cheshire West and Chester Council	Meeting to collate baseline data on socio-economic characteristics.	Information used to improve understanding of baseline conditions and inform the design of the Proposed Scheme and the assessment.

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Type	Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Local Authority technical meetings	Cheshire West and Chester Council	Meetings to provide information on the Proposed Scheme and obtain relevant baseline information and discuss transport survey requirements and assessment methodology relating to traffic and transport.	Improved understanding of local traffic flows, highways operations and future proposals and informed the emerging design and assessment of the Proposed Scheme.
Local Authority technical meetings	Trafford Metropolitan Borough Council	Meeting to discuss the air quality and sound, noise and vibration assessments including proposed mitigation.	Information used to improve understanding of baseline conditions and inform the design of the Proposed Scheme and the assessment.
Local Authority technical meetings	Trafford Metropolitan Borough Council	Meetings with technical leads to collate data and discuss landscape and visual impacts, viewpoint locations and site walkovers.	Informed the identification of viewpoint locations to be assessed and reported within the ES, as well as the extent of the landscape and visual study area and obtaining information to improve understanding of baseline conditions.
Local Authority technical meetings	Trafford Metropolitan Borough Council	Meetings to provide information on the Proposed Scheme and obtain relevant baseline information and discuss transport survey requirements and assessment methodology relating to traffic and transport.	Improved understanding of local traffic flows, highways operations and future proposals and informed the emerging design and assessment of the Proposed Scheme.
Local Authority technical meetings	Transport for Greater Manchester	Meetings to provide information on the Proposed Scheme and obtain relevant baseline information, discuss transport survey requirements and assessment methodology relating to traffic and transport.	Improved understanding of local traffic flows, highways operations and future proposals, and informed the emerging design and assessment of the Proposed Scheme.
Local technical specialist group	Cheshire Archaeology Planning Advisory Service	Meeting to discuss the Proposed Scheme and the approach to the assessment.	Information on local conditions and factors used to refine the Proposed Scheme design and assessment.
Local technical specialist group	Cheshire Wildlife Trust	Meeting to discuss the Proposed Scheme, provide an update on consultation activities and to understand key areas of concern relating to impacts on local wildlife sites.	Information used to improve understanding of baseline conditions, support the identification of sensitive ecological sites, and consider appropriate mitigation and compensation for habitat loss associated with the Proposed Scheme.
Local technical specialist group	Greater Manchester Archaeological Advisory Service	Meetings with technical leads to collate data and discuss the historic environment assessment.	Improved understanding of local baseline conditions and informed the design and assessment of the Proposed Scheme.

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Type	Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Local technical specialist group	Greater Manchester Ecology Unit	Meeting to collate data and discuss the ecology and biodiversity assessment.	Informed understanding of local baseline conditions and the design and assessment of the Proposed Scheme.
Utilities	Cadent Gas	Network provision of gas	Informed considerations relating to the utilities network and factors to be considered in the design and assessment of the Proposed Scheme including the proposed diversion of the existing medium-pressure gas pipeline at A50 Warrington Road overbridge and the existing high-pressure gas pipelines at Lymm and Partington, and mitigation required.
Utilities	EE and Mobile Masts	Network provision of telecommunications services	Identified telecommunication services and informed understanding of potential impacts of the Proposed Scheme and mitigation requirements specifically the existing mobile communications masts at locations including M6 viaduct north satellite compound.
Utilities	Instalcom	Network provision of telecommunications services	Discussions were held regarding the diversion of existing Instalcom assets at the proposed Footpath Tabley Inferior 1/1 accommodation underbridge close to Smoker Brook viaduct north satellite compound, as well as the mitigation works required.
Utilities	Level 3	Network provision of telecommunications services	Identified telecommunication services and informed understanding of potential impacts of the Proposed Scheme and mitigation requirements on Level 3 assets, including specifically the diversion of existing assets at the proposed Footpath Tabley Inferior 1/1 accommodation underbridge close to Smoker Brook viaduct north satellite compound and mitigation required.
Utilities	National Grid Transmission (Electric)	Network provision of electricity	Informed understanding relating to impacts from the Proposed Scheme on existing assets at a number of locations including the diversion and re-stringing of existing 400kV overhead cables close to Winterbottom Lane. Discussions held regarding the provision of electricity supply to the Traction Power intake point located at Peacock Lane (Hoo Green). This intake point consists of a trackside auto-transformer feeder station which is supplied by the nearby National Grid 400kV overhead line, via a new grid supply point. This is a non-contestable work package which will be planned, designed and built by National Grid.

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Type	Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Utilities	National Grid Transmission (Gas)	Network provision of gas	Informed considerations relating to the utilities network and factors to be considered in the design and assessment of the Proposed Scheme including the proposed diversion of an existing high pressure gas pipeline at a number of locations such as Belt Wood, Bucklow Hill Lane, and the Cheshire Showground.
Utilities	Openreach	Network provision of telecommunications services	Identified telecommunication services and informed understanding of potential impacts of the Proposed Scheme and mitigation requirements including telecommunication supplies to satellite compounds at Pickmere Lane, Budworth Road, Bowden View and Peacock Lane auto-transformer feeder station. Discussions were also held regarding the diversions of Openreach assets at a number of locations including Flittogate Lane, Peacock Lane satellite compound, Agden Brow satellite compound and A56 Lymm Road satellite compound, and also the impact on their assets arising from road realignments at several locations including Yew Tree Road and Pickmere Lane.
Utilities	SP Energy Networks (SPEN)	Network provision of electricity and gas	Informed considerations relating to the utilities network and factors to be considered in the design and assessment of the Proposed Scheme including the diversions of existing SPEN assets at several locations such as Bucklow Hill Lane, M6 viaduct south satellite compound, HS2 Manchester spur and Peacock Lane viaduct.
Utilities	United Utilities	Network provision of water and wastewater services	Informed understanding regarding the provision of potable water and sewerage facilities at a number of locations including Pickmere Lane satellite compound, the B5391 Pickmere Lane realignment, Budworth Road satellite compound, Bowden View satellite compound and the Peacock Lane ATFS satellite compound. Discussions were held regarding the diversion of United Utilities assets at the A50 Warrington Road realignment and at Peacock Lane viaduct, as well as the mitigation works required.
Utilities	Virgin Media	Network provision of telecommunications services	Identified telecommunication services and informed understanding of potential impacts of the Proposed Scheme and mitigation requirements on existing Virgin Media assets including diversion of existing assets arising from the A50 Warrington Road realignment and mitigation required.

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Type	Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Utilities	Vodafone and O2 Mobile Masts	Provision of mobile telecommunications networks and cabling for wired/fixed telecommunications services	Identified telecommunication services and informed understanding of potential impacts of the Proposed Scheme and mitigation requirements on existing assets including the mobile mast close to Bowden View satellite compound.
Utilities	Vodafone Ltd (Below Ground Assets)	Network provision of telecommunications services	Identified telecommunication services and informed understanding of potential impacts of the Proposed Scheme and mitigation requirements on existing assets including the diversion of existing underground assets crossing the route of the Proposed Scheme close to Wrenshot Lane satellite compound.
Utilities	Zayo	Provision of telecommunications services and apparatus	Identified telecommunication services and informed understanding of potential impacts of the Proposed Scheme and mitigation requirements on existing Zayo assets including diversion close to Winterbottom Lane and Peacock Lane viaduct.

- 3.3.16 HS2 Ltd has pursued engagement with all affected utility and technical stakeholders across the Proposed Scheme. Where possible HS2 Ltd has obtained information and designs from these stakeholders to inform and promote the collaborative development of the scheme.
- 3.3.17 Further information about topic-specific engagement is provided in Sections 4 to 15, where relevant.

## Directly affected individuals, farmers and growers

- 3.3.18 This group includes those with land and property potentially affected by the Proposed Scheme, including individuals, farmers and growers within the Pickmere to Agden and Hulseheath area.
- 3.3.19 As part of information events held in October 2018, June 2019, between October and November 2020 and between June and July 2021 (including using online channels where necessary), targeted engagement was also offered to those stakeholders who have land or property directly affected by the construction and operation of the Proposed Scheme. These appointments provided an opportunity to meet with technical experts, to gain a better understanding of the emerging design and share their thoughts on how this might affect them. Whilst these opportunities did not replace their right to respond formally to consultation, their feedback has also been considered during design development.
- 3.3.20 Information events provided affected individuals, farmers and growers with the opportunity to gain an understanding of compensation and assistance available for property owners. Facilities were available at the events to have private meetings with HS2 Ltd staff.
- 3.3.21 In addition, engagement has been offered via letter and through known land agents to all farmers and growers directly affected by the Proposed Scheme whether permanently or



temporarily. Where offers have been accepted and it has been possible, visits have been made to the land and property affected although some interviews have needed to be undertaken virtually. The purpose of this engagement has been to obtain baseline information and provide the opportunity to raise issues and discuss mitigation in relation to the Proposed Scheme. Information gathered from farm interviews has informed the assessment presented in this ES. Key issues raised through this engagement include loss of land for landscape, ecological and other mitigation and likely long-term viability of farm holdings including holding severance and access.

- 3.3.22 Engagement with directly affected individuals and growers will continue as the project develops and opportunities for engagement with farmers and growers will continue to be offered throughout the parliamentary process.
- 3.3.23 Engagement is also continuing with key representatives of the farmers and growers industry, in particular with the National Farmers Union and Country Land and Business Association.

## **Major asset owners and businesses**

- 3.3.24 This group includes those with property potentially affected by the Proposed Scheme, including major asset holders and businesses within the Pickmere to Agden and Hulseheath area.
- 3.3.25 As part of the information events held in October 2018, June 2019, between October and November 2020 and between June and July 2021 (including using online channels where necessary), targeted engagement was also offered to those stakeholders who have land, property or business operations directly affected by the construction and operation of the Proposed Scheme. These appointments provided an opportunity for these stakeholders to meet with technical experts, to gain a better understanding of the emerging design and share their thoughts on how this might affect them. Whilst these opportunities did not replace their right to respond formally to consultation, their feedback has also been considered during design development.
- 3.3.26 Engagement has been undertaken with major asset owners and businesses within the Pickmere to Agden and Hulseheath area including Cheshire Agricultural Society, Heyrose Golf Club, Mere Court Hotel, Mere Estates, The University of Manchester and Windmill Nurseries. The purpose of this engagement has been to obtain baseline information and provide these stakeholders with the opportunity to raise issues and discuss mitigation in relation to the Proposed Scheme.
- 3.3.27 Key issues raised during this engagement have included:
- land requirements and impacts on access, property and business viability during both the construction and operational phases of the Proposed Scheme;
  - potential interference on the operation of the Pickmere Telescope arising from electromagnetic interference (EMI) from the operation of the Proposed Scheme; and

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- the effects of noise and visual impacts from the operation and construction of the Proposed Scheme.

3.3.28 Engagement with these stakeholders will continue as the project develops.

## 4 Agriculture, forestry and soils

### 4.1 Introduction

- 4.1.1 This section provides a description of the current baseline for agriculture, forestry and soils and the likely impacts and significant effects of the construction and operation of the Proposed Scheme within the Pickmere to Agden and Hulseheath area. Consideration is given to the extent and quality of the soil and land resources underpinning the primary land use activities of farming and forestry, and the physical and operational characteristics of enterprises engaged in these activities. Consideration is also given to diversification associated with the primary land uses, and to related land-based enterprises, notably equestrian activities.
- 4.1.2 Engagement with farmers and landowners has been undertaken. The purpose of the engagement has been to obtain baseline information on the scale and nature of the farm and forestry operations and related farm-based uses, and to provide farmers and landowners with the opportunity to raise issues and discuss mitigation in relation to the Proposed Scheme. Engagement undertaken with farmers and landowners will be documented in the farm pack for each farm holding as set out within a Phase 2b Farmers and Growers Guide<sup>10</sup>.
- 4.1.3 Details of published and publicly available information used in the assessment, and the results of surveys undertaken within this area, are contained in Volume 5: Appendix AG-001-0MA03 and shown on Map Series AG-01 (Agricultural Holdings), AG-02 (Soil Associations) and AG-04 (Agricultural Land Classification) (Volume 5, Agriculture, forestry and soils Map Book).
- 4.1.4 Maps showing the location of the key environmental features (Map Series CT-10) and the key construction (Map Series CT-05) and key operational (Map Series CT-06) features of the Proposed Scheme can be found in the Volume 2: MA03 Map Book. The Proposed Scheme is described in Section 2.

### 4.2 Scope, assumptions and limitations

- 4.2.1 The assessment scope, key assumptions and limitations for the agriculture, forestry and soils assessment are set out in Section 8 of Volume 1 and the EIA Scope and Methodology Report (SMR)<sup>11</sup>.
- 4.2.2 The study area for the agriculture, forestry and soils assessment covers all land required for the construction and operation of the Proposed Scheme. The resources and receptors that are assessed within this area are agricultural land, forestry land and soils, together with farm

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<sup>10</sup> To be prepared for Phase 2b in due course, as per previous Phases found here: <https://www.gov.uk/government/publications/hs2-guide-for-farmers-and-growers>.

<sup>11</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

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and rural holdings. The assessments of the impacts on agricultural land quality and forestry land are made with reference to the prevalence of best and most versatile (BMV) land and forestry land in the general locality, taken as a 4km corridor centred on the route of the Proposed Scheme and, where it diverges from the route, a 4km corridor centred on the HS2 Manchester spur.

- 4.2.3 The quality of agricultural land in England and Wales is assessed according to the Agricultural Land Classification (ALC)<sup>12</sup> system, which classifies agricultural land into five grades from excellent quality Grade 1 land to very poor quality Grade 5 land. Grade 3 is subdivided into Subgrades 3a and 3b. The main issue in the assessment of the impacts on agricultural land is the extent to which land of BMV agricultural quality (Grades 1, 2 and 3a) is affected by the Proposed Scheme.
- 4.2.4 Forestry is considered as a commercial land use feature providing resources such as timber and fuel. The impacts on this feature are calculated quantitatively in terms of the physical extent of commercial forestry land required. The qualitative effects on forestry land and woodland are addressed principally in Section 7, Ecology and biodiversity, and Section 11, Landscape and visual.
- 4.2.5 The primary functions provided by soils, other than for food and biomass production, include flood water attenuation, carbon storage or the support of ecological habitats. This section describes these functions and assesses the ability of the soils to fulfil their primary functions after construction of the Proposed Scheme. Soil attributes, other than for food and biomass production, are identified in this section, but the resulting function or service provided is assessed in other sections, notably Section 7, Ecology and biodiversity; Section 9, Historic environment; Section 11, Landscape and visual; and Section 15, Water resources and flood risk. The function of soil as a carbon store is described in Volume 3, Route-wide effects (Section 4, Climate change).
- 4.2.6 The main issue for farm holdings is disruption by the Proposed Scheme of the physical structure of agricultural holdings and the operations taking place upon them, during both construction and operational phases. Where any part of a farm or rural holding is required for the construction or operation of the Proposed Scheme, the whole land holding is part of the study area for impacts on this receptor.
- 4.2.7 Common assumptions that have been used in assessing the effects of the Proposed Scheme are set out in Volume 1 (Section 8). These assumptions include the restoration of agricultural land that is required temporarily for construction to agricultural use, and the handing back of land used temporarily to the original landowner. It is also assumed that buildings and other farm infrastructure on the land holding will not be replaced as this will ultimately be at the discretion of the landowner. For this reason, financial compensation is not a consideration in the assessment of effects on farm holdings, as set out under impacts on

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<sup>12</sup> Ministry of Agriculture, Fisheries and Food (1988), *Agricultural Land Classification of England and Wales – Revised guidelines and criteria for grading the quality of agricultural land*. Available online at: <http://publications.naturalengland.org.uk/publication/6257050620264448>.

holdings below. The details of land use have been obtained from face-to-face interviews wherever possible; elsewhere, information has been obtained from publicly available sources. Land use data have been collected since 2017 for the purposes of the assessment reported in this section.

## 4.3 Environmental baseline

### Existing baseline

- 4.3.1 This section sets out the main baseline features that influence the agricultural and forestry use of land within the Pickmere to Agden and Hulseheath area. These include the underlying soil resources that are used for food and biomass production, as well as providing other services and functions for society, and the associated pattern of agricultural and other rural land uses.

### Soil and land resources

#### Soil parent materials

- 4.3.2 A full description of the geological characteristics of the Pickmere to Agden and Hulseheath area is provided in Volume 5: Appendix AG-001-0MA03, Section 10, Land quality and Section 15, Water resources and flood risk. This section only considers geology as a soil parent material, which is a soil-science name for a weathered rock or deposit from and within which a soil has formed<sup>13</sup>. The soil association developed in each parent material is identified below. Individual soil associations are described under 'Description and distribution of soil types' below.
- 4.3.3 The most common soil parent material, which is present over the whole study area, comprises reddish glacial deposits such as till and glaciofluvial sand and gravel deposits, which are mainly overlying Bollin Mudstone. The soils developed from and within this parent material belong to the Salop association.
- 4.3.4 There are glaciofluvial sheet deposits along the Agden Brook, Birkin Brook, Mobberley Brook and, to a lesser extent, in the valley of the River Bollin. Where this parent material, which comprises sand and gravel, is seasonally waterlogged by a fluctuating groundwater table, it produces soils in the Blackwood association. On river terraces, and in older glaciofluvial deposits, sands and gravels give rise to deep and well drained soils in the Wick 1 association.

### Topography and drainage

- 4.3.5 Topography in this study area is characterised by broadly flat countryside of the Cheshire Plain, with numerous rivers, streams and ponds. The land rises from an elevation of

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<sup>13</sup> British Geological Survey (2011), *Soil Parent Material Model*. Available online at: <https://www.bgs.ac.uk/datasets/soil-parent-material-model>.

approximately 35m above Ordnance Datum (AOD) at the southern boundary of the study area to approximately 50m AOD at the M6 in the centre of the study area. To the north of the M6, the elevation continues to rise to approximately 70m AOD near Hoo Green, but descends to approximately 60m AOD at the M56. Between the southern boundary of the study area and the M56 there are no slopes with a gradient in excess of seven degrees. To the north of the M56 at Agden Hall, the land falls from approximately 60m AOD to approximately 25m AOD down a strongly inclined, north-east facing slope to the floodplain of the River Bollin.

- 4.3.6 Flood risk is potentially limiting to agricultural land quality within the study area in the floodplain of the following: Smoker Brook in the south near Pickmere, Waterless Brook/Arley Brook, Tabley Brook to the north of Flittogate Farm, and Agden Brook in the north near Agden Brook Farm. The land in these floodplains is classed as predominantly Flood Zone 3<sup>14</sup>, in which there is a 1 in 100 or greater annual probability of flooding. Further details are provided in Section 15, Water resources and flood risk.

### **Description and distribution of soil types**

- 4.3.7 The broad characteristics of the soils present in the study area are described by the Soil Survey of England and Wales<sup>15</sup> and their general distribution is shown on the National Soil Map<sup>16</sup> which is replicated in Volume 5, Agriculture, forestry and soils (Map AG-02-103 Soil Associations). The soils are grouped into soil associations of a range of soil types that are spatially related. They are described in more detail in Volume 5: Appendix AG-001-0MA03.
- 4.3.8 The Wetness Class (WC) of a soil is classified according to the depth and duration of waterlogging in the soil profile. There are six categories: from WC I, which is well drained, to WC VI which is permanently wet.
- 4.3.9 The soil association data have been supplemented by detailed soil surveys on all land where access has been granted. These surveys assist with ALC and the planning of soil handling and restoration. There are three soil associations within this study area.
- 4.3.10 The most prevalent association comprises clay loams over clay soils of the Salop association. This association comprises slowly permeable and seasonally waterlogged soils (WC III to IV). They are developed in reddish glacial deposits (i.e., till and glaciofluvial sand and gravel deposits).
- 4.3.11 The next most prevalent association comprises deep, well drained (WC I) sandy loam over loamy sand soils in the Wick 1 association. These soils occur in a small pocket to the south of

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<sup>14</sup> Environment Agency (2018), *Flood map for planning 2018*. Available online at: <https://flood-map-for-planning.service.gov.uk>.

<sup>15</sup> Soil Survey of England and Wales (1984), *Soils and their use in Midland and Western England*, Soil Survey of England and Wales, Bulletin No. 12, Harpenden.

<sup>16</sup> Cranfield University (2001), *The National Soil Map of England and Wales 1:250,000 scale*. Cranfield University: National Soil Resources Institute.

High Legh, either side of the A50 Warrington Road/Knutsford Road. This type of soil is developed on sand and gravel and generally gives rise to high quality agricultural land.

- 4.3.12 The least prevalent association comprises deep, permeable sandy and sandy loam soils that belong to the Blackwood association. This type of soil occurs in the far northern end of the study area. These soils are developed in glacial river deposits, which are variable in stone content and frequently overlie clay deposited in glacial lakes, or glacial till, at depth. Where undrained, the Blackwood soils are waterlogged for long periods during the winter (WC III and IV). These soils experience fluctuating levels of groundwater, but where the water table has been lowered, the soils are well drained (WC I) or only slightly seasonally waterlogged (WC II).
- 4.3.13 The sensitivity of the soils disturbed during construction activity is reflected by their textural characteristics, in the light of local Field Capacity Days (FCD), as set out in the SMR. FCD is a meteorological parameter which indicates an estimated duration of the period when the soil moisture deficit is zero. Soils usually return to field capacity (zero deficit) during the autumn or early winter and the field capacity period, measured in days, ends in the spring when evapotranspiration exceeds rainfall and a moisture deficit begins to accumulate. In areas of the highest number of FCD, and during the wettest times of the year, soils with high clay and silt fractions are most susceptible to the effects of handling during construction and the reinstatement of land; whereas soils with a high sand fraction in areas with the fewest FCD and during the driest times of the year are the least susceptible.
- 4.3.14 The soils in this study area are predominantly of medium sensitivity due to their clay content where FCDs are between 185 days and 195 days per annum. Soils of this sensitivity category make up 90% of the study area.

## **Soil and land use interactions**

### **Agricultural land quality**

- 4.3.15 The principal soil/land use interaction is the quality of the agricultural land resource. The ALC is based on the identification of physical limitations to the agricultural capability of land resulting from the interactions of soil, climate, topography and drainage.
- 4.3.16 The main soil properties that affect the cropping potential and management requirements of land are texture, structure, depth, stoniness and chemical fertility. The climatic properties that affect the cropping potential and management requirements of land are rainfall and temperature.
- 4.3.17 Local agro-climatic data have been interpolated from the Meteorological Office's standard 5km grid point dataset<sup>17</sup> for three points within the study area and are set out in Volume 5: Appendix AG-001-0MA03. The data show the climate in the area to be cool and moist. The

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<sup>17</sup> Meteorological Office (1989), *Gridpoint Meteorological data for Agricultural Land Classification of England and Wales and other Climatological Investigations*.

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number of FCD, when the moisture deficit<sup>18</sup> is zero, ranges from 185 days to 195 days per annum. This is higher than average for lowland England (150 days) and generally constrains agricultural cultivations and soil handling for relatively long periods over winter. Moisture deficits, which give an indication of the vulnerability of soils to drought, are moderate to moderately small.

- 4.3.18 Average annual rainfall and accumulated temperature within this area do not in themselves place any limitation on agricultural land quality. However, the interactions of climate with soil characteristics are important in determining the wetness and droughtiness limitations of the land. Droughtiness is a measure of the likely moisture stress in a crop arising from the crop's requirement for water exceeding the available water capacity in the soil.
- 4.3.19 Site factors, such as gradient and microrelief, are not limiting to agricultural land quality within this study area. Microrelief is the complex change of slope angle and direction over short distances, or the presence of boulders or rock outcrops, which can severely limit the use of agricultural machinery.
- 4.3.20 The main physical limitations that result from interactions between soil, climate and site factors are soil wetness, soil droughtiness and a localised susceptibility to erosion. For soil wetness, each soil can be allocated a WC based on soil structure, evidence of waterlogging and the number of FCD. The topsoil texture then determines its ALC grade. Vulnerability to drought is determined by the moisture retention of different soil textures and thicknesses of each soil horizon, soil structures, stone content and moisture deficits.
- 4.3.21 The most prevalent group of soil associations comprises clay loam over clay soils which are slowly permeable and seasonally waterlogged. Salop soil profiles in WC III are limited by soil wetness to Subgrade 3a where the topsoil is medium clay loam, and to Subgrade 3b where the topsoil is heavy clay loam. Where the subsoil is waterlogged for long periods during the winter (WC IV), soil profiles with medium clay loam topsoil are limited by soil wetness to Subgrade 3b. Soils with heavy clay loam topsoil in WC IV would be limited by soil wetness to Grade 4, but no soils in this category have been found during the soil surveys.
- 4.3.22 The next most prevalent association, comprising well-drained (WC I) sandy loam soils in the Wick 1 association, are limited by soil droughtiness. As crop moisture deficits are moderately small, the soil droughtiness limitation is slight to moderate, limiting the quality of agricultural land to mainly Grade 2. Survey data confirms that Wick 1 soils north-east of Hoo Green are Grade 2.
- 4.3.23 The least prevalent group, comprising sandy soil profiles in the Blackwood association in the north of the study area, are affected by a high water table (mainly WC III-IV). The quality of agricultural land is limited by soil wetness to Subgrade 3a where the profile is seasonally waterlogged (WC III) or Subgrade 3b where the profile is waterlogged for long periods during

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<sup>18</sup>The moisture deficit is a crop-related meteorological variable which represents the balance between rainfall and potential evapotranspiration calculated over a critical portion of the growing season.



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the winter (WC IV). Survey data confirms that Blackwood soils between the M56 and Agden Bridge Farm is mainly Subgrade 3a, with occasional pockets of Grade 2 (WC II).

- 4.3.24 As set out in the SMR, the sensitivity of BMV land in the study area is determined relative to the abundance of such land in the locality, set as a 4km corridor centred on the route of the Proposed Scheme. Department for the Environment, Food and Rural Affairs (Defra) predictive mapping<sup>19</sup> shows that there is a moderate likelihood of encountering BMV agricultural land in the locality, which makes such land a resource of medium sensitivity in this study area.
- 4.3.25 The distribution of agricultural land quality in the study area is shown in Table 10, described in more detail in Volume 5: AG-001-OMA03 and shown on Map AG-04-309b to Map AG-04-312a-L1 (Volume 5, Agriculture, forestry and soils Map Book).

**Table 10: Distribution of grades of agricultural land in the study area**

Agricultural land quality	Area within study area (ha)	Percentage of agricultural land area within study area (%)
Grade 1	0.0	0
Grade 2	55.4	13.8
Subgrade 3a	217.3	54.1
<b>BMV subtotal</b>	<b>272.7</b>	<b>67.9</b>
Subgrade 3b	129.1	32.1
Grade 4	0.0	0.0
Grade 5	0.0	0
<b>Total agricultural land</b>	<b>401.8</b>	<b>100</b>

## Other soil interactions

- 4.3.26 Soil fulfils a number of functions and services for society, in addition to those of food and biomass production, that are central to social, economic and environmental sustainability. These are outlined in sources such as the Soil Strategy for England<sup>20</sup> and the Government's White Paper, *The Natural Choice: securing the value of nature*<sup>21</sup> and reinforced in the policies set out in the 25 year Environment Plan<sup>22</sup>, and include:
- the storage, filtration and transformation of water, carbon and nitrogen in the biosphere;
  - the support of ecological habitats, biodiversity and gene pools;
  - support for the landscape;
  - the protection of cultural heritage;

<sup>19</sup> Department for Environment, Food and Rural Affairs (2005), *Likelihood of Best and Most Versatile Agricultural Land*.

<sup>20</sup> Department for Environment, Food and Rural Affairs (2009), *Soil Strategy for England*.

<sup>21</sup> HM Government (2011), *The Natural Choice: securing the value of nature*.

<sup>22</sup> HM Government (2018), *A Green Future: Our 25 Year Plan to Improve the Environment*. Available online at: <https://www.gov.uk/government/publications/25-year-environment-plan>.

- the provision of raw materials; and
  - the provision of a platform for human activities, such as construction and recreation.
- 4.3.27 Forestry resources represent a potentially multifunctional source of productive timber, landscape amenity, biodiversity and carbon storage capacity. An assessment of the value and sensitivity of woodland resources is reported in Section 7, Ecology and biodiversity.
- 4.3.28 The floodplains of the Smoker Brook, Waterless Brook/Arley Brook, Tabley Brook and Agden Brook occupy land where water has to flow or be stored in times of flood, as set out in Section 15, Water resources and flood risk. The soils and floodplains in this study area also provide ecological habitats.

## Land use

### Land use description

- 4.3.29 Agricultural land use in this study area is mixed, with grassland utilised by dairy herds interspersed with large arable holdings; beef cattle and sheep enterprises are also present. The grassland is divided into small, irregularly shaped fields separated by hedgerows, oak trees and many small woods, often planted as game cover.
- 4.3.30 Woodland within the study area is found predominantly around Leonard's and Smoker Wood in the south and between Bentleyhurst Farm and Hulme Barns Farm. Leonard's and Smoker Wood comprises some ancient semi-natural woodland and land designated as a Plantation on Ancient Woodland site (PAWS). A full description of all woodland habitats in the Pickmere to Agden and Hulseheath area is set out in Section 7, Ecology and biodiversity.
- 4.3.31 No areas of commercial forestry land have been identified in this study area. As such, no further assessment has been made of the effects of the Proposed Scheme on commercial forestry.
- 4.3.32 Some agricultural land is subject to historical agri-environment management prescriptions that seek to retain and enhance the landscape and biodiversity qualities and features of farmland. These were associated with the Environmental Stewardship Scheme (the Entry Level Stewardship (ELS), the Organic Entry Level Stewardship (OELS) or the Higher Level Stewardship (HLS)). The Countryside Stewardship Scheme (CSS) has been the main agri-environment scheme in England since 2015. The CSS incorporates elements of the Environmental Stewardship Scheme, the English Woodlands Grant Scheme and Catchment Sensitive Farming grants. Holdings that have land entered into an agri-environment scheme are identified in Table 11. These schemes are under review following the introduction of the Agriculture Act 2020<sup>23</sup>.

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<sup>23</sup> *Agriculture Act 2020* (c.21). London, Her Majesty's Stationary Office. Available online at: <https://www.legislation.gov.uk/ukpga/2020/21/contents/enacted>.

## Number, type and size of holdings

- 4.3.33 Table 11 sets out the main farm holdings within this study area. The details of holdings have been obtained from face-to-face interviews with farm owners and occupiers. The interviews undertaken account for holdings which collectively cover approximately 78% of the total study area. Publicly available sources have been used to obtain information about farm holdings where it has not been possible to arrange interviews.
- 4.3.34 Dairy farming predominates in the Pickmere to Agden and Hulseheath area, with the herds being medium-scale, having between 200 and 300 milking cows in each herd. Arable farming is also widespread, with large land holdings. The average holding size across the study area is 73ha, but this rises to 125ha when the smaller holdings (less than 10ha) are excluded. The remainder of the agricultural land in the area is mostly grazed by livestock, particularly beef cattle and sheep. There is one horticultural unit growing bedding plants, perennials and alpines in glasshouses, and one commercial equestrian holding. The boundaries of the holdings are shown on Maps AG-01-309b to AG-01-312a-L1 (Volume 5, Agriculture, forestry and soils Map Book) along with the location of the main farm buildings.
- 4.3.35 Table 11 also sets out the sensitivity of individual holdings to change. This is determined by the extent to which they have the capacity to absorb or adapt to impacts, which in turn is determined primarily by their nature and scale. In general terms, larger holdings have a greater capacity to change enterprise mix and scale, can better absorb impacts and are less sensitive. Units that rely on the use of buildings (such as intensive livestock and dairy farms, and horticultural units) are less able to accommodate change and have a higher sensitivity. Non-commercial land uses and units, such as pony paddocks associated with residential properties, have a low sensitivity. The holding reference provides a unique identifier and relates to Maps AG-01-309b to AG-01-312a-L1 (Volume 5, Agriculture, forestry and soils Map Book) and Volume 5: Appendix AG-001-0MA03.

**Table 11: Summary characteristics of holdings**

Holding reference/name	Holding type	Holding size (ha)	Diversification	Agri-environment scheme	Sensitivity to change
MA03/1 Roses Farm, including Smoker Hill Farm and Flittogate Farm	Arable and beef cattle	291	None	None	Medium
MA03/2 Cheshire Showground	Showground with ancillary livestock grazing	121	Showground	None	High
MA03/3 Frog Lane Farm	Dairy, arable and potatoes	645	Milk tank repairs and tyre repairs	None	High
MA03/4 School Farm	Equestrian stud	9.7	None	None	Medium

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Holding reference/name	Holding type	Holding size (ha)	Diversification	Agri-environment scheme	Sensitivity to change
MA03/5 Land at School Lane*	Grassland	51	Not known	None	Medium
MA03/6 Land at Frog Lane*	Grassland	1.5	Not known	None	Low
MA03/7 Tabley Brook Farm*	Grassland	7.1	Not known	None	Medium
MA03/8 Windmill Nurseries	Horticultural with glasshouses	2.4	None	None	High
MA03/9 Heyrose Farm	Arable and grassland	32	Golf course	None	Medium
MA03/10 Feldy Green Cottage*	Grassland	15	Not known	None	Medium
MA03/11 East Feldy Farm (A)*	Grassland	4	Not known	None	Medium
MA03/12 East Feldy Farm (B)*	Grassland	11	Not known	None	Medium
MA03/13 Gore Farm	Arable and beef cattle	166	Paper drying mill and phone mast	None	Medium
MA03/14 Old Feldy Farm*	Grassland	20	Not known	None	Medium
MA03/15 Gorsefields Farm*	Grassland and arable	28	Not known	None	Medium
MA03/16 Fields Farm*	Grassland and arable	11	Not known	None	Medium
MA03/17 Hollowood Farm	Beef cattle	63	Phone mast	None	Medium
MA03/18 Land at Smith Cottage*	Grassland	24	Not known	None	Medium
MA03/19 Knowlspit Farm with Bentleyhurst Farm	Dairy	130	None	None	High
MA03/20 Winterbottom Farm	Sheep	80	None	None	Medium
MA03/21 Land at Winterbottom Lane*	Grassland	1.8	Not known	None	Low
MA03/22 Yew Tree Farm	Dairy	81	Land let to model aeroplane club	None	High

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Holding reference/name	Holding type	Holding size (ha)	Diversification	Agri-environment scheme	Sensitivity to change
MA03/23 Moss Farm and Park Farm	Arable and beef cattle	87	None	None	Medium
MA03/24 Brookheyes Farm*	Grassland	11	Not known	None	Medium
MA03/25 Hulme Barn Farm	Arable and grassland	81	None	None	Medium
MA03/26 Land at Bowden View Farm*	Grassland	11	Not known	None	Medium
MA03/27 Land at Wrenshot House*	Equestrian (non-commercial)	6.9	Not known	None	Low
MA03/28 Land at Mere Hall Farm*	Arable	50	Not known	None	Medium
MA03/29 Land at Hulse Heath Lane, Bucklow Hill *	Grassland	4.4	Not known	None	Medium
MA03/30 Hulse Heath Farm*	Grassland	0.8	Not known	None	Low
MA03/31 Land at Chapel Lane, Bucklow Hill*	Grassland	1.6	Not known	None	Low
MA03/32 Land at Peacock Lane, Millington (1)	Grassland let	15	None	None	Low
MA03/33 Gorse Cottage Farm	Grassland let	4.5	None	None	Low
MA03/34 Land at Peacock Lane, Millington (2)*	Grassland	2	Not known	None	Low
MA03/35 Middle Moss Farm	Grassland	4.6	None	None	Low
MA03/36 Little Moss Farm	Grassland	0.6	None	None	Low
MA03/37 Woolstencroft Farm	Dairy	139	None	None	High
MA03/38 Abbey Leys Farm	Organic arable and grassland	40	Farm shop	Mid-tier CSS	Medium
MA03/39 Scandia House, Moss Lane	Grassland	3.6	None	None	Low

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Holding reference/name	Holding type	Holding size (ha)	Diversification	Agri-environment scheme	Sensitivity to change
MA03/40 Agden Brook Farm	Dairy, arable and potatoes	877	Property rentals	None	High
MA03/41 Booth Bank Farm*	Grassland	8.6	Children's activity farm	None	Medium
MA03/42 Thowler Lane Farm*	Equestrian (non-commercial)	1.5	Not known	None	Low
MA03/43 Land at Agden Lane*	Grassland	0.4	Not known	None	Low
MA03/44 Land at Booth Bank Cottage*	Grassland	1.5	Not known	None	Low

\* It has not yet been possible to arrange farm impact assessment interviews with these holdings. Publicly available sources have been used to obtain the information presented.

## Future baseline

### Construction (2025)

- 4.3.36 Volume 5: Appendix CT-004-00000 provides details of the developments in the Pickmere to Agden and Hulseheath area that are assumed to have been implemented by 2025.
- 4.3.37 No committed developments have been identified in this study area that will materially alter the baseline conditions in 2025 for agriculture, forestry and soils.

### Operation (2038)

- 4.3.38 Volume 5: Appendix CT-004-00000 provides details of the developments in the Pickmere to Agden and Hulseheath area that are assumed to have been implemented by 2038.
- 4.3.39 No committed developments have been identified in this study area that will materially alter the baseline conditions in 2038 for agriculture, forestry and soils.

## 4.4 Effects arising during construction

### Avoidance and mitigation measures

- 4.4.1 During the development of the design, the following measures have been incorporated to avoid or mitigate adverse severance impacts on land holdings:
- provision of Footpath Tabley Inferior 1/1 accommodation underbridge to facilitate access to severed land at Roses Farm (MA03/1) (Volume 2: MA03 Map Book, map CT-06-316b, J3 and map CT-06-317, B7);

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- provision of modified accesses within the Cheshire Showground (MA03/2) to facilitate access to severed land to the south (Volume 2: MA03 Map Book, map CT-06-317, E7 to H7) and to the north (Volume 2: MA03 Map Book, map CT-06-317, F7 to H7);
- provision of Restricted Byway Tabley Superior 4/1 accommodation underbridge to provide access to Hollowood Farm (MA03/17) (Volume 2: MA03 Map Book, map CT-06-318, J7 and map CT-06-319, A6);
- provision of Bridleway Mere 1/1 accommodation underbridge to provide access to severed land for Knowlspit Farm, with Bentleyhurst Farm (MA03/19) and Winterbottom Farm (MA03/20) (Volume 2: MA03 Map Book, map CT-06-319, E6); and
- provision of Agden Brook Farm accommodation underbridge to provide access to severed agricultural land for Agden Brook Farm (MA03/40) (Volume 2: MA03 Map Book, map CT-06-322a, E4).

4.4.2 Other design refinements to limit the impact of the Proposed Scheme on agriculture, forestry and soil resources include:

- rationalisation of balancing ponds to seek to locate them in the least sensitive agricultural locations;
- locally slackened slopes to improve agricultural land use or steepened slopes to limit the area of agricultural land required;
- rationalisation of road realignments to limit the area of agricultural land required;
- incorporation of agricultural tracks to gain access to severed land; and
- rationalisation and relocation of mitigation planting to limit the area of agricultural land required and reduce impacts on holdings.

4.4.3 In addition, there is a need to avoid or reduce environmental impacts to soils during construction so that they will be in a suitable condition to support their proposed use for agricultural land, landscape planting and ecological mitigation following construction.

4.4.4 Compliance with the Code of Construction Practice (CoCP) will avoid or reduce environmental impacts during construction. Those measures that are particularly relevant to agriculture, forestry and soils are set out in the draft CoCP<sup>24</sup> and relate to:

- the reinstatement of agricultural land that is used temporarily during construction to agriculture, where this is the agreed end use (Section 6);
- the provision of a method statement for stripping, handling, storing and replacing agricultural and woodland soils to reduce risks associated with soil degradation on areas of land to be returned to agriculture and woodland following construction, based on detailed soil survey work to be undertaken prior to construction. This will include any remediation measures necessary following the completion of works (Section 6);

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<sup>24</sup>Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

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- a requirement for contractors to monitor and manage flood risk and other extreme weather events, insofar as reasonably practicable, that may affect agriculture, forestry and soil resources during construction (Sections 5 and 16);
- arrangements for the maintenance of farm and field accesses affected by construction (Section 6);
- the protection and maintenance of existing land drainage and livestock water supply systems, where reasonably practicable (Sections 6 and 16);
- the protection of agricultural land adjacent to the construction site, including the provision and maintenance of appropriate stock-proof fencing (Sections 5, 6, 9 and 12);
- the adoption of measures to control the deposition of dust on adjacent agricultural crops (Section 7);
- the control of invasive and non-native species; and the prevention of the spread of weeds generally from the construction site to adjacent agricultural land (Section 9);
- the adoption of measures to prevent, as far as reasonably practicable, the spread of soil-borne, tree, crop and animal diseases from the construction area (Sections 6 and 9); and
- liaison and advisory arrangements with affected landowners, occupiers and agents, as appropriate (Sections 5 and 6).

4.4.5 Upon completion of construction, soils replaced for agricultural, forestry or landscape uses will be monitored to identify any unsatisfactory growing conditions during the five-year aftercare period.

4.4.6 Where agricultural uses are to be resumed on land disturbed during the construction of the Proposed Scheme, the design objective is to avoid any reduction in long-term capability, which would downgrade the quality of the disturbed land, through the adoption of good practice techniques in handling, storing and reinstating soils on that land. Some poorly or very poorly drained land or land with heavier textured soils (such as Salop association soils) may also require particularly careful management, such as the timing of cultivation and livestock grazing during the aftercare period to meet this design objective.

## **Assessment of impacts and effects**

4.4.7 The acquisition and use of land for the Proposed Scheme will interfere with existing uses of that land, and in some locations preclude existing land uses or sever and fragment individual fields and operational units of agricultural and forestry land. This could result in potential effects associated with the ability of affected agricultural and forestry interests to access and effectively use residual parcels of land. There may also be the loss of, or disruption to, buildings and operational infrastructure such as drainage. The Proposed Scheme seeks to reduce this disruption, and where appropriate and reasonably practicable, incorporate residual parcels of land no longer effective for agricultural use due to their size and/or shape as part of environmental mitigation works, such as ecological habitat creation.

4.4.8 Land used to construct the Proposed Scheme will fall into the following main categories when work is complete:



- part of the operational railway or associated infrastructure and kept under the control of the operator;
- highway, PRow or utility diversion/realignment;
- returned to agricultural use (with aftercare management to ensure effective field drainage and stabilisation of the soil structure);
- used for drainage or replacement floodplain storage areas, which may also retain some agricultural use; or
- used for ecological and/or landscape mitigation.

## Temporary effects during construction

### Impacts on agricultural land

4.4.9 During the construction phase, the total area of agricultural land used within the Pickmere to Agden and Hulseheath area will be approximately 402ha as shown in Table 12. Of this total, it is anticipated that approximately 246ha will be restored and available for agricultural use following construction.

**Table 12: Agricultural land required for the construction of the Proposed Scheme**

Agricultural land quality	Area required (ha)	Percentage of agricultural land (%)	Area to be restored (ha)
Grade 1	0	0	0
Grade 2	55.4	13.8	29.3
Subgrade 3a	217.3	54.1	142.7
<b>BMV subtotal</b>	<b>272.7</b>	<b>67.9</b>	<b>172.0</b>
Subgrade 3b	129.1	32.1	74.0
Grade 4	0	0	0.0
Grade 5	0	0	0.0
<b>Total agricultural land</b>	<b>401.8</b>	<b>100</b>	<b>246.0</b>

4.4.10 The disturbance during construction to approximately 273ha of BMV land is assessed as an impact of high magnitude, comprising approximately 68% of the agricultural land requirement. BMV land is assessed as a receptor of medium sensitivity because of its abundance in this locality. The effect of the Proposed Scheme on BMV land during the construction phase is, therefore, assessed as major/moderate adverse, which is significant.

4.4.11 Following completion of construction, temporary facilities will be removed, and the topsoil and subsoil reinstated in accordance with the agreed end use for the land. Some permanently displaced soils may be used to restore land to agriculture or other uses with slightly deeper topsoil and subsoil layers, where appropriate. This could improve the quality of agricultural land locally, for example where droughty soils are limited by soil depth, subject to the soil resource plans to be prepared during the detailed design stage.

## Impacts on soils

- 4.4.12 In areas of heaviest rainfall, and during the wettest times of the year, soils with high clay and silt fractions are most susceptible to the effects of handling during construction and the re-instatement of land; whereas soils with a high sand fraction in areas of lowest rainfall and during the driest times of the year are the least susceptible.
- 4.4.13 Successful soil handling is dependent upon movements being undertaken under appropriate weather and ground conditions using the appropriate equipment. The principles of soil handling are well established and set out in advisory material such as Defra's Code of Practice for the Sustainable Use of Soils<sup>25</sup>. These principles will be followed throughout the construction period.
- 4.4.14 Implementation of the measures set out in the draft CoCP will ensure displaced soil mostly fulfils its pre-existing functions on-site, which are production of food, water stores for flood attenuation and providing ecological habitat resulting in an impact of medium magnitude on the displaced soils. The sensitivity of the majority of soil in the study area is medium, and therefore, the significance of the effect on the displaced soils will be moderate adverse, which is significant.

## Impacts on holdings

- 4.4.15 Land may be required for the Proposed Scheme from holdings temporarily, during the construction period, or permanently. In most cases, the temporary and permanent land requirement will occur simultaneously at the start of the construction period and it is the combined effect of both that will have the most impact on the holding. During the construction period, some agricultural land will be restored and the impact on individual holdings will reduce.
- 4.4.16 The effects of the Proposed Scheme on individual agricultural and related interests during the construction period are summarised in Table 13. The table shows the total area of land required from a particular holding in absolute terms and as a percentage of the total area farmed. It also shows the area of land that could be returned to the holding following the construction period. The degree of impact is based on the proportion of the holding required rather than the absolute area of land.
- 4.4.17 The effects of severance during construction are judged on the ease and availability of access to severed land. The disruptive effects, principally of construction noise and dust, are assessed according to their effects on land uses and enterprises. Impacts on residential properties on farm holdings are assessed, as required, in Section 5, Air quality; Section 6, Community; and Section 13, Sound, noise and vibration. Full details of the nature and significance of effects are set out in Volume 5: Appendix AG-001-OMA03.

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<sup>25</sup> Department for Environment, Food and Rural Affairs (2009), *Construction Code of Practice for the Sustainable Use of Soils on Construction Sites*.

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4.4.18 Woolstencroft Farm (MA03/37) and Agden Brook Farm (MA03/40) have land affected in both the Pickmere to Agden and Hulseheath area and the Broomedge to Glazebrook area (MA04). The impacts and effects are only described in this report, as the main farm buildings are in this area.

4.4.19 The potential scale of effect is determined by combining the highest impact on the farm holding with the sensitivity of that holding, as set out in the SMR.

**Table 13: Summary of temporary impacts and effects on holdings from construction**

Holding reference/ name	Sensitivity to change	Total area required from holding	Construction severance	Disruption	Scale of construction effect	Area to be restored
MA03/1 Roses Farm, including Smoker Hill Farm and Flittogate Farm	Medium	46.9ha (16%) Medium	Low	Negligible	Moderate adverse due to the proportion of land required.	21.6ha
MA03/2 Cheshire Showground	High	26.1ha (22%) High	Low	Low	Major adverse due to the proportion of land required.	19.9ha
MA03/3 Frog Lane Farm	High	9.5ha (1%) Negligible	Negligible	Negligible	Minor adverse	7.9ha
MA03/4 School Farm	Medium	3.2ha (33%) High	Negligible	Low	Major/moderate adverse due to the proportion of land required.	0.7ha
MA03/5 Land at School Lane	Medium	0.8ha (2%) Negligible	Negligible	Negligible	Negligible	0.8ha
MA03/6 Land at Frog Lane	Low	0.2ha (15%) Medium	Negligible	Negligible	Minor adverse	0.1ha
MA03/7 Tabley Brook Farm	Medium	1.2ha (17%) Medium	Negligible	Negligible	Moderate adverse due to the proportion of land required.	1.2ha
MA03/8 Windmill Nurseries	High	1.9ha (78%) High	Negligible	Negligible	Major adverse due to the proportion of land required.	0.5ha
MA03/9 Heyrose Farm	Medium	20.3ha (63%) High	Medium	Negligible	Major/moderate adverse due to the proportion of land required and severance.	11.3ha
MA03/10 Feldy Green Cottage	Medium	2.7ha (18%) Medium	Negligible	Negligible	Moderate adverse due to the proportion of land required.	2.7ha

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Holding reference/ name	Sensitivity to change	Total area required from holding	Construction severance	Disruption	Scale of construction effect	Area to be restored
MA03/11 East Feldy Farm (A)	Medium	0.2ha (6%) Low	Negligible	Negligible	Minor adverse	0.2ha
MA03/12 East Feldy Farm (B)	Medium	1.3ha (12%) Medium	Negligible	Negligible	Moderate adverse due to the proportion of land required.	1.3ha
MA03/13 Gore Farm	Medium	4.2ha (3%) Negligible	Negligible	Negligible	Negligible	4.2ha
MA03/14 Old Feldy Farm	Medium	0.9ha (4%) Negligible	Negligible	Negligible	Negligible	0.9ha
MA03/15 Gorsefields Farm	Medium	0.3ha (1%) Negligible	Negligible	Negligible	Negligible	0.3ha
MA03/16 Fields Farm	Medium	0.7ha (6%) Low	Negligible	Negligible	Minor adverse	0.7ha
MA03/17 Hollowood Farm	Medium	14.6ha (23%) High	Low	Negligible	Major/moderate adverse due to the proportion of land required.	9.2ha
MA03/18 Land at Smith Cottage	Medium	1.3ha (>5%) Low	Negligible	Negligible	Minor adverse	1ha
MA03/19 Knowlspit Farm with Bentleyhurst Farm	High	26.4ha (>20%) High	Low	Negligible	Major adverse due to the proportion of land required.	25.2ha
MA03/20 Winterbottom Farm	Medium	75.4ha (94%) High	Negligible	Low	Major/moderate adverse due to the proportion of land required.	41.5ha
MA03/21 Land at Winterbottom Lane	Low	1.8ha (100%) High	Negligible	Negligible	Moderate adverse due to the proportion of land required.	1.8ha
MA03/22 Yew Tree Farm	High	12.2ha (15%) Medium	Medium	Low	Major/moderate adverse due to the proportion of land required.	4.7ha
MA03/23 Moss Farm and Park Farm	Medium	10.5ha (12%) Medium	Negligible	Negligible	Moderate adverse due to the proportion of land required.	3.1ha

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Holding reference/ name	Sensitivity to change	Total area required from holding	Construction severance	Disruption	Scale of construction effect	Area to be restored
MA03/24 Brookheyes Farm	Medium	10.7ha (97%) High	Negligible	Negligible	Major/moderate adverse due to the proportion of land required.	7.4ha
MA03/25 Hulme Barn Farm	Medium	49.9ha (62%) High	Low	Negligible	Major/moderate adverse due to the proportion of land required.	35.2ha
MA03/26 Land at Bowden View Farm	Medium	11.3ha (100%) High	Negligible	Negligible	Major/moderate adverse due to the proportion of land required.	4.7ha
MA03/27 Land at Wrenshot House	Low	1.4ha (>20%) High	Negligible	Low	Moderate adverse due to the proportion of land required.	0.8ha
MA03/28 Land at Mere Hall Farm	Medium	7.9ha (16%) Medium	Negligible	Negligible	Moderate adverse due to the proportion of land required.	7.8ha
MA03/29 Land at Hulse Heath Lane, Bucklow Hill	Medium	4.1ha (94%) High	Negligible	Negligible	Major/moderate adverse due to the proportion of land required.	4.1ha
MA03/30 Hulse Heath Farm	Low	0.4ha (48%) High	Negligible	Negligible	Moderate adverse due to the proportion of land required.	0.4ha
MA03/31 Land at Chapel Lane, Bucklow Hill (1)	Low	1.5ha (93%) High	Negligible	Negligible	Moderate adverse due to the proportion of land required.	1.4ha
MA03/32 Land at Peacock Lane, Millington (1)	Low	12.1ha (81%) High	High	Negligible	Moderate adverse due to the proportion of land required and severance.	1.9ha
MA03/33 Gorse Cottage Farm	Low	3.6ha (80%) High	Negligible	Negligible	Moderate adverse due to the proportion of land required.	1.1ha
MA03/34 Land at Peacock Lane, Millington (2)	Low	1.2ha (60%) High	Negligible	Negligible	Moderate adverse due to the proportion of land required.	1.2ha

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Holding reference/ name	Sensitivity to change	Total area required from holding	Construction severance	Disruption	Scale of construction effect	Area to be restored
MA03/35 Middle Moss Farm	Low	3.6ha (79%) High	Negligible	Negligible	Moderate adverse due to the proportion of land required.	0.6ha
MA03/36 Little Moss Farm	Low	<0.1ha (<5%) Negligible	Negligible	Negligible	Negligible	<0.1ha
MA03/37 Woolstencroft Farm	High	13.7ha (10%) Low	Low	Negligible	Moderate adverse due to the proportion of land required and severance.	8.0ha
MA03/38 Abbey Leys Farm	Medium	3.7ha (9%) Low	Negligible	Negligible	Minor adverse	1.5ha
MA03/39 Scandia House, Moss Lane	Low	1.3ha (36%) High	Negligible	Negligible	Moderate adverse due to the proportion of land required.	0.5ha
MA03/40 Agden Brook Farm	High	137.2ha (16%) Medium	Medium	Low	Major/moderate adverse due to the proportion of land required and severance.	101.6ha
MA03/41 Booth Bank Farm	Medium	6.0ha (69%) High	Negligible	Negligible	Major/moderate adverse due to the proportion of land required.	6.0ha
MA03/42 Thowler Lane Farm	Low	1.2ha (77%) High	Negligible	Negligible	Moderate adverse due to the proportion of land required.	1.2ha
MA03/43 Land at Agden Lane	Low	0.4ha (100%) High	Negligible	Negligible	Moderate adverse due to the proportion of land required.	0.1ha
MA03/44 Land at Booth Bank Cottage	Low	0.9ha (60%) High	Negligible	Negligible	Moderate adverse due to the proportion of land required.	0.9ha

4.4.20 Overall, 44 holdings in the Pickmere to Agden and Hulseheath area will be affected during construction, of which 33 will experience moderate, moderate/major or major adverse effects, which are significant for each holding.

4.4.21 The temporary construction effects are assessed as major adverse for three holdings: the Cheshire Showground (MA03/2), Windmill Nurseries (MA03/8) and Knowlspit Farm with

Bentleyhurst Farm (MA03/19), all due to the high proportion of land required. For the other significantly affected holdings, 11 are predicted to experience major/moderate adverse effects with the remainder predicted to experience moderate adverse effects.

- 4.4.22 Although financial compensation will be available under existing statutory arrangements to offset these impacts, it is not a consideration in the assessment of environmental effects on farm holdings.

## Permanent effects of construction

### Impacts on agricultural land

- 4.4.23 Following construction and restoration, the area of agricultural land that will remain permanently required will be approximately 156ha, as shown in Table 14.

**Table 14: Agricultural land required permanently**

Agricultural land quality	Total area required (ha)	Percentage of agricultural land (%)
Grade 1	0	0
Grade 2	26.1	16.8
Subgrade 3a	74.6	47.9
<b>BMV subtotal</b>	<b>100.7</b>	<b>64.7</b>
Subgrade 3b	55.1	35.3
Grade 4	0	0
Grade 5	0	0
<b>Total agricultural land</b>	<b>155.8</b>	<b>100</b>

- 4.4.24 Of this total requirement, approximately 13ha (8%) will comprise newly planted woodland on agricultural land for visual screening and habitat creation to mitigate environmental effects arising from the Proposed Scheme. This mitigation is described in Section 7, Ecology and biodiversity and Section 11, Landscape and visual.
- 4.4.25 Replacement floodplain storage will occupy a total area of 0.1ha of agricultural land (see Volume 2: MA03 Map Book, CT-06-318. Some of this land is BMV land and could be subject to marginal downgrading in agricultural land quality. This agricultural assessment assumes that this land will return to agricultural use.
- 4.4.26 The permanent requirement for approximately 101ha of BMV land within the Pickmere to Agden and Hulseheath area is assessed as an impact of high magnitude, comprising 65% of the overall agricultural land requirement. BMV land is assessed as a receptor of medium sensitivity because of its relative abundance in this area. The permanent effect on BMV land is, therefore, assessed as major/moderate adverse, which is significant.

### Impacts on holdings

- 4.4.27 The permanent effects from the construction of the Proposed Scheme on individual agricultural and related interests are summarised in Table 15. The land required column

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refers to the area of land required to operate the Proposed Scheme in absolute terms and as a percentage of the overall area farmed. The scale of impact is based on the likely proportion of land required from the holding. The effects of severance are judged on the ease and availability of access to severed land once construction is completed. The impact on farm infrastructure refers mainly to the loss of or damage to farm capital, such as property, buildings and structures, and the consequential effects on land uses and enterprises. Full details of the nature and scale of effects are set out in Volume 5: Appendix AG-001-0MA03.

4.4.28 The potential scale of effect is determined by combining the highest impact on the farm holding with the sensitivity of that holding, as set out in the SMR.

**Table 15: Summary of permanent impacts and effects on holdings from construction**

Holding reference/ name	Sensitivity to change	Land required from holding	Severance	Infrastructure	Scale of effect
MA03/1 Roses Farm, including Smoker Hill Farm and Flittogate Farm	Medium	25.3ha (9%) Low	Low	Negligible (Although the house and buildings at Flittogate Farm are demolished, these do not form part of the MA03/1 tenancy.)	Negligible
MA03/2 Cheshire Showground	High	6.2ha (>5%) Low	Low	Negligible	Moderate adverse due to the proportion of land required and severance.
MA03/3 Frog Lane Farm	High	1.6ha (<1%) Negligible	Negligible	Negligible	Minor adverse
MA03/4 School Farm	Medium	2.5ha (25%) High	Negligible	Negligible	Major/moderate adverse due to the proportion of land required.
MA03/5 Land at School Lane	Medium	<0.1ha (<1%) Negligible	Negligible	Negligible	Negligible
MA03/6 Land at Frog Lane	Low	0.1 ha (9%) Low	Negligible	Negligible	Negligible
MA03/7 Tabley Brook Farm	Medium	<0.1ha (<1%) Negligible	Negligible	Negligible	Negligible
MA03/8 Windmill Nurseries	High	1.4ha (57%) High	Negligible	High	Major adverse due to the proportion of land required and property demolition.



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Holding reference/ name	Sensitivity to change	Land required from holding	Severance	Infrastructure	Scale of effect
MA03/9 Heyrose Farm	Medium	9.0ha (28%) High	Medium	High	Major/moderate adverse due to the proportion of land required and property demolition.
MA03/10 Feldy Green Cottage	Medium	0ha (0%) Negligible	Negligible	Negligible	Negligible
MA03/11 East Feldy Farm (A)	Medium	0ha (0%) Negligible	Negligible	Negligible	Negligible
MA03/12 East Feldy Farm (B)	Medium	0ha (0%) Negligible	Negligible	Negligible	Negligible
MA03/13 Gore Farm	Medium	<0.1ha (<1%) Negligible	Negligible	Negligible	Negligible
MA03/14 Old Feldy Farm	Medium	0ha (0%) Negligible	Negligible	Negligible	Negligible
MA03/15 Gorsefields Farm	Medium	0ha (0%) Negligible	Negligible	Negligible	Negligible
MA03/16 Fields Farm	Medium	0ha (0%) Negligible	Negligible	Negligible	Negligible
MA03/17 Hollowood Farm	Medium	5.4ha (9%) Low	Low	Negligible	Minor adverse
MA03/18 Land at Smith Cottage	Medium	0.3ha (1%) Negligible	Negligible	Negligible	Negligible
MA03/19 Knowlspit Farm with Bentleyhurst Farm	High	1.2ha (1%) Negligible	Low	Negligible	Moderate adverse due to severance.
MA03/20 Winterbottom Farm	Medium	33.9ha (42%) High	Low	Negligible	Major/moderate adverse due to the proportion of land required.
MA03/21 Land at Winterbottom Lane	Low	0ha (0%) Negligible	Negligible	Negligible	Negligible
MA03/22 Yew Tree Farm	High	7.5ha (9%) Low	Negligible	Negligible	Moderate adverse due to the proportion of land required.

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Holding reference/ name	Sensitivity to change	Land required from holding	Severance	Infrastructure	Scale of effect
MA03/23 Moss Farm and Park Farm	Medium	7.4ha (8%) Low	Negligible	Negligible	Minor adverse
MA03/24 Brookheyes Farm	Medium	3.3ha (30%) High	Negligible	Negligible	Major/moderate adverse due to the proportion of land required.
MA03/25 Hulme Barn Farm	Medium	14.7ha (18%) Medium	Negligible	Negligible	Moderate adverse due to the proportion of land required.
MA03/26 Land at Bowden View Farm	Medium	6.6ha (58%) High	Negligible	High	Major/moderate adverse due to the proportion of land required and property demolition.
MA03/27 Land at Wrenshot House	Low	0.6ha (9%) Low	Negligible	High	Moderate adverse due to property demolition.
MA03/28 Land at Mere Hall Farm	Medium	<0.1ha (<1%) Negligible	Negligible	Negligible	Negligible
MA03/29 Land at Hulse Heath Lane, Bucklow Hill	Medium	0ha (0%) Negligible	Negligible	Negligible	Negligible
MA03/30 Hulse Heath Farm	Low	0ha (0%) Negligible	Negligible	Negligible	Negligible
MA03/31 Land at Chapel Lane, Bucklow Hill (1)	Low	0.1ha (8%) Low	Negligible	Negligible	Negligible
MA03/32 Land at Peacock Lane, Millington (1)	Low	10.2ha (68%) High	Medium	Negligible	Moderate adverse due to the proportion of land required.
MA03/33 Gorse Cottage Farm	Low	2.5ha (56%) High	Negligible	Negligible	Moderate adverse due to the proportion of land required.
MA03/34 Land at Peacock Lane, Millington (2)	Low	<0.1ha (<1%) Negligible	Negligible	Negligible	Negligible

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Holding reference/ name	Sensitivity to change	Land required from holding	Severance	Infrastructure	Scale of effect
MA03/35 Middle Moss Farm	Low	3.0ha (66%) High	Negligible	Negligible	Moderate adverse due to the proportion of land required.
MA03/36 Little Moss Farm	Low	<0.1ha (<1%) Negligible	Negligible	Negligible	Negligible
MA03/37 Woolstencroft Farm	High	5.7ha (4%) Negligible	Low	Negligible	Moderate adverse due to severance.
MA03/38 Abbey Leys Farm	Medium	2.2ha (6%) Low	Negligible	Negligible	Minor adverse
MA03/39 Scandia House, Moss Lane	Low	0.8ha (23%) High	Negligible	High	Moderate adverse due to the proportion of land required and property demolition.
MA03/40 Agden Brook Farm	High	35.6ha (4%) Negligible	Low	Negligible	Moderate adverse due to severance.
MA03/41 Booth Bank Farm	Medium	<0.1ha (<1%) Negligible	Negligible	Negligible	Negligible
MA03/42 Thowler Lane Farm	Medium	0ha (0%) Negligible	Negligible	Negligible	Negligible
MA03/43 Land at Agden Lane	Low	0.3ha (84%) High	Negligible	Negligible	Moderate adverse due to the proportion of land required.
MA03/44 Land at Booth Bank Cottage	Low	0ha (0%) Negligible	Negligible	Negligible	Negligible

4.4.29 Overall, the construction of the Proposed Scheme will permanently affect 33 holdings in the Pickmere to Agden and Hulseheath area, with 18 holdings experiencing moderate, major/moderate or major adverse permanent effects, which are significant for each holding. Eleven holdings will only be affected temporarily during construction with negligible permanent effects remaining.

4.4.30 Six holdings will be affected by demolition:

- Flittogate Farm (the agricultural land of which forms part of Roses Farm (MA01/1)), will lose residential properties and agricultural buildings;
- Windmill Nurseries (MA03/8), which will lose its residential property and glasshouses;
- Heyrose Farm (MA03/9), which will lose a residential property and agricultural buildings;

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- Bowden View Farm (MA03/26), which will lose residential properties and agricultural buildings;
- Wrenshot House (MA03/27), which will lose equestrian buildings; and
- Scandia House Farm, Moss Lane (MA03/39), which will lose agricultural buildings.

4.4.31 Although financial compensation will be available under existing statutory arrangements, there can be no certainty that this will be used to reduce the above adverse effects by the purchase of replacement land or the construction of replacement buildings. Therefore, the above assessment should be seen as the worst case, which could be reduced if the owner and/or occupier is able, and chooses, to use compensation payments to replace assets.

## **Other mitigation measures**

- 4.4.32 Other mitigation will incorporate climate change adaptation and resilience measures, as far as reasonably practicable. For example, restored soils in areas that could be prone to drought with climate change could potentially be replaced at greater depths than at present to make them resilient to drought.
- 4.4.33 A farm pack, as set out within the Phase 2b Farmers and Growers Guide, will be provided to all farmers and landowners, setting out baseline conditions on the land holding and the assurances and obligations that HS2 Ltd will accept upon entering the land. This will include advice and appropriate assistance where there is a need for the landowner to relocate or re-provide agricultural buildings displaced by the Proposed Scheme. In instances where replacement facilities need to be provided, HS2 Ltd will identify the likely impact on existing facilities and its timing, as soon as reasonably practicable.

## **Summary of likely residual significant effects**

- 4.4.34 During construction, the total area of agricultural land required will be approximately 402ha, of which approximately 273ha is BMV land. This is assessed as a temporary major/moderate adverse effect, which is significant.
- 4.4.35 Forty-four holdings will be affected temporarily, of which 33 will experience temporary moderate, major/moderate or major adverse residual effects, which are significant for each holding.
- 4.4.36 Once construction is complete and land required temporarily has been restored, 156ha of agricultural land will continue to be required permanently, of which 101ha is BMV land. This is assessed as a permanent major/moderate adverse effect, which is significant.
- 4.4.37 Thirty-three holdings will be affected permanently, of which 18 will experience moderate, moderate/major or major permanent effects following construction, which is significant for each holding. Six holdings are affected by property demolition.
- 4.4.38 Soil displaced from the Proposed Scheme will mostly fulfil the primary functions of production of food, water stores for flood attenuation and providing ecological habitat resulting in a moderate adverse effect, which is significant.

## Cumulative effects

- 4.4.39 There are no cumulative effects identified as arising from the construction of the Proposed Scheme as a consequence of other development projects affecting agricultural land in the locality.

## 4.5 Effects arising from operation

### Avoidance and mitigation measures

- 4.5.1 No measures are included to mitigate the operational effects of the Proposed Scheme on agriculture, forestry and soils.

### Assessment of impacts and effects

- 4.5.2 Potential impacts arising from the operation of the Proposed Scheme will include:
- noise emanating from moving trains; and
  - the propensity of operational land to harbour noxious weeds.
- 4.5.3 Livestock buildings at Hollowood Farm (MA03/17, noise assessment reference: 612892) and Winterbottom Farm (MA03/20, noise assessment reference: 612893) lie within approximately 100m of the route of the Proposed Scheme. Operational airborne sound levels at these locations have been included in the assessment and the results are presented in Volume 5: Appendix SV-003-0MA03.
- 4.5.4 The predicted operational airborne sound levels have been considered against the specific criteria defined in the Agriculture, forestry and soils section of the SMR. Taking into consideration the noise mitigation included within the Proposed Scheme, as shown on Map Series SV-02 (Volume 5, Sound, noise and vibration Map Book), no likely significant effects from noise on livestock are identified.
- 4.5.5 The propensity of linear transport infrastructure to harbour and spread noxious weeds is a consequence of:
- the management of the highway and railway land; and
  - the propensity of the weeds to spread onto such land from adjoining land, which could be exacerbated by the effects of climate change.
- 4.5.6 The presence of noxious weeds (particularly ragwort) will be controlled using an appropriate management regime that identifies and remedies areas of weed growth that might threaten adjoining agricultural interests.

### Other mitigation measures

- 4.5.7 No other mitigation measures have been identified.

## Summary of likely residual significant effects

- 4.5.8 No residual significant effects on agriculture, forestry and soils have been identified as a result of the operation of the Proposed Scheme.

## Cumulative effects

- 4.5.9 There are no cumulative effects identified as arising from the operation of the Proposed Scheme as a consequence of other development projects affecting agriculture, forestry or soil in the study area.

## Monitoring

- 4.5.10 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.
- 4.5.11 On the basis of there being no significant residual operational effects, there are no area-specific requirements for monitoring agriculture, forestry and soil effects during the operation of the Proposed Scheme in the Pickmere to Agden and Hulseheath area.

## 5 Air quality

### 5.1 Introduction

- 5.1.1 This section of the report provides an assessment of the impacts and likely significant effects on air quality arising from the construction and operation of the Proposed Scheme within the Pickmere to Agden and Hulseheath area. Oxides of nitrogen (NO<sub>x</sub>) including nitrogen dioxide (NO<sub>2</sub>), fine particulate matter (particles of size less than 2.5µm and 10µm in diameter, referred to as PM<sub>2.5</sub> and PM<sub>10</sub>, respectively) and dust have been considered in the assessment. Emissions of all or some of these air pollutants are likely to arise from construction activities, demolition, site preparation works and the use of site haul routes. Emissions will also arise from road traffic during construction and operation of the Proposed Scheme.
- 5.1.2 Engagement with Cheshire East Council (CEC), Cheshire West and Chester Council (CWCC), Trafford Metropolitan Borough Council (TMBC) and Transport for Greater Manchester (TfGM) has been undertaken. The purpose of this engagement has been to obtain relevant baseline information, which includes monitoring data in this area.
- 5.1.3 Detailed reports on the air quality data and assessments for this area are contained within Volume 5: Appendix AQ-001-0MA03. Additional information on air quality monitoring and traffic data used in the assessment is set out in Background Information and Data (BID), BID AQ-002-0MA03<sup>26</sup>.
- 5.1.4 Maps showing the location of the key environmental features and the key construction and operational features of the Proposed Scheme can be found in the Volume 2: MA03 Map Book. Air quality mapping is presented in the Volume 5, Air quality Map Book, Map AQ-01-303.
- 5.1.5 The Proposed Scheme is described in Section 2.

### 5.2 Scope, assumptions and limitations

- 5.2.1 The scope, assumptions and limitations for the air quality assessment are set out in Volume 1 (Section 8), the EIA Scope and Methodology Report (SMR)<sup>27</sup> and Volume 5: Appendix AQ-001-0MA03.
- 5.2.2 The study areas for the air quality assessment have been determined on the basis of where impacts on local air quality may occur:

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<sup>26</sup> High Speed Two Ltd (2022), High Speed Rail (Crewe - Manchester), *Background Information and Data, Air quality*, BID AQ-002-0MA03. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

<sup>27</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

- from construction activities;
- from changes in the nature of traffic during construction and operation; for example, increases in traffic flows during construction or where road closures or restrictions cause diversions and heavier traffic on adjacent roads; or
- from changes to road alignment.

- 5.2.3 The assessment of construction dust emissions has been undertaken for sensitive receptors located up to 350m from dust generating activities. The assessment of traffic emissions has been undertaken for sensitive receptors located up to 200m from roads screened in for further assessment.
- 5.2.4 The assessment has incorporated HS2 Ltd's policies on vehicle emissions<sup>28</sup>. These include the use of Euro VI heavy goods vehicles (HGV), Euro 4 petrol and Euro 6 diesel cars and light goods vehicles (LGV) during construction of the Proposed Scheme.
- 5.2.5 The assessment of construction traffic impacts has used traffic data based on an estimate of the average daily flows in the peak year during the construction period (2025-2037). Several construction scenarios have been assessed for air quality to capture peak construction traffic activity at different times in the construction period. It has been assumed that the changes in construction traffic will occur for the whole year. In some cases, this is a conservative approach, as the duration of the peak traffic flows may well be much shorter. These scenarios have been assessed against the relevant future baseline case without the Proposed Scheme. The assessment also assumes vehicle emission rates and background pollutant concentrations from the year 2025. Since pollutant emissions both from vehicle exhausts and from background pollutant concentrations are anticipated to reduce year by year as a result of vehicle emission controls, the year 2025 represents the worst case for the construction assessment.
- 5.2.6 The predicted impacts across all assessed construction scenarios for each receptor are presented in Volume 5: Appendix AQ-001-0MA03. Predicted concentrations and significant effects are presented for the worst case construction traffic scenario assessed.

## 5.3 Environmental baseline

### Existing baseline

#### Background air quality

- 5.3.1 The main sources of air pollution in the Pickmere to Agden and Hulseheath area are emissions from road vehicles and agricultural activities. The main roads within the area are the M6, the M56, the A556 Chester Road and the A50 Toft Road/King Edward Road/Manchester Road/Knutsford Road/Warrington Road/Cliff Lane.

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<sup>28</sup> High Speed Two Ltd (2022), *Phase 2b Western Leg Information Paper E14: Air quality*.



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- 5.3.2 There are no industrial installations (regulated by the Environment Agency) with permits for emissions to air. The contribution of all industrial processes and other emission sources to local air quality is included within the background concentrations.
- 5.3.3 Estimates of background air quality have been taken from the Department for Environment, Food and Rural Affairs (Defra)<sup>29</sup> for the baseline year of 2018. The data are estimated for 1km grid squares for NO<sub>x</sub>, NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>. Background concentrations were within the air quality standards for all pollutants within the Pickmere to Agden and Hulseheath area.

## Local monitoring data

- 5.3.4 There are currently 10 local authority diffusion tube sites located within the Pickmere to Agden and Hulseheath area for monitoring NO<sub>2</sub> concentrations.
- 5.3.5 HS2 Ltd has undertaken additional monitoring for the purpose of verifying the air quality assessment at three locations in this area. The diffusion tubes are adjacent to the B5391 Pickmere Lane, the A50 Warrington Road near Hoo Green and the A56 Lymm Road in Little Bollington.
- 5.3.6 Measurements of NO<sub>2</sub> were above the air quality standard in 2018 at two sites on the A556 Chester Road, south of the M6 junction 19. Measurements at the remaining sites were within the air quality standard.
- 5.3.7 Details of the location of all monitoring sites are presented in Map AQ-01-303 and the monitoring data are presented in Volume 5: Appendix AQ-001-0MA03 and BID AQ-002-0MA03.

## Air quality management areas

- 5.3.8 There is one air quality management area (AQMA) within the Pickmere to Agden and Hulseheath area: the Chelford Road, Knutsford AQMA which was designated for exceedances of the annual mean NO<sub>2</sub> standard. It covers properties adjacent to a stretch of the A537 Chelford Road, Knutsford and was declared in November 2019. Details of the location are presented in Map AQ-01-303 and Volume 5: Appendix AQ-001-0MA03.

## Receptors

- 5.3.9 Several locations have been identified in the area as sensitive receptors, which are considered to be susceptible to changes in air quality due to their proximity to dust generating activities or traffic routes during construction or operation of the Proposed Scheme.

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<sup>29</sup> Department for Environment, Food and Rural Affairs (2020), *Defra Background Pollutant Concentration Maps*. Available online at: <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>.

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- 5.3.10 Most of the receptors which may be affected by the Proposed Scheme are residential. Other receptors include Little Bollington Church of England School and Mere Day Nursery.
- 5.3.11 The air quality assessment has also included receptors in ecological sites sensitive to nitrogen deposition and dust. There are four international/national ecological site designations of relevance to the air quality assessment identified in the Pickmere to Agden and Hulseheath area, namely the Tabley Mere Site of Special Scientific Interest (SSSI), Midland Meres and Mosses Phase 1 Ramsar site, The Mere, Mere SSSI and the Dunham Park SSSI. The Mere, Mere SSSI is within an area covered by the Midland Meres and Mosses Phase 1 Ramsar site. Other relevant local sensitive ecological sites identified close to the Proposed Scheme include Leonard's and Smoker Woods ancient woodland (AW), Round and Rinks Woods AW, Rinks Wood and Round Wood Local Wildlife Site (LWS), Arley and Waterless Brook Corridor LWS, Bongs Wood AW, Bongs Wood and Rough LWS, Tabley Wood AW, Tabley Pipe Wood LWS, Meremoss Wood AW, Belt Wood LWS and Fields Behind 'Ye Olde No. 3' LWS.

## Future baseline

- 5.3.12 Volume 5: Appendix CT-004-00000 provides details of the developments in the Pickmere to Agden and Hulseheath area that are assumed to be implemented by 2025. The potential cumulative impact from committed developments on air quality in conjunction with the effects from the construction and operation of the Proposed Scheme has been considered as part of this assessment. The future air quality baselines are defined as the 'without the Proposed Scheme' scenarios at each stage.

## Construction (2025)

- 5.3.13 Future background pollutant concentrations have been sourced from the Defra background maps for the first year of construction in 2025, which predict NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> levels in 2025 to be lower than in the 2018 baseline and within the relevant air quality standards.
- 5.3.14 Committed developments that have been included as future receptors in the assessment of air quality impacts during construction of the Proposed Scheme are identified in Volume 5: AQ-001-0MA03. No additional committed developments have been identified in this study area that will materially alter the baseline conditions in 2025 for air quality.

## Operation (2038)

- 5.3.15 Future background pollutant concentrations have been sourced from the Defra background maps for 2030, which is the latest available year of data. These predict NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> levels in 2030 to be lower than in the 2018 baseline and within the relevant air quality standards. The 2030 background maps have been used as representative of the future baseline conditions during operation of the Proposed Scheme.
- 5.3.16 Committed developments that have been included as future receptors in the assessment of air quality impacts during operation of the Proposed Scheme are identified in Volume 5: AQ-

001-0MA03. No additional committed developments have been identified in this study area that will materially alter the baseline conditions in 2038 for air quality.

## 5.4 Effects arising during construction

### Avoidance and mitigation measures

- 5.4.1 Emissions to the atmosphere will be controlled and managed during construction through the route-wide implementation of the Code of Construction Practice (CoCP). The draft CoCP<sup>30</sup> includes a range of mitigation measures that are accepted by the Institute of Air Quality Management (IAQM) as being suitable to reduce impacts to as low a level as is reasonably practicable. These measures are generally sufficient to avoid any significant effects from dust during construction.
- 5.4.2 The assessment has assumed that the general measures detailed in Section 7 of the draft CoCP will be implemented. These include:
- contractors being required to manage dust, air pollution, odour and exhaust emissions during construction works;
  - inspection and visual monitoring, undertaken in consultation with the local authorities, to assess the effectiveness of the measures taken to control dust and air pollutant emissions;
  - cleaning (including watering) of vehicle routes and designated vehicle waiting areas to suppress dust;
  - the use of water spray systems on demolition sites to dampen down fugitive dust;
  - keeping soil stockpiles away from sensitive receptors where reasonably practicable, also taking into account the prevailing wind direction relative to sensitive receptors;
  - the use of enclosures to contain dust emitted from construction activities; and
  - soil spreading, seeding and planting of completed earthworks as soon as reasonably practicable following completion of earthworks.
- 5.4.3 The draft CoCP includes the requirement for site-specific traffic management measures, such as the use of site haul routes for construction vehicles to minimise the need to use public roads.
- 5.4.4 Prior to commencement of activities, there will be further detailed assessment for each worksite to determine site specific dust mitigation.

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<sup>30</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

## Assessment of impacts and effects

### Temporary effects

5.4.5 Impacts from construction of the Proposed Scheme could arise from dust generating activities and emissions from construction traffic. As such, the assessment of construction impacts has been undertaken for dust and exposure to NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations.

### Construction dust effects

5.4.6 The risks of demolition of existing buildings, earthworks, construction of new structures and trackout have been assessed for their effect on dust soiling, human health and ecological sites. Trackout refers to the transport of dust and dirt from the construction site(s) onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. The human health effects of dust relate mainly to short-term exposure to PM<sub>10</sub>.

5.4.7 The identified risks potentially arising from construction dust within the Pickmere to Agden and Hulseheath area are shown in Table 16. The risks are dependent on the magnitude of dust generating activities and the location of sensitive receptors in relation to these activities. A range of risks is shown, as there are several construction locations in the area.

**Table 16: Summary of risks for construction dust assessment**

Activity	Dust soiling	Human health	Ecological effects
Demolition	Low to medium	Low	Not applicable
Earthworks	Medium to high	Low	Low
Construction	Medium to high	Low	Low
Trackout	Medium to high	Low	Low

5.4.8 With the application of the established national best practice mitigation measures contained in the draft CoCP, no significant effects are anticipated from the risks associated with the dust generating activities. Further details of the assessment can be found in Volume 5: Appendix AQ-001-0MA03 where the scale of dust emissions and the sensitivity of the area and receptors are fully described.

### Construction traffic effects

5.4.9 Construction activity could also affect local air quality through the additional traffic generated on the highway network and site haul routes as a result of construction vehicles and through changes to traffic patterns arising from temporary road diversions and realignments.

5.4.10 The assessment of construction traffic emissions has been undertaken for a 'without the Proposed Scheme' scenario and a 'with the Proposed Scheme' scenario. The traffic data for each scenario includes the additional traffic from future committed developments.

- 5.4.11 Construction traffic data in the study area have been screened to identify roads that required further assessment and to confirm the likely effect of the change in emissions from vehicles using those roads during construction of the Proposed Scheme. There were seven construction traffic scenarios assessed in this area, four for human health receptors and three for ecological receptors.
- 5.4.12 Receptors expected to experience the greatest change in concentrations have been included in the air quality model. No significant effects are predicted at any modelled receptors during construction of the Proposed Scheme. Concentrations of NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> are within the relevant air quality standards both with and without the Proposed Scheme. No significant air quality effects are anticipated at any of the ecological receptors in this area.

### **Permanent effects**

- 5.4.13 No permanent effects on local air quality are likely to arise during construction of the Proposed Scheme.

### **Other mitigation measures**

- 5.4.14 No other mitigation measures are considered necessary in relation to air quality during construction of the Proposed Scheme in this area.

### **Summary of likely residual significant effects**

- 5.4.15 The methods outlined within the draft CoCP are considered effective at reducing dust and traffic emissions, and therefore, no significant residual effects are anticipated.

### **Cumulative effects**

- 5.4.16 The data used in the air quality assessment take account of predicted changes in traffic as a result of committed developments in the area, and therefore, their impacts have been included within the assessment. It is assumed that dust emissions from construction of other developments in the area will be controlled by appropriate measures as set out within their respective environmental management controls, and therefore, no cumulative effects for air quality are anticipated.

## **5.5 Effects arising from operation**

### **Avoidance and mitigation measures**

- 5.5.1 No specific mitigation measures for air quality are proposed during operation of the Proposed Scheme.

## **Assessment of impacts and effects**

- 5.5.2 Impacts from the operation of the Proposed Scheme will arise from changes in the volume, composition and/or speed of road traffic and changes in road alignment.
- 5.5.3 There will be no direct atmospheric emissions from the operation of trains that will cause an impact on air quality, and therefore, no assessment is required. Indirect emissions from sources such as rail and brake wear have been assumed to be negligible.

## **Operational traffic effects**

- 5.5.4 The assessment of operational traffic emissions has been undertaken for a 'without the Proposed Scheme' scenario and a 'with the Proposed Scheme' scenario in 2038. The traffic data for each scenario include the additional traffic from future committed developments.
- 5.5.5 Traffic data in the study area have been screened to identify roads that required further assessment and to confirm the likely effect of the change in emissions from vehicles using those roads during operation of the Proposed Scheme. There were 50 roads screened in for further assessment in the Pickmere to Agden and Hulseheath area, including the M6, the M56, the A556 Chester Road and the A50 Warrington Road.
- 5.5.6 Receptors expected to experience the greatest change in concentrations have been included in the air quality model. No significant effects are predicted at any modelled receptors during operation of the Proposed Scheme. Concentrations of NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> are within the relevant air quality standards both with and without the Proposed Scheme. No significant effects are anticipated at any of the ecological receptors in this area.

## **Other mitigation measures**

- 5.5.7 No other mitigation measures are proposed in relation to air quality during operation of the Proposed Scheme.

## **Summary of likely residual significant effects**

- 5.5.8 No significant residual effects are anticipated for air quality in this area during operation of the Proposed Scheme.

## **Cumulative effects**

- 5.5.9 The data used in the air quality assessment take account of predicted changes in traffic as a result of committed developments in the area, and therefore, their impacts have been included within the assessment.

## **Monitoring**

- 5.5.10 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.
- 5.5.11 On the basis of there being no significant residual operational effects, there are no area-specific requirements for monitoring air quality effects during operation of the Proposed Scheme in the Pickmere to Agden and Hulseheath area.

## 6 Community

### 6.1 Introduction

- 6.1.1 This section of the report describes the baseline, impacts and likely significant effects on local communities resulting from the construction and operation of the Proposed Scheme in the Pickmere to Agden and Hulseheath area.
- 6.1.2 The assessment draws on information gathered from engagement with the users and operators of community resources. Local authorities, parish councils and operators of community resources that have been engaged with are identified in Section 3, Stakeholder engagement and consultation. The purpose of this engagement has been to understand how the resources are used and to obtain relevant baseline information to inform the design development and assessment of the Proposed Scheme.
- 6.1.3 Further details of the community assessments undertaken within the Pickmere to Agden and Hulseheath area are contained in Volume 5: Appendix CM-001-0MA03.
- 6.1.4 Community assessment maps are provided in the Map Series CM-01 in Volume 5, Community Map Book. Maps showing the location of the key environmental features (Map Series CT-10) and the key construction (Map Series CT-05) and key operational (Map Series CT-06) features of the Proposed Scheme are provided in the Volume 2: MA03 Map Book. The Proposed Scheme is described in Section 2.
- 6.1.5 All distances, lengths and area measurements provided in this section are approximate.

### 6.2 Scope, assumptions and limitations

- 6.2.1 The assessment scope, key assumptions and limitations for the community assessment are set out in Volume 1, Section 8 and the EIA Scope and Methodology Report (SMR)<sup>31</sup>.
- 6.2.2 The study area includes the land required both temporarily and permanently for the construction and operation of the Proposed Scheme. It also includes a wider area including proposed construction traffic routes within which community resources could be affected by a combination of two or more significant residual effects arising from noise, vibration, poor air quality, heavy goods vehicles (HGV)<sup>32</sup> traffic, and visual intrusion. Overall, the study area is taken as the area of land that encompasses the likely significant community effects of the Proposed Scheme.

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<sup>31</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

<sup>32</sup> HGV traffic effects are where there is a 30% or more increase in HGV traffic movements which have been identified as significant by traffic and transport. The increase in HGV traffic results in a traffic-related severance effect for non-motorised users. They contribute to in-combination effects on community resources that are located adjacent to the routes that experience the increase in HGV movements.



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- 6.2.3 Effects relating to the severance of public rights of way (PRoW) (public footpaths and bridleways) and highway and pedestrian diversions are assessed in Section 14, Traffic and transport. However, where PRoW and other routes are a promoted destination in their own right as a recreation resource, they have been considered within this assessment. Where impacts on public open space and recreational routes are considered, these have been informed by open space and PRoW condition surveys, where it has been possible to undertake such surveys.
- 6.2.4 Where reasonably practicable, public footpaths and routes will be re-instated or convenient alternatives provided. HS2 Ltd will seek to provide a temporary or permanent alternative route in advance of a closure of a road or PRoW. No significant effects on these routes are likely once the mitigation measures have been implemented. If a temporary or permanent alternative route cannot be provided in advance of any road or PRoW closure, then this will be discussed with the relevant local authority and local groups.
- 6.2.5 Isolation effects may arise from either physical islanding of properties or an increase in journey times and/or distance between residential areas and the community resources that residents use on a regular basis.
- 6.2.6 The assessment of in-combination effects draws upon: Section 5, Air quality; Section 11, Landscape and visual; Section 13, Sound, noise and vibration; and Section 14, Traffic and transport. Likely significant in-combination effects on community resources are reported in this Section. Durations of in-combination effects on community resources have been identified where information on the duration of contributing effects is provided in the relevant source assessments.
- 6.2.7 Worker accommodation will be located at A50 Warrington Road main compound. Construction worker impacts on community resources are considered at a route-wide level in Volume 3, Route-wide effects, Section 6.
- 6.2.8 No area-specific limitations or assumptions have been identified for this area.

## 6.3 Environmental baseline

### Existing baseline

- 6.3.1 The Pickmere to Agden and Hulseheath area includes a 10.6km section of the route of the Proposed Scheme in Cheshire. The route passes through the parishes of Tabley Inferior, Pickmere, Tabley Superior, Mere, High Legh and Agden. Cheshire East Council (CEC), Cheshire West and Chester Council (CWCC) and Trafford Metropolitan Borough Council (TMBC) are the local authorities in the area. The southern boundary of the area is formed by the boundary between the parishes of Tabley Inferior and Plumley. The route of the Proposed Scheme will run to the northern boundary of the area, which is in the parish of Agden. The HS2 Manchester spur will be 3.3km in length in this area and will diverge from the route of the Proposed Scheme west of Hulseheath and continue to Manchester. The HS2 Manchester spur will run to the eastern boundary of the area, in Hulseheath. The Proposed

Scheme also includes the London to Liverpool junction, which will enable HS2 to connect with a future Northern Powerhouse Rail (NPR) route between London and Liverpool.

- 6.3.2 The Pickmere to Agden and Hulseheath area is predominately agricultural in nature, characterised by several settlements and scattered farmsteads and residential properties. In general, the majority of community facilities serving this area are located in the larger settlements of Northwich (to the south), Knutsford (to the east) and Warrington, Lymm and Altrincham (to the north), all of which are outside of the study area.

## **Pickmere and surrounds**

- 6.3.3 Pickmere comprises approximately 1,000 residential properties. The nearest residential properties are located 1km west of the route of the Proposed Scheme. The village of Pickmere itself is to the west of the route of the Proposed Scheme, outside of the study area. There are scattered farmsteads and residential properties north of Pickmere towards the M6, some of which lie within the study area.
- 6.3.4 The surrounding area is sparsely populated. Community facilities located in the surrounding area and within the study area include the Cheshire Showground, which is accessed from Flittogate Lane in Tabley, and Pickmere Lane in Pickmere. The showground hosts the annual Royal Cheshire Show and several other events throughout the year.
- 6.3.5 Recreational facilities in the study area include Heyrose Golf Club on Budworth Road, which is an 18-hole golf course and club house. A 13.5km section of the North Cheshire Way, which is a 113km PRoW in total, is also located in the study area.

## **Hoo Green, High Legh, Hulseheath, Agden and surrounds**

- 6.3.6 Hoo Green comprises approximately 50 residential properties. The nearest residential properties are located 45m east of the route of the Proposed Scheme. The settlement includes the Kilton Inn public house.
- 6.3.7 High Legh is a settlement to the west of the route of the Proposed Scheme, located mostly outside of the study area. It contains approximately 500 residential properties, the nearest of which are located 1km from the route of the Proposed Scheme. Recreational facilities in the study area include High Legh Park Golf Club, located on the A50 Warrington Road on the eastern outskirts of High Legh. The Cheshire Cycleway (National Cycle Network Regional Route 70), a 280km cycle route through Cheshire, partly lies within the study area.
- 6.3.8 Hulseheath comprises approximately 20 residential properties. The nearest residential properties are located 350m east of HS2 Manchester spur.
- 6.3.9 Agden comprises approximately 150 residential properties. The nearest residential properties are located on the route of the Proposed Scheme. A large number of the residential properties in Agden are located in Agden Brow Park (a residential caravan park). The Cheshire Ring Canal Walk on the Bridgewater Canal towpath passes north-east of the

A56 Lymm Road in Agden. Ye Olde No. 3 public house is located in Little Bollington on the outskirts of Agden, east of the route of the Proposed Scheme.

## Future baseline

### Construction (2025)

- 6.3.10 Volume 5: Appendix CT-004-00000 provides details of the developments in the Pickmere to Agden and Hulseheath area that are assumed to have been implemented by 2025. No committed developments of relevance for the community assessment have been identified that would materially alter the future baseline in this area.

### Operation (2038)

- 6.3.11 Volume 5: Appendix CT-004-00000 provides details of the developments in the Pickmere to Agden and Hulseheath area that are assumed to have been implemented by 2038. No committed developments of relevance for the community assessment have been identified that would materially alter the future baseline in this area.

## 6.4 Effects arising during construction

### Avoidance and mitigation measures

- 6.4.1 The draft Code of Construction Practice (CoCP)<sup>33</sup> includes a range of provisions that will help mitigate community effects associated with construction of the Proposed Scheme within this area, including:
- implementation of a community engagement framework and the provision of appropriately experienced community relations personnel to implement the framework, to provide appropriate information and to be the first point of contact to resolve community issues (Section 5 of the draft CoCP);
  - sensitive layout of construction sites to reduce nuisance as far as possible (Section 5 of the draft CoCP);
  - maintenance of PRoW during construction where reasonably practicable (Section 14 of the draft CoCP);
  - monitoring and management of flood risk and other extreme weather events, where reasonably practicable, which may affect community resources during construction (Section 16 of the draft CoCP);
  - specific measures in relation to air quality and noise will also serve to reduce impacts for the neighbouring communities including discretionary noise insulation for sensitive

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<sup>33</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

community resources and, in special circumstances, temporary rehousing (Sections 7 and 13 of the draft CoCP); and

- where practicable, the avoidance of HGVs operating adjacent to schools during drop off and pick-up periods (Section 14 of the draft CoCP).

## **Assessment of impacts and effects**

### **Pickmere and surrounds**

#### **Temporary effects**

##### **Residential properties**

- 6.4.2 Construction of the Proposed Scheme, including utility works and/or highways works, will be required on residential land in the area. Where the scale of impact will be small, and the duration short (up to three months), these works will result in minor adverse effects, which will not be significant at a community level. A description of the affected properties is included within Volume 5: Appendix CM-001-0MA03.
- 6.4.3 Construction of the Proposed Scheme will be in proximity to a group of approximately five properties in Tabley Superior, in the vicinity of Budworth Road. Residents of these properties will experience significant noise and visual effects during construction associated with Budworth Road satellite compound and construction of Heyrose embankment. Significant noise effects from these works are likely to last for approximately eight months. Together, these noise and visual effects will result in a moderate adverse in-combination effect on amenity for residents at these properties, which is significant.

##### **Community facilities**

- 6.4.4 Construction of Pickmere embankment, Cheshire Showground South access diversion, Cheshire Showground North access diversion and Footpath Pickmere 9/1 underbridge will require the temporary use of land at Cheshire Showground. The Proposed Scheme will temporarily require approximately 25ha (21%) of the 121ha of land that is used for the annual Royal Cheshire Show and other events including Truckfest, game fairs, motorbike rallies, vintage car events and Scout jamborees. A smaller area of the showground, approximately 5ha (5%) will also be required permanently for the Proposed Scheme. During construction, temporary diversions will be put in place. Construction will take approximately three years and six months to complete and will sever land owned by Cheshire Showground. This will reduce the amount of available show space for the site by approximately 21% during this time, which is likely to affect events that take place at this site. Based on engagement with the Showground, the viability of the business may be affected by the loss of land. However, HS2 Ltd and the Cheshire Agricultural Society are working to retain the showground activities on the site. There is no alternative greenfield venue of this size in the area which could be used whilst the construction works are underway. As such, due to the loss of land, it is assumed on a precautionary basis that Cheshire Showground will not be

able to continue to operate. The loss of this resource is considered a major adverse effect, which is significant.

### **Recreational facilities**

- 6.4.5 No temporary construction effects on recreational facilities are anticipated in this area.

### **Public open space and recreational routes**

- 6.4.6 No temporary construction effects on public open space or recreational routes are anticipated in this area.

### **Permanent effects**

#### **Residential properties**

- 6.4.7 The construction of Pickmere embankment will require the demolition of one residential property: Flittogate Farm, on Flittogate Lane in Tabley. This residential property will be permanently lost.
- 6.4.8 The construction of Arley Brook viaduct will require the demolition of two residential properties: Barrhill and Waterless Brook Cottage, on the B5391 Pickmere Lane in Tabley. These residential properties will be permanently lost.
- 6.4.9 The construction of Heyrose embankment will require the demolition of one residential property: Windmill House on Budworth Road in Tabley. This residential property will be permanently lost.
- 6.4.10 The construction of Heyrose embankment will require the demolition of one residential property: Cow Lane Cottage, on Heyrose Lane in Tabley. This residential property will be permanently lost.

#### **Community facilities**

- 6.4.11 It is considered that the temporary effects identified on a precautionary basis on the Cheshire Showground reported above, are likely to result in this resource being unable to continue to operate and as a result there will be a major adverse permanent effect which is significant.

#### **Recreational facilities**

- 6.4.12 No permanent construction effects on recreational facilities are anticipated in this area.

#### **Public open space and recreational routes**

- 6.4.13 No permanent construction effects on public open space or recreational routes are anticipated in this area.

## **Hoo Green, High Legh, Hulseheath, Agden and surrounds**

### **Temporary effects**

#### **Residential properties**

- 6.4.14 Construction of the Proposed Scheme, including utility works and/or highways works, will be required on residential land in the area. Where the scale of impact will be small, and the duration short (up to three months), these works will result in minor adverse effects, which will not be significant at a community level. A description of the affected properties is included within Volume 5: Appendix CM-001-0MA03.
- 6.4.15 The B5569 Chester Road in Mere is a designated route for construction traffic and will experience a significant increase in HGV traffic movements. These significant HGV traffic effects will combine with significant traffic noise effects approximately 50 residential properties on Chester Road, between the A50 Chester Road and the A5304 Mereside Road, during the peak months of construction. Together these noise and HGV traffic effects will result in a moderate adverse in-combination effect on amenity for residents at these properties, which is significant.
- 6.4.16 There will be a significant adverse in-combination effect for some residents at Bucklow Hill (Chapel Lane), which extends across the boundary between the Pickmere to Agden and Hulseheath area and the Hulseheath to Manchester Airport area (MA06). As the majority of the affected properties are in the Hulseheath to Manchester Airport area, the effect is reported in Volume 2: Community Area report: Hulseheath to Manchester Airport (MA06), Section 6 and Volume 5: Appendix CM-001-0MA06.
- 6.4.17 There will be a significant adverse in-combination effect for some residents at Hulseheath. Hulseheath extends across the boundary between the Pickmere to Agden and Hulseheath area and the Hulseheath to Manchester Airport area (MA06). As the majority of the affected properties are in this area, the effect on all of these properties is reported in this section. Construction of the Proposed Scheme will be in proximity to a group of approximately 20 residential properties in Hulseheath in the vicinity of Chapel Lane, Peacock Lane and Thowler Lane. Residents of these properties will experience significant noise and visual effects during construction of Hulseheath North embankment, Hulseheath South embankment, Peacock Lane viaduct and Hoo Green North cutting. Significant noise effects from these works are likely to last for approximately three years. In addition, Chapel Lane is a designated route for construction traffic to enable access to Chapel Lane satellite compound. It will experience a significant increase in HGV traffic movements between Hulseheath Lane and Peacock Lane. 10 out of the 20 properties will also be affected by significant traffic noise effects during peak months of construction. Together these noise, visual and HGV traffic effects will result in a major adverse in-combination effect on amenity for residents at these properties, which is significant.

### **Community facilities**

6.4.18 No temporary construction effects on community facilities are anticipated in this area.

### **Recreational facilities**

6.4.19 No temporary construction effects on recreational facilities are anticipated in this area.

### **Public open space and recreational routes**

6.4.20 No temporary construction effects on public open space and recreational routes are anticipated in this area.

### **Permanent effects**

#### **Residential properties**

6.4.21 Construction of Hoo Green North cutting will require the demolition of four residential properties: two on Bowden View Lane and two on the A50 Warrington Road in Hoo Green. These residential properties will be permanently lost.

6.4.22 The construction of Lymm South embankment will require the demolition of one residential property: Hollybank House, on the A56 Lymm Road in Broomedge. This residential property will be permanently lost.

#### **Community facilities**

6.4.23 No permanent construction effects on community facilities are anticipated in this area.

#### **Recreational facilities**

6.4.24 No permanent construction effects on recreational facilities are anticipated in this area.

#### **Public open space and recreational routes**

6.4.25 No permanent construction effects on public open space or recreational routes are anticipated in this area.

### **Other mitigation measures**

6.4.26 HS2 Ltd is continuing to engage with owners and operators of Cheshire Showground to identify reasonably practicable measures to help mitigate the likely significant effects identified in this assessment.

## Summary of likely residual significant effects

- 6.4.27 The construction of the Proposed Scheme will result in significant temporary residual effects on the following community resources:
- approximately five residential properties in Tabley Superior due to the combination of noise and visual effects;
  - approximately 50 residential properties in Mere due to the combination of HGV traffic and noise effects;
  - approximately 20 residential properties in Hulseheath due to the combination of noise, visual and HGV traffic effects; and
  - loss of Cheshire Showground.
- 6.4.28 The construction of the Proposed Scheme will result in the loss of Cheshire Showground, which is a significant permanent residual effect.

## Cumulative effects

- 6.4.29 No temporary or permanent cumulative effects have been identified in the Pickmere to Agden and Hulseheath area.

## 6.5 Effects arising from operation

### Avoidance and mitigation measures

- 6.5.1 The following measures have been incorporated into the Proposed Scheme design as part of the design development process to avoid or reduce environmental impacts during operation:
- landscape mitigation planting along the route of the Proposed Scheme to provide visual screening for residents of Providence Farm and School Farm, residents of properties on School Lane and the B5391 Pickmere Lane, users of PRoW in the area and residents of properties in Pickmere;
  - landscape mitigation planting along the route of the Proposed Scheme to provide visual screening for users of Heyrose Golf Club, residents of properties on Old Hall Lane, Budworth Road and residents of Hollowood Farm, Bentleyhurst Farm and Winterbottom Farm;
  - landscape mitigation planting to the east and west of the route of the Proposed Scheme to provide visual screening for residents of properties in Hoo Green, on Wrenshot Lane and Thowler Lane, and users of the A50 Warrington Road/Knutsford Road, Yew Tree Farm, Bowden View Lane, Mere Court Hotel and High Legh Park Golf Club;
  - landscape earthworks near Hoo Green, Peacock Lane, Agden Lane and A56 Lymm Road to provide acoustic and visual screening for residents of properties in Hoo Green, and on Peacock Lane, Thowler Lane, Agden Lane, Daisybank Farm and the A56 Lymm Road;



- noise fence barriers to provide acoustic screening for residents of properties in Agden; and
- landscape mitigation planting along HS2 Manchester spur to provide visual screening for residents of properties along Oakwood Road and to screen views of Peacock Lane grid supply point from Peacock Lane, Chapel Lane and Millington.

## **Assessment of impacts and effects**

### **Pickmere and surrounds**

- 6.5.2 A group of approximately 10 residential properties in the vicinity of Old Hall Lane, Over Tabley will be in proximity to the route of the Proposed Scheme. The operation of the Proposed Scheme will result in significant noise and visual effects due to trains running on Heyrose embankment. Together these noise and visual effects will result in a major adverse in-combination effect on amenity for residents at these properties, which is significant.
- 6.5.3 A group of approximately five residential properties in the vicinity of Budworth Road, Tabley Superior will be in proximity to the route of the Proposed Scheme. The operation of the Proposed Scheme will result in significant noise and visual effects due to trains running on Heyrose embankment. Together these noise and visual effects will result in a major adverse in-combination effect on amenity for residents at these properties, which is significant.

### **Hoo Green, High Legh, Hulseheath, Agden and surrounds**

- 6.5.4 The Proposed Scheme will be in proximity to a group of approximately five residential properties in the vicinity of Winterbottom Lane, Winterbottom. The operation of the Proposed Scheme will result in significant visual effects, due to views of trains and overhead line equipment, and significant noise effects due to operational trains running on Hoo Green South embankment No.2. Together these noise and visual effects will result in a major adverse in-combination effect on amenity for residents at these properties, which is significant.
- 6.5.5 There will be a significant adverse in-combination effect for some residents at Hulseheath. Hulseheath extends across the boundary between the Pickmere to Agden and Hulseheath area and the Hulseheath to Manchester Airport area (MA06). As the majority of the affected properties are in this area, the effect on all of these properties is reported in this section. The Proposed Scheme will be in proximity to a group of approximately 15 residential properties in Hulseheath (in the vicinity of Peacock Lane, Back Lane and Thowler Lane). The operation of the Proposed Scheme will result in significant noise and visual effects due to operational trains running on Hulseheath South embankment and Hulseheath North embankment. Together these noise and visual effects will result in a major adverse in-combination effect on amenity for residents at these properties, which is significant.

## Other mitigation measures

6.5.6 No further mitigation is proposed.

## Summary of likely residual significant effects

6.5.7 The operation of the Proposed Scheme will result in residual significant effects on the following resources:

- approximately 10 residential properties in Over Tabley due to the combination of noise and visual effects;
- approximately five residential properties in Tabley Superior due to the combination of noise and visual effects;
- approximately five residential properties in Winterbottom due to the combination of noise and visual effects; and
- approximately 15 residential properties in Hulseheath due to the combination of noise and visual effects.

## Cumulative effects

6.5.8 No cumulative effects have been identified in the Pickmere to Agden and Hulseheath area.

## Monitoring

6.5.9 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.

6.5.10 Any area-specific operational monitoring requirements in relation to air quality effects, noise and vibration effects, traffic effects and visual effects that have contributed to the in-combination assessments, are described in the relevant sections of this Volume 2 report.

## 7 Ecology and biodiversity

### 7.1 Introduction

- 7.1.1 This section of the report describes the ecological baseline and identifies the predicted impacts and likely significant effects on habitats and species that will arise from construction and operation of the Proposed Scheme in the Pickmere to Agden and Hulseheath area. This includes effects on sites recognised or designated on the basis of their importance for nature conservation.
- 7.1.2 Engagement has been undertaken with stakeholders including Natural England, the Environment Agency, the Forestry Commission, the Woodland Trust, Cheshire Wildlife Trust, Greater Manchester Ecology Unit, the National Trust, Cheshire East Council and Cheshire West and Chester Council. The purpose of this engagement has been to obtain relevant baseline information and inform the design development and assessment of the Proposed Scheme.
- 7.1.3 Volume 5 contains supporting information to the ecological assessment reported in this section, including:
- ecological baseline data – designated sites (see Volume 5: Appendix EC-001-0MA03);
  - an ecological register of local level effects, which are not reported individually in Volume 2 (Volume 5: Appendix EC-015-0MA03); and
  - documents to support the Habitat Regulations Assessment Screening Report and Appropriate Assessment for the Rostherne Mere Ramsar site and The Mere, Mere component of the Midland Meres and Mosses Phase 1 Ramsar site (Volume 5: Appendix EC-016-00003).
- 7.1.4 Map Series EC-01 showing statutory and non-statutory designated sites of relevance to the assessment in the Pickmere to Agden and Hulseheath area is provided in the Volume 5, Ecology Map Book.
- 7.1.5 Maps showing the location of the key environmental features (Map Series CT-10) and the key construction (Map Series CT-05) and key operational (Map Series CT-06) features of the Proposed Scheme can be found in the Volume 2: MA03 Map Book.
- 7.1.6 In addition, ecological baseline information relating to habitats and species recorded in the Pickmere to Agden and Hulseheath area is set out in Background Information and Data BID)<sup>34</sup> (BID EC-002-00001 to BID EC-014-00001<sup>35</sup>) and accompanying Map Series EC-02 and EC-04 to EC-12 (BID Ecology Map Books).

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<sup>34</sup> High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background Information and Data*. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

<sup>35</sup> Note that BID EC-014-00000 contains data on badgers and is not published.

- 7.1.7 The Proposed Scheme is described in Section 2.
- 7.1.8 All distances, lengths and area measurements in this section are approximate.

## 7.2 Scope, assumptions and limitations

- 7.2.1 The scope, assumptions and limitations for the ecological assessment are set out in Volume 1, Section 8 and the EIA Scope and Methodology Report (SMR)<sup>36</sup> and in the Field Survey Methods and Standards (FSMS), which is included as an annex to the SMR.
- 7.2.2 A route-wide Water Framework Directive (WFD) compliance assessment has been undertaken in conjunction with the environmental assessment (Section 15, Water resources and flood risk). Details of the assessment are set out in Volume 5: Appendix WR-003-0MA03 – Water resource assessment and WR-005-0MA03 – Flood assessment as per Section 15.
- 7.2.3 Access was obtained for the majority of the land where general habitat survey (Phase 1 habitat survey) was proposed. However, access could not be gained in time for seasonally constrained surveys at locations identified below that have potential to support key ecological features. These include Rinks Wood and Round Wood Local Wildlife Site (LWS), Rounds and Rinks Woods Ancient Woodland Inventory (AWI) site and Tabley Pipe Wood LWS. Further details are provided in Background Information and Data: BID EC-002-00001 to BID EC-014-00001.
- 7.2.4 Where data are limited, such as due to the absence of field surveys, a precautionary baseline has been built up according to the guidance reported in the SMR. This constitutes a ‘reasonable worst case’ basis for the subsequent assessment and development of mitigation.
- 7.2.5 BID EC-002-00001 to BID EC-014-00001 identifies these survey locations. Where the assessment has been based upon limited data, the ecological receptor is described as ‘of up to’ a specific value to indicate that a precautionary approach has been applied.
- 7.2.6 The precautionary approach to the assessment that has been adopted identifies the likely significant ecological effects of the Proposed Scheme. Use of the precautionary approach ensures that any limitations arising from the age of datasets are taken into account. Unless otherwise stated, the description of effects assumes that land within Bill limits will be subject to habitat loss resulting from development of the Proposed Scheme, with the land required for construction purposes only being reinstated following completion of construction. This includes areas identified specifically for habitat creation.
- 7.2.7 With respect to utility works, it is normally assumed that all habitat is lost from the land required for the Proposed Scheme. This is assumed to be temporary except for mature woodland and areas of high-quality habitat. However, for some utility works, such as decommissioning of existing utilities, the construction methods are such that it has been

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<sup>36</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

possible to exclude significant effects on receptors within the land required for the construction of the Proposed Scheme at the following sites:

- Bongs Wood and Rough LWS; and
- Bongs Wood AWI site.

## 7.3 Environmental baseline

### Existing baseline

#### Introduction

- 7.3.1 This section describes the ecological baseline relevant to the assessment: the designated sites, habitats and species recorded in this area. Further details are provided in the reports presented in Volume 5: Appendix EC-001-00001 and BID: BID EC-002-00001 to BID EC-015-00001, and maps presented in Volume 5, Map Series EC-01 and BID Ecology Map Books: Map Series EC-02 and EC-04 to EC-12. Statutory and non-statutory designated sites are shown on Volume 5, Map EC-01-509b to EC-01-512a-R1, more distant designated sites listed in this report are beyond the map extents. The extent of the EC-01 maps is such that some designated sites are identified on them that are not relevant to the assessment due to their distance from the Proposed Scheme. Such sites are not covered in this report.
- 7.3.2 Land required for and adjacent to the Proposed Scheme in the Pickmere to Agden and Hulseheath area consists mainly of agricultural land, with scattered farm buildings, villages and isolated dwellings. Ponds are concentrated in the south, between Pickmere and Winterbottom, whilst scattered woodlands occur throughout the Pickmere to Agden and Hulseheath area. The Proposed Scheme will cross several watercourses, including Waterless Brook/Arley Brook, as well as major roads and motorways including the M6 at Winterbottom and the M56 at Agden. The topography of the land in the Pickmere to Agden and Hulseheath area is predominately flat, with steep slopes between Agden Hall and Agden Brook Farm.

#### Designated sites

- 7.3.3 There are two statutory designated sites of international importance of potential relevance to the assessment in the Pickmere to Agden and Hulseheath area. They are:
- Midland Meres and Mosses Phase 1 Ramsar site, covering an area of 510.9ha is designated for nutrient-rich water bodies (meres), associated fringe habitats of reed swamp, fen carr and damp pasture, and quaking peat bog. The wide range of habitats supports numerous associated rare species of plants and invertebrates. The Mere, Mere Site of Special Scientific Interest (SSSI) component unit of the Ramsar site is located east of Mere, 260m east of the land required for the construction of the Proposed Scheme within the Pickmere to Agden and Hulseheath area. It is also 180m east of a construction traffic route along the A556. Tatton Meres SSSI component site is located north of Knutsford, 2.8km east of the land required for the construction of the Proposed Scheme

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within the Pickmere to Agden and Hulseheath area and 1.6km east of a construction traffic route along the A5034 Mereside Road. The Midland Meres and Mosses Phase 1 Ramsar site is also relevant to the Hulseheath to Manchester Airport area (MA06) assessment and a further component of this Ramsar site, Wybunbury Moss SSSI, is relevant to the Hough to Walley's Green area (MA01) assessment; and

- Rostherne Mere Ramsar site, covering an area of 79.8ha, is designated because it is one of the deepest and largest of the meres of the Shropshire-Cheshire Plain. Marginal vegetation consists of a narrow fringe of common reed. It is also designated as Rostherne Mere SSSI. The site is located west of Rostherne, 1.2km east of the land required for the construction of the Proposed Scheme within the Pickmere to Agden and Hulseheath area. This Ramsar site is also relevant to the Hulseheath to Manchester Airport area (MA06) assessment where it is located north of Rostherne, adjacent to land required for the construction of the Proposed Scheme.

7.3.4 There are four nationally important SSSI that are of potential relevance to the assessment in the Pickmere to Agden and Hulseheath area. For each of these sites the land required for the construction of the Proposed Scheme in this area is within the Impact Risk Zone<sup>37</sup> relevant to railway infrastructure as identified by Natural England. They are:

- Plumley Lime Beds SSSI, covering an area of 23.2ha, is designated as it represents calcareous habitat of which there are few remaining natural outcrops in Cheshire, and due to the presence of a variety of habitats including woodland, a pool and marshland. There are a range of plant species associated with alkaline soils such as yellow-wort, common centaury and at least four species of orchid. A variety of willow hybrids and rare mosses are also present. Notable assemblages of birds, including warblers and wildfowl, use the habitats within the site. The SSSI is located between Pickmere and Smoker Brook, 810m south of a site haul route from Ascol Drive, which is within the land required for the construction of the Proposed Scheme, and 840m south of land that has been identified for the purpose of habitat creation or enhancement. This SSSI is also relevant to the Wimboldsley to Lostock Gralam area (MA02) assessment, where the western extent of the SSSI (which comprises a hardstanding track only) is located partially within the land required for the construction of the Proposed Scheme;
- Tabley Mere SSSI, covering an area of 44.4ha, is designated as an example of a very nutrient-rich mere type with a well-developed aquatic flora, as well as acidic marshy grassland and woodland. The site is important for birds, with a large heronry and numerous wildfowl. The site is located between Smoker Brook and Budworth Road, 124m east of the land required for the construction of the Proposed Scheme and 114m west of a construction traffic route along the A556. The SSSI is also relevant to the Wimboldsley to Lostock Gralam area (MA02) assessment, where the western extent of

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<sup>37</sup> The Impact Risk Zones are a GIS tool developed by Natural England to make a rapid initial assessment of the potential risks to SSSIs posed by development proposals and indicate the types of development proposal which could potentially have adverse impacts.

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the SSSI is located 1.3km north-east of the land required for the construction of the Proposed Scheme at its closest point;

- The Mere, Mere SSSI, covering an area of 18.9ha, is designated for moderately nutrient-rich meres with a very diverse aquatic flora. The site consists of two lakes (The Mere and Little Mere), which are separated by a spillway. Twelve species of submerged macrophytes are present. These include the nationally rare autumnal water-starwort, which is locally abundant. Slender spike-rush and shore-weed, which are rare in Cheshire, are abundant at this site. The aquatic invertebrate fauna is diverse and includes the red-eyed damselfly, which has a restricted distribution in Britain. The site is located between Winterbottom and Hulseheath, 260m east of the land required for the construction of the Proposed Scheme. It is also 180m east of a construction traffic route along the A556; and
- Rostherne Mere SSSI and National Nature Reserve (NNR), covering an area of 152.9ha, is designated for nutrient-rich open water body with fringing reed swamp. Rostherne Mere occupies a large oval hollow formed by subsidence resulting from the removal in solution of underlying salt deposits. The area of the Rostherne Mere SSSI extends beyond the boundary of the Ramsar site and includes additional grassland habitats. It is a winter roost for large numbers of pochard and shoveler duck. The site's designation as an NNR is for woodland and wetland birds, mammals, butterflies and its importance for freshwater research. The site is located between Hulseheath and Agden Lane, 1.1km east of the land required for the construction of the Proposed Scheme. This SSSI/NNR is also relevant to the Hulseheath to Manchester Airport area (MA06) assessment, where it is located within the land required for the construction of the Proposed Scheme for the purposes of ecological mitigation only.

7.3.5 Wybunbury Moss SSSI and Tatton Meres SSSI component sites of The Midland Meres and Mosses Phase 1 Ramsar site, are of relevance to the assessment of the Ramsar site. However, the Proposed Scheme within the Pickmere to Agden and Hulseheath area is not within the Impact Risk Zones for these SSSI.

7.3.6 There are 10 LWS that are of potential relevance to the assessment in the Pickmere to Agden and Hulseheath area, each of which is of county/metropolitan value. They are:

- Leonard's and Smoker Wood LWS, covering an area of 10.7ha, comprises two narrow connected woodlands along the banks of two converging brooks. The woodland includes extensive areas of ancient semi-natural woodland and several specimens of veteran oak and ash. It also includes a fungal assemblage of more than fifty species, with a diverse understory and ground flora. The LWS is located along Smoker Brook, partially within the land required for the construction of the Proposed Scheme. It is also 10m south of a site haul route from the A556. The LWS is also relevant to the Wimboldsley to Lostock Gralam area (MA02) assessment, where the woodland is located partially within the land required for the construction of the Proposed Scheme;
- Rinks Wood and Round Wood LWS, covering an area of 14.8ha, is designated for mixed, semi-natural woodland and coniferous woodland, including areas of ancient semi-natural woodland and Rinks Pool. The LWS is located at Nether Tabley, adjacent to the land

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required for the construction of the Proposed Scheme and a construction traffic route along the A556 and Flittogate Lane;

- Arley and Waterless Brook Corridor LWS covering an area of 3.5ha. It is designated for lowland mixed deciduous woodland, wet woodland, veteran trees, neutral and marshy grassland, hedgerows and river habitat along Arley Brook. The LWS is located south of Yew Tree Farm, within the land required for the construction of the Proposed Scheme;
- Bongs Wood and Rough LWS covering an area of 7.6ha. It is designated for lowland mixed deciduous woodland and wet woodland along Arley Brook, including areas of ancient semi-natural woodland. The LWS is located east of Feldy, 380m west of the land required for the construction of the Proposed Scheme and within the land required for utilities work involving modification of an overhead power line;
- Tabley Pipe Wood LWS, covering an area of 5.2ha, is designated for lowland mixed deciduous woodland and wet woodland, including areas of ancient semi-natural woodland. The LWS is located west of Over Tabley, adjacent to a site haul route from the A556 and a construction traffic route along the A556;
- Meremoss (Mere) LWS, covering an area of 43.8ha, is designated for lowland mixed deciduous woodland, including areas of ancient semi-natural woodland. The LWS is located along the A50 Knutsford Road, south of Mere, 311m east of the land required for the construction of the Proposed Scheme. It is also adjacent to a construction traffic route along the A50 Knutsford Road;
- Belt Wood LWS, covering an area of 10.5ha, is designated for lowland mixed deciduous woodland, including areas of ancient semi-natural woodland. The LWS is located west of Mere, within land required for utilities work associated with the construction of the Proposed Scheme, including modification of a telecommunication duct, modification of an overhead power line, removal of an overhead power line and modification of high-pressure gas pipeline;
- Cicely Mill Pool LWS, covering an area of 4.8ha, is designated for wet woodland and fen and comprises a shallow, silty lake managed for sport fishing and wildlife conservation. The LWS is located along Cicely Mill Lane at Cicely Mill, 664m east of a construction traffic route along the A556, which is part of the land required for the construction of the Proposed Scheme. The LWS is also relevant to the Hulseheath to Manchester Airport area (MA06) assessment, where it is located 1.3km south of the land required for the construction of the Proposed Scheme;
- Fields Behind “Ye Olde No.3” LWS, covering an area of 2.5ha, is designated for broadleaved woodland, wet woodland and areas of swamp and comprises two fields adjacent to the Bridgewater Canal (located in the Broomedge to Glazebrook area (MA04)). The LWS is located south of Agden Bridge Farm along the Bridgewater Canal, 190m west of the land required for the construction of the Proposed Scheme, 4m north of land required for utilities works associated with the construction of the Proposed Scheme and adjacent to a construction traffic route along the A56 Lymm Road; and
- Woolstencroft Farm Meadow LWS, covering an area of 6.1ha. It is designated for lowland mixed deciduous woodland, neutral and semi-improved grassland, floodplain grazing



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marsh, ponds, ditches and hedgerows. The LWS is located north of Broomedge, 590m north-east of the land required for the construction of the Proposed Scheme within the Pickmere to Agden and Hulseheath area and 330m north of a construction traffic route along the A56 Lymm Road. The LWS is also relevant to the Broomedge to Glazebrook area (MA04) assessment, where it is located 543m south of the land required for the construction of the Proposed Scheme.

7.3.7 There are seven AWI sites of potential relevance to the assessment in the Pickmere to Agden and Hulseheath area, each of which is of national value. They are:

- Leonard's and Smoker Wood AWI site (which is also part of Leonard's and Smoker Wood LWS), covering an area of 8.2ha, comprising 4.5ha of ancient semi-natural woodland and 3.7ha of Plantation on Ancient Woodland Site (PAWS), is located along Smoker Brook, partially within the land required for the construction of the Proposed Scheme. It is also 10m south of a site haul route from the A556. This AWI site is located partially within the Pickmere to Agden and Hulseheath area, with the remainder of the LWS in the Wimboldsley to Lostock Gralam area (MA02);
- Round and Rinks Woods AWI site (which is also part of the Rinks Wood and Round Wood LWS), covering an area of 31.9ha, including 0.9ha of PAWS. The AWI site is located at Nether Tabley, adjacent to the land required for the construction of the Proposed Scheme. It is also adjacent to a construction traffic route along the A556;
- Bongs Wood AWI site (which is also part of the Bongs Wood and Rough LWS), covering an area of 4.1ha, including 2.5ha of PAWS. The AWI site is located east of Feldy, 590m west of the land required for the construction of the Proposed Scheme and within the land required for utilities work involving modification of an overhead power line;
- Tabley Wood AWI site, which is PAWS covering an area of 1.3ha. The AWI site is located to the south of the M6 and north of Holehouses, 45m south of the land required for the construction of the Proposed Scheme;
- Belt Wood AWI site (which is also part of Belt Wood LWS), covering an area of 5.6ha. The AWI site is located west of Mere, within land required for utilities work involving modification of an overhead power line and 40m east of the land required for the construction of the Proposed Scheme;
- Meremoss Wood AWI site (which is also part of the Meremoss (Mere) LWS), which is PAWS covering an area of 10.7ha. The AWI site is located south of Mere, 775m west of the land required for the construction of the Proposed Scheme, 80m south of land required for utilities work associated with the construction of the Proposed Scheme and 310m south of a construction traffic route along the A50 Knutsford Road; and
- Park Covert AWI site, which is PAWS covering an area of 3.3ha. The AWI site is located south of Woodside Farm, 200m west of the land required for the construction of the Proposed Scheme, 30m east of land required for utilities work associated with the construction of the Proposed Scheme and 145m north of a construction traffic route along the A50 Warrington Road.

- 7.3.8 Areas of semi-natural woodland within the AWI sites are likely to qualify as lowland mixed deciduous woodland, a habitat of principal importance in Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006<sup>38</sup> and a conservation priority of the Cheshire Biodiversity Action Plan<sup>39</sup> (local BAP).
- 7.3.9 HS2 Ltd has carried out a heritage review of three woodlands of potential relevance to the assessment in the Pickmere to Agden and Hulseheath area, which indicates that they could be ancient woodlands and that they may be added to the AWI in due course, each of which is of national value. They are:
- School Wood, covering an area of 2.2ha of broadleaved woodland. It is located west of Tabley Hall, 90m north-east of the land required for the construction of the Proposed Scheme. It is also adjacent to a construction traffic route along the A556;
  - Tabley Pipe Wood (which is also part of Tabley Pipe LWS), covering an area of 3.2ha of mixed deciduous woodland. It is located west of Over Tabley, 50m west of a site haul route from the A556. It is also adjacent to a construction traffic route along the A556; and
  - Rookery at Dunham Massey, covering an area of 2.1ha of mixed deciduous woodland. It is located adjacent to Home Farm at Dunham Massey, 195m north of land required for the construction of the Proposed Scheme. It is also 100m east of a construction traffic route along the A556 Dunham Road.
- 7.3.10 An additional site was identified as ancient woodland, but this will not be added to the AWI. Daisybank Wood, covering an area of 0.2ha, comprises semi-natural broadleaved woodland habitat. Pedunculate oak is dominant in the canopy layer and the shrub layer is dominated by invasive *Rhododendron* species. Bramble is prominent in the ground flora and broad-buckler fern and remote sedge are also present. The species composition of this habitat is characteristic of National Vegetation Classification (NVC) W10a *Quercus robur*- *Pteridium aquilinum* - *Rubus fruticosus* typical sub-community. The ancient woodland is located south-west of Daisy Bank Farm, within the land required for the construction of the Proposed Scheme. The woodland habitat is of national value.

## Habitats

- 7.3.11 In addition to the ancient woodlands identified above, the following habitat types that occur in this area are relevant to the assessment.

## Woodland

- 7.3.12 There are nine other areas of lowland deciduous woodland that qualify or are likely to qualify as lowland mixed deciduous woodland, a habitat of principal importance. They are:

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<sup>38</sup> *Natural Environment and Rural Communities Act 2006* (c.16). London, Her Majesty's Stationery Office.

<sup>39</sup> Cheshire Biodiversity Trust (2020), *Cheshire Biodiversity Action Plan*. Available online at: <https://www.cheshirewildlifetrust.org.uk/sites/default/files/2018-06/BAP%20list%20-%20updated%20April%202011.pdf>.

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- an unnamed woodland located between Arley and Waterless Brook LWS and Round and Rinks Woods AWI site, covering an area of 1.8ha. The woodland comprises mature trees including ash, holly, hawthorn, pedunculate oak and alder, with hawthorn and holly in the shrub layer. The woodland is partially within the land required for the construction of the Proposed Scheme, south of Waterless Brook Cottages. The woodland is of district/borough value;
- an unnamed woodland located within and adjacent to Arley and Waterless Brook Corridor LWS, covering an area of 1.7ha. The woodland comprises a mix of lowland mixed deciduous woodland and wet woodland. The canopy includes frequent alder and crack willow, with oak, ash, sycamore, hawthorn and holly also present. Ground flora includes dog's mercury, wood speedwell and the invasive species Himalayan balsam<sup>40</sup>. The woodland is located partially within the land required for the construction of the Proposed Scheme, south of Yew Tree Farm. The woodland is of county/metropolitan value;
- lowland mixed deciduous woodland located within Belt Wood LWS, covering an area of 8.7ha. The canopy is dominated by oak with Scots pine and larch also present. The dense understorey contains bracken and invasive *Rhododendron* species. The woodland is located 50m east of the land required for the construction of the Proposed Scheme, west of Mere, and is within the land required for utilities work associated with the construction of the Proposed Scheme, including modification of a telecommunication duct, modification of an overhead power line, removal of an overhead power line and modification of a high-pressure gas pipeline. The woodland is of county/metropolitan value;
- a narrow strip of unnamed woodland located along Agden Brook in Moston, covering an area of 4.9ha. The woodland comprises mature trees such as willow, pedunculate oak, ash, beech, alder, holly and sycamore. The ground flora includes common bluebell, common nettle, ribwort plantain, cleavers, perennial rye-grass, herb robert and opposite-leaved golden-saxifrage. Deadwood is also present. The woodland is partially within land required for utilities, for modification of a high-pressure gas pipeline associated with the construction of the Proposed Scheme. The woodland is of district/borough value; and
- a further five woodlands, each less than 1.5ha in area and none within wildlife site designations, at the following locations: Tabley Brook corridor; woodland north of Waterless Brook/Arley Brook; woodland south of Budworth Road; linear woodland east of Heyrose Golf Club and woodland in-between Peacock Lane and Wrenshot Lane. These woodland habitats are of up to local/parish value.

## Grassland

- 7.3.13 Marshy grassland, covering an area less than 0.1ha in area, is located at several locations at High Legh Park Golf Club. The grassland comprises bulrush, soft rush and northern marsh

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<sup>40</sup> *The Invasive Alien Species (Enforcement and Permitting) Order 2019*. London, Her Majesty's Stationary Office. Available online at: <http://www.legislation.gov.uk/uksi/2019/527/contents/made>.

orchid. The grassland is located within and adjacent to the land required for the construction of the Proposed Scheme, and is of district/borough value.

- 7.3.14 Species-poor semi-improved grassland covers an area of 79ha within the land required for the construction of the Proposed Scheme in the Pickmere to Agden and Hulseheath area. Areas of species-poor semi-improved grassland are of local/parish value.

## Hedgerows

- 7.3.15 In total, there is 68km of hedgerow within the land required for the construction of the Proposed Scheme in the Pickmere to Agden and Hulseheath area. Hedgerow with at least 80% cover of native woody species is a habitat of principal importance.
- 7.3.16 Of the 68km of hedgerow, 34.6km have not been surveyed. To accord with Phase 1 habitat descriptions these are mapped as native species-rich on map series EC-02 and they are included as native species-rich in the list below. Based on survey data, and on a precautionary basis, the hedgerow is assumed to consist of:
- 29.3km of native species-poor; and
  - 38.7km of native species-rich of which 5km are also classified as 'Important' according to the 'Wildlife and Landscape' criteria in The Hedgerows Regulations 1997<sup>41</sup>.
- 7.3.17 As part of the precautionary assessment, it is assumed that further important hedgerows will be found within land that was not surveyed, but which will be required for the construction of the Proposed Scheme. The hedgerows within the area also function as wildlife corridors. The hedgerow network as a whole is of county/metropolitan value.

## Watercourses

- 7.3.18 Waterless Brook/Arley Brook will be crossed by the Proposed Scheme. Waterless Brook/Arley Brook may qualify as habitat of principal importance and local BAP habitat. This watercourse and adjacent habitats are intrinsically important and provide corridors for wildlife dispersal, as such they are of up to county/metropolitan value.
- 7.3.19 Sections of Tributary of Millington Clough 1, Tributary of Millington Clough 2, Tributary of Millington Clough 3 and Tributary of Millington Clough 4 will be diverted or realigned to reduce impacts on these features. These tributaries of a main watercourse provide corridors for wildlife dispersal and are of up to district/borough value.
- 7.3.20 Several smaller watercourses, including those associated with Smoker Brook, Waterless Brook/Arley Brook, Tabley Brook and Millington Clough will also be crossed by the Proposed Scheme. These smaller watercourses are of up to district/borough value. The unnamed tributaries of these smaller watercourses are of up to local/parish value.

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<sup>41</sup> *The Hedgerows Regulations 1997 (No. 1160)*. London, Her Majesty's Stationery Office. Available online at: <https://www.legislation.gov.uk/uksi/1997/1160/made>.

## **Water bodies**

7.3.21 There are 109 ponds located within, or partly within, the land required for the construction of the Proposed Scheme, and a further 289 ponds within 250m of the land required for the construction of the Proposed Scheme. On a precautionary basis it is assumed that all ponds could support habitats of principal importance or local BAP habitats and are of district/borough value unless surveys have shown that they are of local/parish value only.

## **Ancient and veteran trees**

- 7.3.22 Ancient and veteran trees with potential relevance to the assessment in the Pickmere to Agden and Hulseheath area have been considered. An ancient tree is one that has passed maturity and is old, or aged, in comparison with other trees of the same species. Veteran trees are younger than ancient trees, but have features found on ancient trees such as decay in the trunk, branches and/or roots.
- 7.3.23 There are two LWS designated, at least in part, for the presence of veteran trees that are within the land required for the construction of the Proposed Scheme. They are:
- Leonard's and Smoker Wood LWS, which has several specimens of veteran oak and ash; and
  - Arley and Waterless Brook Corridor LWS, which has several specimens of veteran crack willow.
- 7.3.24 The veteran trees within these sites are of national value.
- 7.3.25 In addition to the potential presence of veteran trees in the two sites mentioned above, on the basis of surveys undertaken and desk study data there are two oak trees within the land required for the construction of the Proposed Scheme that are considered to be of a sufficient age and/or that support features to indicate they are of veteran status. They are located between the A56 Lymm Road and Agden Lane, and are of national value.
- 7.3.26 Within 100m of the Proposed Scheme, there is a veteran oak tree located at the golf course west of The Mere, Mere which is of national value, and two beech trees east of the gatehouse to the Golf Resort and Spa which could be veteran trees of up to national value.
- 7.3.27 There are also two trees which could be ancient, which are a sycamore and a small-leaved lime at Mere Old Hall, which are of up to national value.

## **Traditional orchards**

7.3.28 Desk study information indicates the presence of an orchard within an area identified as a potential LWS that likely qualifies as traditional orchard, a habitat of principal importance. This is an orchard at Pownall Green Farm, covering an area of 0.1ha, located north-west of junction 19 of the M6. The orchard is adjacent to land required for the construction of the Proposed Scheme. The orchard is of up to county/metropolitan value.

## **Standing water – eutrophic**

- 7.3.29 Eutrophic standing water, covering an area of approximately 18.9ha, is present within The Mere, Mere SSSI. The open water and associated transition habitats support a range of bird, invertebrate and macrophyte species that rely on nutrient-rich waters and are of high conservation value. The Mere, Mere SSSI is located east of Mere, 260m east of a construction traffic route along the A556, which is part of land required for the construction of the Proposed Scheme between Winterbottom and Hulseheath. Eutrophic standing water habitats at the SSSI are of international value.

## **Protected and/or notable species**

- 7.3.30 A summary of the likely value of protected and/or notable species of relevance to the assessment is provided in Table 17.

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**Table 17: Protected and/or notable species within the Pickmere to Agden and Hulseheath area**

Resource/feature	Value	Receptor	Baseline and rationale for valuation
Bats	Regional	Bat assemblage between Smoker Brook and the M6	<p>Field surveys confirmed the presence of common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, brown long-eared bat, noctule, serotine, Leisler's bat, whiskered/Brandt's bat, Natterer's bat, Daubenton's bat and <i>Myotis</i> species within this assemblage:</p> <ul style="list-style-type: none"> <li>• occasional roosts of common pipistrelle, soprano pipistrelle, brown long-eared bat and <i>Myotis</i> species;</li> <li>• a common pipistrelle potential maternity roost in a residential building at Hollowood Lane, Tabley, 15m north of land required for the construction of the Proposed Scheme; and</li> <li>• high levels of common and rarer bat species were recorded foraging and commuting in this area, including noctule, serotine, Leisler's bat and <i>Myotis</i> species.</li> </ul> <p>All bat species in the assemblage are a conservation priority of the Cheshire BAP. Nathusius' pipistrelle, noctule, serotine, Leisler's bat and <i>Myotis</i> species including whiskered bat, Brandt's bat, Natterer's bat and Daubenton's bat are considered to be 'rarer' species in England<sup>42</sup>. However, noctule are considered to be more common in Cheshire. Brown long-eared bat, noctule and soprano pipistrelle are species of principal importance<sup>43</sup>.</p> <p>The assemblage is considered to be of regional value on the basis that high levels of noctule, serotine, Leisler's bat and <i>Myotis</i> species activity was recorded, which are considered to be 'rarer' species in England. Maternity roosts, including those of the most common species, are relatively uncommon and are important in maintaining bat populations.</p>
Bats	Regional	Bat assemblage bounded by the M6, the M56 and the A556 within the Pickmere to Agden and Hulseheath area and the Hulseheath to Manchester Airport area (MA06)	<p>Field surveys confirmed the presence of common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, brown long-eared bat, noctule, Leisler's bat, whiskered/Brandt's bat, Natterer's bat, Daubenton's bat and <i>Myotis</i> species within this assemblage:</p> <ul style="list-style-type: none"> <li>• occasional roosts of common pipistrelle, soprano pipistrelle, <i>Pipistrellus</i> species, brown long-eared bat, noctule, whiskered bat and <i>Myotis</i> species;</li> <li>• a soprano pipistrelle and brown long-eared bat potential maternity roost in a barn at Winterbottom Lane, High Legh, 10m west of land required for the construction of the Proposed Scheme;</li> <li>• a <i>Myotis</i> species possible maternity roost in a barn at Thowler Lane, High Legh, within the land required for the construction of the Proposed Scheme within the Hulseheath to Manchester Airport area (MA06);</li> </ul>

<sup>42</sup> Wray S, Wells D, Long E and Mitchell-Jones T. (2010), *Valuing Bats in Ecological Impact Assessment*, IEEM In-Practice, p23-25.

<sup>43</sup> *Natural Environment and Rural Communities Act 2016*. London, Her Majesty's Stationary Office. Available online at: <http://www.legislation.gov.uk/ukpga/2006/16/section/41>.

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Resource/feature	Value	Receptor	Baseline and rationale for valuation
			<ul style="list-style-type: none"> <li>a whiskered bat possible maternity roost in a barn at Thowler Lane, High Legh, 10m north of land required for the construction of the Proposed Scheme and within the Hulseheath to Manchester Airport area (MA06); and</li> <li>Peacock Lane is considered an important commuting and foraging corridor due to the high levels of soprano pipistrelle, common pipistrelle and <i>Myotis</i> species activity recorded. The surrounding area contains a high number of bat roosts in buildings, a commuting and foraging corridor along Millington Clough and Rostherne Mere to the east which will be used for foraging by the bats in the assemblage. The assemblage is considered to be of regional value on the basis that a possible maternity roost of whiskered bat and <i>Myotis</i> species was recorded and high levels of Nathusius' pipistrelle, noctule, Leisler's bat and <i>Myotis</i> species bat activity were recorded, which are considered to be 'rarer' species in England. Maternity roosts, including those of the most common species, are relatively uncommon and are important in maintaining bat populations.</li> </ul>
Bats	Regional	Bat assemblage between the M56, the River Bollin and the Bridgewater Canal within the Pickmere to Agden and Hulseheath area and Broomedge to Glazebrook area (MA04)	<p>Field surveys confirmed the presence of common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, <i>Pipistrellus</i> species, brown long-eared bat, noctule, Leisler's bat, Daubenton's bat, Natterer's bat, Brandt's bat and <i>Myotis</i> species within this assemblage:</p> <ul style="list-style-type: none"> <li>occasional roosts of common pipistrelle, soprano pipistrelle, brown long-eared bat and <i>Myotis</i> species;</li> <li>high levels of common and rarer bat species were recorded foraging and commuting across the area, including noctule, Leisler's bat and <i>Myotis</i> species;</li> <li>a common pipistrelle possible maternity roost in a barn at Moss Brow Farm, Paddock Lane, Warburton, 20m east of land required for the construction of the Proposed Scheme within the Broomedge to Glazebrook area (MA04); and</li> <li>the relatively high levels of activity indicate the River Bollin and the Bridgewater Canal in the Broomedge to Glazebrook area (MA04) are key commuting corridors for bats and likely to provide connectivity between roosts and foraging habitat for this assemblage.</li> </ul> <p>The assemblage is considered to be of regional value on the basis that high levels of noctule, Leisler's bat and <i>Myotis</i> species activity was recorded, which are considered to be 'rarer' species in England.</p>
Amphibians	County/metropolitan	A meta-population (a group of at least four spatially separated populations which interact) <sup>44</sup>	Field surveys recorded a medium meta-population of great crested newt, which includes a pond containing a medium population and another with a small population, which sit within a larger network of 47 ponds. Two of the 47 ponds lie within the land required for the construction of the Proposed Scheme; the other

<sup>44</sup> Each great crested newt meta-population (GCNMP) has been given an identifying number. Meta-populations are described in BID EC-007-00001 Ecological baseline data - amphibian and pond and canal surveys.



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Resource/feature	Value	Receptor	Baseline and rationale for valuation
		(GCNMP1.3.1) of great crested newt in a network of 47 ponds located north of Lostock Gralam	ponds are all outside the land required for the construction of the Proposed Scheme and in some cases more than 500m from it. Great crested newt is an Annex 2 species, a species of principal importance, and a conservation priority of the local BAP.
Amphibians	County/metropolitan	A meta-population (GCNMP1.3.3) of great crested newt in a network of 97 ponds located north of Lostock Gralam	Field surveys recorded a medium meta-population of great crested newt, which includes a small population in four ponds and a medium population in two ponds, which sit within a larger network of 97 ponds. Surveys also recorded positive eDNA <sup>45</sup> field study results for great crested newt in seven ponds. Ten of the 97 ponds lie within the land required for the construction of the Proposed Scheme; the other ponds are all outside the land required for the construction of the Proposed Scheme and in some cases more than 500m from it.
Amphibians	County/metropolitan	A meta-population (GCNMP1.3.4) of great crested newt in a network of 170 ponds located south of High Legh	Field surveys recorded an assumed large meta-population of great crested newt, including a small population in 13 ponds, which sit within a larger network of 170 ponds. Surveys also recorded positive eDNA field study results for great crested newt in five ponds. Twenty-six of the 170 ponds lie within the land required for the construction of the Proposed Scheme; the other ponds are all outside the land required for the construction of the Proposed Scheme and in some cases more than 500m from it.
Amphibians	County/metropolitan	A meta-population (GCNMP1.3.9) of great crested newt in a network of 110 ponds located north of Tatton Dale. This meta-population extends into the Hulseheath to Manchester Airport area (MA06)	Field surveys recorded an assumed large meta-population of great crested newt, which includes a small population in five ponds and a medium population in two ponds, which sit within a larger network of 110 ponds. Surveys also recorded positive eDNA field study results for great crested newt in nine ponds. Twenty-seven of the 110 ponds lie within the land required for the construction of the Proposed Scheme; the other ponds are all outside the land required for the construction of the Proposed Scheme and in some cases more than 500m from it.
Amphibians	Up to county/metropolitan	A meta-population (GCNMP1.3.2) of great crested newt in a network of 16 ponds located west of Knutsford	An assumed medium meta-population of great crested newt was identified across 16 ponds, which includes confirmed presence of great crested newt from positive desk study records for one pond. The ponds are all outside the land required for the construction of the Proposed Scheme and in some cases more than 500m from it.
Amphibians	Up to county/metropolitan	A meta-population (GCNMP1.3.5) of great crested newt in a network of 26 ponds located south of High Legh	An assumed medium meta-population of great crested newt was identified across 26 ponds, which includes confirmed presence of great crested newt from positive desk study records for four ponds. The ponds are all outside the land required for the construction of the Proposed Scheme and in some cases more than 500m from it.

<sup>45</sup> Natural England (2021), *Great crested newts: advice for local planning authorities*. Available online at: <https://www.gov.uk/guidance/great-crested-newts-surveys-and-mitigation-for-development-projects#survey-methods>.

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Amphibians	Up to county/metropolitan	A meta-population (GCNMP1.3.7) of great crested newt in a network of 16 ponds located north of Tatton Dale. This meta-population extends into the Hulseheath to Manchester Airport area (MA06)	An assumed medium meta-population of great crested newt was identified across 16 ponds, which includes confirmed presence of great crested newt from positive eDNA field survey results for one pond. The ponds are all outside the land required for the construction of the Proposed Scheme and in some cases more than 500m from it.
Amphibians	Up to county/metropolitan	A meta-population (GCNMP1.3.11) of great crested newt in a network of 10 ponds located north of High Legh. This meta-population extends into the Hulseheath to Manchester Airport area (MA06)	An assumed medium meta-population of great crested newt was identified across 10 ponds, which includes confirmed presence of great crested newt from positive eDNA field survey results for one pond. The ponds are all outside the land required for the construction of the Proposed Scheme and in some cases more than 500m from it.
Amphibians	Up to county/metropolitan	A population (GCNP1.3.12) of great crested newt in a pond located south-west of Hale	An assumed medium population of great crested newt was identified in a pond, which includes confirmed presence of great crested newt from positive eDNA field survey results for one pond. The pond is located within the land required for the construction of the Proposed Scheme.
Amphibians	Up to county/metropolitan	Populations of great crested newt within un-surveyed ponds	Ponds that have not been surveyed are assumed to support breeding populations of great crested newt of medium size class.
Amphibians	Local/parish	Populations of other amphibian species comprising smooth newt, palmate newt, common toad and common frog	These common amphibian species have been identified within ponds throughout the Pickmere to Agden and Hulseheath area during surveys and are assumed to be present within the ponds that have not yet been surveyed. Woodland, rough grassland and hedgerow habitats are likely to be utilised by these species during their terrestrial phase for foraging, dispersal and shelter. Each of these species is common and widespread throughout the UK. Common toad is a species of principal importance.
Birds	County/metropolitan	Potential barn owl populations in the Pickmere to Agden and Hulseheath area	The desk study data recorded barn owl in the Pickmere to Agden and Hulseheath area, including one record and five breeding sites within and up to 2km from the land required for the construction of the Proposed Scheme. Field surveys identified suitable foraging habitat for barn owl throughout the Pickmere to Agden and Hulseheath area and three incidental sightings of barn owl were recorded during field surveys: one near Hoo Green and two north of Winterbottom.

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			Barn owl is a conservation priority of the local BAP and a Schedule 1 species <sup>46</sup> .
Birds	District/borough	Breeding hobby near Tabley	Field surveys recorded a pair of hobby breeding near Tabley, within 280m of land required for the construction of the Proposed Scheme. Hobby is a Schedule 1 species and is a scarce migrant breeder <sup>47</sup> , but is not listed as a bird of conservation concern or on the Cheshire LWS selection criteria <sup>48</sup> .
Birds	District/borough	Wintering bird assemblage between Tabley Grange and the B5391 Pickmere Lane	Field surveys recorded a total of 50 species, including 21 notable species, within and adjacent to the land required for the construction of the Proposed Scheme. This included 10 Red List species and nine species of principal importance and/or conservation priorities of the local BAP. Corn bunting, a rare species in Cheshire, is present within this assemblage. Although corn bunting was recorded, records of this species are few, and they are not considered to be regularly present. Habitats present within the land required for the construction of the Proposed Scheme are typical of the area and are widespread.
Birds	District/borough	Wintering bird assemblage between Park Farm and Agden Brow	Field surveys recorded a total of 57 species, including 25 notable species, within and adjacent to the land required for the construction of the Proposed Scheme. This included 12 Red List species and 12 species of principal importance and/or conservation priorities of the local BAP. Snipe, a scarce species in Cheshire, and corn bunting and golden plover, which are rare species in Cheshire, is present within this assemblage. Although snipe, corn bunting and golden plover were recorded, records of this species are few, and they are not considered to be regularly present. Habitats present within the land required for the construction of the Proposed Scheme are typical of the area and are widespread.
Birds	District/borough	Wintering bird assemblage between Chapel Lane and Agden Bridge Farm	Field surveys recorded a total of 39 species, including 16 notable species, within and adjacent to the land required for the construction of the Proposed Scheme. This included nine Red List species and seven species of principal importance and/or conservation priorities of the local BAP.

<sup>46</sup> *Wildlife and Countryside Act (1981) Schedule 1 (c.69)*. London, Her Majesty's Stationary Office. Available online at: <https://www.legislation.gov.uk/ukpga/1981/69/schedule/1>.

<sup>47</sup> Royal Society for the Protection of Birds (RSPB) (2016), *Cheshire and Wirral Bird Report 2016*. Available online at: <https://ww2.rspb.org.uk/groups/images/05032019163802.pdf>.

<sup>48</sup> Cheshire Wildlife Trust (2014), *Cheshire Local Wildlife Site selection criteria*. Available online at: <https://www.cheshirewildlifetrust.org.uk/sites/default/files/2018-06/Cheshire%20LWS%20selection%20criteria.pdf>.

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Resource/feature	Value	Receptor	Baseline and rationale for valuation
			Corn bunting, a rare species in Cheshire was recorded infrequently during surveys and is not considered to be regularly present. Habitats present within the land required for the construction of the Proposed Scheme are typical of the area and are widespread.
Birds	Local/parish	Breeding bird assemblage between the B5391 Pickmere Lane and Litley Farm	Field surveys recorded a total of 40 bird species, including 17 notable species, within and adjacent to the land required for the construction of the Proposed Scheme. Breeding territories of 34 species were recorded, of which 10 are notable, with five Red List species and six species of principal importance and/or conservation priorities of the local BAP.
Birds	Local/parish	Breeding bird assemblage between Pownallgreen Farm and Park Farm	Field surveys recorded a total of 41 bird species, including 15 notable species, within and adjacent to the land required for the construction of the Proposed Scheme. Breeding territories of 11 species were recorded, of which two are notable, with two Red List species and two species of principal importance and/or conservation priorities of the local BAP.
Birds	Local/parish	Breeding bird assemblage between Park Farm and Agden Brow	Field surveys recorded a total of 44 bird species, including 15 notable species, within and adjacent to the land required for the construction of the Proposed Scheme. Breeding territories of 23 species were recorded of which eight are notable, with four Red List species and four species of principal importance and/or conservation priorities of the local BAP.
Birds	Local/parish	Wintering bird assemblage between the B5391 Pickmere Lane and Litley Farm	Field surveys recorded a total of 42 species, including 16 notable species, within and adjacent to the land required for the construction of the Proposed Scheme. This included nine Red List species and eight species of principal importance and/or conservation priorities of the local BAP.
Birds	Local/parish	Wintering bird assemblage between Pownallgreen Farm and Hoo Green	Field surveys recorded a total of 44 species, including 15 notable species, within and adjacent to the land required for the construction of the Proposed Scheme. This included eight Red List species and six species of principal importance and/or conservation priorities of the local BAP.
Birds	Local/parish	Wintering bird assemblage between Betley Hurst Farm and Chapel Lane	Field surveys recorded a total of 28 species, including 10 notable species, within and adjacent to the land required for the construction of the Proposed Scheme. This included five Red List species and two species of principal importance and/or conservation priorities of the local BAP.
Birds	Local/parish	Kingfisher populations in the Pickmere to Agden and Hulseheath area	Field surveys recorded kingfisher twice at Waterless Brook and once at Arley Brook. The desk study data contained three records of kingfisher, the closest of which was between the B5391 Pickmere Lane and Litley Farm, 1km south of the land required for the construction of the Proposed Scheme.

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			Kingfisher is a Schedule 1 species but are cited as uncommon in Cheshire (100-500 breeding pairs) <sup>49</sup> , which means that they are not considered to be rare or scarce at a County level. They are an amber listed species of conservation concern, so while notable, are not considered at high risk.
Water vole	County/ metropolitan	Water vole population at Millington Clough	Water vole presence was identified at Millington Clough during field surveys, to the north-east of Sandhole Farm and within land required for the construction of the Proposed Scheme. Water vole is a species of principal importance and a conservation priority of the local BAP. Water vole are largely absent in the north-west due to the presence of mink, encroachment of invasive plants and a lack of suitable burrowing sites <sup>50</sup> .
Vascular plants	District/ borough	Alternate-leaved golden-saxifrage within the Pickmere to Agden and Hulseheath area	Within the Pickmere to Agden and Hulseheath area there are desk study records of alternate-leaved golden-saxifrage within and adjacent to the land required for the construction of the Proposed Scheme in Leonard's and Smoker Wood and at Tabley Pipe Wood respectively. Field surveys recorded alternate-leaved golden-saxifrage adjacent to land required for the construction of the Proposed Scheme adjacent to the Bridgewater Canal. This species is listed as Locally Scarce <sup>51</sup> in Cheshire.
Vascular plants	District/ borough	Small-leaved lime within the Pickmere to Hulseheath area	There are desk study records of small-leaved lime, within land required for the construction of the Proposed Scheme in Leonard's and Smoker Wood and at Over Tabley, and within the wider area. Field surveys recorded small-leaved lime within land required for the construction of the Proposed Scheme at Over Tabley and Leonard's and Smoker Wood LWS. This species is listed as Locally Scarce in Cheshire.
Vascular plants	Up to district/ borough	Bee orchid within the Pickmere to Hulseheath area	Within the Pickmere to Agden and Hulseheath area there are desk study records of bee orchid, within land required for the construction of the Proposed Scheme adjacent to the M56 at Agden, and within the wider area. This species is listed as Locally Scarce in Cheshire. Although no confirmed evidence of this species has been observed during field surveys, it is possible that it is present in suitable habitat in the area.

<sup>49</sup> Cheshire and Wirral Ornithological Society (2014), *Cheshire and Wirral Bird Report 2014*, Swallowtail Print Ltd, Norwich.

<sup>50</sup> Powell, A. and Milburn, K. (2011), *Northwest Lowlands Water Vole Project*, Final Report, June 2011.

<sup>51</sup> Botanical Society of Britain and Ireland (BSBI) (2015), *Cheshire VC58 County Rare Plant Register 2015*. Available online at: [https://bsbi.org/wp-content/uploads/dlm\\_uploads/Cheshire\\_RDB\\_2015.pdf](https://bsbi.org/wp-content/uploads/dlm_uploads/Cheshire_RDB_2015.pdf).

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Resource/feature	Value	Receptor	Baseline and rationale for valuation
Otter	District/borough	Otter population using Tabley Brook	Three potential holts were recorded to the south of Yew Tree Farm along Tabley Brook, adjacent to the land required for the construction of the Proposed Scheme. Given the availability of suitable habitat, it is assumed that otters are using Tabley Brook as well as other adjacent watercourses and water bodies for foraging, breeding and dispersal. Otter is an Annex 2 species, a species of principal importance, and a conservation priority of the local BAP.
Otter	District/borough	Otter population using Agden Brook	Three potential holts were recorded along the northern stretch of Agden Brook. Two of these and a potential couch were recorded less than 30m to the west of land required for the construction of the Proposed Scheme. The third was located to the north of the A56 Lymm Road, 180m to the east of the land required for the construction of the Proposed Scheme. The holts were not considered to be active. Given the availability of suitable habitat, it is assumed that otters are using Tabley Brook as well as other adjacent watercourses and water bodies for foraging, breeding and dispersal.
Otter	Up to district/borough	Population of otter using watercourses in the Pickmere to Agden and Hulseheath area	Given the availability of suitable habitat, it is assumed that otters are using Waterless Brook/Arley Brook and tributaries, and Millington Clough Tributaries 1 and 2 as well as other watercourses and water bodies within the Pickmere to Agden and Hulseheath area for foraging, breeding and dispersal.
Aquatic macro-invertebrates	District/borough	Aquatic macro-invertebrates in Waterless Brook/Arley Brook	The aquatic macro-invertebrate field surveys recorded 347 individual specimens from 36 taxa in spring, with a Community Conservation Index (CCI) <sup>52</sup> score indicating that the macro-invertebrate assemblage was of 'Moderate' conservation value with a 'Moderate' to 'Good' WFD quality class. A variety of taxa were recorded, including flatworms, snails, mussels, worms, leeches, crustacea, mayflies, caddisflies and true bugs.
Aquatic macro-invertebrates	Local/parish	Aquatic macro-invertebrates in Tributary of Tabley Brook 3	The aquatic macro-invertebrate field surveys recorded 521 individual specimens from 21 taxa in spring, with a CCI score indicating that the macro-invertebrate assemblage was of "Low" conservation value with a 'Poor' to 'Moderate' WFD quality class. The stretch surveyed was recorded as a small ditch flowing through agricultural land with homogenous habitat, a largely silt substrate and a lack of flow diversity throughout.
Aquatic macro-invertebrates	Local/parish	Aquatic macro-invertebrates in Tributary of Tabley Brook 8	The aquatic macro-invertebrate field survey recorded 548 individual species from 14 taxa in spring, with a CCI score indicating that the macro-invertebrate assemblage was of 'Low' conservation value with a 'Poor' WFD quality class. The stretch surveyed recorded a deep, small ditch that flowed through agricultural land with poor habitat and flow diversity and a bed substrate of clay.

<sup>52</sup> Chadd, R. and Extence, C. (2004), *The conservation of freshwater macroinvertebrate populations: a community - based classification scheme*, Aquatic Conservation: Marine and Freshwater Ecosystems, 14(6), pp.597-624.

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Resource/feature	Value	Receptor	Baseline and rationale for valuation
Fish	Up to district/ borough	Potential fish assemblage within Waterless Brook/Arley Brook	Desk study records found chub, dace, abundant three-spined stickleback, stone loach, roach, bullhead and perch. Incidental observations during macro-invertebrate surveys identified the presence of bullhead. Waterless Brook/Arley Brook has good habitat variability including differing water depth, shaded overhangs and exposed and submerged tree roots with large woody debris present. Bullhead is an Annex 2 species <sup>53</sup> . This species is widespread in suitable habitat in England. This species is not found in badly polluted rivers.
Fish	Local/parish	Fish assemblage in Agden Brook	Field surveys identified the presence of three-spined stickleback within Agden Brook. The presence of this species is indicative of 'Fair' biological water quality.
Badger	Local/parish	Population of badgers at undisclosed locations in the Pickmere to Agden and Hulseheath area	Seven badger main setts have been recorded during field surveys in the Pickmere to Agden and Hulseheath area, one within the land required for the construction of the Proposed Scheme. Other annex, subsidiary and outlier setts have been identified from desk study records and field surveys within land required for the construction of the Proposed Scheme. There is suitable habitat for badger throughout the land required for the construction of the Proposed Scheme in the area in the mosaic of pasture, arable and woodland habitat.
Reptiles	Local/ parish	Potential small populations of common reptiles in the Pickmere to Agden and Hulseheath area	There is a desk study record of common lizard within the land required for the construction of the Proposed Scheme, likely on the margin of the M56 close to Agden House. No reptiles were found during field surveys at three sites. Suitable habitat that was not surveyed was generally constrained to field margins, edges of woodland and scrub habitat or isolated small patches of overgrown grassland. These habitats are within a generally intensively farmed landscape, offering limited opportunities for reptiles. Following consultation with Manchester Biodiversity Partnership and Cheshire Wildlife Trust, the study area is not considered suitable to support a large or widespread population of reptiles and any reptiles located within the land required for the construction of the Proposed Scheme are considered to be present in low numbers. Grass snake, slow-worm and common lizard are all species of principal importance. Grass snake is also a conservation priority of the Cheshire BAP.

<sup>53</sup> Annex 2 of the EU's Habitats Directive (1992) lists priority species whose conservation requires the designation of Special Areas of Conservation.

## Future baseline

### Construction (2025)

- 7.3.31 Volume 5: Appendix CT-004-00000 provides details of the developments in the Pickmere to Agden and Hulseheath area that are assumed to have been implemented by 2025.
- 7.3.32 No committed developments have been identified in this study area that will materially alter the baseline conditions in 2025 for ecology and biodiversity.

### Operation (2038)

- 7.3.33 Volume 5: Appendix CT-004-00000 provides details of the developments in the Pickmere to Agden and Hulseheath area that are assumed to have been implemented by 2038.
- 7.3.34 No committed developments have been identified in this study area that will materially alter the baseline conditions in 2038 for ecology and biodiversity.

## 7.4 Effects arising during construction

### Avoidance and mitigation measures

- 7.4.1 The following measures have been included as part of the design of the Proposed Scheme, additional to the landscape planting as shown on the Map Series CT-06 along the route of the Proposed Scheme, which will be largely a mixture of woodland/scrub and grassland. These measures contribute towards limiting effects on habitats and species:
- provision of Arley Brook viaduct to avoid direct effects on Waterless Brook/Arley Brook and allow free passage for wildlife beneath it;
  - limiting the extent of land required for the construction of the Proposed Scheme within Leonard's and Smoker Wood LWS and Leonard's and Smoker Wood AWI site, to reduce habitat loss;
  - refinement of the location of the Smoker Brook viaduct north satellite compound to remove additional impacts on Leonard's and Smoker Wood LWS and Leonard's and Smoker Wood AWI site;
  - changes to the road junction improvement works along the A556 and Flittogate Lane, to avoid loss of woodland at Rinks Wood and Round Wood LWS and Round and Rinks Woods AWI site;
  - refinement of the location of the site haul route from the A556, to avoid loss of woodland at Tabley Pipe Wood LWS;
  - refinement of the location of the Footpath Agden 2/4 diversion to avoid impacts on deciduous woodland priority habitat near Agden Brook Farm; and
  - refinement of the design at various locations to avoid direct loss of 35 ponds.



- 7.4.2 The assessment assumes implementation of the measures set out within the draft Code of Construction Practice<sup>54</sup> (CoCP), which includes sensitive construction practices and habitat management plans.
- 7.4.3 Section 9 of the draft CoCP requires contractors to implement a range of measures to protect ecological receptors including the following:
- manage impacts from construction, including the timing of works, on designated sites, protected and notable species and other features of ecological importance such as ancient woodlands and watercourses;
  - reduce habitat loss by keeping the working area to the reasonable minimum;
  - reinstatement of areas of temporary habitat loss;
  - restoration and replacement planting;
  - management measures for potential ecological impacts to control dust, water quality and flow, noise and vibration, and lighting;
  - provision of a watching brief, where relevant;
  - relocation or translocation of species, soil and/or plant material, as appropriate;
  - consultation with Natural England, the Environment Agency, local wildlife trusts and relevant planning authorities prior to and during construction; and
  - compliance with all wildlife licensing requirements, including those for protected and invasive species and designated sites.

## Assessment of impacts and effects

- 7.4.4 Effects arising during construction that are significant at the district/borough level or above are described below. Effects on ecological features of significance at the local/parish level are listed in Volume 5: Appendix EC-015-0MA03.

### Designated sites

- 7.4.5 A study to inform the Habitats Regulations Assessment (HRA) Screening Report<sup>55</sup>. was undertaken for the Midland Meres and Mosses Phase 1 Ramsar site during the Appraisal of Sustainability stage of the Proposed Scheme. This was undertaken in consultation with Natural England and the Environment Agency. The HRA Screening Report concluded that there was a potential significant effect on the Ramsar site due to changes in the hydrological regime of the Mere, Mere SSSI component of the Ramsar site. However, measures to convey groundwater to the SSSI were proposed to protect the integrity of the Ramsar site. Further documents to inform the Appropriate Assessment for hybrid Bill design have been completed as set out in Volume 5: Appendix EC-016-00003. They include a detailed study of the potential hydrological impacts of the Proposed Scheme on groundwater flows in

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<sup>54</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

<sup>55</sup> High Speed Two Ltd (2012), *HRA Screening Report for Midland Meres and Mosses Phase 1 Ramsar Site*.

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glaciofluvial deposits that contribute groundwater to The Mere, Mere SSSI. This demonstrates that groundwater flows to the SSSI could be intercepted by Hoo Green North cutting and Hoo Green North cutting retaining wall. Aquatic and fringing macrophyte communities and invertebrates, which are designating features of the Ramsar site, depend on the maintenance of a suitable hydrological regime that incorporates both water quality and water resource elements. Consequently, the interruption of groundwater could prompt damaging changes to the extent, species composition, abundance and/or distribution of wetland communities. Therefore, mitigation comprising groundwater recharge trenches in the superficial deposits to the east of the zone of influence of Hoo Green North cutting and Hoo Green North cutting retaining wall to reinstate groundwater flows to the mere, will be provided. The potential impacts of nitrogen deposition caused by changes in traffic flows during construction of the Proposed Scheme close to The Mere, Mere and two further constituent SSSI<sup>56</sup> of the Ramsar site have also been assessed. This assessment demonstrated that there will be no adverse effects on the integrity of the Ramsar site due to changes in air quality. The documents to inform the Appropriate Assessment conclude that, with implementation of the proposed mitigation measures, there will be no adverse effects on the integrity of the Midland Meres and Mosses Phase 1 Ramsar site arising from the Proposed Scheme, alone or in combination with other projects and plans.

- 7.4.6 A study to inform the HRA Screening Report was undertaken for the Rostherne Mere Ramsar site during the Appraisal of Sustainability stage of the Proposed Scheme<sup>57</sup>. This study was undertaken in consultation with Natural England and the Environment Agency. The HRA Screening Report concluded that there was a potential significant effect due to changes in the hydrological regime. However, measures to convey groundwater to the site were proposed to protect the integrity of the Ramsar site. Subsequently, new documents to inform the Appropriate Assessment for hybrid Bill design have been completed as set out in Volume 5: Appendix EC-016-00003. They include a detailed study of hydrological impacts of Hoo Green North cutting and Hoo Green North cutting retaining wall located within the Pickmere to Agden and Hulseheath area and Millington cutting and Rostherne cutting, which are located within the Hulseheath to Manchester Airport area (MA06). The cuttings will interrupt the sub-surface flows to the Ramsar site, potentially prompting adverse changes to the extent, abundance and/or distribution of wetland communities that are reasons for designation of the site. Therefore, mitigation comprising groundwater recharge trenches in the superficial deposits to the south and east of the zone of influence of the cuttings will be provided in the superficial deposits to the east of Hoo Green North cutting and Hoo Green North cutting retaining wall and will be provided along Cherry Tree Lane in the Hulseheath to Manchester Airport area (MA06). The documents to inform the Appropriate Assessment also consider the potential impacts of nitrogen deposition caused by changes in traffic flows during construction of the Proposed Scheme. They conclude that there will be no adverse

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<sup>56</sup> Wybunbury Moss SSSI, reported in Volume 2, Community Area report: Hough to Walley's Green (MA01), Section 7 and Tatton Meres SSSI, reported in Volume 2, Community Area report: Hulseheath to Manchester Airport (MA06), Section 7.

<sup>57</sup> High Speed Two Ltd (2012), *HRA Screening Report for Rostherne Ramsar Site*.

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effects on the integrity of the Ramsar site. The documents to inform the Appropriate Assessment conclude that, with implementation of the proposed mitigation measures, there will be no adverse effects on the integrity of Rostherne Mere Ramsar site arising from the Proposed Scheme, alone or in combination with other projects and plans.

- 7.4.7 Plumley Lime Beds SSSI will not be directly affected by construction of the Proposed Scheme in the Pickmere to Agden and Hulseheath area and there will be no loss of habitats as the SSSI is outside the land required for the construction of the Proposed Scheme. Temporary utilities works adjacent to the western boundary of the SSSI will be required in the Wimboldsley to Lostock Gralam area (MA02). Further assessment of the impacts and effects on Plumley Lime Beds SSSI is discussed in Volume 2: Community Area report: Wimboldsley to Lostock Gralam (MA02), which concludes that there will be no significant effect on the designated features of this SSSI.
- 7.4.8 Tabley Mere SSSI, which is designated as a mere type consisting of very nutrient-rich water with a well-developed aquatic flora, will not be affected by the construction of the Proposed Scheme. Pickmere embankment and Arley Brook viaduct, located 864m west of the SSSI, will not affect groundwater flows into the SSSI. There are no surface water pathways or connections discharging into Tabley Mere that will be crossed by the Proposed Scheme. The potential impacts of nitrogen deposition caused by changes in traffic flows during construction of the Proposed Scheme close to Tabley Mere has also been assessed, and has demonstrated that there that there will be no adverse effects on the structure and function of the SSSI due to changes in air quality. There will be no adverse effects on the structure and function of Tabley Mere SSSI as a result of construction of the Proposed Scheme in the Pickmere to Agden and Hulseheath area. Effects on this SSSI are also discussed in Volume 2: Community Area report: Wimboldsley to Lostock Gralam (MA02).
- 7.4.9 The Mere, Mere SSSI in the Pickmere to Agden and Hulseheath area will be 180m north-west of the construction traffic route along the A50 Warrington Road, and 260m east at the closest point of construction on this road. Hoo Green North cutting will be 1.7km east of the SSSI. The habitats for which The Mere, Mere SSSI is designated will be sensitive to the hydrological impacts described above for the Midland Meres and Mosses Phase 1 Ramsar site. Although the HRA Screening Report concluded that there was a potential significant effect on the site, with implementation of the proposed mitigation measures as described above and set out in documents to inform the Appropriate Assessment for the Midland Meres and Mosses Phase 1 Ramsar site in Volume 5: Appendix EC-016-00003, there will be no adverse effects on the structure and integrity of The Mere, Mere SSSI arising from the Proposed Scheme due to changes in hydrology. Also as mentioned in relation to the Ramsar site, there will be no adverse effects from nitrogen deposition on the wetland habitats that form a reason for the designation of the SSSI.
- 7.4.10 Rostherne Mere SSSI and NNR is designated because it is one of the deepest and largest of the meres of the Shropshire-Cheshire Plain and for its woodland and wetland birds, mammals and butterflies. It is located 1.2km to the east of land required for the construction of the Proposed Scheme in this area, and 80m south of the Proposed Scheme in the Hulseheath to Manchester Airport area (MA06). The impact to the SSSI and NNR habitats and

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species is assessed in Volume 2: Community Area report: Hulseheath to Manchester Airport (MA06). As described above for the Rostherne Mere Ramsar site, although the HRA Screening Report concluded that there was a potential significant effect on the site, with implementation of the proposed mitigation, there will be no adverse effects arising from changes in water levels in the mere. Also as mentioned in relation to the Ramsar site, there will be no adverse effects from nitrogen deposition on the wetland habitats that form a reason for the designation of the SSSI.

- 7.4.11 Construction of Pickmere embankment and Smoker Brook viaduct will result in the loss of 600m<sup>2</sup> of woodland in Leonard's and Smoker Wood LWS (0.6%) Leonard's and Smoker Wood AWI site (0.7%) within the Pickmere to Agden and Hulseheath area. Within the Wimboldsley to Lostock Gralam area (MA02), there will be a further loss of 0.4ha (4%) of Leonard's and Smoker Wood LWS and 0.4ha (5%) of Leonard's and Smoker Wood AWI site. The loss of the semi-natural woodland and ancient woodland will result in an adverse effect on the structure and function, which will be significant at the county/metropolitan level at Leonard's and Smoker Wood LWS and national level at Leonard's and Smoker Wood AWI site.
- 7.4.12 Construction of Arley Brook viaduct will result in the permanent loss of 0.5ha (14%) of Arley and Waterless Brook Corridor LWS. The loss of mixed deciduous woodland and wet woodland will have an adverse effect on the structure and function of the site, which will be significant at the county/metropolitan level.
- 7.4.13 Construction of Hoo Green South embankment No.2, modification of telecommunication ducts, modification of an overhead power line, removal of an overhead power line and modification of a high-pressure gas pipeline will result in the loss of 2.9ha (22%) of Belt Wood LWS. Modification of an overhead power line will result in the further loss of 400m<sup>2</sup> (0.7%) of Belt Wood AWI site that is not within the LWS. The loss of lowland mixed deciduous woodland and ancient woodland will have an adverse effect on the structure and function, which will be significant at the county/metropolitan level at Belt Wood LWS and national level at Belt Wood AWI site.
- 7.4.14 Construction of Hoo Green South embankment No.2 will result in the permanent loss of 0.2ha (100%) of Daisybank Wood ancient woodland. The loss of ancient woodland will have an adverse effect on the structure and function of the site, which will be significant at the national level.

## Habitats

### Woodland

- 7.4.15 As well as the effects on ancient woodland described in the designated sites section, there are a number of other woodlands that will be affected by the construction of the Proposed Scheme.
- 7.4.16 Construction of Arley Brook viaduct will result in the permanent loss of 0.2ha (11%) of lowland mixed deciduous woodland and wet woodland between Arley and Waterless Brook

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LWS and Round and Rinks Woods AWI site. The permanent loss of woodland will have a permanent adverse effect, which will be significant at the district/borough level.

- 7.4.17 Construction of Arley Brook viaduct will result in the permanent loss of 0.7ha (8%) of lowland mixed deciduous and wet woodland within and adjacent to Arley and Waterless Brook Corridor LWS. The loss of woodland will have an adverse effect on the structure and function of the site, which will be significant at the county/metropolitan level.
- 7.4.18 Construction of Hoo Green South embankment No.2, modification of a telecommunication duct, modification of an overhead power line, removal of an overhead power line and modification of a high-pressure gas pipeline will result in the loss of 2.9ha (22%) of lowland mixed deciduous woodland located within Belt Wood LWS. The loss of woodland will have an adverse effect on the structure and function of the site, which will be significant at the county/metropolitan level.
- 7.4.19 Construction of Agden cutting and modification of a high-pressure gas pipeline will result in the permanent loss of 0.8ha (16%) of broadleaved semi-natural woodland located along Agden Brook in Moston. The permanent loss of woodland will have a permanent adverse effect, which will be significant at the district/borough level.

### **Hedgerows**

- 7.4.20 On a precautionary basis, it is assumed that all hedgerows (68km) within the land required for the construction of the Proposed Scheme in the Pickmere to Agden and Hulseheath area will be permanently lost and the remaining hedgerow network will be fragmented. This total, however, includes some hedgerows that are likely to be retained, such as those located within land required for overhead line diversions/realignments and those located within land required for habitat creation. The combined loss and severance of hedgerows within the land required for the construction of the Proposed Scheme will have a permanent adverse effect that is significant at county/metropolitan level.

### **Watercourses**

- 7.4.21 The Proposed Scheme will cross Waterless Brook/Arley Brook on Arley Brook viaduct. This watercourse will not be directly affected, and indirect adverse effects will not be significant as they will be controlled through the implementation of measures that are described in the draft CoCP. However, Tributary of Tabley Brook 2, Tributary of Tabley Brook 4, Tributary of Tabley Brook 8, Tributary of Millington Clough 1, Tributary of Millington Clough 2, Tributary of Millington Clough 3, Tributary of Millington Clough 4 and a series of smaller watercourses will also be permanently diverted, realigned or culverted, reducing the connectivity of the habitat corridors associated with these watercourses. The habitat loss and reduction in connectivity will result in a permanent adverse effect, which will be significant at up to the district/borough level.

## **Water bodies**

- 7.4.22 On a precautionary basis it is assumed that all 109 ponds located within the land required for the construction of the Proposed Scheme in the Pickmere to Agden and Hulseheath area will be permanently lost. This total, however, includes some ponds that are likely to be retained, such as those located within the land required for overhead line diversions/realignments. Where survey has not been possible, a precautionary approach to the assessment has been applied. The loss of ponds within the land required for construction of the Proposed Scheme will lead to a permanent adverse effect on the conservation status of water bodies that will be significant, in each case, at up to district/borough level.

## **Ancient and veteran trees**

- 7.4.23 On a precautionary basis it is assumed that works associated with Lymm South embankment, will result in the permanent loss of at least two veteran trees recorded within the land required for the construction of the Proposed Scheme in the Pickmere to Agden and Hulseheath area. The loss of veteran trees is significant at the national level in each case. Where reasonably practicable, measures will be taken to protect and retain ancient and veteran trees within and adjacent to construction works to reduce the number that will be lost.

## **Species**

### **Bats**

- 7.4.24 The removal or disturbance of habitat features that are utilised by bats during breeding, hibernation or migrating between roosts is considered to have the potential to result in adverse effects on the bat populations or assemblages during construction. However, the point at which such impacts are considered likely to result in significant adverse effects on the conservation status of a population will differ depending on the status of the species concerned.
- 7.4.25 The impact of disturbance on bat populations will generally be localised and limited to the period of construction. Bats utilising retained habitats may be subject to irregular and localised disturbance from lighting and noise during the construction period where works in autumn, winter and spring may be carried out for short periods after dusk or prior to dawn. These impacts will only temporarily deter bats from using foraging and commuting habitats and the implementation of measures that are described in the draft CoCP will reduce potential disturbance effects to a level that is not significant.
- 7.4.26 The Proposed Scheme will cross the M6 near Winterbottom and the M56 near Agden, both of which have six lanes and have regular and heavy traffic. They are likely to have an effect on the activity of the bats present in this area by influencing their flightlines and limiting crossing points between habitats either side of the carriageways. The movement of bats north-south between assemblages is likely restricted due to the presence of these roads.

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- 7.4.27 An assemblage of both common bat species and rarer bat species, including noctule, serotine, Leisler's bat and *Myotis* species, utilise the habitats (watercourses, woodland and grassland) between Smoker Brook and the M6. Construction of Pickmere embankment, Arley Brook viaduct and Heyrose embankment will result in the removal and fragmentation of foraging and commuting habitat. The loss of connectivity in these areas will result in a permanent adverse effect on the assemblage of bats in this area. On a precautionary basis, it is assumed that construction of the Proposed Scheme will result in the disturbance of a common pipistrelle bat potential maternity roost building at Hollowood Lane, Tabley, which is within 15m of land required for the construction of the Proposed Scheme. Maternity roosts are important to the continued breeding success of bat populations. The proximity of construction activities to this roost and the resulting level of noise and vibration is likely to result in it becoming unviable for continued use, and on a precautionary basis, it is assumed the roost will be lost. Construction of the Proposed Scheme will also result in the removal and loss due to disturbance of common and soprano pipistrelle, brown long-eared bat and *Myotis* species occasional roosts. The impacts on foraging and commuting habitat of rarer species including noctule, serotine, Leisler's bat and *Myotis* species will result in a permanent adverse effect on the bat assemblage that is significant at the regional level.
- 7.4.28 An assemblage of both common bat species and rarer bat species, including Nathusius' pipistrelle, noctule, Leisler's bat and *Myotis* species, utilise the habitats (watercourses, woodland and grassland) bounded by the M6, the M56 and the A556 within the Pickmere to Agden and Hulseheath area and the Hulseheath to Manchester Airport area (MA06). Construction of Hoo Green South embankment No.2, Hoo Green box structure, Hoo Green North cutting and High Legh cutting will result in the removal and fragmentation of foraging and commuting habitat, including along Peacock Lane, at Belt Wood and at Five Acres. The loss of connectivity in this area will result in a permanent adverse effect on the assemblage of bats in this area. Construction of the Proposed Scheme could result in the disturbance of a soprano pipistrelle and brown long-eared bat potential maternity roost building at Winterbottom Lane, High Legh, which are within 10m of land required for the construction of the Proposed Scheme. Maternity roosts are important to the continued breeding success of bat populations. The proximity of construction activities to these roosts and the resulting level of noise and vibration is likely to result in them becoming unviable for continued use. On a precautionary basis, it is assumed the roosts will be lost. The combined effect from the loss of a *Myotis* species possible maternity roost, and disturbance of a whiskered bat, soprano pipistrelle and brown long-eared bat possible maternity roost and the loss and fragmentation of foraging and commuting habitat of rarer species including Nathusius' pipistrelle, noctule, serotine, Leisler's bat and *Myotis* species, in the Pickmere to Agden and Hulseheath and Hulseheath to Manchester Airport area (MA06) will result in a permanent adverse effect on the bat assemblage that is significant at the regional level.
- 7.4.29 An assemblage of both common and rarer bat species, including noctule, Leisler's bat and *Myotis* species utilise the habitats (watercourses, woodland and grassland) between the M56, the River Bollin and the Bridgewater Canal within the Pickmere to Agden and Hulseheath area and Broomedge to Glazebrook area (MA04). Construction of Agden cutting in the Pickmere to Agden and Hulseheath area will result in the removal and fragmentation of

foraging and commuting habitat. The loss of connectivity in this area will result in a permanent adverse effect on the assemblage of bats in this area. Construction of the Proposed Scheme will also result in the loss of common and soprano pipistrelle, brown long-eared bat and *Myotis* species occasional roosts in the Pickmere to Agden and Hulseheath area. The combined effect from the impacts on foraging and commuting habitat of rarer species including noctule, Leisler's bat and *Myotis* species, in the Pickmere to Agden and Hulseheath and Broomedge to Glazebrook area (MA04), represent a permanent adverse effect on the bat assemblage that is significant at the regional level.

- 7.4.30 Loss of other suitable habitats within the land required for the construction of the Proposed Scheme may require some bats to travel further and expend more energy during day to day foraging and movement throughout their home range for the duration of construction. However, such effects alone are for all species considered unlikely to result in sufficient disturbance of the populations or assemblages concerned to result in an adverse effect on their conservation status.

## Amphibians

- 7.4.31 There are two meta-populations, six assumed meta-populations and one assumed population of great crested newt within the Pickmere to Agden and Hulseheath area where habitat loss resulting from the construction of the Proposed Scheme will result in significant adverse effects at up to the county/metropolitan level. These are as follows:
- GCNMP1.3.1 in a network of 47 ponds located north of Lostock Gralam;
  - GCNMP1.3.3 in a network of 97 ponds located north of Lostock Gralam;
  - GCNMP1.3.4 in a network of 170 ponds located south of High Legh;
  - GCNMP1.3.9 in a network of 110 ponds located north of Tatton Dale;
  - GCNMP1.3.2 in a network of 16 ponds located west of Knutsford;
  - GCNMP1.3.5 in a network of 26 ponds located south of High Legh;
  - GCNMP1.3.7 in a network of 16 ponds located north of Tatton Dale;
  - GCNMP1.3.11 in a network of 10 ponds located north of High Legh; and
  - GCNP1.3.12 in one pond located south-west of Hale.
- 7.4.32 Of the 109 water bodies providing potential breeding sites within the land required for the construction of the Proposed Scheme that require survey within the Pickmere to Agden and Hulseheath area, 27 have been confirmed as supporting great crested newt, three have been assessed as being unsuitable for this species, and 30 have been found not to support the species. The remaining 49 have not been surveyed due to access constraints and are assumed to support populations of great crested newts and the loss of the water bodies supporting these populations could result in a permanent adverse effect on amphibian populations that will be, in each case, significant at up to county/metropolitan level.



## **Birds**

- 7.4.33 Construction of Pickmere embankment, Heyrose embankment, Hoo Green South embankment No.2, Hoo Green North cutting, High Legh cutting, Agden cutting and Lymm South embankment will result in the permanent loss of potential barn owl foraging habitats. These habitats take the form of arable fields, semi-improved and improved fields and associated field margins. These habitats are of value to the barn owl population identified in the B5391 Pickmere Lane to Litley Farm area, Pownallgreen Farm and Park Farm area and Park Farm to Agden Brow area. This loss represents a permanent adverse effect on the barn owl population in this area, which will be significant at up to county/metropolitan level.

## **Vascular plants**

- 7.4.34 Construction of Hoo Green South embankment No.2 and Pickmere embankment will on a precautionary basis result in the loss of alternate-leaved golden-saxifrage at Leonard's and Smoker Wood LWS. Loss of this species will be significant at the district/borough level.
- 7.4.35 Construction of Heyrose embankment and Smoker Brook viaduct will, on a precautionary basis, result in the loss of small-leaved lime at Over Tabley and Leonard's and Smoker Wood LWS. Loss of this species will be significant at the district/borough level.
- 7.4.36 On a precautionary basis, it is assumed that there are low numbers of bee orchid within land required for the construction of the Proposed Scheme. Loss of this species will be significant at up to the district/borough level.

## **Otter**

- 7.4.37 Construction of Budworth Road satellite compound and a site haul route from the B5391 Pickmere Lane could result in the disturbance and loss of three potential holts, to the south of Yew Tree Farm along Tabley Brook. The satellite compound will be in use for three years. The loss of holts will result in a permanent adverse effect on the conservation status of this otter population which will be significant at the district/borough level.

## **Other mitigation measures**

- 7.4.38 This section describes other mitigation measures designed to reduce or compensate for significant ecological effects. These include habitat creation and habitat enhancement.

## **Habitats**

### **Woodland**

- 7.4.39 The Proposed Scheme will result in the combined loss of 0.3ha of ancient woodland, which is irreplaceable, from Leonard's and Smoker Wood, Daisybank Wood and Belt Wood, each of which is significant at the national level.

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- 7.4.40 In addition, the Proposed Scheme will result in the combined loss of 3.4ha of lowland mixed deciduous woodland at Arley and Waterless Brook Corridor LWS and Belt Wood LWS, each of which is significant at the county/metropolitan level and 1.3ha of lowland mixed deciduous woodland between Arley and Waterless Brook LWS and Round and Rinks Woods AWI site, adjacent to Arley and Waterless Brook Corridor LWS and located along Agden Brook in Moston, each of which is significant at the district/borough level.
- 7.4.41 There will be further loss and fragmentation from five small woodlands across the Pickmere to Agden and Hulseheath area, including loss of 1ha of lowland mixed deciduous woodland, as reported within the register of local/parish effects (Volume 5: Appendix EC-015-0MA03). The combined loss and fragmentation of habitat from these woodlands is significant at the district/borough level.
- 7.4.42 In accordance with the Ecological Principles of Mitigation in the SMR, a route-wide, integrated strategic approach has been developed to compensate for the loss of woodland. The woodland habitat creation in this area is to compensate for the loss of woodland habitat in the local area as well as to ensure that the populations of protected and notable species including bats are maintained. With these objectives in mind, where reasonably practicable, the locations of woodland habitat creation have been selected so as to increase the size of existing higher quality habitat and to increase connectivity.
- 7.4.43 The loss of ancient woodland will be partly compensated through a range of measures, including planting of native broadleaved woodland as follows:
- 0.9ha to the west of Pickmere embankment, which will enhance connectivity along Leonard's and Smoker Wood LWS. This will partly compensate for the loss of 600m<sup>2</sup> at Leonard's and Smoker Wood AWI site within the Pickmere to Agden and Hulseheath area, as well as the loss of other non-ancient woodland habitats in the vicinity. It will also mitigate the effects on bat habitat;
  - 1.6ha to the west of Daisybank Wood and 0.1ha north of Gorse Cottage, which will partly compensate for the loss of 0.2ha from Daisybank Wood ancient woodland; and
  - 1.1ha to the east of Pickmere embankment, which will partly compensate for the loss of 400m<sup>2</sup> from Belt Wood AWI site. It will also mitigate the effects on bat habitat.
- 7.4.44 Woodland planting to partly compensate for the loss of ancient woodland will include further measures such as translocation of ancient woodland soil with its associated seed bank where appropriate. Other measures such as planting native trees and shrubs of local provenance and translocation of coppice stools and dead wood will be undertaken in accordance with the Ecological Principles of Mitigation within the SMR.
- 7.4.45 Within the Pickmere to Agden and Hulseheath area, a further 9.4ha of woodland habitat creation will be undertaken to compensate primarily for adverse effects upon non-ancient woodland at locations including the following:
- 1.7ha of woodland will be created in two locations along the B5391 Pickmere Lane. The planting will enhance connectivity of habitats in the Waterless Brook/Arley Brook location. It will also mitigate the effects on bat habitat;

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- 0.2ha of woodland will be created along Tributary of Tabley Brook 2, increasing woodland habitat along the watercourse;
- 4.4ha of woodland will be created in two locations west of Hulse Heath Farm, increasing habitat connectivity near Hulseheath;
- 1.8ha of woodland will be created in five locations near Little Moss Farm to increase habitat connectivity near HS2 Manchester spur. It will also mitigate the effects on bat habitat; and
- 1.3ha of woodland will be created in three locations near Agden Park, increasing habitat connectivity near Agden. It will also mitigate the effects on bat habitat.

7.4.46 The target habitat type for woodland planting is mixed deciduous woodland habitat of principal importance. The new areas of woodland habitat will connect and help maintain the structure and function of remaining areas of woodland. A temporary adverse effect is expected until these areas have become established, after which these measures will reduce the overall effect on woodland to a level that is not significant.

7.4.47 Landscape mitigation planting will provide some additional benefits to wildlife and will help to connect areas of higher quality habitats.

## **Grassland**

7.4.48 In accordance with the Ecological Principles of Mitigation in the SMR a route-wide, integrated strategic approach has been developed to compensate for loss of grassland. The species-rich grassland creation in this area is required to ensure that the populations of protected and notable species including great crested newts, bats and barn owls are maintained. With these objectives in mind, where reasonably practicable, the locations of grassland creation have been located so as to increase the size of existing higher quality habitat and to increase connectivity.

## **Hedgerows**

7.4.49 New hedgerows will be planted as replacement for those lost as a result of the Proposed Scheme. A total of 21.2km of new hedgerows will be planted and the species composition will be characteristic of the surrounding area. This represents a net reduction in hedgerow of 46.8km after mitigation, which is a residual adverse effect that is significant at the county/metropolitan level.

## **Watercourses**

7.4.50 Where smaller watercourses are realigned, the channel will be naturalised, where reasonably practicable, with a profile to promote the establishment of marginal vegetation and pools. Once the vegetation has developed, the adverse effect on these watercourses will be reduced to a level that is not significant.

## **Water bodies**

- 7.4.51 At least one pond will be created for every pond lost within the land required for the construction of the Proposed Scheme. New ponds will be established in accordance with the Ecological Principles of Mitigation in the SMR. Once established, it is anticipated that any adverse effect on pond habitats will be reduced to a level that is not significant.

## **Ancient and veteran trees**

- 7.4.52 Where practicable, measures will be taken to protect the veteran trees that are assumed to be lost. Where loss is unavoidable, the trees will be soft-felled and sections placed within retained habitats to provide a continued deadwood resource. Veteran trees are irreplaceable and the loss of each of these trees represents a residual adverse effect that is significant at the national level.

## **Species**

### **Bats**

- 7.4.53 To replace roosts that will be lost to construction, artificial roosts will be provided across the Proposed Scheme in accordance with the Ecological Principles of Mitigation within the SMR. The habitat creation measures detailed above in response to habitat loss, including creation of grasslands, hedgerows, new ponds and semi-natural woodlands will compensate for those bat foraging habitats lost within the land required for the construction of the Proposed Scheme as detailed below.
- 7.4.54 The loss of foraging and commuting habitat used by the bat assemblage between Smoker Brook and the M6 will be addressed by provision of woodland planting and creation of hedgerows, grassland, wetland habitat and ponds throughout this area. This will include hedgerow planting around Hollowood Farm access realignment. The disturbance and potential loss of a common pipistrelle bat potential maternity roost building at Hollowood Lane, Tabley will be addressed through the provision of suitable replacement roosts within habitat creation and enhancement areas south of Hollowood Lane. The loss of occasional roosts will be addressed through the provision of alternative roosting facilities in retained areas as close to the roost being lost as possible. Following the implementation of these measures, the effects on the bat assemblage in this area will be reduced to a level that is not significant.
- 7.4.55 The loss of foraging and commuting habitat used by the bat assemblage bounded by the M6, the M56 and the A556 within the Pickmere to Agden and Hulseheath area and the Hulseheath to Manchester Airport area (MA06) will be addressed by provision of woodland planting and creation of hedgerows, grassland, wetland habitat and ponds throughout both areas. This will include woodland planting to the west of NPR London to Liverpool junction, to the west of Hoo Green North cutting, and around HS2 Manchester spur. The disturbance and potential losses of a soprano pipistrelle and brown long-eared bat potential maternity roost building at Winterbottom Lane, High Legh will be addressed through the provision of

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suitable replacement roosts within habitat creation and enhancement areas west of London to Liverpool junction. The loss of occasional roosts will be addressed through the provision of alternative roosting facilities in retained areas as close to the roost being lost as possible. Following the implementation of these measures, the effects on the bat assemblage in this area will be reduced to a level that is not significant.

- 7.4.56 The loss of foraging and commuting habitat used by the bat assemblage between the M56, the River Bollin and the Bridgewater Canal within the Pickmere to Agden and Hulseheath area and Broomedge to Glazebrook area (MA04) will be addressed by provision of woodland planting and creation of hedgerows, grassland, wetland habitat and ponds throughout both areas. This will include woodland planting to the west of Agden cutting within the Pickmere to Agden and Hulseheath area. The loss of occasional roosts will be addressed through the provision of alternative roosting facilities in retained areas as close to the roost being lost as possible. Following the implementation of these measures, the effects on the bat assemblage in this area will be reduced to a level that is not significant.

## **Amphibians**

- 7.4.57 Ponds, species-rich grassland and broadleaved woodland included as part of the Proposed Scheme will be designed to compensate for the loss of breeding sites, foraging habitat and places of shelter used by great crested newts and other amphibians. Compensation will be provided within ecological habitat creation areas west of Smoker Hill Farm, north of Waterless Brook Cottage, north of Yew Tree Farm, north and south of Heyrose Farm, north-east of Winterbottom, east of Goodiersgreen Farm, at Mere Court Hotel, west and east of Hoo Green North cutting, south of Middlemoss Farm, north of Agden Cottage and at Hollybank House. Ponds, grassland and woodland will be established in accordance with the Ecological Principles of Mitigation within the SMR. Following implementation, the adverse effects on amphibian populations in the Pickmere to Agden and Hulseheath area will be reduced to a level that is not significant. HS2 Ltd will continue to survey ponds for great crested newt populations, and where it is confirmed that populations are absent then pond and terrestrial habitat provision will be re-assessed.

## **Birds**

- 7.4.58 Habitat creation measures to address the adverse effects on barn owl in the Pickmere to Agden and Hulseheath area will include the provision of grassland, woodland and hedgerow habitat creation adjacent to Pickmere embankment, Heyrose embankment, Hoo Green South embankment No.2, Hoo Green North cutting, High Legh cutting and Lymm South embankment. These habitat creation measures will provide foraging and nesting opportunities for barn owl populations in the Pickmere to Agden and Hulseheath area. Once the habitats have become established, the adverse effect on barn owl populations resulting from the loss of foraging habitat in the Pickmere to Agden and Hulseheath area will be reduced to a level that is not significant.

## **Vascular plants**

- 7.4.59 To address the adverse effect on vascular plants, where appropriate, translocation will be undertaken of alternate-leaved golden-saxifrage, bee orchid and small-leaved lime to suitable areas of new planting that form part of the wider habitat creation measures. New areas of habitat planting will also include these species where the conditions are suitable. Following the implementation of these measures, the adverse effects on the populations of these species will be reduced to a level that is not significant.

## **Otter**

- 7.4.60 To address the adverse effect from the loss of three existing holts on the otter population along Tabley Brook, three replacement holts will be created within the wetland habitat creation areas adjacent to the nearby Waterless Brook/Arley Brook. These will be created in accordance with the Ecological Principles of Mitigation within the SMR. The provision of the replacement holts will be sufficient to maintain the favourable conservation status in the population of otter associated with Tabley Brook and will reduce the adverse effects to a level that is not significant.

## **Badger**

- 7.4.61 Although there will be no significant effects on badger populations in this area, mitigation measures to address the potential disturbance of badgers will be provided in accordance with the Ecological Principles of Mitigation within the SMR. This will include the provision of badger proof fencing and replacement setts where necessary.

## **Summary of likely residual significant effects**

- 7.4.62 This section describes likely significant residual ecological effects during construction, taking account of the mitigation and compensation proposed.
- 7.4.63 Ancient woodland is irreplaceable and the loss of 0.3ha of this habitat will result in a permanent adverse residual effect upon ancient woodland at each location where this habitat is lost, which will be significant at the national level.
- 7.4.64 The assumed loss of at least two veteran trees will result in a permanent adverse residual effect that is significant at national level in each case.
- 7.4.65 On a precautionary basis, it is assumed that there will be a net loss in hedgerows of 46.8km, which will result in a permanent adverse residual effect, which will be significant at the county/metropolitan level. In addition to the mitigation described, opportunities will be sought for additional retention and replacement of hedgerow within the land required for temporary works.

## Cumulative effects

7.4.66 No cumulative effects on ecological receptors have been identified in the Pickmere to Agden and Hulseheath area.

## 7.5 Effects arising during operation

### Avoidance and mitigation measures

7.5.1 Within this section of the Proposed Scheme the following elements of the design will avoid or reduce impacts on features of ecological value during operation:

- Arley Brook viaduct, M6 Mere viaduct, Peacock Lane viaduct and A56 Lymm Road viaduct will provide ecological connectivity under the route of the Proposed Scheme to adjacent habitats. Ecological connectivity beneath the Proposed Scheme will be maintained for a combined length of 394m of viaducts in the Pickmere to Agden and Hulseheath area. This will reduce habitat fragmentation and barrier effects, allowing free passage of wildlife at these locations;
- six underbridges (Footpath Tabley Inferior 1/1 accommodation, Footpath Pickmere 9/1, Restricted Byway Tabley Superior 4/1 accommodation, Bridleway Mere 1/1 accommodation, Agden Brook Farm accommodation, Millington Clough) will maintain farm access and/or public access on footpaths or bridleways across the Proposed Scheme. These structures will be of a sufficient size to also allow for the passage of a range of wildlife species and their primary purpose will not discourage use by most wildlife species. These underbridges will reduce barrier effects by facilitating wildlife movement under the Proposed Scheme;
- four overbridges (the A50 Warrington Road, Peacock Lane, NPR Manchester to Liverpool junction and M56 West) will maintain farm access and/or public access on footpaths or bridleways across the Proposed Scheme. These structures will be of a sufficient size to also allow for the passage of a range of wildlife species, and their primary purpose will not discourage use by wildlife. These overbridges will reduce barrier effects by facilitating wildlife movement over the Proposed Scheme; and
- where the route of the Proposed Scheme will cross a watercourse, a culvert or dry tunnel will be provided to allow passage for mammals such as otter and water vole.

### Assessment of impacts and effects

7.5.2 Significant effects arising during operation at the district/borough level or above are described below. Significant effects on ecological features at the local/parish level are listed in Volume 5: Appendix EC-015-0MA03.

## Species

### Bats

- 7.5.3 The operation of the Proposed Scheme has the potential to result in a variety of impacts on bat populations including those as a result of collision with passing trains, turbulence and noise. The point at which such impacts are considered to result in a significant adverse effect on the conservation status of the population concerned will differ between species. As a consequence, the following assessment of operational impacts takes into account the differing character and nature of the bat populations and/or assemblages concerned in determining the likely effects of the Proposed Scheme on each of these receptors.
- 7.5.4 Due to the large areas over which bats forage it is likely that any loss of, or displacement from, suitable foraging habitat in the vicinity of the Proposed Scheme will in itself amount to only a small proportion of the wider available resource. However, the impact of any such disturbance or displacement could be greatly increased if bats are hampered in moving between breeding sites, hibernation sites and other roosts which they commonly utilise.
- 7.5.5 Noise, vibration and lighting associated with passing trains have the potential to disturb bat species foraging and commuting within habitats close to the Proposed Scheme. Understanding of the impact of noise on bats caused by passing trains is limited. Research suggests that gleaning bats, such as brown long-eared, will have reduced foraging success within areas where there is persistent noise from busy roads<sup>58</sup>. However, noise generated from passing trains will be regular but temporary and as such will differ from that resulting from a busy road.
- 7.5.6 Where the Proposed Scheme will bisect, or be located in proximity to existing features known to be utilised regularly by foraging or commuting bats, there is an increased risk that bats could be killed or injured as a result of collisions with passing trains or associated turbulence. The significance of any such effect will be dependent on both the flight height range of the species and the vertical alignment of the Proposed Scheme (i.e. whether the Proposed Scheme is in cutting, at ground level or on embankment) at the point the impact occurs.
- 7.5.7 Woodland habitat creation alongside Smoker Brook will connect Leonard's and Smoker Wood LWS and AWI site to the areas of grassland habitat creation to the north, encouraging bats to utilise the foraging habitats in this location. Bats flying west-east across the Proposed Scheme will be encouraged by this planting to cross beneath the Proposed Scheme at Smoker Brook viaduct into the Wimboldsley to Lostock Gralam area (MA02).
- 7.5.8 Grassland and wetland habitat creation alongside Waterless Brook/Arley Brook and hedgerow and woodland planting around Flittogate Lane diversion will connect to Arley and Waterless Brook Corridor LWS, encouraging bats to utilise the foraging habitats in this

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<sup>58</sup> Schaub, A., Ostwald, J. & Simeers, B.M. (2008), *Foraging bats avoid noise*, Journal of Experimental Biology, 211, 3174-3180.



location. Bats flying west-east across the Proposed Scheme will be encouraged by this planting to cross beneath the Proposed Scheme at Arley Brook viaduct.

- 7.5.9 Hedgerow and woodland habitat planting around Peacock Lane realignment will encourage bats flying west-east across the Proposed Scheme.
- 7.5.10 Although it is possible that there may be infrequent incidental mortality of individual bats, due to the avoidance measures described above and the availability of alternative foraging and commuting habitat on either side of the Proposed Scheme, this is unlikely to result in a significant adverse effect on the conservation status of the bat assemblages present in the Pickmere to Agden and Hulseheath area.

## **Birds**

- 7.5.11 The majority of bird species that are known to be present in the area are not considered to be particularly vulnerable to collision with trains. However, barn owls hunt low over the rough grassland habitats that are associated with railway embankments and are slow moving and are, therefore, likely to be subject to collision with high speed trains. Research undertaken by the British Trust for Ornithology on behalf of HS2 Ltd suggests that there may be effects on barn owls up to 3km away<sup>59</sup>. This means that more barn owls are likely to be affected than those in the vicinity of the Proposed Scheme identified above. This will result in a permanent adverse effect, which will be significant at the county/metropolitan level.

## **Other mitigation measures**

- 7.5.12 A Barn Owl Mitigation Plan will be prepared to identify the measures that can be implemented to help offset the effects on barn owls. As the availability of nesting sites is a limiting factor for this species the provision of additional nest boxes would be likely to increase numbers of barn owls within the wider landscape and thus offset the adverse effect.

## **Summary of likely residual significant effects**

- 7.5.13 The mitigation, compensation and enhancement measures described above are likely to reduce the residual ecological effects during operation to a level that is not significant, except for barn owl. Train strike is likely to result in the loss of barn owls that nest within 3km of the Proposed Scheme resulting in a residual significant effect at the county/metropolitan level. However, if the proposed mitigation measures for barn owl are implemented through liaison with landowners and other relevant stakeholders, the residual effect on barn owl would be reduced to a level that is not significant.

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<sup>59</sup> Pringle, H., Siriwardena, G. & Toms, M. (2016), *Informing best practice for mitigation and enhancement measures for Barn Owls*, British Trust for Ornithology, Thetford.

## **Cumulative effects**

- 7.5.14 No cumulative effects on ecology receptors have been identified from other committed developments in the Pickmere to Agden and Hulseheath area.

## **Monitoring**

- 7.5.15 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.
- 7.5.16 There are no area-specific requirements for monitoring ecology and biodiversity effects or mitigation during the operation of the Proposed Scheme in the Pickmere to Agden and Hulseheath area.

## 8 Health

### 8.1 Introduction

- 8.1.1 This section identifies the communities within the Pickmere to Agden and Hulseheath area that will be subject to impacts associated with the Proposed Scheme and describes how these impacts are likely to affect the health and wellbeing of people within these communities, where these effects are considered to be consequential.
- 8.1.2 Engagement with key public health bodies, including Public Health England and local Directors of Public Health, has been undertaken to inform the health assessment process. Consultation with communities, local authorities and parish councils has been ongoing throughout the route design and assessment process, as described in Volume 1, Section 3. This has contributed to the measures identified to avoid and mitigate adverse health effects.
- 8.1.3 The assessment also draws on health-related information and views expressed in consultation responses from the owners and/or operators of Heyrose Golf Club within the Pickmere to Agden and Hulseheath study area.
- 8.1.4 This section deals specifically with impacts at a local level within the Pickmere to Agden and Hulseheath area. Health effects assessed across the Proposed Scheme as a whole are reported in Volume 3, Route-wide effects, Section 8.
- 8.1.5 Further details of the health assessment, including the criteria used to assess effects on population health as described in the EIA Scope and Methodology Report (SMR)<sup>60</sup>, are contained in Volume 5: Appendix HA-001-0MA03 Health assessment matrix.
- 8.1.6 Maps showing the location of the key environmental features (Map Series CT-10), construction features (Map Series CT-05), and key operational features (Map Series CT-06) of the Proposed Scheme can be found in the Volume 2: MA03 Map Book. The Proposed Scheme is described in Section 2.

### 8.2 Scope, assumptions and limitations

- 8.2.1 The scope, assumptions and limitations for the health assessment are set out in Volume 1, Section 8 and the SMR.
- 8.2.2 As set out in the SMR, the health assessment is based on a broad understanding of health, consistent with the World Health Organization (WHO) definition of health as 'a state of complete physical, mental and social well-being and not merely an absence of disease or infirmity'. An individual's health is mostly determined by genetics and lifestyle factors, but for a large enough population many other factors, or 'health determinants', are known to be important, and these factors may be affected by the Proposed Scheme.

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<sup>60</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

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- 8.2.3 The impacts of the Proposed Scheme on a range of environmental and socio-economic 'health determinants' could result in adverse or beneficial effects on health and wellbeing. This process of assessing these effects is documented in the health assessment matrices in Volume 5: Appendix HA-001-0MA03. Based on this a professional judgement has been made to identify those effects on population health and wellbeing that are sufficiently important to report within the health assessment sections found in this report and Volume 3, Route-wide effects.
- 8.2.4 The health determinants of relevance within the Pickmere to Agden and Hulseheath area during construction (temporary and permanent impacts) are:
- neighbourhood quality;
  - access to green space, recreation and physical activity; and
  - social capital.
- 8.2.5 One health determinant, neighbourhood quality, has been identified as being relevant within the Pickmere to Agden and Hulseheath area during operation (permanent).
- 8.2.6 Additionally, health effects that are relevant along the route of the Proposed Scheme as a whole are reported in Volume 3, Route-wide effects, Section 8.
- 8.2.7 The geographic extent of the health assessment covers those areas where impacts on health determinants are predicted to occur. Health effects arising from impacts on a particular resource may affect communities across a wide area. These effects are described in the report section corresponding to the location of the resource itself. Health effects arising from reduced access to resources, for example as a result of traffic delays, are described in the report section corresponding to the community whose access is restricted.
- 8.2.8 The health assessment methodology is based on a review of published evidence showing how impacts on health determinants are linked to health effects in a large population. The health assessment is based on a review of evidence linking changes in health determinants to potential health outcomes. This information is presented in Volume 5: Appendix HA-002-00000. The strength of evidence varies; for example, the evidence linking physical activity to health outcomes is strong, whereas the evidence linking social capital with health outcomes is moderate. The strength of evidence does not necessarily determine the importance of a health effect but is an indication of the level of certainty in the assessment. Additionally, there is greater certainty in the prediction of an impact on a health determinant than the consequent effect on health.
- 8.2.9 There is no established or widely accepted framework for assessing the significant health effects of a development proposal. The SMR sets out a methodology for describing the impacts on health determinants in terms of the magnitude and duration of the change and the extent of the population exposed to this change. It also draws attention to the strength of evidence that links a change in health determinant with health effects. This framework permits the assessment to describe the impacts on determinants in a largely qualitative manner, with some structure to the relative scale of these impacts to give a sense of the

importance of the potential health effects. This does not, however, provide a clear basis for drawing conclusions as to whether a health effect is likely to be 'significant'.

## 8.3 Environmental baseline

### Existing baseline

#### Description of communities in the Pickmere to Agden and Hulseheath area

8.3.1 The Pickmere to Agden and Hulseheath area covers a 10.6km section of the route of the Proposed Scheme in Cheshire. The route will pass through the parishes of Tabley Inferior, Pickmere, Tabley Superior, Mere, High Legh and Agden. In addition, HS2 Manchester spur will be 3.3km in length in this area and will diverge from the route of the Proposed Scheme west of Hulseheath and continue to Manchester. The HS2 Manchester spur will run to the eastern boundary of the area, in Hulseheath. The Proposed Scheme also includes the Northern Powerhouse Rail (NPR) London to Liverpool junction, which will enable HS2 to connect with a future Northern Powerhouse Rail (NPR) route between London and Liverpool. The Pickmere to Agden and Hulseheath area is predominately agricultural in nature, characterised by several villages, hamlets and scattered farmsteads and dwellings. In general, the majority of community facilities serving this area are located in the larger settlements of Northwich (to the south), Knutsford (to the east) and Warrington, Lymm and Altrincham (to the north), all of which are outside of the study area. A more detailed description of community facilities is provided in Section 6, Community.

#### Pickmere and surrounds

- 8.3.2 This area covers Pickmere and its surrounds, from the southern boundary of the Pickmere to Agden and Hulseheath area to the M6. Pickmere is located to the west of the route of the Proposed Scheme and contains approximately 1,000 residential properties. The nearest residential properties are located 1km west of the route of the Proposed Scheme. The surrounding area is sparsely populated.
- 8.3.3 Recreational facilities in the study area include Heyrose Golf Club on Budworth Road, which is an 18-hole golf course and club house. A section of the North Cheshire Way, which is a 113km public right of way (PRoW) in total is also located in the study area.

#### Hoo Green, High Legh, Hulseheath, Agden and surrounds

- 8.3.4 This area covers the villages of Hoo Green, High Legh, Mere, Bucklow Hill, Little Bollington, Agden and Hulseheath.
- 8.3.5 Hoo Green comprises approximately 50 residential properties. The nearest residential properties are located approximately 45m east of the route of the Proposed Scheme.

- 8.3.6 High Legh is located to the west of the route of the Proposed Scheme. High Legh contains approximately 500 residential properties, the nearest of which are 1km from the route of the Proposed Scheme. Recreational facilities in the study area include High Legh Park Golf Club, located on the A50 Warrington Road on the eastern outskirts of High Legh, and the Cheshire Cycleway (National Cycle Network Regional Route 70), a 280km cycle route through Cheshire.
- 8.3.7 Hulseheath is a settlement comprising approximately 20 residential properties. The nearest residential properties are located 350m east of HS2 Manchester spur.
- 8.3.8 Agden is a settlement comprising approximately 150 residential properties, the nearest of which are on the route of the Proposed Scheme. The Cheshire Ring Canal Walk on the Bridgewater Canal towpath also passes north-east of the A56 Lymm Road in Agden.

## **Demographic and health profile of the Pickmere to Agden and Hulseheath area**

- 8.3.9 A review of publicly available health and demographic information has been undertaken to inform the health assessment. The information gathered describes the populations that could be affected by the Proposed Scheme in terms of their key characteristics such as size, distribution, age structure, socio-economic status and health. It enables consideration of the nature of the populations affected and their sensitivity to potential health effects, as well as indicating the prevalence of specific vulnerable groups.
- 8.3.10 The communities affected by the Proposed Scheme in the Pickmere to Agden and Hulseheath area have a relatively low population density compared to the national average.
- 8.3.11 Public health indicators have been benchmarked by Public Health England<sup>61</sup> to show how a local authority compares to England for each specific indicator. The benchmark is presented on a three-point scale: worse than, similar to and better than the English average. The data provided by Public Health England show that this population has a similar health status compared with the English average.
- 8.3.12 The English Indices of Deprivation<sup>62</sup> rank neighbourhoods from most to least deprived, according to a range of criteria and an overall (combined) ranking. The neighbourhoods in the Pickmere to Agden and Hulseheath area are generally less deprived than the national average, falling mainly within the 10% to 50% least deprived bands.
- 8.3.13 This area as a whole is considered to be slightly more resilient than the national average with regard to changes in the relevant health determinants. However, there are some vulnerabilities in terms of the health status of the population.

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<sup>61</sup> Public Health England (2019), *Local Authority Health Profiles*. Available online at: <https://fingertips.phe.org.uk/profile/health-profiles>.

<sup>62</sup> Ministry of Housing, Communities and Local Government (2019), *English indices of deprivation 2019*. Available online at: <https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019>.

- 8.3.14 The available data provide detail down to local authority and ward level and enable a profile to be made of the population within the Pickmere to Agden and Hulseheath area. The description of the whole population, and the populations within wards, does not preclude the possibility that there will be individuals or groups of people who do not conform to the overall profile.

## **Future baseline**

### **Construction (2025)**

- 8.3.15 Volume 5: Appendix CT-004-00000 provides details of the developments in the Pickmere to Agden and Hulseheath area that are assumed to have been implemented by 2025. No committed developments of relevance for the health assessment have been identified that would materially alter the future baseline in this area.

### **Operation (2038)**

- 8.3.16 Volume 5: Appendix CT-004-00000 provides details of the developments in the Pickmere to Agden and Hulseheath area that are assumed to have been implemented by 2038. No committed developments of relevance for the health assessment have been identified that would materially alter the future baseline in this area.

## **8.4 Effects arising during construction**

### **Avoidance and mitigation measures**

- 8.4.1 Consideration of potential health issues is an integral part of the planning and design of the Proposed Scheme, alongside consideration of other environmental, community and economic issues. Insofar as reasonably practicable, mitigation measures have been incorporated into the design of the Proposed Scheme with the aim of avoiding or reducing adverse effects on people. The locations of construction compounds and site haul routes have been selected to reduce the number of people exposed to construction impacts insofar as reasonably practicable. The mitigation measures incorporated into the design of the Proposed Scheme in the Pickmere to Agden and Hulseheath area are described in Section 2.
- 8.4.2 Contractors will be required to comply with the environmental management regime for the Proposed Scheme, set out in the draft Code of Construction Practice (CoCP)<sup>63</sup>, which provides a general basis for route-wide construction environmental management. Contractors will also be required to comply with the measures set out in Local Environmental Management Plans (LEMP), which will apply the environmental management strategies at a local level.

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<sup>63</sup>Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

- 8.4.3 The draft CoCP will be the means of controlling the construction works associated with the Proposed Scheme to ensure that the effects of the works upon people and the natural environment are reduced or avoided so far as reasonably practicable.
- 8.4.4 The draft CoCP will require contractors to produce and implement a community engagement framework, provide appropriately experienced community relations personnel to implement the framework, provide appropriate information and to be the first point of contact to resolve community issues. Contractors will be required to take reasonable steps to engage with the community, focusing on those who may be affected by construction impacts, including local residents, businesses, landowners and community resources, while taking into account the specific needs of protected groups (as defined in the Equality Act 2010).
- 8.4.5 In the event of any loss of a community facility, the options for mitigating significant community effects to be explored by HS2 Ltd would include:
- improving or altering the remaining portion of the community facility;
  - improving other existing community facilities in the area that could reduce the effect;
  - improving accessibility to other community facilities; and/or
  - identifying land owned by the relevant local authority that could be brought into use as a community facility with its agreement.

## **Assessment of impacts and effects**

- 8.4.6 Impacts on health determinants resulting from the construction of the Proposed Scheme are presented in the health assessment matrix in Volume 5: Appendix HA-001-0MA03. The health assessment criteria are described within the SMR. Within the assessment matrix, the assessment criteria are applied to determine which impacts are likely to lead to health and wellbeing effects at the population level. These effects are reported in the assessment sections below.

## **Neighbourhood quality**

- 8.4.7 The neighbourhood quality assessment identifies changes in the character and amenity of neighbourhoods along the Proposed Scheme. It includes public realm such as streets, footpaths, public squares, parks and playing fields. It does not include residential or other private property. The assessment identifies combinations of impacts on two or more of the following environmental factors within the public realm: traffic, noise and vibration, landscape and visual impacts. When these factors are altered people's levels of satisfaction with their living environment may change, which in turn may affect their mental wellbeing. This may include reduced feelings of attachment to, and pride in, their neighbourhood and reduced enjoyment of outside space.
- 8.4.8 A review of published research evidence linking neighbourhood quality with health and wellbeing can be found in Volume 5: Appendix HA-002-00000. The evidence linking the



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various aspects of neighbourhood quality with health outcomes ranges from moderate to strong.

- 8.4.9 The neighbourhood quality assessment uses information from other topics but does not apply the same assessment thresholds, as it is focused on neighbourhoods rather than individual receptors. The construction of the Proposed Scheme will affect neighbourhood quality through impacts such as noise, visual impacts and additional traffic, including heavy goods vehicles (HGVs)<sup>64</sup>. These impacts are described in Section 11, Landscape and visual, Section 13, Sound, noise and vibration and Section 14, Traffic and transport.
- 8.4.10 Construction of Heyrose embankment and construction associated with Budworth Road satellite compound will be visible from street level in the vicinity of Budworth Road in Tabley Superior. Construction noise will be noticeable in outdoor areas for approximately eight months. People in this community are likely to experience these features of the Proposed Scheme as changing the quality of their neighbourhood and to regard that change as adverse, both in diminishing the amenity of the village and in reducing the sense of its rural character.
- 8.4.11 The B5569 Chester Road in Mere is a designated route for construction traffic and is expected to experience a significant increase in HGV traffic movements. Significant HGV traffic effects are expected to combine with significant noise effects from construction traffic on residential properties on Chester Road, between the A50 Chester Road and the A5034 Mereside Road, during the peak months of construction. People in this community are likely to experience these effects as changing the quality of their neighbourhood and to regard that change as adverse, both in diminishing the amenity of the village and in reducing the sense of its rural character.
- 8.4.12 There will be a neighbourhood quality effect for some residents at Bucklow Hill (Chapel Lane), which extends across the boundary between the Pickmere to Agden and Hulseheath area and the Hulseheath to Manchester Airport area (MA06). As the majority of the affected properties are in the Hulseheath to Manchester Airport area, the effect is reported in Volume 2: Community Area report: Hulseheath to Manchester Airport (MA06), Section 6 and Volume 5: Appendix CM-001-0MA06.
- 8.4.13 There will be a neighbourhood quality effect for some residents at Hulseheath. Hulseheath extends across the boundary between the Pickmere to Agden and Hulseheath area and the Hulseheath to Manchester Airport area (MA06). As the majority of the affected properties are in this area, the effect on all of these properties is reported in this section. Construction of Hulseheath North embankment, Hulseheath South embankment, Peacock Lane viaduct and Hoo Green North cutting will be visible from street level in the vicinity of Hulseheath. Construction noise will be noticeable in outdoor areas, particularly along Chapel Lane,

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<sup>64</sup> HGV traffic effects are where there is a 30% or more increase in HGV traffic movements which have been identified as significant by traffic and transport. The increase in HGV traffic results in a traffic-related severance effect for non-motorised users. They contribute to neighbourhood quality effects on health resources that are located adjacent to the routes that experience the increase in HGV movements.

Peacock Lane and Thowler Lane for a period of approximately three years. In addition, Chapel Lane is a designated route for construction traffic to enable access to Chapel Lane satellite compound. It is expected to experience a significant increase in HGV traffic movements, between Hulseheath Lane and Peacock Lane. Properties will also be affected by significant noise effects from construction traffic during peak months of construction. People in this community are likely to experience these features of the Proposed Scheme as changing the quality of their neighbourhood and to regard that change as adverse, both in diminishing the amenity of the village and in reducing the sense of its rural character.

## **Access to green space, recreation and physical activity**

- 8.4.14 There is moderate evidence to show that access to green space contributes to good mental health, including reduced stress and improved cognitive function and resilience. There is also moderate evidence that environmental factors such as access to high quality green space, safety and amenity can influence participation in physical activity. Physical activity is strongly linked to health outcomes. A review of published research evidence linking access to green space, recreation and physical activity with health and wellbeing can be found in Volume 5: Appendix HA-002-00000.
- 8.4.15 The Proposed Scheme will intersect some public rights of way (PRoW) in the Pickmere to Agden and Hulseheath area. Effects relating to the severance and diversion of PRoW (public footpaths and bridleways) are described in Section 14, Traffic and transport. Surveys of the user numbers and condition of PRoW have been undertaken and are reported in Background Information and Data<sup>65</sup> (see BID TR-004-00001: Transport Assessment policy and data report). Where PRoW and other routes are a 'promoted' destination in their own right as a recreational resource, they are also assessed within the Section 6, Community. Effects on views from PRoW are assessed in Section 11, Landscape and visual effects. PRoW are not identified as sensitive receptors in the assessment of sound, noise and vibration (Section 13) as they are, by their nature, transitory in their use, with users not staying in any one location for any length of time. However, during construction, the amenity and recreational value of some PRoW will be temporarily reduced due to their proximity to construction activities, as well as other aspects such as changes in the length and appearance, and the addition of features such as underpasses. This may result in some people using alternative routes or, where a suitable alternative is not available, being deterred from using PRoW, leading to adverse effects on wellbeing for some individuals. However, the impacts on PRoW are not considered to reduce access to green space and levels of physical activity to a level that would lead to adverse health effects on the population in the Pickmere to Agden and Hulseheath area.
- 8.4.16 Construction traffic, including HGVs, will be present on local roads within the Pickmere to Agden and Hulseheath area as described in Section 14, Traffic and transport. The presence

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<sup>65</sup> High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background Information and Data*. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

of HGVs is likely to deter some non-motorised users (pedestrians, cyclists and equestrians) from using the affected routes, due to concerns about safety and amenity. In the case of recreational users, it is considered that alternative routes will be available. However, for those using these routes for active travel to work or to access shops and services, there is the possibility that people will choose instead to travel by car, temporarily reducing levels of physical activity and associated health and wellbeing benefits. Given the location of construction traffic routes and the number of HGV movements, it is considered that any reduction in physical activity would be small, and would not lead to adverse health effects on the population in the Pickmere to Agden and Hulseheath area.

## Social capital

- 8.4.17 The term ‘social capital’ refers to the connections between individuals within communities, and the increased likelihood that arises through these networks for individuals to feel valued, to feel a sense of belonging, to have companionship and to support each other. The Office for National Statistics<sup>66</sup> defines social capital as follows:
- “In general terms, social capital represents social connections and all the benefits they generate. Social capital is also associated with civic participation, civic-minded attitudes and values which are important for people to cooperate, such as tolerance or trust.”
- 8.4.18 There is moderate evidence for a link between social capital and mental and physical health outcomes. A change in social capital has the potential to influence the mental health effects that are gained through social contact and support, social participation, reciprocity and trust. Adverse effects on health from changes in social capital could be experienced as a reduction in mental wellbeing or as physiological effects on the body's hormonal and immune systems, with increased susceptibility to mental and physical illness. A review of published research evidence linking social capital with health and wellbeing can be found in Volume 5: Appendix HA-002-00000.
- 8.4.19 The settlements in this area support small, well-established communities. The assessment has identified potential wellbeing effects within these communities associated with the temporary construction workforce, which will be substantial relative to the size of these communities. A50 Warrington Road main compound will be located directly west of Hoo Green for six years and three months and will provide temporary accommodation for around 155 workers for three years and nine months. During the day, the workforce will be present on construction sites and compounds throughout the area, including work sites and satellite compounds. The daily average number of workers at each site will typically be around 40 to 80, and the duration of the works at each site will range from approximately three years to six years and three months. The presence of construction workers is likely to

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<sup>66</sup> Office for National Statistics (2014), *Measuring social capital*. Available online at: [https://webarchive.nationalarchives.gov.uk/20160107115718/http://www.ons.gov.uk/ons/dcp171766\\_371693.pdf](https://webarchive.nationalarchives.gov.uk/20160107115718/http://www.ons.gov.uk/ons/dcp171766_371693.pdf).

be very noticeable, with construction vehicles using local roads to access compounds, and workers using facilities within local settlements, particularly Hoo Green.

- 8.4.20 The introduction of a temporary construction workforce into established communities has the potential to negatively alter people's perceptions of, and interactions with, their communities, modifying behaviour and the value they place on social capital. Such a reduction in social capital has the potential to adversely affect wellbeing, and may influence behaviours that are beneficial to wellbeing such as the use of community facilities.
- 8.4.21 The draft CoCP includes a commitment to produce and implement a community engagement framework and provide appropriately experienced community relations personnel to implement the framework and provide a first point of contact. HS2 Ltd will engage with local authorities and community representatives to identify measures aimed at fostering and maintaining good relationships between the workforce and local communities. Any measures identified will be included within the community engagement framework as appropriate.

## **Other mitigation measures**

- 8.4.22 HS2 Ltd will engage with local authorities and community representatives to identify measures aimed at fostering and maintaining good relationships between the workforce and local communities. Any measures identified will be included within the community engagement framework as appropriate.
- 8.4.23 No other mitigation measures are proposed in the Pickmere to Agden and Hulseheath area.

## **Cumulative effects**

- 8.4.24 The assessment has considered whether the cumulative effects of the Proposed Scheme and other committed developments are likely to give rise to additional health effects.
- 8.4.25 Cumulative effects may also occur where a number of individual health effects come together within a location, such that a considerable proportion of the population is likely to experience more than one type of health effect. This will place increased stress on those individuals affected and may exacerbate health outcomes associated with the individual effects.
- 8.4.26 No cumulative health effects have been identified.

## **8.5 Effects arising from operation**

### **Avoidance and mitigation measures**

- 8.5.1 Consideration of potential health issues is an integral part of the planning and design of the Proposed Scheme, alongside consideration of other environmental, community and economic issues. Insofar as reasonably practicable, mitigation measures have been

incorporated into the design of the Proposed Scheme with the aim of avoiding or reducing adverse effects on people. The mitigation measures incorporated into the design of the Proposed Scheme in the Pickmere to Agden and Hulseheath area are described in Section 2 and include:

- landscape earthworks and landscape mitigation planting to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening for residents of properties in Pickmere, Tabley, Winterbottom, Hoo Green, Hulseheath, Millington and Agden; and
- two noise fence barriers on the western side of A56 Lymm Road viaduct and Lymm North embankment to provide acoustic screening for residents of properties in Agden.

## Assessment of impacts and effects

8.5.2 Impacts on health determinants resulting from the operation of the Proposed Scheme are presented in the health assessment matrix in Volume 5: Appendix HA-001-OMA03. The health assessment criteria are detailed within the SMR. Within the assessment matrix, the assessment criteria are applied to determine which impacts are likely to lead to health and wellbeing effects at population level. These effects are reported in the assessment sections below.

### Neighbourhood quality

- 8.5.3 Noise and visual impacts from passing trains will result in permanent operational impacts on neighbourhood quality in the communities in proximity to the Proposed Scheme, including Over Tabley, Tabley Superior, Winterbottom, Hulseheath and Agden. These operational impacts will be experienced alongside permanent construction impacts, including the presence of the railway within the local landscape.
- 8.5.4 Overhead line equipment and passing trains on Heyrose embankment will be visible from Over Tabley. Noise from passing trains will also be noticeable in the area, particularly along Old Hall Lane. Residents living in this area are likely to experience these features of the Proposed Scheme as changing the quality of their neighbourhood. Residents are likely to regard that change as adverse, both in diminishing the amenity of the area and in reducing its rural character and tranquillity.
- 8.5.5 Overhead line equipment and passing trains on Heyrose embankment will be visible from Tabley Superior. Noise from passing trains will also be noticeable in the area, particularly along Budworth Road. Residents living in this area are likely to experience these features of the Proposed Scheme as changing the quality of their neighbourhood. Residents are likely to regard that change as adverse, both in diminishing the amenity of the area and in reducing its rural character and tranquillity.
- 8.5.6 Overhead line equipment and passing trains on Hoo Green South embankment No.2 will be visible from Winterbottom. Noise from passing trains will also be noticeable in the area, particularly along Winterbottom Lane. Residents living in this area are likely to experience

these features of the Proposed Scheme as changing the quality of their neighbourhood. Residents are likely to regard that change as adverse, both in diminishing the amenity of the area and in reducing its rural character and tranquillity.

- 8.5.7 There will be a neighbourhood quality effect for some residents at Hulseheath. Hulseheath extends across the boundary between the Pickmere to Agden and Hulseheath area and the Hulseheath to Manchester Airport area (MA06). As the majority of the affected properties are in this area, the effect on all of these properties is reported in this section. Overhead line equipment and passing trains on Hulseheath South embankment and Hulseheath North embankment will be visible from streets in Hulseheath. Noise from passing trains will also be noticeable in these areas. Residents living in this area, particularly along Peacock Lane, Back Lane and Thowler Lane, are likely to experience these features of the Proposed Scheme as changing the quality of their neighbourhood. Residents are likely to regard that change as adverse, both in diminishing amenity and in reducing the sense of its rural character and tranquillity.

## **Other mitigation measures**

- 8.5.8 Avoidance and mitigation measures are described above. No other mitigation measures have been identified.

## **Cumulative effects**

- 8.5.9 No cumulative effects have been identified.

## **Monitoring**

- 8.5.10 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.
- 8.5.11 Proposals for monitoring of precursors to health effects, such as air quality and noise, are reported in Sections 5 and 13.
- 8.5.12 Any area-specific operational monitoring requirements in relation to air quality effects, noise and vibration effects, traffic effects and visual effects that have contributed to the health assessment are described in the relevant sections of this Volume 2 report.

## 9 Historic environment

### 9.1 Introduction

- 9.1.1 This section of the report provides a description of baseline conditions for heritage assets and the identified impacts and likely significant effects resulting from the construction and operation of the Proposed Scheme within the Pickmere to Agden and Hulseheath area. Consideration is given to the extent and value of heritage assets including archaeological and palaeoenvironmental remains, historic buildings, the built environment and historic landscape.
- 9.1.2 Engagement has been undertaken with Historic England, Cheshire East Council, Cheshire West and Chester Council, Cheshire Archaeology Planning Advisory Service, the Greater Manchester Archaeological Advisory Service, the Canal & River Trust and the National Trust. The purpose of this engagement has been to discuss the assessment approach, to obtain relevant baseline information and to inform the design development and assessment of the Proposed Scheme.
- 9.1.3 Appendices and Background Information and Data (BID<sup>67</sup>) reports accompany this section of the report. These are:
- Volume 5: Appendix HE-002-0MA03 – Summary gazetteer, impact assessment table and archaeological character areas;
  - Volume 5: Appendix HE-003-0MA03 – Historic landscape character areas;
  - Volume 5, Map Book HE-01 and HE-02 – Heritage assets within the study area and Map Book HE-03 - Archaeological sub-zones;
  - BID HE-001-0MA03 – Historic environment baseline report (including a full gazetteer of heritage assets);
  - BID HE-004-0MA03 – Historic environment field survey report (geophysical survey), and Map Book HE-004; and
  - BID HE-005-0MA03 – Historic environment remote sensing survey report (aerial photograph and LiDAR<sup>68</sup> assessment), and Map Book HE-005.
- 9.1.4 Heritage assets have been given a Unique gazetteer identifier (UID), for example MA03\_0001. These have been allocated to all heritage assets within the gazetteer and are referenced throughout the ES, BID reports and in map books.

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<sup>67</sup> High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background Information and Data*. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

<sup>68</sup> LiDAR (meaning ‘light detection and ranging’) is a surveying method that measures distance to a target by illuminating the target with pulsed laser light and measuring the reflected pulses with a sensor, this can be used to identify archaeological earthwork evidence.

- 9.1.5 Maps showing the location of the key environmental features (Map Series CT-10), and the key construction (Map Series CT-05) and key operational (Map Series CT-06) features of the Proposed Scheme can be found in the Volume 2: MA03 Map Book. The Proposed Scheme is described in Section 2.

## 9.2 Scope, assumptions and limitations

- 9.2.1 The general scope, assumptions and limitations for the historic environment assessment are set out in full in Volume 1, Section 8 and the EIA Scope and Methodology Report (SMR)<sup>69</sup>, including the method for determining the value of a heritage asset and magnitude of impact.
- 9.2.2 The assessment focuses on the extent to which the Proposed Scheme will affect designated and non-designated heritage assets. The Proposed Scheme could impact heritage assets through the alteration, demolition or removal of the asset, or as a result of changes within the asset's setting, where setting contributes to the value of the asset.
- 9.2.3 The study area for the assessment of effects on designated and non-designated heritage assets is the land required for the construction of the Proposed Scheme plus 500m on each side in rural areas. This is referred to in the remainder of this section as 500m study area.
- 9.2.4 Designated heritage assets within a study area of up to 2km from the land required for the construction and operation of the Proposed Scheme have been considered in relation to potential effects arising from changes within an asset's setting. This is referred to in the remainder of this section as the 2km study area.
- 9.2.5 The historic environment methodology includes the consideration of the relevant interactions with other topics, including ecology and biodiversity, landscape and visual, socio-economics, sound, noise and vibration, water resources and flood risk, and in-combination climate change impacts. These interactions have been included in the assessment of baseline conditions, impacts and effects.
- 9.2.6 Where noise is considered, this is within the context of the way in which sound and noise currently contribute to the heritage value of the assets and is not a reference to absolute noise levels or sound, or the noise or vibration impacts on the health and quality of life of people who live in or visit the area.

## 9.3 Environmental baseline

### Existing baseline

- 9.3.1 A full list of data sources used in establishing baseline conditions is provided in BID HE-001-0MA03. In addition to the desk-based assessment, the following surveys have been undertaken in the Pickmere to Agden and Hulseheath area:

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<sup>69</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.



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- walkover and site reconnaissance from areas of public access or in locations where site access was granted. This was carried out in order to understand the character of the historic landscape; review the nature, condition and setting of known heritage assets; and identify previously unknown assets;
- desk-top analysis of remote sensing data, including LiDAR and aerial photographs (BID HE-005-0MA03); and
- a programme of non-invasive geophysical survey in areas identified as suitable for this survey method and where access was granted (BID HE-004-0MA03).

## Designated assets

9.3.2 Designated heritage assets within the 2km study area are described in Volume 5: Appendix HE-002-0MA03.

9.3.3 The assets summarised below are located outside of the land required for the construction of the Proposed Scheme but are partially or wholly within the 2km study area. Only assets where a significant effect is predicted, as described in Section 9.4 and 0, 9.4 are named below:

- three scheduled monuments of high heritage value, which are moated sites;
- five Grade I listed buildings of high heritage value, all of which are country houses or structures associated with these country houses;
- four Grade II\* listed buildings of high heritage value, including domestic halls and country houses, a private chapel and an industrial sawmill;
- three Grade II listed buildings of high heritage value, including a rare telephone box, aviary and converted barn;
- several Grade II listed buildings of moderate heritage value including farmhouses and associated structures such as Winterbottom Farmhouse (MA03\_0040), structures associated with country houses, cottages including Ovenback Cottage (MA03\_0058) and Mere Court Hotel (MA03\_0047). Other examples include churches, chapels and parsonages, halls, transport structures and a mill;
- two Grade II\* registered parks and gardens of high heritage value;
- one Grade II registered park and garden of moderate heritage value;
- two conservation areas of high heritage value; and
- two conservation areas of moderate heritage value.

## Non-designated assets

9.3.4 The non-designated heritage assets summarised below lie wholly or partially within the land required for the construction of the Proposed Scheme. Only assets where a significant effect is predicted, as described in Section 9.4 and 0, are named below.

9.3.5 There are 13 assets of low heritage value within the land required for the construction of the Proposed Scheme. These date from the Roman, medieval, post-medieval and modern

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periods and relate to domestic, agricultural, gardens and parks, industrial, defence and transportation activity in the area. The assets include Flittogate Farm (MA03\_0081), Barrhill and Waterless Brook Cottage (MA03\_0084), Barn and Range at Heyrose Farm (MA03\_0085), Holly House Farm, Warrington Road (MA03\_0091), Bowden View Farm (MA03\_0101), Roman Road – The North Cheshire Ridge (Margary 70aa; MA03\_0116), Millington possible deserted settlement (MA03\_0118), Roman Road – Chester to Manchester (Margary 7a; MA03\_0119), Site of anti-aircraft batteries and defence features south of Budworth Road (MA03\_0143), Group of levelled rectilinear banks and ditches representing the former gardens of Agden Hall (MA03\_0144), High Legh Park (site of) (MA03\_0155), possible kiln or sawpit at Hoo Green (MA03\_0167) and Group of linear archaeological features south of Gorse Cottage (MA03\_0170). There are no non-designated assets of high or moderate heritage value within the land required for the construction of the Proposed Scheme.

- 9.3.6 The non-designated heritage assets summarised below lie wholly or partially within the 500m study area. There is one non-designated asset of moderate heritage value within the 500m study area: the Bridgewater Canal – Leigh Branch (MA03\_0168). There are several non-designated assets of low heritage value within the 500m study area. These include a prehistoric ring ditch, cropmarks in Mere Parish, two deserted medieval settlements, farms, cottages, a radio telescope, two decoy sites, the site of an undated chapel at Tabley and three post-medieval brick kiln sites.

## **Historic environment overview**

- 9.3.7 Geological deposits of glacial till, consisting of boulder clay laid down during the last Ice Age, are found across the Pickmere to Agden and Hulseheath area. These deposits lie on top of a bedrock geology that consists of sedimentary mudstone, as described in Section 10, Land quality. Till deposits within the area have been eroded by streams and rivers, resulting in deposits of alluvium along watercourses such as Tabley Brook, Agden Brook, Waterless Brook and Arley Brook. The area is crossed by a sandstone ridge at Hoo Green and High Legh, known as the High Legh to Knutsford Ridge. The ridge is overlain by freely draining sands and gravels which have been attractive to settlement and human activity since the prehistoric period.
- 9.3.8 Evidence for Palaeolithic human activity in north-west England is scarce, possibly because during this period much of the region was at the edge of, or under, glacial ice. At the end of the last glacial period, dramatic environmental change began in Britain. Climatic warming led to a rise in sea levels and a change in vegetation patterns. Open landscapes were replaced by woodland, and species such as arctic hare and reindeer gave way to boar and deer. These changes encouraged the emergence of Mesolithic hunter-gatherer societies, and the subsequent development of the early agricultural societies of the Neolithic. Archaeological evidence from these periods is provided through stone tools, flints and environmental evidence. There is no recorded archaeological evidence from the Palaeolithic, Mesolithic or Neolithic period in the study area. However, sites have been identified to the east in Cheshire, at Tatton Park and Oversley Farm in the Hulseheath to Manchester Airport area

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(MA06), that demonstrate temporary camps used for hunting in the Mesolithic continued to be occupied in the Neolithic.

- 9.3.9 The Bronze Age is nationally defined by the introduction of bronze metalwork, changes in pottery style and the increase of single burials. Knowledge of the period is generally gained from physical evidence of land division, settlement and the disposal of the dead. In the study area, possible evidence of a Bronze Age settlement enclosure was identified at High Legh during excavations for construction of the A556 Chester Road in 2015. Evidence for the transition to individual burials was found in the form of funerary monuments, known as round barrows, identified at Bucklow Hill in the Parish of Mere (MA03\_0146) and High Legh (MA03\_0147).
- 9.3.10 The Iron Age is nationally characterised by the development of iron manufacturing and evidence for a more structured society. Across Cheshire, patterns of settlement are represented by single banked or ditched enclosures, identified by aerial photography, including an example of a square enclosure at Pickmere. However, there are no archaeological sites dating to the Iron Age in the 500m study area.
- 9.3.11 Although Britain came under Roman control after AD43 it was not until AD70 that the Romans began to occupy the area north of the Midlands that is nowadays Cheshire. Military roads were essential during this period. The Roman road – Chester to Manchester (Margary 7a; MA03\_0119) is aligned roughly north to south within the study area. The North Cheshire Ridge Roman road (Margary 70aa; MA03\_0116) runs broadly east to west following the line of the High Legh to Knutsford Ridge (described above). It is common for settlements, cemeteries and other activity to be found along and close to the routes of Roman roads; however, none have been identified within the study area.
- 9.3.12 After the withdrawal of Roman rule in the 5th century AD, the region fragmented into smaller kingdoms. In the early medieval period, archaeological evidence becomes increasingly scarce and knowledge of the period is largely dependent on documentary sources. Rare archaeological evidence of early medieval settlement has been identified at Bucklow Hill, on the High Legh to Knutsford Ridge, in the form of several pits dated to the 6th and 7th centuries AD. Several of these pits appear to be focused on a Bronze Age ring ditch, suggesting that early medieval people were aware of prehistoric monuments and that these features continued to shape their usage of the landscape. Environmental evidence gathered during the archaeological investigations suggests a settlement existed in the area surrounded by a landscape of grassland and arable fields. At High Legh, a possible early medieval deer park may have been a precursor to the medieval High Legh Park (MA03\_0155). This is speculative, however, and based on documentary and field name evidence including the mention of a 'haia' or 'haeg' at High Legh in the Domesday Survey, a term used occasionally to describe a deer park. Deer parks were a feature within the landscape in the early medieval period. They were used for the keeping and hunting of deer for food.
- 9.3.13 The Domesday Survey was compiled in 1086 by William I to assess liability for taxes within the Kingdom. An analysis of the survey results indicates that most people in Cheshire lived

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within an ordered manorial regime, of hamlets and isolated farmsteads, which cultivated mainly cereal crops. The survey recorded the small settlements of Great Budworth, Aston by Budworth, Tabley, Over Tabley, Mere, High Legh and Dunham Massey within the 2km study area, suggesting a landscape characterised by scattered settlements. The existence of possible deserted medieval settlements at Tabley Inferior (MA03\_0110), Strettle (MA03\_0113) and Millington (MA03\_0118) has been speculated, based on references within documentary sources. The presence of deserted medieval settlements is indicative of population decline and shifting settlement patterns in the 14th and 15th centuries.

- 9.3.14 The manorial system was the organising principle of the study area at this time, where legal and economic power were vested in a lord of the manor. Halls were the nuclei of medieval manors and were often moated. The construction of moated manor sites was common from the 12th to the 14th century. The reasons for digging moats is not entirely clear, though in the main it is thought to be an expression of social standing rather than to have had an explicitly defensive function. Examples include the scheduled monuments of Tabley Old Hall moated site and gatehouse (MA03\_0007) and Hough Hall moated site, ancillary enclosure and fishpond (MA03\_0049). At Dunham the 12th century castle was replaced by a moated manor house, the predecessor of the 17th century Dunham Hall (MA03\_0076). Farming typically involved mixed arable and pasture carried out on irregular field patterns. Evidence of this type of farming can be identified within the study area in the form of historic field boundaries and ridge and furrow earthworks. The Tabley Historic Landscape Character Area (MA03\_HLCA02) provides a good example of this kind of landscape. From the late 14th century onwards, there was a trend towards the conversion of arable land to pasture in the county. This was in part stimulated by the Black Death (bubonic plague), which caused large population losses and subsequent labour shortages, resulting in arable cultivation being less sustainable.
- 9.3.15 The post-medieval period witnessed the transformation of north-west England from a relatively impoverished and sparsely populated area to a key region in the industrialisation of Britain. This change largely manifested itself within the study area through changes to agricultural production. Such changes were driven by an increasing knowledge of methods of agricultural improvement and demand for greater land productivity. The increasing agricultural yields which resulted allowed for the huge population expansion of the 19th century. The reduction in the requirement for agricultural labourers drove workers into the new industrial towns of the north. Marl pits were an early method of agricultural improvement. They were dug in Cheshire from the medieval period onwards to extract marl, a calcareous soil, which was then spread on fields to improve soil fertility. Later changes included the enclosure of marginal land and reclamation of wastes such as mosses for agriculture. The creation of large estate farms as at Home Farm (MA03\_0061), and improvements in the management of cattle and pasture, enabled a massive increase in the size of herds of livestock. These improvements in agricultural techniques and technology often resulted in the amalgamation of holdings and complete rebuilding of farm buildings.
- 9.3.16 Timber was the predominant building material in the study area during the medieval and early post-medieval period, utilising surrounding woodland. Examples of surviving timber-

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framed buildings include Winterbottom Farmhouse (MA03\_0040) and Ovenback Cottage (MA03\_0058). The increased scarcity of timber and the availability of local clay meant that buildings were increasingly built in brick from the 18th century onwards. Examples include Flittogate Farm (MA03\_0081), Barrhill and Waterless Brook Cottage (MA03\_0084), Barn and Range at Heyrose Farm (MA03\_0085), Holly House Farm, Warrington Road (MA03\_0091) and Bowden View Farm (MA03\_0101). Evidence of timber preparation can be identified at the site of a possible sawpit at Hoo Green (MA03\_0167) and the Sawmill, Dunham Park (MA03\_0071). A number of brick kiln sites have been identified within the study area, including the possible site of two brick kilns south of Old Hall Lane (MA03\_0153) suggesting a local industry.

- 9.3.17 The roads of Cheshire were in very poor condition in the 18th century. Many of the major roads in the region were taken over by turnpike trusts. They improved the roads and introduced tolls (a charge) for using them. Roads that were turnpiked include the A50 Warrington Road/Knutsford Road and the A556 Chester Road. The Bridgewater Canal (MA03\_0168) that follows the northern border of the study area was the first canal in Britain to be built without following an existing watercourse. Built in 1761, it became a model for those that followed. Despite the boom in railway construction in Cheshire in this period, no railways were constructed in the 2km study area.
- 9.3.18 During the post-medieval period, large country houses and associated parklands were developed within the 2km study area, including Dunham Massey (MA03\_0068), Tabley House (park) (MA03\_0009), Mere Hall, Agden Hall Farm (MA03\_0106) and High Legh Hall. These houses often developed from medieval manor sites, with post-medieval buildings replacing or, in some cases, incorporating earlier structures. The parklands that accompanied these houses became important features within the landscape, occupying vast swathes of land and often drawing elements of the surrounding landscape into their design. Their creation often resulted in the clearing of settlements and realignment of roads, as at Tabley House (MA03\_0009) and High Legh Park (MA03\_0155). At Agden Hall Farm (MA03\_0106), the remnants of the formal gardens survive as archaeological remains in the form of a group of levelled rectilinear banks and ditches (MA03\_0144). Mere Court Hotel (MA03\_0047), originally known as Meadowlands, was designed in the Arts and Crafts style by celebrated local architect Frank Dunkerley and constructed in 1903. Now a hotel, the building was originally designed as a private residence for the family of Frank Dunkerley's brother. The house was built on former agricultural land and was situated within seven acres of landscaped gardens designed by Thomas Hayton Mawson.
- 9.3.19 During the modern period, the study area retained its predominantly agricultural character. However, it did experience the effects of two wider trends within the 20th century: the rise of the motorcar and the decline of the country house. The construction of the M6 in the 1960s and the M56 in the 1970s substantially changed the landscape. The M6 crosses the study area in a broadly south-east to north-west alignment and the M56 crosses in a broadly east-west alignment. The A556 Knutsford to Bowdon Relief Road was improved in 2017 by the construction of a new dual carriageway to the east of the historic alignment. The decline of the country house resulted in the conversion and loss of many of the area's historic country houses and the reductions of their associated parklands, once again altering the landscape.

Many were demolished, others converted to leisure such as Mere Court Hotel (MA03\_0047) or incorporated into golf courses like at High Legh Park (MA03\_0155) or the New Park at Dunham Massey (MA03\_0068). The Second World War saw the creation of defence structures within rural locations. Evidence of this includes a bombing decoy site at Budworth (MA03\_0114) and a site of anti-aircraft batteries and defence structures south of Budworth Road (MA03\_0143).

## Future baseline

### Construction (2025)

- 9.3.20 Volume 5: Appendix CT-004-00000 provides details of the developments in the Pickmere to Agden and Hulseheath area that are assumed to have been implemented by 2025. No committed developments have been identified in this study area that will materially alter the baseline conditions in 2025 for historic environment.

### Operation (2038)

- 9.3.21 Volume 5: Appendix CT-004-00000 provides details of the developments in the Pickmere to Agden and Hulseheath area that are assumed to have been implemented by 2038. No committed developments have been identified in this study area that will materially alter the baseline conditions in 2038 for historic environment.

## 9.4 Effects arising during construction

### Avoidance and mitigation measures

- 9.4.1 The design of the Proposed Scheme has sought to avoid adverse effects on heritage assets within the land required for construction insofar as reasonably practicable.
- 9.4.2 Section 8 of the draft Code of Construction Practice<sup>70</sup> sets out the measures that will be adopted, insofar as reasonably practicable, to control effects on heritage assets. These include:
- management measures that will be implemented for heritage assets that are to be retained within the land required for the Proposed Scheme;
  - route-wide principles, standards and techniques for works affecting heritage assets; and
  - a programme of historic environment investigation and recording (including archaeology and historic buildings) to be undertaken prior to or during construction works affecting the heritage assets.

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<sup>70</sup>Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

- 9.4.3 The following design measures have also been included to reduce impacts on heritage assets in the Pickmere to Agden and Hulseheath area:
- a retaining wall on the west side of High Legh cutting taking the land required for the construction of the Proposed Scheme further away from Ovenback Cottage (MA03\_0058); and
  - planting, which will reduce the effect on Winterbottom Farmhouse (MA03\_0040) and Ovenback Cottage (MA03\_0058) arising from changes to their settings by visually screening the assets from the Proposed Scheme.

## Assessment of impacts and effects

- 9.4.4 Impacts on all heritage assets described above have been assessed and are set out in the Impact Assessment Table (Volume 5: Appendix HE-002-0MA03). Only impacts on heritage assets resulting in significant effects are described in the assessment set out below. Effects on Historic Landscape Character Areas are set out in Volume 5: Appendix HE-003-0MA03, and again only the significant effects are described below.

## Temporary effects

- 9.4.5 The temporary construction works, such as excavations and earthworks for construction compounds, storage areas, and diversions of existing roads and services, have the potential to affect heritage assets during the construction period. Heritage assets could be affected as a result of changes within the assets' settings, where setting contributes to the value of the asset. The duration of the activities giving rise to the temporary effect described below are set out in the indicative construction programme in Section 2.3.
- 9.4.6 The following significant effects are expected to occur as a result of temporary impacts on designated or non-designated heritage assets due to changes that affect the contribution made by setting to the asset's value.
- 9.4.7 Winterbottom Farmhouse (MA03\_0040) is Grade II listed and is of moderate heritage value. It is located adjacent to the land required for the construction of the Proposed Scheme within fields which form part of the farm's landholding. These fields form the setting of the asset and aid in the ready appreciation of the historic function of the asset as a farmhouse, making a positive contribution to the asset's heritage value. The temporary presence of construction plant within agricultural land to the north of the asset during construction of Hoo Green South embankment No. 2 will adversely impact how the historic interest of the asset is appreciated and understood. Utility diversions adjacent to the asset will contribute to the impact on the heritage value of the asset but will not increase the scale of this impact. This will constitute a medium impact and result in a moderate adverse significant effect.
- 9.4.8 Mere Court Hotel (MA03\_0047) is Grade II listed and is of moderate heritage value. It is located immediately adjacent to the land required for the construction of the Proposed Scheme. The house, which was constructed in 1903 in the Arts and Crafts style, is currently a hotel. It sits within a designed landscaped garden containing a small lake, lodge and coach

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house, which forms the setting of the asset. The hotel and sections of the landscaped gardens are surrounded by mature trees and planting that prevents views of the agricultural land beyond. The trees give the gardens a peaceful, discrete and enclosed character. The setting was designed to complement the building, and therefore positively contributes to how the heritage value of the asset is understood and appreciated. The presence of noise and movement from machinery during construction of A50 Warrington Road overbridge and Hoo Green North cutting within the setting of the asset will temporarily alter the peaceful, enclosed and discrete character of the asset. This will reduce the legibility of the design intention and function of the asset and its gardens, constituting a medium impact and resulting in a moderate adverse significant effect.

- 9.4.9 Ovenback Cottage (MA03\_0058) is Grade II listed and is of moderate heritage value. It is located adjacent to the land required for the construction of the Proposed Scheme. The asset is a mid-17th century cottage with later additions. The cottage was formerly a bakery, and the remains of a bread oven are located to the rear of the property. The setting of the cottage is formed by its gardens, Agden Lane and the two large agricultural fields immediately north of Agden Lane. These fields positively contribute to understanding the historic interest of the asset as a cottage and former bakery serving a community in a rural hamlet. The M56 passes 215m to the north of the asset and the traffic noise forms the auditory experience within the cottage's setting. However, this does not detract from the legibility of the setting. The use of construction machinery associated with the construction of High Legh cutting and High Legh cutting retaining wall within the two fields on the north side of Agden Lane will increase noise and activity within the setting of the asset. Despite existing noise from the M56, this additional noise and construction activity will alter the experience of the asset and disrupt the legibility of the association between the former bakery and the rural hamlet it once served. This will reduce the contribution made by setting to the heritage value of the asset, constituting a medium impact and resulting in a moderate adverse significant effect.

## **Permanent effects**

- 9.4.10 Permanent construction phase effects can occur either as a result of physical impacts on heritage assets within the land required for the Proposed Scheme, or through changes to the setting of heritage assets that affect the contribution made by setting to the asset's value.
- 9.4.11 The following significant effects will occur as a result of permanent physical impacts on heritage assets within the land required for the construction of the Proposed Scheme.
- 9.4.12 Flittogate Farm (MA03\_0081), a non-designated asset of low heritage value, is located within the land required for the construction of the Proposed Scheme. The heritage asset includes a 19th century farmhouse and range of possible 18th century origin, as well as associated 19th and 20th century farm buildings. The farmhouse and range have the potential to contain evidence of earlier structures and the farm has the potential to contain buried archaeological remains relating to earlier phases of the development of the farm. The asset



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will be demolished as a result of the construction of Pickmere embankment. This will constitute a high impact and result in a moderate adverse significant effect.

- 9.4.13 Barrhill and Waterless Brook Cottage (MA03\_0084), a non-designated asset of low heritage value, is located within the land required for the construction of the Proposed Scheme. The pair of mid-19th century cottages and two outbuildings will be demolished as a result of the construction of Arley Brook viaduct. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.14 Barn and Range at Heyrose Farm (MA03\_0085), a non-designated asset of low heritage value, is located within the land required for the construction of the Proposed Scheme. The late 18th century or early 19th century L-shaped barn and range will be demolished as a result of the construction of Heyrose embankment. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.15 Holly House Farm, Warrington Road (MA03\_0091), a non-designated asset of low heritage value, is located within the land required for the construction of the Proposed Scheme. The 19th century house and former barn will be demolished as a result of the construction of Hoo Green North cutting. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.16 Bowden View Farm (MA03\_0101), a non-designated asset of low heritage value, is located within the land required for the construction of the Proposed Scheme. The farmhouse, with associated farm building now converted to dwellings including Bowden View Cottage and Willow Barn, will be demolished as a result of the construction of Hoo Green North cutting. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.17 Site of anti-aircraft batteries and defence features south of Budworth Road (MA03\_0143), a non-designated asset of low heritage value, is located within the land required for the construction of the Proposed Scheme. Potential archaeological remains of the defence structures will be removed as a result of the construction of Heyrose embankment. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.18 Group of levelled rectilinear banks and ditches representing the former gardens of Agden Hall (MA03\_0144), a non-designated asset of low heritage value, is located within the land required for the construction of the Proposed Scheme. Potential archaeological remains of the banks and ditches will be removed as a result of the construction of Agden cutting. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.19 A possible kiln or sawpit at Hoo Green (MA03\_0167), a non-designated asset of low heritage value, is located within the land required for the construction of the Proposed Scheme. Potential archaeological remains of the asset will be removed as a result of the construction of Hoo Green North cutting. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.20 Group of linear archaeological features south of Gorse Cottage (MA03\_0170), a non-designated asset of low heritage value, is located within the land required for the construction of the Proposed Scheme. The features likely represent the remains of a former

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field system. Potential archaeological remains of the asset will be removed as a result of the construction of Hoo Green North cutting and Hulseheath South embankment. This will constitute a high impact and result in a moderate adverse significant effect.

- 9.4.21 The following significant effect will occur as a result of permanent physical impacts on Historic Landscape Character Areas within the land required for the construction of the Proposed Scheme.
- 9.4.22 Tabley Historic Landscape Character Area (MA03\_HLCA02) is an area of agricultural land, characterised by irregular fields dating to the medieval period. It is of moderate heritage value due to its historic interest, arising from the capacity of the landscape to illustrate and provide evidence for former agricultural practices and settlement patterns from the medieval period onwards. The Proposed Scheme will be aligned north to south and will impact on a broad swathe of the Historic Landscape Character Area. This contrasts with the existing transport corridor of the M6, which crosses the Historic Landscape Character Area on a south-east to north-west alignment. Historic field boundaries, ridge and furrow earthworks and marl pits will be removed by the Proposed Scheme. This represents a large proportion of the surviving medieval field systems within the Pickmere to Agden and Hulseheath area and will adversely impact on the legibility of the historic landscape. This will constitute a medium impact and result in a moderate adverse significant effect.
- 9.4.23 The following significant effects will occur as a result of permanent impacts on designated or non-designated heritage assets due to changes to their settings.
- 9.4.24 Winterbottom Farmhouse (MA03\_0040) is Grade II listed and is of moderate heritage value (as described under temporary effects above). It is located adjacent to the land required for the construction of the Proposed Scheme. The Proposed Scheme will be constructed within agricultural fields, which surround the asset to the north and east, and form part of the farm's landholding. These fields form part of the setting of the asset and aid in the ready appreciation of the historic function of the asset as a farmhouse, making a positive contribution to the asset's heritage value. The presence of the Proposed Scheme within the setting of the asset will adversely impact how the historic interest of the asset is appreciated and understood. This will constitute a medium impact and result in a moderate adverse significant effect.
- 9.4.25 Mere Court Hotel (MA03\_0047) is Grade II listed and is of moderate heritage value (as described under temporary effects above). It is located immediately adjacent to land required for the construction of the Proposed Scheme. The asset will be affected by the presence of A50 Warrington Road overbridge and Hoo Green North cutting. Sections of the asset's gardens will be removed by the Proposed Scheme, including a raised terrace of mature tree planting, the orchard, former rose garden, former tennis court and a section of the small lake. The removal of these features will result in the loss of elements of the landscaped garden, which were deliberately designed to complement the building. The designed landscape positively contributes to how the heritage value of the asset is understood and appreciated. This will constitute a high impact and result in a major adverse significant effect.

9.4.26 Ovenback Cottage (MA03\_0058) is Grade II listed and is of moderate heritage value (as described under temporary effects above). It is a mid-17th century cottage with later additions. It is located adjacent to land required for the construction of the Proposed Scheme. The two large agricultural fields to the north of the asset form part of its setting and positively contribute to understanding the historic interest of the asset as a cottage and former bakery serving a rural community. High Legh cutting and High Legh cutting retaining wall will be constructed within the fields on the north side of Agden Lane, removing these fields from the setting of the asset. This will change how it can be appreciated as a rural cottage and former bakery within the surrounding farmland, constituting a medium adverse impact and resulting in a moderate adverse significant effect.

## Other mitigation measures

9.4.27 Potential opportunities for further mitigation measures will continue to be considered through detailed design to reduce further the significant effects described above where practicable. These may include the identification of:

- suitable locations for advance planting, to reduce the effects of changes within the assets' setting where setting contributes to the heritage value of the asset; and
- locations where the physical impacts on below ground heritage assets can be reduced through the detailed design of the works.

## Summary of likely residual significant effects

9.4.28 The temporary effects of construction activity on the setting of heritage assets have been considered. However, as these effects result from temporary construction activities they are restricted to the duration of those activities and are reversible.

9.4.29 Specific mitigation measures have been incorporated as set out above and taken into account during assessment. Therefore, the residual effects are the same as those reported under permanent construction phase effects.

## Cumulative effects

9.4.30 No cumulative effects on heritage assets during construction have been identified in the Pickmere to Agden and Hulseheath area.

## 9.5 Effects arising from operation

### Avoidance and mitigation measures

- 9.5.1 Some of the design measures, as shown on the Map Series CT-06 within the Volume 2: MA03 Map Book, could reduce the operational impacts and effects on heritage assets:
- noise mitigation measures have been included within the Proposed Scheme that could reduce potential impacts on some heritage assets; and
  - landscape planting could increasingly reduce the effect of changes within the assets' setting within the study area as it matures.

### Assessment of impacts and effects

- 9.5.2 The assessment considers the Proposed Scheme once operational; all effects are permanent.
- 9.5.3 During the operation of the Proposed Scheme no further ground works are anticipated. As such, there would be no further physical impacts on heritage assets arising from the operation of the Proposed Scheme.
- 9.5.4 Impacts on heritage assets arising from changes in their setting due to the presence of the Proposed Scheme are reported as permanent construction effects. These effects are not repeated but will continue throughout the operation of the Proposed Scheme.
- 9.5.5 An additional significant effect is predicted at Mere Court Hotel (MA03\_0047), a Grade II listed building of moderate heritage value. The intermittent noise of passing trains will alter the setting of Mere Court Hotel formed by the surviving elements of the peaceful garden. This will result in a medium impact and a moderate adverse significant effect.

### Other mitigation measures

- 9.5.6 The Proposed Scheme includes a number of design measures to address potential impacts and significant effects. No additional operational mitigation measures beyond those included within the Proposed Scheme design have been identified. Potential opportunities for further mitigation such as additional planting and noise fencing will be considered as part of the detailed design process.

### Summary of likely residual significant effects

- 9.5.7 No mitigation beyond that described above has been identified. As a result, it is currently anticipated that residual effects will be the same as those reported in the assessment of effects during operation.

## **Cumulative effects**

- 9.5.8 No cumulative effects on heritage assets during operation have been identified in the Pickmere to Agden and Hulseheath area.

## **Monitoring**

- 9.5.9 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.
- 9.5.10 Operational noise and vibration monitoring in relation to sound, noise and vibration effects is described in Section 13.

## 10 Land quality

### 10.1 Introduction

- 10.1.1 This section of the report presents the baseline conditions along the route of the Proposed Scheme in the Pickmere to Agden and Hulseheath area in relation to land quality and reports the likely impacts and significant effects resulting from construction and operation of the Proposed Scheme. Consideration is given to land that potentially contains contamination and land that has special geological significance, either from a scientific, historical, mining and mineral exploitation or mineral resources point of view including geological Sites of Special Scientific Interest (SSSI) and Local Geological Sites (LGS), and areas of designated mineral resources. Consideration is also given to petroleum (including gas) prospects and licensing.
- 10.1.2 Engagement has been undertaken with Cheshire East Council (CEC), the Environment Agency, the Animal and Plant Health Agency (APHA) and local geological interest groups. The purpose of this engagement has been to discuss the Proposed Scheme and potential effects and obtain relevant baseline information. Engagement will continue as part of the development of the Proposed Scheme.
- 10.1.3 Details of baseline information, conceptual site models (CSM) and risk assessments are outlined in Volume 5: Appendix LQ-001-0MA03. Baseline data relevant to land quality are presented on Maps LQ-01-309b to LQ-01-312a-L1 (in the Volume 5, Land quality Map Book).
- 10.1.4 Maps showing the location of the key environmental features (Map series CT-10), key construction (Map series CT-05) and key operational (Map series CT-06) features of the Proposed Scheme can be found in the Volume 2: MA03 Map Book.
- 10.1.5 Land contamination issues are closely linked with those involving water resources and waste. Issues regarding water resources are addressed in Section 15, Water resources and flood risk. Issues regarding the disposal of waste materials, including contaminated soils are addressed in Volume 3, Route-wide effects (Section 15).
- 10.1.6 The Proposed Scheme is described in Section 2.
- 10.1.7 All distances, lengths and area measurements in this section are approximate.

### 10.2 Scope, assumptions and limitations

- 10.2.1 The scope, assumptions and limitations for the land quality assessment are set out in Volume 1, Section 8 and the EIA Scope and Methodology Report (SMR)<sup>71</sup>.
- 10.2.2 In accordance with the SMR, a risk-based approach was undertaken to identify contamination that may have an impact in relation to construction of the Proposed Scheme.

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<sup>71</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

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To support this, a desk-based assessment has been undertaken for the study area, defined as the land required for the construction of the Proposed Scheme plus a 250m buffer. In the case of groundwater abstractions, this buffer is increased to 1km.

- 10.2.3 For major above ground utilities work, a pre-screening exercise has been completed to determine where these may break ground, or otherwise interact with land quality. In such cases, these are considered in the land quality assessment.
- 10.2.4 The majority of new and diverted minor utilities will be laid in the boundaries of existing highways within normal road construction layers and natural soils below. These have been considered in the context of the CSM approach. The lack of contact with nearby potentially contaminated sites, the usual approach to ensuring services are protected from contamination by design and choice of materials and the absence of sensitive receptors within the roadways, reduces the risk of an impact occurring. The potential impacts of laying these new and diverted utilities has, therefore, been scoped out of the assessment as they are unlikely to cause any significant land quality effects.
- 10.2.5 Potentially contaminated areas of land have been identified that could affect, or be affected by, the construction of the Proposed Scheme (e.g. contaminated soils may need to be removed or construction may alter existing contamination pathways). Each of these areas has been studied to evaluate the scale of potential impacts caused by existing contamination (if present) and what needs to be done to avoid significant consequences to people and the wider environment.
- 10.2.6 The location of the Proposed Scheme was viewed from points of public access initially. In addition, and where permission could be obtained, visits to some key sites have been undertaken to verify desktop information. The details of site visits are provided in Background Information and Data (BID) LQ-002-0MA03<sup>72</sup>.
- 10.2.7 A CSM approach has been used to provide an understanding of the sources and types of contaminants that may be present, the likely sources and/or pathways by which contamination can spread and the potential receptors (i.e. people and the wider environment) that could be affected. It indicates the types of impacts that existing contamination may be having at present and may have during and after construction.
- 10.2.8 The minerals assessment is based upon the mineral resources<sup>73</sup> identified in published mineral plans, and existing planning or licensed areas. Any inference of minerals provided by geological maps/reports is excluded (except where these are covered by a published mineral plan).

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<sup>72</sup> High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background and Information Data, Land quality baseline data, BID LQ-002*. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

<sup>73</sup> Defined in the SMR as ‘mineral body including aggregates, salt, coal and other hydrocarbons, Petroleum Extraction and Development Licences (PEDL), Shale Prospective Area (SPA)’.

10.2.9 The geoconservation assessment is based upon local authority and publicly available local geological trust records.

## 10.3 Environmental baseline

### Existing baseline

10.3.1 Baseline data have been collected from a range of sources including Ordnance Survey mapping, the British Geological Survey (BGS), the Environment Agency, Coal Authority, Oil and Gas Authority (OGA), Public Health England (PHE), CEC, Cheshire Regionally Important Geological Sites (RIGS) Group, Natural England, Network Rail, and the APHA records, as well as online sources such as local geological trusts. Further details are given in Volume 5: Appendix LQ-001-0MA03 and BID LQ-002-0MA03 and presented on Maps LQ-01-1-309b to LQ-01-312a-L1 (Volume 5, Land quality Map Book).

### Geology

10.3.2 This section describes the underlying ground conditions within the Pickmere to Agden and Hulseheath area. Recent changes in lithostratigraphic classifications by the BGS have been incorporated where appropriate<sup>74</sup>.

10.3.3 Table 18 provides a summary of the geology (made ground, superficial and bedrock units) in the study area.

**Table 18: Summary of the geology underlying the land quality study area**

Category	Geology	Distribution	Formation description	Aquifer classification
Made ground	Made ground	Made ground is not shown in the study area on the BGS mapping. However, although not recorded, localised deposits of made ground may be present across the previously developed land in the study area, or associated with landfilling activities.	Made ground comprising variable deposits of reworked natural and man-made materials	Not designated
Superficial	Alluvium	Identified on BGS mapping <sup>75</sup> along the base of the valley of Smoker Brook, Waterless Brook, Tabley Brook, and Agden Brook.	Organic rich clay, silt, sand and gravel	Secondary A
Superficial	Shirdley Hill Sand Formation	Located at the northernmost 300m of the Proposed Scheme in this area in the River Bollin valley.	Sand	Secondary A

<sup>74</sup> British Geological Survey (2014), *Lithostratigraphy of the Sherwood Sandstone Group of England, Wales and south-west Scotland*. Available online at: <http://pubs.bgs.ac.uk/publications.html?pubID=B07318>.

<sup>75</sup> British Geological Survey (2019), *BGS Geology 50k (DiGMapGN-50) WMS, superficial deposits and bedrock geology*. Available online at: [https://www.bgs.ac.uk/products/digitalmaps/digmapgb\\_50.html](https://www.bgs.ac.uk/products/digitalmaps/digmapgb_50.html).



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Category	Geology	Distribution	Formation description	Aquifer classification
Superficial	Glaciofluvial deposits	Isolated pockets located: to the south of Smoker Brook; around Waterless/Arley Brook; to the south of Bate Heath; to the west of Over Tabley; around Agden Brook; to the south of the M6, where the Proposed Scheme will cross the A50 Warrington Road; and along Bucklow Hill.	Sand and gravel	Secondary A
Superficial	Glaciofluvial sheet deposits	To the west of Little Bollington.	Sand and gravel	Secondary A
Superficial	Glacial till	Located across the majority of the study area.	Sandy silty clay with gravel	Secondary (Undifferentiated)
Bedrock	Mercia Mudstone Group - Sidmouth Mudstone Formation - Northwich Halite Member	Present in the south of the study area, along the Proposed Scheme south of the M6 and to the north of the A56 Lymm Road. Potential collapse breccia may be present throughout the Northwich Halite Formation.	Halite and mudstone	Unproductive
Bedrock	Mercia Mudstone Group - Sidmouth Mudstone Formation - Bollin Mudstone Member	To the west of the Proposed Scheme from Feldy, to where it underlies the land required for the Proposed Scheme from the north of the M6 to the north-west of Hulseheath. Potential collapse breccia may be present in the Bollin Mudstone Member around geological boundaries.	Mudstone and siltstone	Secondary B
Bedrock	Mercia Mudstone Group - Tarporley Siltstone Formation	At the northern extent of the Proposed Scheme in this area on both the route of the Proposed Scheme and HS2 Manchester spur.	Siltstone, mudstone and sandstone	Secondary B
Bedrock	Sherwood Sandstone Group - Helsby Sandstone Formation	From 300m north of the M56 until the end of the area on the route of the Proposed Scheme.	Pebbly sandstone	Principal

10.3.4 Bedrock faults are recorded underlying the land required for the construction of the Proposed Scheme in three locations:

- from Frog Lane Farm near Feldy, to the junction of the A556 and the A50 Knutsford Road near Mere, oriented north-east to south-west between the Sidmouth Mudstone Formation and Bollin Mudstone Member;
- 950m south of the M56, oriented north-east to south-west between the Taporley Siltstone Formation and Bollin Mudstone Member; and

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- at the northernmost extent of the route of the Proposed Scheme, oriented north-west to south-east, between the Helsby Sandstone Formation and Sidmouth Mudstone Formation.
- 10.3.5 An area of potential collapse breccia may be present in the bedrock strata (Northwich Halite Member and Bollin Mudstone Member), from the southern extent of the study area as far as 600m south of the M6.
- 10.3.6 Farm burial or pyre sites, associated with the 1967/8 and 2001 outbreaks of foot and mouth disease (FMD), are known to be present within the Pickmere to Agden and Hulseheath area based on local authority and APHA records.
- 10.3.7 The 2001 to 2002 FMD outbreak risk assessment map<sup>76</sup> identifies the study area to lie within a FMD impacted county. Bowden View Farm is located within land required for construction of the Proposed Scheme to the north of the A50 Warrington Road in Hoo Green; it is recorded as having buried 100 cattle in the 1967 outbreak. Winterbottom Farm (although called Gore Farm in provided data) and adjacent Mere Heyes Farm are located partially within land required for the construction of the Proposed Scheme to the north of the M6; they are recorded to have an unspecified number of burials in the 1967 outbreak. Older unrecorded sites may also be present from the 1967 outbreak. Similarly, anthrax infected cattle burial sites may be present, generally relating to burials over 50 to 100 years ago. However, no records have been found of such burials. In all cases the records do not provide an exact location for the burial or pyre sites and other, unrecorded sites may be present.

## Radon

- 10.3.8 Radon is a radioactive gas formed by the radioactive decay of naturally occurring uranium in rocks and soils. The occurrence of radon gas is shown in the BGS Radon Potential Dataset<sup>77</sup>.
- 10.3.9 The study area lies within a lower probability radon area, where less than 1% of homes are estimated to be at or above the action level of 200 becquerels per cubic metre of air (Bq/m<sup>3</sup>) for residential properties.

## Groundwater

- 10.3.10 Five aquifer designations have been identified within the study area, as defined by the Environment Agency. These are as follows:
- the Helsby Sandstone Formation is classified as a Principal aquifer;
  - the alluvium, glaciofluvial sheet deposits, glaciofluvial deposits and the Shirdley Hill Sand Formation are designated as Secondary A aquifers;

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<sup>76</sup> Animal and Plant Health Agency (2001), *Foot and Mouth Disease 2001 County Status Map 01.10.2001*.

<sup>77</sup> British Geological Society (2020), *Radon Potential Dataset*. Available online at: <http://www.bgs.ac.uk/radon/hpa-bgs.html>. This dataset underpins Public Health England (2007), *Indicative Atlas of Radon in England and Wales*. Available online at: [www.ukradon.org/information/ukmaps](http://www.ukradon.org/information/ukmaps).

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- the Bollin Mudstone Member and Tarporley Siltstone Formation are designated as Secondary B aquifers;
- glacial till is designated as a Secondary (Undifferentiated) aquifer; and
- the Northwich Halite Member is designated as Unproductive Strata.

10.3.11 Table 19 sets out the groundwater designations and abstractions in the land quality study area of 1km from the land required for construction of the Proposed Scheme in the Pickmere to Agden and Hulseheath area.

**Table 19: Groundwater designations and abstractions in the land quality study area**

Feature	Details
Source Protection Zones (SPZ) associated with licensed public water supplies	None; however, a SPZ3 (total catchment) is present within the north-west of the study area where it is associated with a groundwater abstraction in the neighbouring Broomedge to Glazebrook area (MA04).
Private licensed groundwater abstractions	Two – Well at Frog Lane Farm, Pickmere; and Well at Heyrose Farm, Over Tabley. One private groundwater abstraction/Licence of Right (less than 20m <sup>3</sup> per day).
Private unlicensed groundwater abstractions	One - Dairy House Farm, Tabley, for spring fed collecting tanks

10.3.12 Further information on the groundwater in the Pickmere to Agden and Hulseheath area is provided in Section 15, Water resources and flood risk.

## Surface water

10.3.13 The Proposed Scheme will cross a number of main rivers, as described in Section 15, Water resources and flood risk. The main rivers and watercourses, including unnamed streams, tributaries, drains, ponds and culverts located within the study area are described in Volume 5: Appendix WR-003-0MA03.

10.3.14 Table 20 sets out the surface water designations and abstractions in the land quality study area of 250m from the land required for construction of the Proposed Scheme in the Pickmere to Agden and Hulseheath area.

**Table 20: Surface water designations and abstractions in the land quality study area**

Feature	Details
Surface water abstractions	Two - at Frog Lane Farm in Pickmere, from a pond and tributary of Smoker Brook; and from Agden Brook at Agden Brook Farm.
Private water supplies from surface water sources	None
Environment Agency Drinking Water Protected Area – Surface water Safeguard Zone	None

10.3.15 Further information on surface water in the Pickmere to Agden and Hulseheath area is provided in Section 15, Water resources and flood risk.

## Current and historical land use

- 10.3.16 Current potentially contaminative land uses within the study area include 52 industrial and commercial sites. These are limited to a number of farms with tanks that possibly contain fuels and three current petrol filling stations.
- 10.3.17 Historical land uses identified within the study area with the potential to have caused contamination include one landfill site, five shallow mining sites and 161 industrial and commercial sites. Infilled pits and ponds may have been filled with a variety of waste materials but have not been licensed.
- 10.3.18 Table 21 to Table 23 summarise the key current and historical contaminative land uses in the Pickmere to Agden and Hulseheath area. These are categorised into:
- landfill sites;
  - mining and mineral sites; and
  - industrial, commercial and other sites identified with a high risk of potential contamination.

**Table 21: Current and historical landfill sites located within the study area**

Name and area reference	Location	Description
Booth Bank Farm, Boothbank MA03-172	The landfill is located on land required for construction of the Proposed Scheme, in a field adjacent to, and to the north of the M56.	Local authority (CEC) recorded landfill site. Environment Agency licence number: EAHLD35024. Anecdotal evidence that this historical landfill contains material excavated during the construction of the M56.

**Table 22: Current and historical mining and mineral sites located within the study area**

Name and area reference	Location	Description
Brick field, south-west of Hulseheath MA03-123	East of High Legh Park Golf Club near Hulseheath, within land required for construction of the Proposed Scheme.	Historical brick field with kiln, active in 1876. Since redeveloped as residential land. Covered 1.9ha.
Brick field, north of High Legh MA03-156	North of High Legh, within land required for construction of the Proposed Scheme.	Historical brick field with potential kiln, active between 1898 and 1938. Now a field and partially intersected by the M56. Covered 1.5ha.

**Table 23: Current and historical industrial, commercial and other sites identified with a high risk of potential contamination located within the study area**

Name and area reference	Location	Description
Petrol filling station MA03-109	Hoo Green, 60m east of land required for the construction of the Proposed Scheme.	Historical petrol filling station with tanks, active between 1967 and 1992, since redeveloped for residential use.
Works MA03-143	North-east of High Legh, 100m north of land required for the construction of the Proposed Scheme.	Current works associated with Limetree Farm.

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Name and area reference	Location	Description
Depot MA03-151	North of High Legh, 30m north-west of land required for the construction of the Proposed Scheme.	Historical depot, active between 1954 and 1992. Since redeveloped to residential properties.
Smithy MA03-182	Agden Bridge, 150m east of land required for the construction of the Proposed Scheme.	Historical smithy from 1899 to 1967, now a residential property.

10.3.19 Contaminants commonly associated with sites in Table 21, Table 22 and Table 23 could include metals, semi-metals, asbestos, organic and inorganic compounds. In addition, infilled pits and landfills could give rise to landfill gases such as methane or carbon dioxide and leachate.

## Other regulatory data

10.3.20 The regulatory data reviewed included pollution incidents (major, significant and minor categories), radioactive and hazardous substances consents, ecological sites and environmental permits (previously landfill, integrated pollution control and integrated pollution prevention and control licences).

10.3.21 In the Pickmere to Agden and Hulseheath area, this includes:

- 32 discharge consents, of which 12 are active, though none of these are to groundwater;
- three petrol filling station licensed sites with local authority pollution prevention and control permits;
- six Local Wildlife Sites (LWS), including three partially within land required for the construction of the Proposed Scheme; and
- one ecological designation, as defined in the land quality section of the SMR, located within the study area. Tabley Mere is a SSSI located approximately 1km north of Plumley.

10.3.22 Further details of relevant regulatory data in the Pickmere to Agden and Hulseheath area is provided in Section 5 of BID LQ-002-0MA03.

10.3.23 Further information on ecological designations in the Pickmere to Agden and Hulseheath area is provided in Section 7, Ecology and biodiversity.

## Mineral resources

10.3.24 There are a range of mineral resources located within the study area that have the potential to be affected by the Proposed Scheme. These include sand, gravel, salt, and coal, which can be protected via local or county level minerals plans and by the Coal Authority, as well as other forms of petroleum hydrocarbons, such as shale gas and oil, which are regulated by the OGA via the issue of Petroleum Exploration and Development Licences (PEDL).

## Minerals plans

- 10.3.25 Cheshire County Council was responsible for the overall mineral and waste local plans for the study area. The Cheshire Replacement Minerals Local Plan<sup>78</sup> was adopted in June 1999 and sets out the policies aimed at controlling mineral related developments within the CEC and Cheshire West and Chester Districts up to the year 2006. No further revisions of the plan were published by Cheshire County Council prior to its dissolution in 2009 (now Cheshire West and Chester Council and CEC). To date, no replacement plans have been published by CEC, although it is noted that the Minerals and Waste Development Plan Document of the new Cheshire East Local Plan is currently in preparation.
- 10.3.26 The Cheshire Mineral Resource Information map<sup>79</sup> presents the extent of all mineral extraction planning permissions and brinefields.
- 10.3.27 The location of specific mineral and mining resources within the study area are described below.

## Sand and gravel deposits

- 10.3.28 There are two recorded quarries within the study area. These are recorded at Yew Tree Farm and Land at Agden Lane, both in the northern part of the study area. They are no longer active. The quarries extracted minerals from the glaciofluvial sheet deposits (sand) and Helsby Sandstone Formation (sandstone), respectively.
- 10.3.29 There is a sand and gravel Area of Search underlying the land required for the Proposed Scheme in a strip approximately 380m wide, immediately to the north of the A50 Warrington Road. Another Area of Search is recorded underlying land required for the construction of the Proposed Scheme to the north-west of Arthill (north of the M56).
- 10.3.30 As a low value receptor, these resources are not considered further as part of the assessment.

## Salt

- 10.3.31 There are no recorded salt extraction permissions or brinefields in the study area.

## Coal

- 10.3.32 The study area is not located in an area identified by the Coal Authority as being at risk from mine water or mine gas contamination.
- 10.3.33 The study area is not within a development high risk or coal authority mining area.

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<sup>78</sup> Cheshire County Council (1999), *The Cheshire Replacement Minerals Local Plan*.

<sup>79</sup> Norton et al. (2006), *Mineral Resources Information for National, Regional and Local Planning: Cheshire (comprising Cheshire and the Boroughs of Halton and Warrington)*. British Geological Survey Commissioned Report CR/05/090N.

- 10.3.34 Deep coal (located at between 50m to 1.2km depth) is recorded as a resource in the study area. Available records from the Coal Authority show that the Proposed Scheme will not be located in areas of recorded current or historical underground coal mining activities.
- 10.3.35 As a low value resource, without a specific designation (e.g. minerals safeguarding area (MSA)), coal is not considered further as part of the assessment.

## Petroleum Exploration and Development Licences/Hydrocarbons

- 10.3.36 The OGA<sup>80</sup> indicates that the route of the Proposed Scheme passes through PEDL 296. The PEDL area is associated with extraction wells for conventional oil and gas. However, none of the extraction wells associated with the PEDL are located in the study area. The study area is also within a shale prospective area (SPA).

## Geoconservation resources

- 10.3.37 No geological SSSI or LGS sites have been identified within the study area. Therefore, no assessment of geoconservation resources has been undertaken.

## Receptors

- 10.3.38 The sensitive receptors that have been identified within the study area are summarised in Table 24. A definition of receptor sensitivity is given in the SMR.

**Table 24: Summary of sensitive receptors**

Issue	Receptor type	Receptor description	Receptor sensitivity
Land contamination	People	Residents at existing properties, nurseries, schools, study centres, play areas, parks and public open space users such as walkers.	High
Land contamination	People	Employees and visitors of retail parks and areas, and hotels.	Moderate
Land contamination	People	Employees and visitors of commercial areas, and workers at and visitors of farms and industrial premises.	Low
Land contamination	Groundwater	Principal aquifer (Helsby Sandstone Formation).	High
Land contamination	Groundwater	Secondary A aquifers (alluvium, Shirdley Hill Sand Formation, glaciofluvial deposits and glaciofluvial sheet deposits).	Moderate
Land contamination	Groundwater	Secondary (Undifferentiated) aquifer (glacial till), Secondary B aquifer (Bollin Mudstone Member and Tarporley Siltstone Formation).	Low
Land contamination	Surface waters	Agden Brook and tributaries of Millington Clough.	Moderate
Land contamination	Surface waters	Tabley Brook and its tributaries, tributaries of Smoker Brook and Waterless/Arley Brook and its tributaries, and springs.	Low

<sup>80</sup> Oil and Gas Authority (2019), *Onshore Interactive Maps*. Available online at: <https://ogauthority.maps.arcgis.com/apps/webappviewer/index.html?id=29c31fa4b00248418e545d222e57dada>.

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Issue	Receptor type	Receptor description	Receptor sensitivity
Land contamination	Ecological designations	SSSI (Tabley Mere).	High
Land contamination	Ecological designations	LWS.	Moderate
Land contamination	Built environment	Underground structures and buried services.	Low
Impacts on mineral and petroleum (gas) sites (severance and sterilisation)	Mineral sites	PEDL 296 – located across the study area.	High
Impacts on mineral and petroleum (gas) sites (severance and sterilisation)	Mineral sites	SPA.	Medium
Impacts on mineral and petroleum (gas) sites (severance and sterilisation)	Mineral sites	Areas of search for sand and gravel resources.	Low

## Future baseline

### Construction (2025)

- 10.3.39 Volume 5: Appendix CT-004-00000 provides details of the committed developments in the Pickmere to Agden and Hulseheath area that are assumed to have been implemented by 2025.
- 10.3.40 The following committed development of relevance to land quality that would materially alter the future baseline during construction of the Proposed Scheme in this area, is set out in Table 25.

**Table 25: Committed developments of relevance to land quality during construction**

Map book reference <sup>81</sup>	Planning reference	Description	How this is considered in the assessment
MA03/050	19/0372M	Location: Agden Hall Farm, Agden Lane, Agden. Full permission for the demolition of mixed-use commercial / light industrial buildings and the construction of 14 no. dwellings, a small office building and associated storage building and a stables building with associated works.	Informing future baseline.

- 10.3.41 Implementation of committed development MA03/050, which is located partially within land required for the construction of the Proposed Scheme, will result in the addition of residential properties adjacent to land quality site MA03-169. These residential properties

<sup>81</sup> Volume 5, Planning Data/Committed Development Map Book: Maps CT-13-309b to CT-13-312a.



have been considered in the assessment as residential human health receptors at future baseline, and are included in the conceptual models found in Volume 5: Appendix LQ-001-OMA03. As such, this committed development has been included as part of the future baseline and considered within this assessment.

## **Operation (2038)**

- 10.3.42 Volume 5: Appendix CT-004-00000 provides details of the developments in the Pickmere to Agden and Hulseheath area that are assumed to have been implemented by 2038.
- 10.3.43 No committed developments have been identified in this study area that will materially alter the baseline conditions in 2038 for land quality.

## **10.4 Effects arising during construction**

### **Avoidance and mitigation measures**

- 10.4.1 The construction assessment takes into account the mitigation measures described in the draft Code of Construction Practice (CoCP)<sup>82</sup>. The draft CoCP sets out the measures and standards of work that will be applied to the construction of the Proposed Scheme and includes requirements to ensure the effective management and control of work in contaminated areas.
- 10.4.2 The requirements in the draft CoCP relating to work in contaminated areas will ensure the effective management and control of the work. These requirements include:
- methods to control noise, waste, dust, odour, gases and vapours (Sections 5, 7, 11, 13, 14 and 15);
  - methods to control spillage and prevent contamination of adjacent areas (Sections 5, 11 and 16);
  - the management of human exposure for both construction workers and people living and working nearby (Sections 5, 7, 11, 13 and 14);
  - methods for the storage and handling of excavated materials (both contaminated and uncontaminated) (Sections 6, 7, 11 and 15);
  - management of any unexpected contamination found during construction (Sections 11 and 15);
  - a post-remediation permit to work system (Section 11);
  - storage requirements for hazardous substances such as oil (Sections 5, 11 and 16);
  - traffic management to ensure that there is a network of designated site haul routes to reduce compaction/degradation of soils (Sections 5, 6 and 14);

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<sup>82</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

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- methods to monitor and manage flood risk and other extreme weather events which may affect land quality during construction (Sections 5 and 16); and
  - methods to manage discovery of unknown animal burial pits (Section 6).
- 10.4.3 The draft CoCP will require that prior to and during construction, a programme of further detailed investigations, which may include both desk based and site based work, takes place in order to confirm the full extent of areas of contamination. It also requires a risk assessment to be undertaken to determine what, if any, site specific remediation measures are required to allow the Proposed Scheme to be constructed safely and to prevent harmful future migration of contaminants. The investigation and assessment of potentially contaminated sites will be undertaken in accordance with Environment Agency's Land Contamination Risk Management (LCRM) framework<sup>83</sup>, based on CLR11<sup>84</sup> and British Standards BS10175<sup>85</sup> and BS8576<sup>86</sup>.
- 10.4.4 A remedial options appraisal will be undertaken to define the most appropriate remediation techniques. Where appropriate, this appraisal will be undertaken based on multi-criteria attribute analysis that considers environmental, resource, social and economic factors in line with the framework set out by the Sustainable Remediation Forum UK<sup>87</sup>. The preferred option will then be developed into a remediation strategy.
- 10.4.5 Contaminated soils excavated within the site, where reasonably practicable, will be treated to remove or render contamination inactive and reused within the Proposed Scheme where needed and suitable for use. Treatment techniques are likely to include stabilisation, soil washing and bio-remediation. Contaminated soil removed off-site will be taken to a soil treatment facility, another construction site (for treatment and reuse) or to an appropriately permitted landfill.

## Assessment of impacts and effects

- 10.4.6 Construction of the Proposed Scheme in this area will require earthworks, utility diversions, deep foundations, ground stabilisation and other activities, including the construction of the various viaducts, embankments and road infrastructure works. These aspects of the Proposed Scheme, along with other construction features, are shown on the CT-05 Map series in the Volume 2: MA03 Map Book.

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<sup>83</sup> Environment Agency (2020), *Land Contamination Risk Management (LCRM)*. Available online at: <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>.

<sup>84</sup> Environment Agency (2004), *CLR11 Model Procedures for the Management of Land Contamination*. Available online at: <http://webarchive.nationalarchives.gov.uk/20140328084622/http://cdn.environment-agency.gov.uk/scho0804bibr-e-e.pdf>.

<sup>85</sup> British Standards Institution (2011), *BS10175+A2:2017 Investigation of Potentially Contaminated Sites*.

<sup>86</sup> British Standards Institution (2013), *BS8576:2013 Guidance on Investigations for Ground Gas*.

<sup>87</sup> Sustainable Remediation Forum UK (2010), *A Framework for Assessing the Sustainability of Soil and Groundwater Remediation*.

## Land contamination

- 10.4.7 In line with the assessment methodology, as set out in the SMR, an initial screening process has been undertaken to identify areas of current or historical contaminative use within the study area and to consider which of these areas might pose contaminative risks in relation to the Proposed Scheme. Sites that present a low risk have not been taken further in the assessment. Any moderate to higher risk sites have been taken forward to more detailed risk assessments, in which the potential risks are assessed more fully. All areas assessed are shown on Maps LQ-01-309b to LQ-01-312a-L1 (Volume 5, Land quality Map Book) and those considered as potentially posing a risk in relation to the Proposed Scheme are labelled with a reference number (site ID). In this report the site ID are presented as MA03-48 and on the related maps as 03-48.
- 10.4.8 In the Pickmere to Agden and Hulseheath area, 12 sites remain following initial screening to go through to detailed risk assessment and require CSM. The majority of the sites that have undergone the more detailed risk assessments are historical landfills, industrial, and mining sites.
- 10.4.9 CSM have been produced for those areas taken to detailed risk assessments. The following factors determine the need for detailed risk assessments:
- whether the site is located within the land required for the construction of the Proposed Scheme;
  - the vertical profile of the Proposed Scheme in the vicinity of the site;
  - the presence of underlying sensitive groundwater aquifers (Principal or Secondary A) or nearby watercourses; and
  - the presence of adjacent residential properties or sensitive ecological receptors.
- 10.4.10 Clusters of potentially contaminated sites of a similar nature have been grouped and assessed together, where appropriate.
- 10.4.11 A simple summary of the baseline CSM is provided in Table 26. A more detailed assessment of baseline risk is provided in Volume 5: Appendix LQ-001-0MA03. The baseline risks quoted are those before any mitigation applied. The assessed baseline risk is based on the information provided at the time of the assessment. Where limited information is available, the assessment is based on precautionary, worst case assumptions and may, therefore, report a higher risk than that which actually exists. A screening assessment of the effects of contamination has been completed by comparing the detailed CSM developed for potential contaminated areas at baseline with construction and post-construction stages. For clarity, 'on-site' means within the land required for the construction of the Proposed Scheme and 'off-site' refers to land beyond this boundary, but within the study area.
- 10.4.12 Not all sites referenced in Table 21 to Table 23 have been taken further in the assessment following the initial screening.

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**Table 26: Summary of baseline CSM for sites which may pose a contaminative risk in relation to the Proposed Scheme**

Category	Site group/ID	Human health risk	Groundwater risk	Surface water risk	Ecosystem risk	Buildings risk
On-site	Farms MA03-48, MA03-115	Low to moderate/ low	Low to moderate/ low	Low	N/A	Low
On-site	Historical landfill MA03-172	Moderate/ low to moderate	Low to moderate/ low	Moderate/low	N/A	N/A
On-site	Historical infilled brick works/marl pits MA03-123	Low to moderate/ low	Low	Low	N/A	Very low to moderate/ low
Off-site	Farms MA03-110, MA03-117, MA03-136, MA03-144, MA03-152, MA03-169	Low to moderate/ low	Low to moderate/ low	Low	N/A	Very low to low
Off-site	Current and former tanks, likely for fuel storage MA03-104, MA03-112	Low to moderate/ low	Low to moderate/ low	N/A	N/A	Low to moderate/ low

*N/A means receptor/pathway not present*

## Temporary effects

- 10.4.13 In order to identify potential temporary effects, the baseline and construction CSM have been compared to determine the change in level of risk at receptors during the construction stage, and thus to define the level of effect at the construction stage.
- 10.4.14 Where there is no change between the main baseline risk and the main construction risk, the temporary effect significance is deemed to be neutral even if the risk is deemed to be high. For example, this will be the case where the construction of the Proposed Scheme does not alter the risks from an existing potentially contaminated site that is off-site (i.e. outside the area required for construction).
- 10.4.15 A worsening risk at the construction stage compared to baseline will result in a negative effect, and conversely, an improvement will result in a positive effect. The assessment assumes that contamination will be controlled through the general measures in the draft CoCP.
- 10.4.16 All of the sites set out in Table 26 have been assessed for the change in impact associated with the construction stage of the work and were found to have no significant effects.
- 10.4.17 In the event that unexpected contamination is encountered during the construction of the Proposed Scheme in this area, this will be remediated as described in the draft CoCP resulting in an overall beneficial effect.

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- 10.4.18 The application of the measures set out in the draft CoCP makes it unlikely that there will be significant adverse effects, but it is considered that there may still be some temporary minor adverse effects during the construction period from ground disturbance in these areas. These temporary minor adverse impacts at the construction stage are not regarded as significant in line with the methodology set out in the SMR.
- 10.4.19 Construction compounds located in this study area could include the storage of potentially hazardous substances, such as fuels and lubricating oils. They may also be used for temporary storage of potentially contaminated soils. Control and mitigation measures, contained within the draft CoCP, include measures to manage the risks associated with the storage of such materials resulting in no significant effects.

### **Permanent effects**

- 10.4.20 In order to identify potential permanent effects, a screening assessment has been undertaken comparing the baseline and post-construction CSM to assess the permanent (post-construction) effects.
- 10.4.21 The magnitude of the permanent effects and their significance have been determined by assessing the change in risk between the main baseline risk and the main post-construction risk. Therefore, where there is no change between the main baseline risk and the main post-construction risk, the permanent effect significance is deemed to be neutral even if the risk is assessed to remain as high. This will be the case where the construction of the Proposed Scheme will not alter the risks from an existing potentially contaminated site that is outside the land required for the construction of the Proposed Scheme. As noted above, a worsening will result in negative effects and an improvement will result in positive effects.
- 10.4.22 All of the sites set out in Table 26 have been assessed for the change in impact associated with the post-construction stage of the work and were found to have no significant effects.
- 10.4.23 Additional site-specific permanent remediation measures, which would focus on source removal, pathway breakage or receptor protection, will be developed during the detailed design stage if required.

### **Mineral resources**

- 10.4.24 Construction of the Proposed Scheme has the potential to affect existing mineral resources, and proposed areas of mineral exploitation. This could occur by sterilisation of the resource through direct excavation during construction of the Proposed Scheme or through temporary and/or permanent severance or isolation that may occur during the construction phase of the Proposed Scheme, possibly continuing through to its operation.
- 10.4.25 The Proposed Scheme will pass through PEDL 296 which is associated with the extraction of conventional oil and gas, and a shale prospective area.

## Temporary effects

10.4.26 The following section outlines the potential temporary effects arising during the construction of the Proposed Scheme.

### Petroleum Exploration and Development Licences/Hydrocarbons

10.4.27 The effect of construction of the Proposed Scheme on the identified PEDL and SPA will be negligible, as it is unlikely that construction of the Proposed Scheme will place a constraint on future exploitation of potential sources of shale gas or other forms of hydrocarbon resource. This is due to the large extent of the PEDL and SPA and the limited area of land required for the construction of the Proposed Scheme that would restrict potential well locations.

### Summary of temporary effects

10.4.28 Table 27 sets out a summary of the temporary effects identified for mineral resources.

**Table 27: Summary of temporary effects for mineral resources**

Mineral resource	Status	Description	Sensitivity/ value	Magnitude of impact	Effect and significance (Y/N)
PEDL 296	PEDL	Petroleum exploration and development licence area	High	Negligible	Negligible (N)
Shale gas	SPA	SPA for Shale gas	Medium	Negligible	Negligible (N)

10.4.29 There will be negligible temporary effects on the mineral resources, which are not significant.

## Permanent effects

10.4.30 The following section outlines the potential permanent effects resulting from the construction of the Proposed Scheme.

### Petroleum Exploration and Development Licences/Hydrocarbons

10.4.31 The permanent effects of the Proposed Scheme on the identified PEDL and SPA will be negligible, as it is unlikely that the Proposed Scheme would place a constraint on future exploitation of potential sources of shale gas or other forms of hydrocarbon resource. This is due to the large extent of the PEDL and SPA, and the limited area of land that will restrict potential well locations.

### Summary of permanent effects

10.4.32 Table 28 sets out a summary of the permanent effects identified for mineral resources.

**Table 28: Summary of permanent effects for mineral resources**

Mineral resource	Status	Description	Sensitivity/ value	Magnitude of impact	Effect and significance (Y/N)
PEDL 296	PEDL	Petroleum exploration and development licence area	High	Negligible	Negligible (N)
Shale gas	SPA	SPA for Shale gas	Medium	Negligible	Negligible (N)

10.4.33 There will be negligible permanent effects on the mining and mineral resources, which are not significant.

## Geoconservation sites

10.4.34 No geoconservation areas such as SSSI or LGS are present in the study area.

## Other mitigation measures

10.4.35 No additional measures are considered necessary to mitigate risks from land contamination during the construction stage beyond those that are set out in the draft CoCP and/or instigated as part of the site-specific remediation strategies that will be developed at the detailed design stage. These measures will ensure that risks to people, property and environmental receptors from contaminants in the ground will be controlled such that they will not be significant. For example, measures might include excavation and treatment of contaminated soils or controls to manage movement of ground gas and leachate.

## Summary of likely residual significant effects

10.4.36 Based on the information currently available and with the application of the mitigation measures set out above, no likely significant residual effects are anticipated with respect to land quality.

10.4.37 Where remediation at contaminated land sites is undertaken there may be significant beneficial residual effects.

## Cumulative effects

10.4.38 Volume 5: Appendix CT-004-00000 sets out the committed developments that have been considered in the assessment of cumulative effects.

10.4.39 Based upon the review of committed development sites, it is assessed that there will be no significant cumulative effects arising from the construction of the Proposed Scheme with respect to land quality.

## 10.5 Effects arising from operation

- 10.5.1 Users of the Proposed Scheme (i.e. rail passengers) will be at all routine times within a controlled environment (i.e. within trains), and have therefore, been scoped out of the assessment.

### Avoidance and mitigation measures

- 10.5.2 Maintenance and operation of the Proposed Scheme will be in accordance with environmental legislation and good practice. Spillage and pollution response procedures similar to those to be outlined in the draft CoCP will be established for all high risk activities and employees will be trained in responding to such incidents.

### Assessment of impacts and effects

- 10.5.3 The Proposed Scheme within this area will include Budworth Road auto-transformer station, Peacock Lane grid supply point and Peacock Lane auto-transformer feeder station. Fuel and oil storage tanks, auto-transformer stations, feeder stations and substations can, in principle, be a source of contamination through accidental discharge or leaks of coolant. However, in common with other modern infrastructure development, secondary containment appropriate to the level of risk will be included in the installed design.
- 10.5.4 The operation of the trains may give rise to minor contamination through leakage of hydraulic or lubricating oils. However, such leakage or spillage is expected to be very small and unlikely to result in significant contamination.

### Other mitigation measures

- 10.5.5 No mitigation measures are expected to be required beyond what has already been outlined relating to land quality in the study area.

### Summary of likely residual significant effects

- 10.5.6 No significant residual effects are anticipated associated with operation of the Proposed Scheme.

### Cumulative effects

- 10.5.7 There are anticipated to be no significant cumulative residual effects from operation of the Proposed Scheme.

### Monitoring

- 10.5.8 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme. Requirements for monitoring will be determined as part



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of the investigation, treatment and validation of contamination on a site specific basis as part of the detailed design process. During the operational phase, monitoring works for groundwater will continue, where required. Monitoring requirements may include water quality, air quality and/or landfill bulk and trace gases, depending on the site being considered.

# 11 Landscape and visual

## 11.1 Introduction

- 11.1.1 This section of the report presents the assessment of the likely significant landscape and visual effects within the Pickmere to Agden and Hulseheath area. It summarises the baseline conditions and describes the likely impacts and significant effects during construction and operation on landscape and visual receptors.
- 11.1.2 The operational assessment section refers not just to the running of the trains, vehicles on roads and any associated lighting but also the presence of the new permanent infrastructure associated with the Proposed Scheme.
- 11.1.3 Engagement with Cheshire East Council, Trafford Metropolitan Borough Council and the National Trust has been undertaken. The purpose of this engagement has been to discuss the assessment methodology, the extent of the landscape and visual study area, the extent of the landscape character boundaries and the locations of visual assessment and verifiable photomontage viewpoints.
- 11.1.4 Further details on the landscape and visual assessment, including engagement, baseline information and assessment findings, are presented in the Volume 5, Landscape and visual Map Book and Volume 5: Appendix LV-001-0MA03 which comprises the following:
- Part 1: Engagement with technical stakeholders;
  - Part 2: Landscape character assessment;
  - Part 3: Visual assessment;
  - Part 4: Assessment matrices; and
  - Part 5: References.
- 11.1.5 The Proposed Scheme is described in Section 2. The Volume 2: MA03 Map Book shows the locations of key environmental features (Map Series CT-10) and the key construction (Map Series CT-05) and operational (Map Series CT-06) elements of the Proposed Scheme. It also shows the locations of landscape and visual impact mitigation measures (Map Series CT-06), viewpoints that will be significantly affected at the construction (Map Series LV-03) and operation (Map Series LV-04) phases and landscape character areas (LCA) that will be significantly affected at the construction and operation phases (Map Series LV-02).
- 11.1.6 A separate, but related, assessment of effects on the setting of heritage assets is reported in Section 9, Historic environment.

## 11.2 Scope, assumptions and limitations

- 11.2.1 The scope, key assumptions and limitations for the landscape and visual assessment are set out in full in Volume 1 (Section 8) and the EIA Scope and Methodology Report (SMR)<sup>88</sup>.
- 11.2.2 Surveys were undertaken during the following periods to inform the landscape and visual assessment:
- summer surveys from July to August in 2017, August to September in 2018, May 2019 and September 2020; and
  - winter surveys in February and March 2018, in March 2019, November 2019, and November 2020.
- 11.2.3 The extent of the study area has been informed by construction and operational phase zones of theoretical visibility (ZTV). The ZTV have been produced in line with the methodology described in the SMR and are an indication of the theoretical visibility of the Proposed Scheme. In some locations, extensive vegetation cover means that the actual extent of visibility will be substantially less than that shown in the ZTV, and professional judgement has been used to further refine the study area to focus on likely significant effects.
- 11.2.4 Tall construction plant (for example cranes and piling rigs) is excluded from the ZTV for the construction phase, as there is a great degree of variability in the extent and timeframes of the visibility of construction activity and plant. Overhead line equipment rarely gives rise to significant effects if it is the only element visible and has, therefore, been excluded from the ZTV to give a better indication of the possible spread of significant effects to aid the assessment. However, overhead line equipment as well as tall construction plant are taken into account in the assessment of effects on LCA and visual receptors.
- 11.2.5 Landscape and visual receptors within approximately 1.5km of the centre line of the route of the Proposed Scheme or HS2 Manchester spur, as appropriate have been assessed as part of the study area. Where important receptors fall just beyond the ZTV, professional judgement has been used in recording and assessing these. Long distance views of up to 2km have been considered at settlement edges, such as at High Legh and Bucklow Hill.
- 11.2.6 This assessment is based on preliminary design information and makes reasonable worst-case assumptions on the nature of potentially significant effects where these can be substantiated. The assessment of visual effects during construction covers the situation in winter at peak activity. The assessment of operational visual effects covers the situation in winter and summer of year 1 and summer of year 15 and year 30. The assessment of landscape effects is undertaken for the construction phase and for the operational phase at year 1, year 15 and year 30. The landscape assessment does not consider seasonal variations e.g. winter/summer, since these do not affect character.

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<sup>88</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

- 11.2.7 Professional judgements on landscape value are provided in the baseline descriptions and judgements on susceptibility of the landscape to the Proposed Scheme and overall landscape sensitivity are provided as part of the assessment of effects on each significantly affected LCA.
- 11.2.8 The assessment has been carried out on the basis that design of structures will, insofar as reasonably practicable, integrate with existing skyline features and will make use of a simple, clean and coherent palette of materials to help structures fit in the landscape.
- 11.2.9 It has been assumed that all vegetation within the land required for construction of the Proposed Scheme will be removed during construction unless stated otherwise. This excludes areas included only for the purpose of mitigation planting. Removed vegetation will be reinstated insofar as is reasonably practicable and would provide screening and integration benefits by year 15.
- 11.2.10 It has also been assumed that with respect to utilities and utility decommissioning, it is likely that the majority of existing vegetation can be retained. Vegetation will be removed along new utility lines, based on easement guidance from specific utility companies. All vegetation removed during utilities construction work will be reinstated insofar as is reasonably practicable. The assessment has been based on the assumption that any reinstatement planting will provide integration benefits by year 15. Works associated with underground utilities within highways will follow the principles set out in the draft Code of Construction Practice (CoCP)<sup>89</sup> and existing street trees and property boundary vegetation will be retained insofar as is reasonably practicable.

## 11.3 Environmental baseline

### Existing baseline

#### Landscape baseline

- 11.3.1 The study area extends from Smoker Brook in the south to Dunham Massey and the River Bollin and Hulseheath in the north.
- 11.3.2 The landscape of the southern part of the study area around Pickmere is largely flat. The northern part of the area between Hoo Green and Hulseheath is gently rolling and there is a localised area of steeper landform at Millington Clough and at Agden, where the land slopes down to the Bollin Valley. Farmland is a mixture of arable fields and pasture for grazing dairy cattle. The red-brick farmhouses and barns are characteristic of the landscape and many of the barns have been converted to residential or commercial use. Fields are generally enclosed by hedgerows with mature oak trees. The intricate arrangement of small scale fields, hedgerows and mature trees is characteristic of the Cheshire Plain landscape. For much of the area, the small fields, high hedges and abundant hedgerow trees contribute to a

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<sup>89</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

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strong sense of enclosure. Fields are larger with low, well maintained hedgerows and fewer trees in the northern part of the area and close to the M6, the M56, the A556 Chester Road and the A50 Cliff Lane/Warrington Road/Knutsford Road. Here, lower levels of enclosure allow more extensive views, with the hills of the Peak District visible in the east.

- 11.3.3 The area is well wooded, with deciduous and mixed woodlands. Some are designated as ancient woodland and these are listed in Section 7, Ecology and biodiversity. The watercourses of Smoker Brook, Waterless Brook/Arley Brook and Agden Brook are tree-lined. In contrast, the valley of the River Bollin in the north is more open where it joins the floodplain of the River Mersey. Ponds are characteristic features of the landscape and many are meres (nutrient-rich water bodies) left after the last ice age. Other ponds are flooded marl pits, formed by farmers digging for marl (lime-rich clay used to spread on fields to improve fertility). Historic assets that contribute to landscape character include the 18th century Bridgewater Canal and two important designed landscapes: Dunham Massey and Arley Hall. Both designed landscapes are Grade II\* listed and included in Historic England's Register of Historic Parks and Gardens of Special Historic Interest in England. The Bridgewater Canal passes through the northern part of the area and its aqueduct over the River Bollin is Grade II listed. The Cheshire Ring Canal Walk follows the Bridgewater Canal towpath. The North Cheshire Way long distance footpath links Northwich and Knutsford, skirting round Arley Hall.
- 11.3.4 There is an extensive arterial road network in the area including the M6, M56, the A56 Lymm Road, the A50 Warrington Road and the A556 Chester Road. Prominent features in the landscape include overhead power lines north of the M6 and the Pickmere Telescope east of Pickmere. There is street lighting in most settlements. Through traffic on the rural roads is frequent and there are few places in the study area where traffic noise is not audible. Consequently, tranquillity in the area is generally low.
- 11.3.5 Villages include Pickmere in the south, Mere and Bucklow Hill in the east and High Legh, Hoo Green and Little Bollington in the north. There are many isolated hamlets, cottages and farms in the area.
- 11.3.6 The LCA have been determined as part of an integrated process of environmental characterisation, informed by a review of historic mapping, historic landscape characterisation datasets and the outcome from other topics including ecological assessments. Use has been made of published landscape character assessments and a wide range of supporting GIS data, aerial photography and Ordnance Survey mapping, plus desk study and fieldwork. Landscape character assessments reviewed include the relevant National Landscape Character Areas<sup>90</sup>, the Cheshire East Landscape Character Assessment<sup>91</sup>,

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<sup>90</sup> Natural England (2013, 2014), *National Character Area profiles*. Available online at: <https://www.gov.uk/government/publications/national-character-area-profiles-data-for-local-decision-making/national-character-area-profiles>.

<sup>91</sup> LUC (2018), *Cheshire East Landscape Character Assessment*.

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the Landscape Character assessments for the Greater Manchester Combined Authority<sup>92</sup> and Trafford<sup>93</sup>.

- 11.3.7 These published LCA have been adapted for this assessment to provide LCA of an appropriate, consistent scale. Minor amendments have been made to some published LCA boundaries to reflect existing conditions, as verified on-site, or to draw out specific aspects susceptible to change from the Proposed Scheme.
- 11.3.8 For the purposes of this assessment, the study area for the Pickmere to Agden and Hulseheath area has been subdivided into three LCA. Full descriptions of these LCA are provided in Volume 5: Appendix LV-001-0MA03.
- 11.3.9 Two of the three LCA will not be significantly affected by the Proposed Scheme either due to their distance from the Proposed Scheme and/or the presence of intervening vegetation, landform and urban development which contain landscape effects to a relatively narrow corridor.
- 11.3.10 A summary of the one LCA that will be significantly affected within the Pickmere to Agden and Hulseheath area is shown in Figure 15 and described below.
- 11.3.11 In addition to the three LCA in this area, the River Bollin Meadowlands LCA and Tatton and Rostherne Wooded Estates and Meres LCA will be significantly affected by the Proposed Scheme. Part of the River Bollin Meadowlands LCA is within the Pickmere to Agden and Hulseheath area; however, as it is located for the most part within the Broomedge to Glazebrook area (MA04), it is reported in Volume 2: Community Area report: Broomedge to Glazebrook (MA04). Part of the Tatton and Rostherne Wooded Estates and Meres LCA is within the Pickmere to Agden and Hulseheath area; however, as it is located for the most part within the Hulseheath to Manchester area (MA06), it is reported in Volume 2: Community Area report: Hulseheath to Manchester area (MA06).

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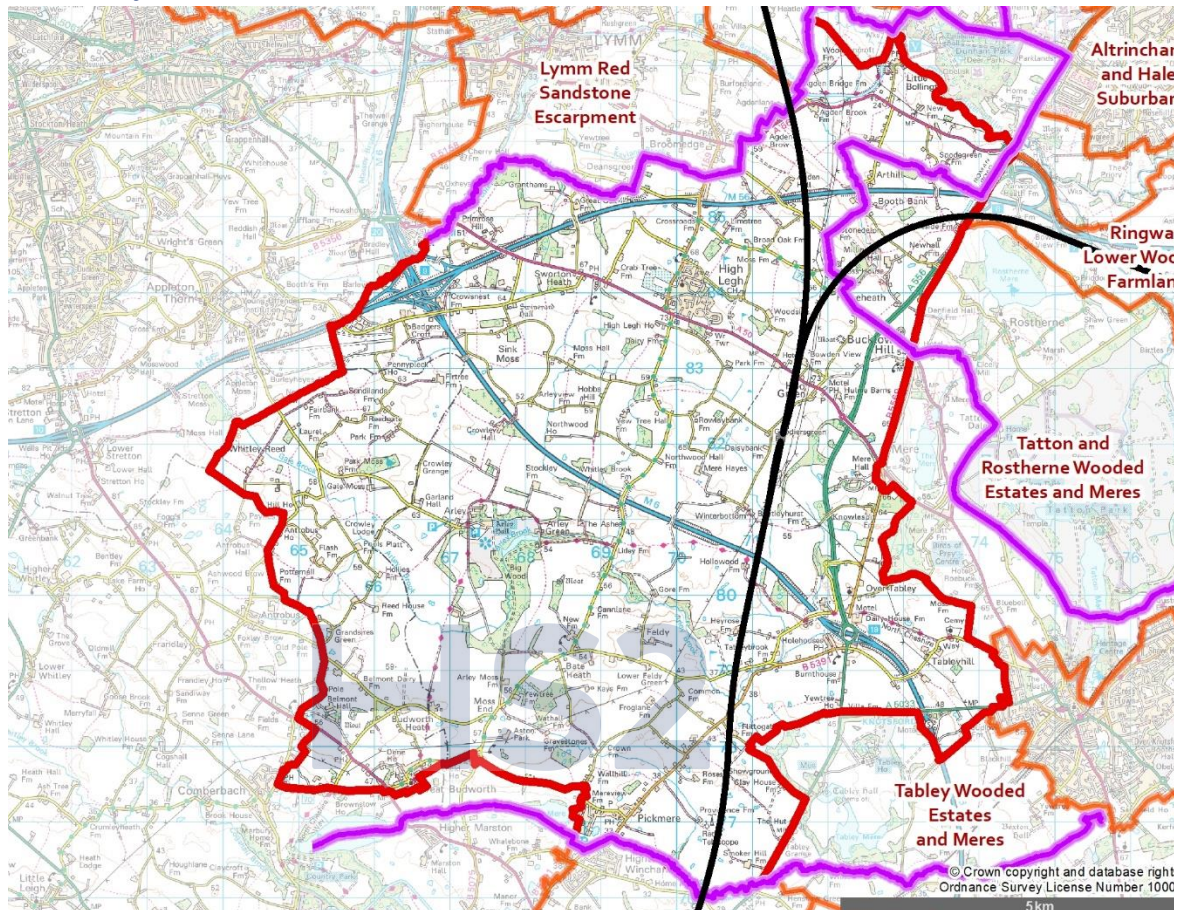
<sup>92</sup> LUC (on behalf of Greater Manchester Combined Authority) (2018), *Greater Manchester Landscape Character and Sensitivity Assessment*. Available online at: <https://www.greatermanchester-ca.gov.uk/media/1727/greater-manchester-landscape-character-and-sensitivity-report.pdf>.

<sup>93</sup> Trafford Metropolitan Borough Council (2004), *Supplementary Planning Guidance, Landscape Strategy*. Available online at: <https://www.trafford.gov.uk/planning/strategic-planning/docs/spg-2004-landscape-strategy.pdf>.

## Significantly affected landscape character areas

### Arley Lower Wooded Farmland

Figure 15: Arley Lower Wooded Farmland



11.3.12 The Arley Lower Wooded Farmland LCA is a low-lying, rolling, rural landscape. Its intricate pattern of hedgerows and woodland is characteristic of the Cheshire Plain. The land is mainly in agricultural use, with large dairy farms and arable farmland. Fields are medium sized, of medieval and post-medieval origin and there are abundant mature hedgerow trees (mainly oak). Vegetation filters and contains long-distance views, giving much of the LCA a feeling of enclosure. In the north, where the River Bollin flows into the Mersey Valley, through farmland partly within the wider Dunham Massey Estate, the landscape is more open with larger fields and longer views. Views from the LCA towards Dunham Massey house (in the Dunham Massey Wooded Estate LCA) are screened by estate woodland. Settlements include Pickmere, Hoo Green, Hulseheath, Little Bollington and High Legh, as well as isolated cottages and brick-built 18th and 19th century farmsteads. The area is verdant, with trees, woodland and tree-lined waterbodies. Public rights of way (PRoW), the North Cheshire Way and the Cheshire Ring Canal Walk contribute to its recreational value. Detracting infrastructure features include motorways and overhead power lines. Road traffic noise is audible in much of the LCA as is the noise of aircraft using Manchester Airport. Away from settlements and major roads, most of the area is unlit. The majority of land within the LCA is designated as Green Belt. The Arley Lower Wooded Farmland LCA is assessed as

having an overall **medium-high** landscape value based on its rolling terrain, historic landscape pattern, woodland belts, trees, hedgerows and detracting transport infrastructure.

## Visual baseline

- 11.3.13 A summary description of the distribution and types of receptors most likely to be affected is provided below. The viewpoints are numbered to identify their locations and are shown on the viewpoint location maps (see Volume 2: MA03 Map Book, Map Series LV-03 and LV04). In each case, the middle number (xxx-xx-xxx) identifies the type of receptor that is present in this area – 1: Protected views (none within this area), 2: Residential, 3: Recreational<sup>94</sup>, 4: Transport, 5: Hotels/healthcare/schools and 6: Employment.
- 11.3.14 The flat and gently rolling rural landscape of the Cheshire Plain is characterised by a strong pattern of hedgerows and mature trees which prevent long views in much of the Pickmere to Agden and Hulseheath area. Views from the southern part of the area are predominantly rural in character, and the undulating landform, trees, hedgerows and woodland screen most views of detracting features such as the M6, the M56 and the A556 Chester Road from their surroundings. In the north of the area, fields are larger with low, trimmed hedgerows and fewer trees than in the south. Consequently, views are more extensive here. Urban development in Altrincham can be seen above the wooded outskirts of Bowdon and Bow Green in views north-east from higher ground in Agden. Clusters of tall buildings in Manchester break the skyline in the background of views from the same direction. The hills of the Peak District can be seen in the background of views east. Woodland surrounding and within the Dunham Massey deer park screens views of Dunham Massey house from the area.
- 11.3.15 Views from individual houses and farmsteads are largely filtered or partially screened by intervening trees and hedgerows, except around Agden, where views are more open. Views experienced by recreational users on the majority of PRoW are from relatively low-lying land and therefore restricted by intervening woodland and hedgerows. These receptors have more open views in the north of the area from the North Cheshire Way, the Bridgewater Canal towpath and the Cheshire Ring Canal Walk. Views from rural roads and lanes are often filtered or partially screened by roadside hedgerows and trees.

## Future baseline

### Construction (2025)

- 11.3.16 Volume 5: Appendix CT-004-00000 provides details of the additional developments in the Pickmere to Agden and Hulseheath area that are assumed to have been implemented by

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<sup>94</sup> Reference to specific civil parish numbers for footpaths is provided where available otherwise the adjacent road name is used as a reference to the footpath.



2025. No committed developments of relevance for landscape and visual amenity have been identified in this study area that will materially alter the baseline in this area.

## **Operation (2038)**

- 11.3.17 Volume 5: Appendix CT-004-00000 provides details of the developments in the Pickmere to Agden and Hulseheath area that are assumed to have been implemented by 2038. No committed developments of relevance for landscape and visual amenity have been identified that would materially alter the future baseline in this area.

## **11.4 Temporary effects arising during construction**

- 11.4.1 As is commonplace with major infrastructure works, the scale of the construction activities means they will be visible from many locations and will have the potential to give rise to significant temporary effects that cannot practicably be mitigated. Such effects will vary over the construction period depending on the intensity and scale of the works at the time. The assessment of landscape and visual effects has been based on the activities occurring during the peak construction phase, which is defined as the period during which the main construction works will take place, including the presence of compounds, main earthworks and structure works.
- 11.4.2 The effects associated with the peak construction stage in this area are generally considered to be medium-term, based on the indicative construction programme in Section 2.3. Effects during other stages of works are likely to be less intensive due to less construction equipment being required at the time and a reduced intensity of construction activity.
- 11.4.3 Section 2.2 sets out the key permanent elements of the Proposed Scheme and Section 2.3 describes the construction compounds and associated temporary works that have been considered in this assessment.

## **Avoidance and mitigation measures**

- 11.4.4 Measures that have been incorporated into Sections 12 and 14 of the draft CoCP to avoid or reduce landscape and visual effects, where reasonably practicable, during construction include the following:
- avoidance of unnecessary tree and vegetation removal, and protection of existing trees in accordance with BS 5837: Trees in relation to design, demolition and construction<sup>95</sup>;
  - use of well-maintained hoardings and fencing;
  - prevention of damage to the landscape features adjacent to the construction sites due to movement of construction vehicles;

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<sup>95</sup> British Standards Institution (2012), *BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations*.

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- designing lighting to avoid unnecessary intrusion onto adjacent buildings and other land uses; and
- replacement of any trees intended to be retained should they die as a consequence of nearby construction works.

11.4.5 Implementation of these measures has been taken into account in the assessment of the construction effects.

## Assessment of temporary impacts and effects

11.4.6 The most apparent changes to the landscape and to the views experienced by visual receptors during construction will relate to the presence of construction plant, compounds and soils and material storage and stockpiling. Key construction activities that will give rise to the most apparent changes to landscape and visual receptors are the excavation of cuttings, construction of viaducts, embankments, overbridges, underbridges and electrical substations, road and utility diversions, removal of trees and hedgerows, demolition of buildings and closure or diversion of PRoW.

11.4.7 Non-significant effects are reported in Volume 5: Appendix LV-001-0MA03.

## Landscape assessment

11.4.8 The LCA set out in Table 29 will be significantly affected during construction of the Proposed Scheme.

**Table 29: Summary description and assessment of effects on LCA**

Location	
<p><b>Arley Lower Wooded Farmland</b></p> <p>The Arley Lower Wooded Farmland LCA, of <b>medium-high</b> value, will be directly affected by large-scale construction works occurring in the area. A wide, linear construction zone will be introduced into the pattern of woodland, hedges and hedgerow oaks of the Cheshire Plain landscape. Construction of large-scale structures including: Pickmere, Heyrose, Over Tabley, Hoo Green, Hulseheath and Lymm embankments; Hoo Green box structure; M56 West overbridge; Arley Brook, M6 Mere, Peacock Lane and A56 Lymm Road viaducts; Hoo Green north, High Legh and Agden cuttings; and Peacock Lane auto-transformer feeder station and grid supply point will substantially alter the character of a predominantly rural area. Changes to the local terrain will result from large-scale earthworks and temporary material stockpiles. Woodland, trees and hedgerows within the land required for construction of the Proposed Scheme will be removed. A number of dwellings and farm buildings within the land required for construction of the Proposed Scheme will be demolished. Temporary closure and diversion of PRoW will reduce connectivity in the wider countryside. Construction vehicle movements, activity and noise will reduce tranquillity throughout the LCA. Smoker Brook viaduct north satellite compound, Pickmere Lane satellite compound, Budworth Road satellite compound, Arley Brook viaduct satellite compound, M6 viaduct south satellite compound, M6 viaduct north satellite compound, A50 Warrington Road main compound, Bowden View satellite compound, Wrenshot Lane satellite compound, Chapel Lane satellite compound, Peacock Lane satellite compound, Peacock Lane ATFS satellite compound, Agden Lane satellite compound, the M56 west satellite compound,</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

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Location	
<p>Agden Brow satellite compound and A56 Lymm Road satellite compound, as well as Bridgewater Canal satellite compound (in the Broomedge to Glazebrook area (MA04)), will all be lit at night, introducing localised areas of brightness and contributing to sky-glow in a predominantly unlit rural area. The changes will affect the south-western edge of farmland which forms part of the Dunham Massey estate.</p> <p>Due to the <b>medium-high</b> value, low-lying landform, mature vegetation, intimate character and presence of detracting infrastructure, the landscape has a <b>medium-high</b> susceptibility to change arising from the Proposed Scheme. The introduction of construction works will result in a <b>high</b> magnitude of change to the landscape.</p> <p>The <b>high</b> magnitude of change for the Arley Lower Wooded Farmland and its <b>medium-high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	

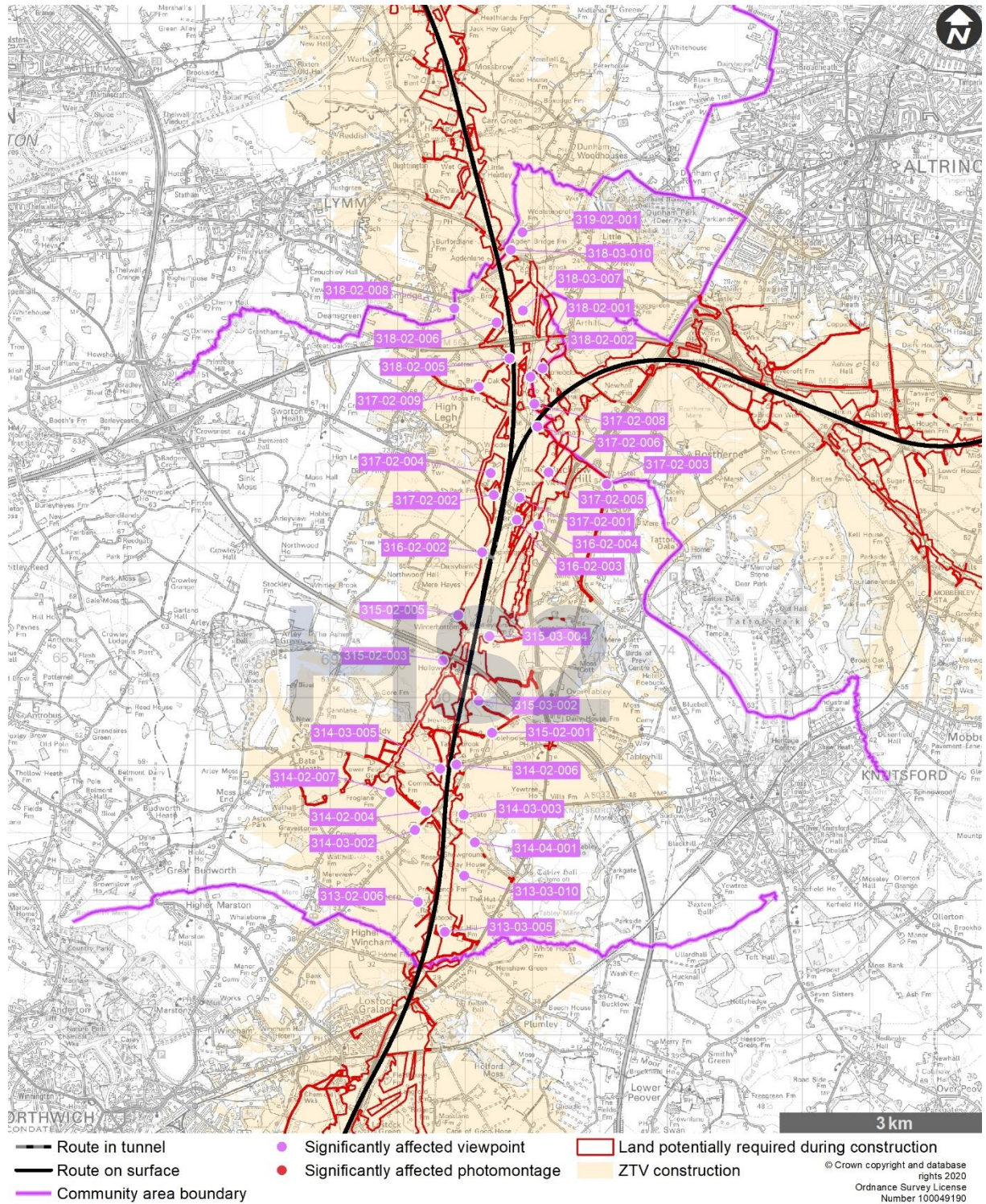
## Visual assessment

### Introduction

- 11.4.9 The following section describes the likely significant effects on visual receptors during construction. The construction assessment has been undertaken for the winter period, in line with best practice guidance, to ensure a robust assessment. However, in some cases, visibility of construction activities may be reduced during summer when vegetation, if present in a view, will be in leaf. Where visual receptors are predicted to experience significant effects at night-time arising from additional lighting, these are also presented in this section.
- 11.4.10 Where a viewpoint represents multiple types of receptor, the assessment is based on the most sensitive receptor. Effects on other receptor types with lower sensitivity will be lower than those reported.
- 11.4.11 The visual assessment has identified locations where continuous night working and/or overnight working during construction will result in significant effects on visual receptors (summarised in Table 30 and described in detail in Volume 5: Appendix LV-001-0MA03, Part 3).
- 11.4.12 Table 30 describes the construction phase potentially significant visual effects. Viewpoint locations are shown in Map Series LV-03 in the Volume 2: MA03 Map Book.

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**Table 30: Construction phase significant visual effects**



**View west from Footpath Tabley Inferior 1/1 (High sensitivity receptors) (VP 313-03-005)**

Users of Footpath Tabley Inferior 1/1 and residents of Smokers Hill Cottage of **high** susceptibility and with **medium-high** value views will experience a substantial change to near-distance views as a result of the construction of Pickmere embankment, Footpath Tabley Inferior 1/1 accommodation underbridge and the diversion of a gas pipeline. Woodland surrounding the northern and eastern boundaries of Smokers Hill Cottage will screen most views of construction from the cottage. The removal of trees lining the access

Level of effect:  
**Major** adverse  
 (significant)

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<b>View west from Footpath Tabley Inferior 1/1 (High sensitivity receptors) (VP 313-03-005)</b>	
<p>track to the east will be noticeable in views from Smokers Hill Farm. The large-scale structures associated with construction, including the presence of Smoker Brook viaduct north satellite compound, construction plant, earthworks and temporary material stockpiles, will be out of character with existing views over the rural landscape. A section of Footpath Tabley Inferior 1/1 will be temporarily realigned. Construction activity will be visible across the majority of the view, particularly for users of the footpath. The removal of intervening vegetation will open up views of construction and the emerging structures. The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	
<p>Night-time effects:</p> <p>The night-time lighting required for Smoker Brook viaduct north satellite compound will create a brightly lit area in a rural and unlit landscape, resulting in a noticeable change in the existing view. Residential receptors at Smokers Hill Cottage will have near-distance views of Smoker Brook viaduct north satellite compound at night. This will be seen against the dark backdrop of the tree-lined Smoker Brook and will result in a noticeable change in the existing view. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view.</p> <p>At night there will be a <b>medium</b> magnitude of visual change resulting in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

<b>View east from Footpath Pickmere 5/1 and Providence Farm (High sensitivity receptors) (VP 313-02-006)</b>	
<p>Residents of Providence Farm, Roses Farm and Dunholme Farm and users of Footpath Pickmere 5/1 of <b>high</b> susceptibility and with <b>medium-high</b> value views will experience substantial changes to near and middle-distance views as a result of the construction of Smoker Brook viaduct, Pickmere embankment and Footpath Tabley Inferior 1/1 accommodation underbridge. The large-scale structures associated with construction including construction plant, earthworks and temporary material stockpiles will be prominent within views over the rural landscape of the Cheshire Plain. Mature trees and hedgerows within the land required for construction of the Proposed Scheme will be removed, further increasing the prominence of the construction works in the view. The PRoW will be temporarily diverted will remain close to the land required for construction and consequently construction activity will extend across the majority of the view experienced by footpath users. Views will be filtered from Providence Farm, Roses Farm and Dunholme Farm by intervening trees and hedgerows.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Night-time effects:</p> <p>Residential receptors at Providence Farm will be affected by the night-time lighting required for Smoker Brook viaduct north satellite compound in the far distance to the south. There will be far distant, filtered views north from Roses Farm and Dunholme Farm of the lighting required for Pickmere Lane satellite compound. The compounds will create new light sources apparent above and through intervening vegetation in a predominantly rural and unlit area but seen in the context of skyglow from the A556 Chester Road. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. There will be a noticeable change in the existing view. At night there will be a <b>medium</b> magnitude of visual change and a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

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**View north-west from Footpath Tabley Inferior 2/2 (High sensitivity receptors) (VP 313-03-010)**

<p>Users of Footpath Tabley Inferior 2/2 (contiguous with Footpath Pickmere 8/1 and Tabley Inferior 3/1) of <b>high</b> susceptibility and visitors to the Cheshire Showground of lower susceptibility, both with <b>medium</b> value views will experience substantial changes to near and middle-distance views during construction of Pickmere embankment, Flittogate Lane diversion, the B5391 Pickmere Lane realignment and diversion of a gas pipeline. The construction of Arley Brook viaduct will be visible, beyond intervening fields in the distance. There will be near-distance views of construction activity from Footpath Tabley Inferior 2/2, contiguous with Footpath Tabley Inferior 3/1 and diverted to the north, as it crosses the Proposed Scheme via Footpath Pickmere 9/1 underbridge. The large-scale structures associated with construction, including construction plant, earthworks, temporary material stockpiles and Pickmere Lane satellite compound, will be out of character with existing views over the rural landscape. Flittogate Lane, to the east, will be used as a construction traffic route, increasing the number of vehicles crossing the view.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
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**View north-west from Flittogate Lane (Medium sensitivity receptors) (VP 314-04-001)**

<p>Rural road users of Flittogate Lane of <b>medium</b> susceptibility and residents of Flittogate Lane, to the east of the viewpoint, of <b>high</b> susceptibility, both with <b>medium</b> value views will experience noticeable changes to near and middle-distance views during construction of Pickmere embankment, Flittogate Lane diversion and Arley Brook viaduct. Flittogate Lane will be closed during construction, except for access to residential properties on the lane. It will be used as a construction traffic route and will be widened for this purpose, leading to a loss of trees and hedgerows. Tall construction plant such as cranes will be visible above intervening vegetation from Flittogate Lane and the use of the lane as a construction traffic route will increase the number of vehicles crossing the view from the properties overlooking the lane.</p> <p>The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and medium sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>
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**View north-east from Pickmere Lane (High sensitivity receptors) (VP 314-03-002)**

<p>Users of Footpath Tabley Inferior 3/1, Footpath Tabley Inferior 4/1 and residents along Pickmere Lane, all of <b>high</b> susceptibility and with <b>medium</b> value views will experience noticeable changes to views in the near and middle distance during construction of Pickmere embankment, the B5391 Pickmere Lane realignment, Arley Brook viaduct and Footpath Pickmere 9/1 underbridge. Views of construction activity will be partly screened or filtered from residential properties on Pickmere Lane by intervening vegetation. Footpath Tabley Inferior 3/1 and Footpath Tabley Inferior 4/1 will be diverted and footpath users will have clear views of construction activity and Pickmere Lane satellite compound in the near-distance. Cranes and other tall construction plant may be visible above the trees from the wider area.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
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**View west from Footpath Pickmere 9/1 (High sensitivity receptors) (VP 314-03-003)**

<p>Users of Footpath Pickmere 9/1 of <b>high</b> susceptibility and with <b>medium</b> value views will experience substantial changes to views in the near and middle distance during construction of Pickmere embankment, Footpath Pickmere 9/1 underbridge, Flittogate Lane diversion and the B5391 Pickmere Lane realignment. The property demolition at Flittogate Farm, and the removal of mature trees and hedgerows will open up clear, wide views of the works. The large-scale structures associated with construction, including construction plant, earthworks and temporary material stockpiles, will be out of character with existing views over the rural landscape of the Cheshire Plain. Flittogate Lane will be used as a construction traffic route which will introduce increased levels of traffic movement into the view. The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
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**View south-east from School Lane (High sensitivity receptors) (VP 314-02-004)**

<p>Residents of School Lane of <b>high</b> susceptibility and users of School Lane and Pickmere Lane of lower susceptibility, all with <b>medium</b> value views will experience substantial changes to near and middle-distance views during construction of Pickmere embankment, Footpath Pickmere 9/1 underbridge, the B5391 Pickmere Lane realignment and Arley Brook viaduct. School Lane will be widened and realigned. Construction of the B5391 Pickmere Lane realignment and Arley Brook viaduct will be visible from the rear of properties on School Lane, above intervening garden vegetation. The removal of trees along School Lane for the road widening will open up views of Pickmere Lane satellite compound and the farmland to the south from the lane. Use of the lane as a construction traffic route will introduce increased levels of traffic movement into views.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Night-time effects</p> <p>The additional night-time lighting required for Pickmere Lane satellite compound will be a new area of light source visible through intervening vegetation in a predominantly rural and unlit area, resulting in a noticeable change in the existing view. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. At night there will be a <b>medium</b> magnitude of visual change and a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

**View east from Budworth Road (Medium sensitivity receptors) (VP 314-03-005)**

<p>Golfers and visitors to the Heyrose Golf Club of <b>medium</b> susceptibility and with <b>medium</b> value views will experience substantial changes to near and middle-distance views during construction of Heyrose embankment and Arley Brook viaduct, as well as the modification of an existing overhead power line, west of the golf course. The land required for construction will be adjacent to the viewpoint. The removal of mature trees and hedgerows will open up clear, wide views of the works. Budworth Road will be used as a construction traffic route introducing uncharacteristic vehicle movements into the view. The large-scale structures associated with construction, including construction plant, earthworks, temporary material stockpiles and Arley Brook Road and Budworth Road satellite compounds will be out of character with existing views over the small-scale rural landscape.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>medium</b> sensitivity will result in a <b>moderate</b> adverse significant effect</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>
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<b>View west from Budworth Road (High sensitivity receptors) (VP 314-02-006)</b>	
<p>Residents of Budworth Road, Waterless Brook Cottages and Pickmere Lane of <b>high</b> susceptibility and with <b>medium</b> value views will experience substantial changes to near and middle-distance views during construction of Heyrose embankment and Arley Brook viaduct. The land required for construction of the Proposed Scheme is adjacent to the viewpoint and views of construction from dwellings on Budworth Road and Waterless Brook Cottages, on Pickmere Lane, will be close, but partially screened or filtered through intervening vegetation in gardens or along Tabley Brook. The removal of mature trees and hedgerows to enable road modifications for construction traffic routes will open up views of the works from Budworth Road. The use of Pickmere Lane and Budworth Road as a construction traffic route will introduce increased levels of vehicle movement into views. The large-scale structures associated with construction, including construction plant, earthworks, temporary material stockpiles and construction activity associated with Budworth Road satellite compound in the near distance and Arley Brook viaduct satellite compound in the middle distance will be out of character with existing views over the small-scale, rural landscape.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse            (significant)</p>
<p>Night-time effects</p> <p>The lighting associated with Budworth Road and Arley Brook viaduct satellite compound will create a large lit area which will be visible above and through existing vegetation in a predominantly rural and unlit landscape, resulting in a noticeable change in the existing view. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. At night there will be a <b>high</b> magnitude of visual change and a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse            (significant)</p>
<b>View north from Frog Lane and Footpath Pickmere 4/1 (High sensitivity receptors) (VP 314-02-007)</b>	
<p>Residents of Frog Lane and Budworth Road, Pickmere and users of Footpath Pickmere 4/1 and Ashton by Budworth 8/1 of <b>high</b> susceptibility and with <b>medium</b> value views will experience substantial changes to near and middle-distance views as a result of the construction of the Proposed Scheme. Frog Lane and School Lane realignments which, together with utility works along Budworth Road, will require the removal of mature trees and hedgerow bordering School Lane, Frog Lane and Budworth Road. This will open up views of works associated with the restringing of overhead power lines. The presence of construction traffic on School Lane and Budworth Road, construction plant, earthworks and temporary material stockpiles, will be out of character with existing views over the rural landscape. Tall machinery required for the construction of Pickmere embankment, Heyrose embankment and Arley Brook viaduct will be visible in the far distance. Views from the Footpath Pickmere 4/1 and Aston By Budworth 8/1 will be largely filtered by intervening vegetation.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse            (significant)</p>
<b>View west from Old Hall Lane (High sensitivity receptors) (VP 315-02-001)</b>	
<p>Residents of Old Hall Lane and residents on the unnamed road off Old Hall Lane including Heyrose Cottages, Heyrose House and Field Cottage of <b>high</b> susceptibility and with <b>medium</b> value views will experience substantial changes to near and middle-distance views during construction of Heyrose embankment. There will be clear views of construction from Field Cottage due to the removal of trees. Views from Heyrose Cottages, Heyrose House and the</p>	<p>Level of effect:  <b>Major</b> adverse            (significant)</p>



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<b>View west from Old Hall Lane (High sensitivity receptors) (VP 315-02-001)</b>	
<p>dwelling on Old Hall Lane will be partially screened by intervening vegetation in gardens and in farmland and by the gently rising landform between Old Hall Road and the construction works. Residents will experience changes to views due to the presence of large-scale structures associated with construction, including construction plant, earthworks and temporary material stockpiles. These will be out of character with existing views over the rural landscape. The use of the lane as a construction traffic route will introduce increased levels of traffic movements into views.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	

<b>View west from North Cheshire Way, Restricted Byway Tabley Superior 4/1 (High sensitivity receptors) (VP 315-03-002)</b>	
<p>PRoW users and residents of The Shooting Box of <b>high</b> susceptibility and with <b>medium</b> value views will experience substantial changes to views during construction of Heyrose embankment and Restricted Byway Tabley Superior 4/1 accommodation underbridge from the diverted North Cheshire Way and Restricted Byway Tabley Superior 4/1. The large-scale structures associated with construction, including construction plant, earthworks and temporary material stockpiles will be out of character with existing views over the rural landscape. The restricted byway will be widened for construction access, resulting in the removal of hedgerows and hedgerow trees. Views of construction activity to the north and west from The Shooting Box, adjacent to the restricted byway, will be largely screened by intervening woodland and garden vegetation. However, the removal of vegetation will allow views of the construction of Heyrose embankment in the south.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

<b>View east from North Cheshire Way, Footpath Aston by Budworth 6/1 (High sensitivity receptors) (VP 315-02-003)</b>	
<p>Residents of Hollowood Farm and users of North Cheshire Way (Footpath Aston by Budworth 6/1, Footpath Tabley Superior 10/1 and Restricted Byway Tabley Superior 4/1) of <b>high</b> susceptibility and with <b>medium</b> value views will experience substantial changes to near and middle-distance views during construction of Heyrose embankment, Restricted Byway Tabley Superior 4/1 accommodation underbridge, M6 Mere viaduct and the M6 realignment. Large-scale construction activity including M6 viaduct south satellite compound, construction plant, earthworks and temporary stockpiles will be out of character with existing views over the rural landscape. The main construction activity will be east of Hollowood Farm, with additional construction activity associated with the overhead power line to the west, but in the in the near distance. The North Cheshire Way and Restricted Byway Tabley Superior 4/1 will be diverted during construction. Views of the construction activity will be partially filtered or screened from Hollowood Farm and the Footpath Aston by Budworth 6/1 by outbuildings and intervening trees and tree belts. Where the PRoW passes close to the construction works, near-distance views will be open.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Night-time effects:  M6 viaduct south satellite compound will be close to Hollowood Farm and although it will be seen against a backdrop of moving vehicle lights on the M6 which is unlit along this stretch, it</p>	<p>Level of effect:</p>

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<b>View east from North Cheshire Way, Footpath Aston by Budworth 6/1 (High sensitivity receptors) (VP 315-02-003)</b>	
will increase the extent of artificial lighting and sky glow in a predominantly rural area. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. At night there will be a <b>medium</b> magnitude of visual change and a <b>moderate</b> adverse significant effect.	<b>Moderate</b> adverse (significant)

<b>View west from Bentleyhurst Farm and Bridleway Mere 1/1 (High sensitivity receptors) (VP 315-03-004)</b>	
<p>Users of Bridleway Mere 1/1 and 1/2 and residents of Bentleyhurst Farm of <b>high</b> susceptibility and with <b>medium</b> value views will experience substantial changes to views during construction of Hoo Green South embankments (No.1-3), Bridleway Mere 1/1 realignment and accommodation underbridge and the southern end of Hoo Green South embankment No. 2. Bridleway Mere 1/1 will be temporarily realigned. Views of construction will be near-distance and open from the PRow and filtered and more distant from Bentleyhurst Farm. The diversion of an existing overhead power line and high pressure gas pipeline will be clearly visible from Bentleyhurst Farm and the PRow. PRow users and residents will experience substantial changes to views due to the large-scale structures associated with construction including construction plant, earthworks and temporary material stockpiles. These will be out of character with existing views over the rural landscape. Views of M6 viaduct north satellite compound will be filtered by field boundary vegetation.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	Level of effect: <b>Major</b> adverse (significant)

<b>View east from Winterbottom Lane at Winterbottom Farm (High sensitivity receptors) (VP 315-02-005)</b>	
<p>Residents on Winterbottom Lane and users of Restricted Byway Mere 2/1 and 1/2 of <b>high</b> susceptibility and with <b>medium</b> value views will experience substantial changes to near and middle-distance views during construction of Hoo Green South embankments (No.1-3), the London to Liverpool junction northbound and the diversion of an existing overhead power line. Construction activity will be visible in clear views from Winterbottom Farm and in filtered or partly screened views from the other dwellings on Winterbottom Lane. The removal of hedgerows and trees along field boundaries will remove intervening vegetation and allow more open views towards construction activity. The diversion of an existing overhead power line will also be clearly visible. The large-scale structures associated with construction including the construction plant, earthworks and temporary material stockpiles will be out of character with existing views over the rural landscape. The removal of a substantial block of woodland from Belt Wood, east of the receptor, will change the composition of the view in the far distance.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	Level of effect: <b>Major</b> adverse (significant)

<b>View east from Goodiersgreen Farm (High sensitivity receptors) (VP 316-02-002)</b>	
<p>Residents of Hoo Green Lane and Winterbottom Lane of <b>high</b> susceptibility and road users of Hoo Green Lane and Winterbottom Lane of lower susceptibility, all with <b>medium</b> value views will experience substantial changes to near and middle-distance views during construction of Hoo Green box structure, Hoo Green South embankments 1 and 2, Hoo Green North embankment, Hoo Green tunnel and the diversion of Hoo Green Lane and an existing overhead power line. Construction of A50 Warrington Road overbridge will be visible in the distance. The large-scale structures associated with construction, including construction</p>	Level of effect: <b>Major</b> adverse (significant)

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**View east from Goodiersgreen Farm (High sensitivity receptors) (VP 316-02-002)**

<p>machinery, earthworks and temporary material stockpiles, will be out of character with existing views from Daisy Bank Farm, Goodiersgreen Farm, Winterbottom Lane and Hoo Green Lane over the rural landscape of the Cheshire Plain. The structures will extend across the majority of the view creating a new skyline and screening views towards Belt Wood. Hoo Green Lane diversion and Winterbottom Lane will accommodate construction traffic, increasing the number of vehicles crossing the view. The removal of existing roadside hedgerow and trees will open up views to the east.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	
<p>Night-time effects:</p> <p>A50 Warrington Road main compound lighting will noticeably increase the extent of lighting in a predominantly rural and unlit area, though in views north, the lighting will be seen in the context of the lights of moving vehicle traffic using the A50 Cliff Lane/Warrington Road/Knutsford Road (unlit along this stretch). The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. At night there will be a <b>medium</b> magnitude of visual change and a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

**View west from Hoo Green Lane (High sensitivity receptors) (VP316-02-003)**

<p>Residents on Oak Wood Road, Hoo Green Lane and at New Cottages on the A50 Cliff Lane/Warrington Road/Knutsford Road of <b>high</b> susceptibility and users of Hoo Green Lane of lower susceptibility, all with <b>medium</b> value views will experience substantial changes to near and middle-distance views during construction of Hoo Green box structure, Hoo Green North cutting, Hoo Green Lane diversion and the A50 Warrington Road realignment and overbridge. A50 Warrington Road main compound and Bowden View satellite compound will be visible above the existing hedgerow and, along with the construction works, will occupy the majority of the view. The compounds will be visible in direct views to the south and filtered, oblique views to the west from New Cottages on the A50 Cliff Lane/Warrington Road/Knutsford Road. The large-scale structures associated with construction, including construction plant, earthworks and temporary material stockpiles, will be out of character with existing views over the rural landscape. Hoo Green Lane will be used for construction traffic, increasing the number of vehicles crossing the view.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Night-time effects:</p> <p>The lighting associated with A50 Warrington Road main compound and Bowden View satellite compound will noticeably increase the extent of lighting in a predominantly rural and unlit area, though in views west the lighting will be seen in the context of the lights of moving vehicle traffic using the A50 Cliff Lane/Warrington Road/Knutsford Road (unlit along this stretch). The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. There will be a <b>medium</b> magnitude of visual change and a <b>moderate</b> significant adverse effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

**View south-west from the A50 Cliff Lane/Warrington Road/Knutsford Road (High sensitivity receptors) (VP 316-02-004)**

<p>Residents on the A50 Cliff Lane/Warrington Road/Knutsford Road (Barley Fields, The Kilton Inn and Hulme Barns Farm) of <b>high</b> susceptibility and road users of lower susceptibility with <b>medium</b> value views will experience substantial changes to near and far-distance views</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
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**View south-west from the A50 Cliff Lane/Warrington Road/Knutsford Road (High sensitivity receptors) (VP 316-02-004)**

<p>during the diversion of a gas pipeline and overhead power line and the construction of Hoo Green box structure, Hoo Green North cutting and the A50 Warrington Road realignment and overbridge. The diversion of the gas pipeline and overhead power line will be clearly visible from Barley Fields and Hulme Barns Farm. The construction of Hoo Green box structure, Hoo Green North cutting, HS2 Manchester spur and the A50 Warrington Road realignment and overbridge will be visible in the far distance, partially screened by properties in Oak Wood Road. The large-scale structures associated with construction, including construction plant, earthworks and temporary material stockpiles, will be out of character with existing open views over the rural landscape. The A50 Cliff Lane/Warrington Road/Knutsford Road will be used by construction traffic, increasing the number of vehicles crossing the view.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	
<p>Night-time effects:  A50 Warrington Road main compound and Bowden View satellite compound lighting will noticeably increase the extent of lighting in a predominantly rural and unlit area. However, the lighting will be seen in the context of the lights of moving traffic using the A50 Cliff Lane/Warrington Road/Knutsford Road (unlit along this stretch). The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. There will be a <b>medium</b> magnitude of visual change and a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

**View west from Bowden View Lane (High sensitivity receptors) (VP 317-02-001)**

<p>Residents of Bowden View Lane of <b>high</b> susceptibility and road users on Bowden View Lane of lower susceptibility all with <b>medium</b> value views will experience substantial changes to near and middle-distance views during construction of Hoo Green North cutting, the A50 Warrington Road realignment and A50 Warrington Road overbridge. Gas pipelines will be diverted to the north and east of the viewpoint. Property demolitions and removal of trees at Holly House Farm and Bowden View Farm will open up views of the construction works. The large-scale structures associated with construction, including construction plant, earthworks and temporary material stockpiles, will be out of character with existing views over the rural landscape. Bowden View satellite compound will occupy much of the middle distance of views from Bowden View Lane with A50 Warrington Road main compound beyond.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Night-time effects:  A50 Warrington Road main compound and Bowden View satellite compound lighting will noticeably increase the extent of artificial lighting in a predominantly rural and unlit area, though the lighting will be seen in the context of the lights of traffic using the A50 Cliff Lane/Warrington Road/Knutsford Road (unlit along this stretch). The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. There will be a <b>medium</b> magnitude of visual change and a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

**View south-east from the A50 at Mere Court Hotel (High sensitivity receptors) (VP 317-02-002)**

<p>Residents of the A50 Cliff Lane/Warrington Road/Knutsford Road of <b>high</b> susceptibility and road users of the A50 and guests at Mere Court Hotel of lower susceptibility, all with <b>medium</b></p>	<p>Level of effect:</p>
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**View south-east from the A50 at Mere Court Hotel (High sensitivity receptors) (VP 317-02-002)**

<p>value views, will experience substantial changes to near and middle-distance views during construction of the A50 Warrington Road realignment, A50 Warrington Road overbridge, Hoo Green North cutting and Hoo Green Lane diversion. The removal of hedgerows bordering the A50 Cliff Lane/Warrington Road/Knutsford Road and of mature trees from the grounds of Mere Court Hotel and the wider landscape will open up expansive views, from a slightly elevated position, of the works as far as Hoo Green box structure and Hoo Green North embankment in the far distance. The large-scale structures associated with construction, including construction plant, earthworks and temporary material stockpiles, will be out of character with existing views over the rural landscape. The A50 Warrington Road and Hoo Green Lane diversion will be used as a construction traffic route, introducing additional traffic movements into the view.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p><b>Major</b> adverse (significant)</p>
<p>Night-time effects:  A50 Warrington Road main compound and Bowden View satellite compound lighting will noticeably increase the extent of lighting in a predominantly rural and unlit area, though the lighting will be seen in the context of the lights of traffic using the A50 Cliff Lane/Warrington Road/Knutsford Road (unlit along this stretch). The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. There will be a <b>medium</b> magnitude of visual change and a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

**View west from the B5569 Chester Road (Roman Road) at Bucklow Hill (High sensitivity receptors) (VP 317-02-003)**

<p>Residents of Bucklow Hill, Bucklowhill Lane and Chapel Lane (partly in the adjoining Hulseheath to Manchester Airport area (MA06)) of <b>high</b> susceptibility and road users on Bucklowhill Lane and Chapel Lane of lower susceptibility both with <b>medium</b> value views will experience noticeable changes in near-distance views during construction of the new junction linking Chapel Lane with the A556 as part of the Proposed Scheme. Chapel Lane will be used as a construction traffic route and construction traffic will introduce additional and uncharacteristic traffic movement into views from properties on Chapel Lane and the B5569 Chester Road.</p> <p>The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>
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**View east from Wrenshot Lane (High sensitivity receptors) (VP 317-02-004)**

<p>Residents of Wrenshot Lane of <b>high</b> susceptibility, road users of Wrenshot Lane and golfers at the High Legh Park Golf Club of lower susceptibility, all with <b>medium</b> value views will experience substantial changes to near and middle-distance views during construction of Hoo Green North and West cuttings. Construction of the A50 Warrington Road realignment, A50 Warrington Road overbridge and Peacock Lane realignment will be visible in filtered views in the far distance. Trees and woodland will be removed from the gardens of Wrenshot House and Mere Court Hotel, opening up views to the north-east and south-east, but trees growing along Wrenshot Lane, in gardens and in the grounds of High Legh Park Golf Club will partly filter views of construction. The large-scale structures associated with construction, including the Wrenshot Lane satellite compound, earthworks and temporary material stockpiles, will be out of character with existing views over the rural landscape.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
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<b>View east from Wrenshot Lane (High sensitivity receptors) (VP 317-02-004)</b>	
The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.	
Night-time effects: Lighting for Wrenshot Lane satellite compound and Peacock Lane satellite compound will noticeably increase the extent of lighting in a predominantly rural and unlit area. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. There will be a <b>medium</b> magnitude of visual change and a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)

<b>View west from Hulseheath Lane (High sensitivity receptors) (VP 317-02-005)</b>	
Residents of Hulseheath Lane and Chapel Lane (in the adjoining Hulseheath to Manchester Airport area (MA06)) of <b>high</b> susceptibility and road users of lower susceptibility, all with <b>medium</b> value views will experience substantial changes to near and middle-distance views during construction of Hulseheath South embankment, Peacock Lane grid supply point, new gas pipelines and the diversion of existing overhead power lines. The construction of Peacock Lane auto-transformer feeder station and grid supply point will be visible in the far distance. The removal of trees, hedgerows and woodland will open up views of the construction of the Proposed Scheme. Construction traffic on Chapel Lane will introduce uncharacteristic levels of movement into views. The large-scale structures associated with construction, including Chapel Lane satellite compound (in the adjoining Hulseheath to Manchester Airport area (MA06)), construction plant and earthworks, will be out of character with existing views over the rural landscape. The combination of the above will result a <b>high</b> magnitude of visual change. The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.	Level of effect: <b>Major</b> adverse (significant)
Night-time effects: Lighting for Chapel Lane satellite compound (in the adjoining Hulseheath to Manchester Airport area (MA06)) will noticeably increase the extent of lighting in a predominantly rural and unlit area. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. There will be a <b>medium</b> magnitude of visual change and a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)

<b>View north from Broom Manor (High sensitivity receptors) (VP 317-02-006)</b>	
Residents of Broom Manor, Gorse Cottage and Barn and Four Acres of <b>high</b> susceptibility and road users of Peacock Lane of lower susceptibility, all with <b>medium</b> value views will experience substantial changes to near and middle-distance views during construction of Hulseheath North embankment (in the adjoining Hulseheath to Manchester Airport area (MA06)), Hulseheath South embankment, Peacock Lane viaduct and Peacock Lane grid supply point and auto-transformer feeder station. The land required for construction of the Proposed Scheme will be immediately adjacent to the viewpoint. The large-scale structures associated with construction, including construction plant and earthworks, will be out of character with existing views over the rural landscape and will be clearly visible across the majority of the view. The construction of Peacock Lane auto-transformer feeder station will be visible in the middle distance to the west and the grid supply point to the south. Removal of trees, hedgerows and woodland will open up views of construction activity and the emerging structures. Construction traffic using the realigned Peacock Lane will introduce increased levels of movement into views. The combination of the above will result in a <b>high</b> magnitude of visual change.	Level of effect: <b>Major</b> adverse (significant)

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<b>View north from Broom Manor (High sensitivity receptors) (VP 317-02-006)</b>	
The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.	
Night-time effects: Lighting for Chapel Lane satellite compound (in the adjoining Hulseheath to Manchester Airport area (MA06)) in the middle distance will increase the extent of artificial lighting in a predominantly rural and unlit area. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. At night there will be a <b>medium</b> magnitude of visual change and a <b>moderate</b> significant adverse effect.	Level of effect: <b>Moderate</b> adverse (significant)

<b>View south from Thowler Lane (High sensitivity receptors) (VP 317-02-008)</b>	
Residents of Five Acres on Back Lane and properties on Thowler Lane (partly in the adjoining Hulseheath to Manchester Airport area (MA06)) of <b>high</b> susceptibility and road users of lower susceptibility, all with <b>medium</b> value views will experience substantial changes to near and middle-distance views during construction of Peacock Lane auto-transformer feeder station, Peacock Lane realignment, Peacock Lane overbridge, Peacock Lane viaduct, Hulseheath South embankment, Hulseheath North embankment (in the adjoining Hulseheath to Manchester Airport area (MA06)) and Hoo Green North cutting. Views of construction including the removal of overhead power lines will, to a small extent, be filtered through intervening garden vegetation, but generally the removal of hedgerow, trees and woodland within the land required for the construction of the Proposed Scheme will open up views of construction activity from most locations. Construction traffic using Thowler Lane, Back Lane and Peacock Lane will introduce increased traffic movement into views. The large-scale structures associated with construction, including Peacock Lane ATFS satellite compound, construction plant and earthworks, will be out of character with existing views over the rural landscape. The combination of the above will result in a <b>high</b> magnitude of visual change. The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.	Level of effect: <b>Major</b> adverse (significant)
Night-time effects: Lighting on the Peacock Lane ATFS satellite compound, together with background lighting associated with Peacock Lane and Chapel Lane satellite compounds, will noticeably increase the extent of lighting at night in a predominantly rural and unlit area. The lit areas will be visible in the near distance from Five Acres, on Back Lane and in the middle distance from properties on Thowler Lane. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. There will be a <b>medium</b> magnitude of visual change and a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)

<b>View east from Moss Lane (High sensitivity receptors) (VP 317-02-009)</b>	
Residents of Moss Lane and Peacock Lane and users of Footpath High Legh 4/1 of <b>high</b> susceptibility and road users of Moss Lane and Peacock Lane of lower susceptibility, all with <b>medium</b> value views will experience substantial changes to near and middle-distance views during Peacock Lane realignment and the construction of Peacock Lane overbridge, Hoo Green North cutting and Peacock Lane auto-transformer feeder station. Residents of Moss Farm, Little Moss Farm and users of Footpath High Legh 4/1 will have near and middle-distance views of Peacock Lane realignment and the construction of Peacock Lane overbridge, Hoo Green North cutting and Peacock Lane auto-transformer feeder station. Residents of Whyte Cottage will have middle-distance views, partly screened by intervening vegetation, of the construction of Hoo Green North cutting. Construction traffic on Peacock Lane, Thowler Lane and Back Lane will introduce increased movement into views. The large-scale structures associated with construction, including Peacock Lane satellite compound,	Level of effect: <b>Major</b> adverse (significant)

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<b>View east from Moss Lane (High sensitivity receptors) (VP 317-02-009)</b>	
<p>construction plant and earthworks will be out of character with existing views over the rural landscape.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	
<p>Night-time effects:</p> <p>Lighting for Peacock Lane satellite compound in the middle distance will noticeably increase the extent of lighting at night in a predominantly rural and unlit area. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. There will be a <b>medium</b> magnitude of visual change and <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

<b>View south-west from Agden Lane (High sensitivity receptors) (VP 318-02-001)</b>	
<p>Residents on Agden Lane, Thowler Lane and Boothbank Lane of <b>high</b> susceptibility and road users of lower susceptibility all with <b>medium value</b> views will experience substantial changes to near-distance views due to the construction of High Legh cutting and NPR Manchester to Liverpool junction overbridge and the removal of an existing overhead power line. The land required for the construction of the Proposed Scheme extends into the garden of Middle Moss Farm and trees and vegetation will be removed, opening up clear views of construction to the west. The use of Agden Lane and Thowler Lane as a construction traffic route will introduce increased traffic movement into views. The large-scale structures associated with construction, including the Agden Lane satellite compound, construction plant and earthworks, will be out of character with existing views over the rural landscape.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

<b>View south-east from Boothbank Lane (High sensitivity receptors) (VP 318-02-002)</b>	
<p>Residents of Boothbank Lane and users of Footpath Millington 3/1 (in the adjoining Hulseheath to Manchester Airport area (MA06)) of <b>high</b> susceptibility and road users of lower susceptibility with <b>medium</b> value views will experience substantial changes to near-distance views during the construction of the Proposed Scheme. Gas pipelines will be modified through the Agden Brook valley, continuing east and west of Booth Bank Cottage, west of Booth Bank Farm and east of Stonedelph Farm (in the adjoining Hulseheath to Manchester Airport area (MA06)). Residents of Stonedelph Farm will also see the construction of a maintenance track, immediately east of the property. Hedgerows and hedgerow trees will be removed during the utilities works, opening up near-distance views of construction activity. Intervening vegetation retained during construction will filter views of the construction of Ivy House Farm accommodation access diversion (in the Hulseheath to Manchester Airport area (MA06)). The use of Boothbank Lane for construction traffic and the presence of construction plant and earthworks will be out of character with existing views over the country lane and rural landscape.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>



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<b>View east from Agden Lane (High sensitivity receptors) (VP 318-02-005)</b>	
<p>Residents of Agden Lane and Moss Lane of <b>high</b> susceptibility and road users of lower susceptibility all with <b>medium</b> value views will experience substantial changes to near-distance views during the construction of High Legh cutting. The land required for construction of the Proposed Scheme will be adjacent to the viewpoint. The removal of trees and hedges will open up views to the south and east and consequently, the construction works will be clearly visible across the majority of the view. Vegetation in gardens of dwellings on Agden Lane and Moss Lane will partially filter views to construction activity. The structures associated with construction including Agden Lane satellite compound, construction plant, earthworks and temporary material stockpiles will be prominent in existing views of the rural landscape due to their scale and extent. Construction traffic on Agden Lane and Moss Lane will introduce uncharacteristic additional traffic movement into views.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>
<p>Night-time effects:</p> <p>Lighting for Agden Lane satellite compound will noticeably increase the extent of lighting in a predominantly rural and unlit area. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. There will be a <b>medium</b> magnitude of visual change and a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect: <b>Moderate</b> adverse (significant)</p>

<b>View east from Footpath Agden 2/3 (High sensitivity receptors) (VP 318-02-006)</b>	
<p>Residents of Agden Hall Farm and 'Four Winds' and users of Footpaths Agden 2/3, 2/4 and 3/3 of <b>high</b> susceptibility and with <b>medium value</b> views will experience substantial changes to near and middle-distance views during the construction of Agden cutting, Agden Brook Farm accommodation underbridge and access diversion and Lymm South embankment. A short section of Footpath Agden 2/4 will be temporarily diverted. The construction works will be clearly visible from much of the footpath. However, along certain sections of Footpaths Agden 2/3 and 2/4 the view will be curtailed by the sloping landform in the near-distance. The structures associated with construction, including the M56 west satellite compound, construction plant, earthworks and temporary material stockpiles will be prominent due to their large-scale and extent.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>
<p>Night-time effects:</p> <p>Lighting for M56 west satellite compound and the Agden Lane satellite compound to the south of the M56 will noticeably increase the extent of lighting at night in a predominantly rural and unlit area. However, views of the compound will be partially filtered through intervening vegetation. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. There will be a <b>medium</b> magnitude of visual change and a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect: <b>Moderate</b> adverse (significant)</p>

<b>View west from Footpath Agden 1/4 (High sensitivity receptors) (VP 318-03-007)</b>	
<p>Users of Footpaths Agden 1/2, 1/4 and 5/1 of <b>high</b> susceptibility and <b>medium</b> value views will experience substantial changes to near and middle-distance views as a result of the construction of Agden cutting, Agden Brook Farm accommodation underbridge and access diversion and Lymm South embankment. The construction works will be clearly visible across much of the view. A short section Footpath Agden FP1/4 will be temporarily diverted. The structures associated with construction, including M56 west satellite compound, construction</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>

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<b>View west from Footpath Agden 1/4 (High sensitivity receptors) (VP 318-03-007)</b>	
<p>plant, earthworks and temporary material stockpiles will be prominent in existing views due to their large-scale and extent.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	

<b>View east from Agden Park Lane (High sensitivity receptors) (VP 318-02-008)</b>	
<p>Residents of Lymm Road and Agden Park Lane of <b>high</b> susceptibility and with <b>medium</b> value views will experience noticeable changes to middle and far-distant views due to the construction of Agden cutting, Agden Brook Farm accommodation underbridge and access diversion and Lymm South embankment. The construction works will be partially screened by the sloping landform of the middle distance and by Agden Hall Farm, but the structures associated with construction, including the Agden Brow satellite compound, construction plant, earthworks and temporary material stockpiles will be visible in far distance views due to their large-scale and extent.</p> <p>The combination of above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> significant adverse effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

<b>View south-west from Footpath Agden 9/2 (High sensitivity receptors) (VP 318-03-010)</b>	
<p>Users of the Cheshire Ring Canal Walk, Footpath Agden 9/2 and recreational boat users on the Bridgewater Canal of <b>high</b> susceptibility and with <b>medium</b> value views will experience substantial changes to near and middle-distance views during the construction of Lymm South embankment, Lymm North embankment and A56 Lymm Road viaduct, as well as Heatley South embankment and Bridgewater Canal viaduct (in the Broomedge to Glazebrook area (MA04)). The structures associated with construction, including A56 Lymm Road satellite compound, construction plant, earthworks and temporary material stockpiles will be prominent in the in the near-distance due to their large-scale and extent.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> significant adverse effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

<b>View west from Footpath Agden 6/2 and Spring Lane (High sensitivity receptors) (VP 319-02-001)</b>	
<p>Residents of Woolstencroft Cottage and Woolstencroft Farm and users of Footpath Agden 6/2 of <b>high</b> susceptibility and with <b>medium</b> value views will experience substantial changes to middle-distance views during the construction of Lymm North embankment, Heatley South embankment and Bridgewater Canal viaduct (in the Broomedge to Glazebrook area (MA04)). The structures associated with construction, including Bridgewater Canal satellite compound, (in the Broomedge to Glazebrook area (MA04)) construction plant, earthworks and temporary material stockpiles, will be prominent in views due to their large-scale and will be visible across the majority of the view. The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Night-time effects:            Lighting for Bridgewater Canal satellite compound (in the Broomedge to Glazebrook area (MA04)) and A56 Lymm Road satellite compound will noticeably increase the extent of lighting</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

**View west from Footpath Agden 6/2 and Spring Lane (High sensitivity receptors) (VP 319-02-001)**

at night in a predominantly rural and unlit area. Views of both satellite compounds will be partially filtered through intervening vegetation. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. There will be a **medium** magnitude of visual change and a **moderate** adverse significant effect.

## Other mitigation measures

- 11.4.13 No other mitigation measures are considered reasonably practicable during construction. Not all landscape and visual effects can be mitigated due to the visibility of construction activity and the sensitivity of surrounding receptors.
- 11.4.14 However, consideration will be given during the detailed design stage to where mitigation planting can be established early in the construction programme to help achieve landscape integration or visual screening at an earlier time.

## Summary of likely residual significant effects

- 11.4.15 The temporary residual significant effects during construction remain as described above. These effects will be temporary and reversible in nature lasting only for the duration of the construction works. These residual effects will generally arise from the widespread presence of construction activity and construction plant within the landscape and viewed by residents and users of PRoW, golf courses and main roads within the study area.
- 11.4.16 The significant effects that will remain after implementation of construction phase mitigation are summarised below:
- major adverse effects in relation to one LCA;
  - major adverse visual effects at 22 representative residential viewpoint locations;
  - major adverse visual effects at eight representative recreational viewpoint locations;
  - moderate adverse visual effects at two representative residential viewpoint locations;
  - moderate adverse visual effects at one representative recreational viewpoint location;
  - moderate adverse visual effects at one representative transport viewpoint location;
  - major adverse night-time visual effects at one representative residential viewpoint location; and
  - moderate adverse night-time visual effects at 17 representative residential viewpoint locations.

## Cumulative effects

### Cumulative landscape effects

- 11.4.17 No significant cumulative temporary effects during construction are anticipated.

## Cumulative visual effects

11.4.18 No significant cumulative temporary effects during construction are anticipated.

## 11.5 Permanent effects arising from operation

11.5.1 The permanent elements of the Proposed Scheme that have been taken into account in determining the effects arising during operation on landscape and visual receptors are presented in Section 2.2 of this report.

### Avoidance and mitigation measures

11.5.2 The operational assessment of impacts and effects is based on year 1 (2038), year 15 (2053) and year 30 (2068) of the Proposed Scheme. A process of iterative design and assessment has been employed, and is ongoing, to avoid or reduce adverse effects during the operation of the Proposed Scheme. Measures that will be integrated into the design of the Proposed Scheme include:

- design of earthworks to tie the engineering earthworks for embankments (such as Pickmere embankment) and cuttings (such as Agden cutting) into their wider landscape context and to mitigate views of structures and overhead line equipment from sensitive receptors, where reasonably practicable. Earthworks design also takes account of the relationship to surrounding land uses and management, such as agriculture;
- compensatory woodland planting in areas of loss, using the same species composition and planting types (and appropriate planting density), where reasonably practicable, to replace woodland lost from Leonard's and Smoker Wood, Belt Wood, Bongs Wood and along Waterless Brook/Arley Brook and Agden Brook to provide connectivity between habitats and green infrastructure, to soften the appearance of embankments and viaduct abutments and to integrate them into the landscape; and
- hedgerow replacement and restoration in areas of loss throughout the Pickmere to Agden and Hulseheath area to restore connectivity and landscape pattern, where reasonably practicable, and using an appropriate palette of hedgerow types and species to tie the Proposed Scheme mitigation into its wider landscape context.

### Assessment of impacts and effects

11.5.3 The likely effects on landscape and visual receptors during operation of the Proposed Scheme relate to the presence of new structures and elements in the landscape including:

- Arley Brook, M6 Mere, Peacock Lane, A56 Lymm Road viaducts, and Bridgewater Canal viaduct (in the Broomedge to Glazebrook area (MA04));
- Pickmere, Heyrose, Hoo Green South and North and Hulseheath South and North embankments;
- Hoo Green west and north, High Legh and Agden cuttings;

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- Footpath Pickmere 9/1, Restricted Byway Tabley Superior 4/1 accommodation, Bridleway Mere 1/1 accommodation and Agden Brook Farm accommodation underbridges;
- telecommunications sites, auto-transformer stations, Peacock Lane auto-transformer feeder station and Peacock Lane grid supply point;
- Hoo Green box structure;
- NPR Manchester to Liverpool junction, A50 Warrington Road and M56 West overbridges;
- B5391 Pickmere Lane, School Lane and Peacock Lane realignments and Hoo Green Lane diversion; and
- train movements, overhead line equipment, fencing and noise fence barriers.

11.5.4 Non-significant effects are reported in Volume 5: Appendix LV-001-0MA03.

## Landscape assessment

11.5.5 The LCA described in Table 31 will be significantly affected during operation of the Proposed Scheme.

**Table 31: Operational phase significant landscape effects**

Location	
<b>Arley Lower Wooded Farmland LCA</b>	
<p>Year 1: This LCA will be directly affected by the introduction of large-scale infrastructure including Hoo Green box structure, A56 Lymm Road viaduct and Bridgewater Canal viaduct (in the Broomedge to Glazebrook area (MA04)) and changes to the landform across the LCA. The removal of trees and hedgerows and the demolition of dwellings and farm buildings during construction will result in the loss of key features that contribute to the existing wooded, rural character of the landscape. The high embankments and viaducts, the wide, deep cuttings, the highways overbridges, Peacock Lane auto-transformer feeder station and grid supply point and overhead line equipment will be uncharacteristic new structures in the landscape that will substantially alter its character. The rural area around Hulseheath and Millington Clough, where the route of the Proposed Scheme and HS2 Manchester spur divide, will be particularly affected with embankments, viaducts, cuttings, highway overbridges, electricity supply infrastructure and the isolation of land between the route of the Proposed Scheme and HS2 Manchester spur. PRoW connectivity will be restored with new crossings and diversions, but tranquillity will be reduced due to the train movements through the landscape. Mitigation planting will not be sufficiently mature to provide any integration at this stage.</p> <p>Due to the low-lying landform, mature vegetation, small scale of the landscape and its secluded character, the landscape has a <b>medium-high</b> susceptibility to change arising from the Proposed Scheme. The introduction of large-scale infrastructure and changes to the landform will result in a <b>high</b> magnitude of change to the landscape.</p> <p>The <b>high</b> magnitude of change for the Arley Lower Wooded Farmland LCA and its <b>medium-high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>
<p>Year 15: The landscape character of the area will remain substantially changed due to severance and disruption of the existing landscape pattern, the loss of key features and the introduction of large-scale infrastructure structures including Hoo Green box structure, A56 Lymm Road viaduct and Bridgewater Canal viaduct (in the Broomedge to Glazebrook area (MA04)) into the rural landscape. Landscape mitigation planting will provide some screening of the embankments, viaducts, highways overbridges and Peacock Lane auto-transformer feeder station and grid supply point, but the large scale of these structures means that they will remain prominent in the landscape, visible above intervening vegetation. Mitigation planting will not be sufficiently mature to</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>

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Location	
<p>restore the wooded character of the LCA, diminished by the loss of woodland due to construction and the diversion of utilities.</p> <p>The magnitude of change will remain <b>high</b> with a <b>major</b> adverse significant effect.</p>	
<p>Year 30: The upper parts of Hoo Green box structure, A56 Lymm Road viaduct and Bridgewater Canal viaduct (in the Broomedge to Glazebrook area (MA04)) will remain prominent structures in the landscape, apparent above intervening landscape mitigation planting. Overhead line equipment and train movements along the embankment and viaduct will remain visible above the planting through much of the LCA. Maturing landscape mitigation planting will partly restore the tree-lined character of country lanes widened during construction and the wooded character of the LCA.</p> <p>The magnitude of change will reduce to <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>

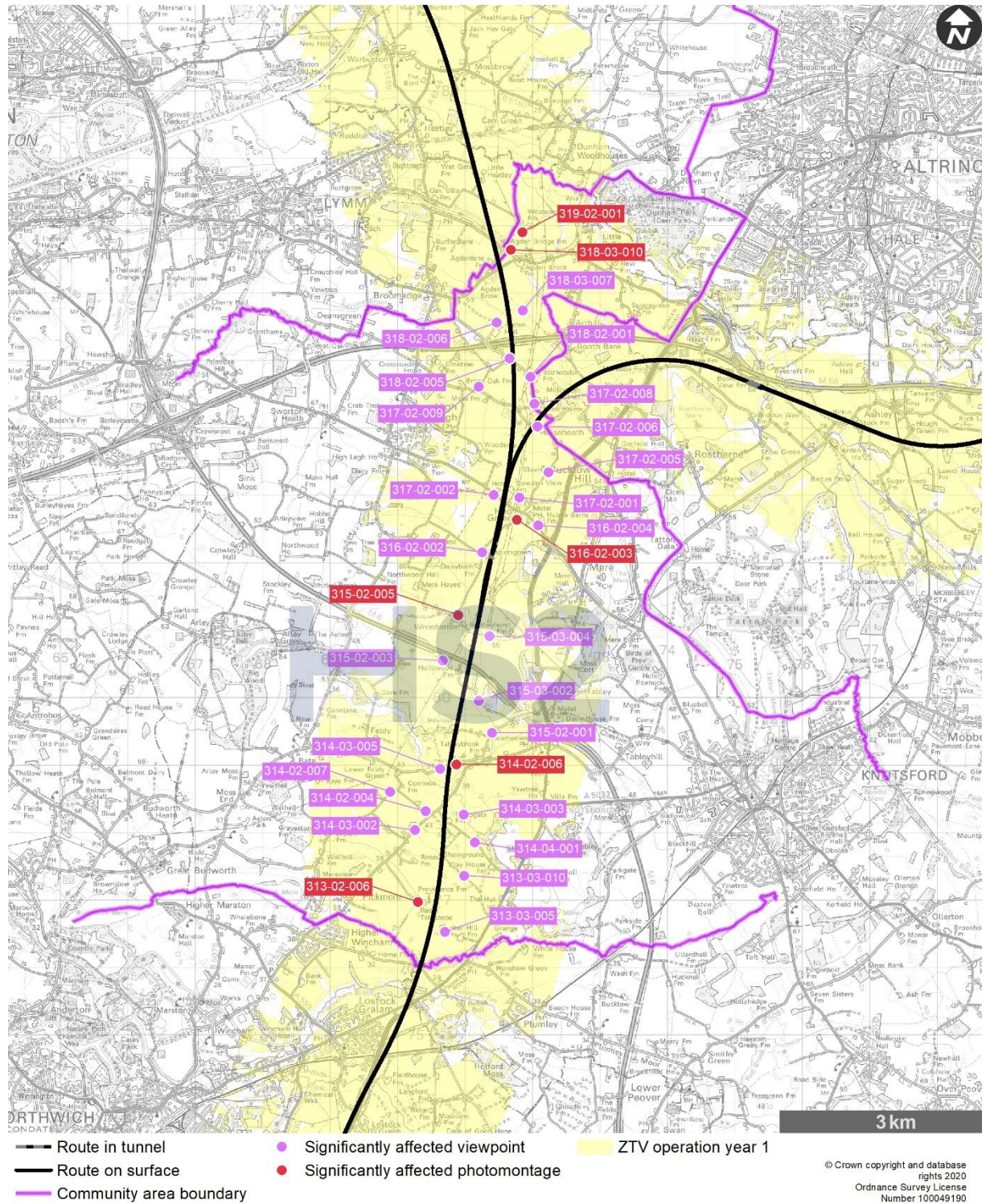
## Visual assessment

### Introduction

- 11.5.6 The following section describes the likely significant effects on visual receptors during operation in the winter and summer of year 1 and in the summer of both year 15 and year 30. The year 1 assessment includes the winter period, in line with best practice guidance, to ensure a robust assessment. In some cases, visibility of the operational Proposed Scheme may be reduced during summer when vegetation, if present in a view, will be in leaf. Where visual receptors are predicted to experience significant effects at night-time arising from additional lighting, these are also presented in this section.
- 11.5.7 Where a viewpoint represents multiple types of receptor, the assessment is based on the most sensitive receptor. Effects on other receptor types with a lower sensitivity will be lower than those reported.
- 11.5.8 The assessment has not identified any locations within this study area where additional lighting during operation will result in significant visual effects at night.
- 11.5.9 Table 32 identifies the locations where the operation of the Proposed Scheme will potentially result in significant effects. Viewpoint locations are shown in Map Series LV-04 in the Volume 2: MA03 Map Book.

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**Table 32: Operation phase significant visual effects**



<b>View west from Footpath Tabley Inferior 1/1 (High sensitivity receptors) (VP 313-03-005)</b>	
Year 1 – winter and summer: Footpath users and residents of Smokers Hill Cottage of <b>high</b> susceptibility and with <b>medium-high</b> value views will experience substantial changes to near and middle-distance views. Footpath Tabley Inferior 1/1 will be routed under the Proposed Scheme via Footpath Tabley Inferior 1/1 accommodation underbridge. Pickmere embankment, Pickmere telecommunications site, overhead line equipment and train movements will be prominent in	Level of effect: <b>Major</b> adverse (significant)

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<b>View west from Footpath Tabley Inferior 1/1 (High sensitivity receptors) (VP 313-03-005)</b>	
<p>near-distance views for footpath users and will screen existing views of the Pickmere Telescope from the stretch of the PRoW close to the embankment. Woodland surrounding the northern and eastern boundaries of Smokers Hill Cottage will screen most views of the Proposed Scheme for residents of the cottage. The Proposed Scheme will introduce a large-scale linear element across the majority of the existing view over a rural landscape. The loss of mature trees and hedgerows from farmland and along the access road to Smokers Hill Farm during construction will notably change the composition of views compared to the baseline and will open up views of the Proposed Scheme. Mitigation planting will not be sufficiently established to provide any screening or visual integration at this stage.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	
<p>Year 15 – summer:</p> <p>Landscape mitigation planting and hedgerow habitat creation will provide some integration of structures into the landscape. Due to the growth of landscape mitigation planting on Pickmere embankment, the lower slopes of the embankment, train movements and Pickmere telecommunications site will be partially screened. The tops of trains and overhead line equipment on the embankment will remain visible above the vegetation.</p> <p>The magnitude of visual change will reduce to <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>
<p>Year 30 – summer:</p> <p>The magnitude of change will be reduced to non-significant by year 30 and the resulting effects will be non-significant as a result of maturing planting (reported in Volume 5: Appendix LV-001-OMA03).</p>	<p>Level of effect:            Non-significant</p>

<b>View east from Footpath Pickmere 5/1 and Providence Farm (High sensitivity receptors) (VP 313-02-006)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents of Providence Farm, Roses Farm and Dunholme Farm and users of Footpath Pickmere 5/1 of <b>high</b> susceptibility and with <b>medium-high</b> value views will experience substantial changes to near and middle-distance views. Pickmere embankment, boundary fencing, overhead line equipment, Pickmere telecommunications site and the train movements will be seen against the skyline, altering key characteristics of the view. The Proposed Scheme will introduce a large scale linear element across the pattern of hedgerows and mature oak trees, foreshortening long views over the rural landscape. Footpath Pickmere 5/1 will pass under the Proposed Scheme at Footpath Tabley Inferior 1/1 accommodation underbridge, changing views from the path in this location. The loss of mature trees, especially oaks, and hedgerows from farmland during construction will remove key features which currently contribute to the rural character of existing views. Mitigation woodland and hedgerow planting will not be sufficiently established to contribute to any visual integration or enclosure at this stage.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p> <p>A photomontage illustrating this scenario is included in Volume 5: Appendix LV-001-OMA03, Part 3.</p>	<p>Level of effect:  <b>Major</b> adverse            (significant)</p>
<p>Year 15 – summer:</p> <p>The growth of the landscape mitigation planting along the western side of Pickmere embankment will screen views of the lower slopes of the embankment. However, overhead line equipment, Pickmere telecommunications site and the train movements will still be visible</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>



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<b>View east from Footpath Pickmere 5/1 and Providence Farm (High sensitivity receptors) (VP 313-02-006)</b>	
in filtered views above the intervening vegetation. The Proposed Scheme will remain a strong, linear element in the landscape. The magnitude of visual change will reduce to <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.	
Year 30 – summer: Effects will reduce to non-significant for year 30 due to the growth and maturity of the landscape mitigation planting (reported in Volume 5: Appendix LV-001-0MA03).	Level of effect: Non-significant

<b>View north-west from Footpath Tabley Inferior 2/2 (High sensitivity receptors) (VP 313-03-010)</b>	
Year 1 – winter and summer: Users of Footpath Tabley Inferior 2/2 of <b>high</b> susceptibility and visitors to the Cheshire Showground of <b>lower</b> susceptibility, both with <b>medium</b> value views, will experience substantial changes to near and middle-distance views. Pickmere embankment, boundary fencing, overhead line equipment and the train movements will be highly visible across the landscape. Trees in the far distance will remain visible beyond the Proposed Scheme, above train movements and boundary fencing. There will be near-distance views to the Proposed Scheme from Footpath Tabley Inferior 2/2 and Footpath Tabley Inferior 3/1 which will be diverted to the east, crossing the Proposed Scheme via Footpath Pickmere 9/1 underbridge. The loss of mature trees during construction, especially oaks, will remove key features which currently contribute to the rural character of the existing view. Mitigation planting will not be sufficiently established to provide any screening or visual integration at this stage. The combination of the above will result in a <b>high</b> magnitude of visual change. The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.	Level of effect: <b>Major</b> adverse (significant)
Year 15 – summer: Landscape mitigation planting along Pickmere embankment will have sufficiently matured to largely screen the embankment and the train movements. The overhead line equipment will remain visible, especially from the stretch of the diverted Footpath Tabley Inferior 3/1 where it passes close to the Proposed Scheme. The Proposed Scheme will remain a strong, linear element in the landscape. The magnitude of visual change will reduce to <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)
Year 30 – summer: Effects will reduce to non-significant for year 30 due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5: Appendix LV-001-0MA03).	Level of effect: Non-significant

<b>View north-west from Flittogate Lane (Medium sensitivity receptors) (VP 314-04-001)</b>	
Year 1 - winter and summer: Rural road users of Flittogate Lane of <b>medium</b> susceptibility and residents of Flittogate Lane, to the east of the viewpoint, of <b>high</b> susceptibility, both with <b>medium</b> value views, will experience noticeable changes to near and middle-distance views. The previously narrow rural lane will have been widened and diverted in a shallow cutting under the Proposed Scheme, via Arley Brook viaduct. Train movements and overhead line equipment will cross Arley Brook viaduct above the lane. Pickmere embankment and Arley Brook viaduct will be large-scale structures, seen in proximity to receptors. They will not be visible from dwellings on Flittogate Lane due to the screening effect of intervening existing vegetation and the distance of the new structures from the viewpoint. Mitigation planting will not be sufficiently established to provide any screening or visual integration at this stage.	Level of effect: <b>Moderate</b> adverse (significant)

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<b>View north-west from Flittogate Lane (Medium sensitivity receptors) (VP 314-04-001)</b>	
The combination of the above will result in a <b>medium</b> magnitude of visual change. The <b>medium</b> magnitude of visual change and <b>medium</b> sensitivity will result in a <b>moderate</b> adverse significant effect.	
Year 15 and year 30 – summer: Effects will reduce to non-significant for year 15 and remain so for year 30 due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5: Appendix LV-001-0MA03).	Level of effect: Non-significant

<b>View north-east from Pickmere Lane (High sensitivity receptors) (VP 314-03-002)</b>	
Year 1 - winter and summer: Users of Footpath Tabley Inferior 3/1, Footpath Tabley Inferior 4/1 and residents along Pickmere Lane, all of <b>high</b> susceptibility and with <b>medium</b> value views will experience substantial changes to near and middle-distance views. The realigned B5391 Pickmere Lane will be clearly visible from sections of the PRoW, and visible in narrow, framed, distant views from Pickmere Lane. PRoW users will see the overhead line equipment and train movements from the realigned Footpath Pickmere 9/1. They will also see the underside of Footpath Pickmere 9/1 underbridge as they walk under the bridge. Pickmere embankment, train movements and overhead line equipment will be largely screened from Pickmere Lane by intervening vegetation. Mitigation planting will not be sufficiently established to provide any screening or visual integration at this stage. The combination of the above will result in a <b>high</b> magnitude of visual change. The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.	Level of effect: <b>Major</b> adverse (significant)
Year 15 – summer: Landscape mitigation planting along Pickmere embankment will partially screen the embankment, but train movements and overhead line equipment will remain clearly visible in near and middle-distance views from the PRoW. Woodland habitat creation around the realigned B5391 Pickmere Lane and Arley Brook viaduct will largely screen these structures from dwellings on Pickmere Lane. The magnitude of visual change will reduce to medium and there will be a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)
Year 30 – summer: Effects will reduce to non-significant for year 30 due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5: Appendix LV-001-0MA03).	Level of effect: Non-significant

<b>View west from Footpath Pickmere 9/1 (High sensitivity receptors) (VP 314-03-003)</b>	
Year 1 - winter and summer: Users of Footpath Pickmere 9/1 of <b>high</b> susceptibility and with <b>medium</b> value views will experience substantial changes to near and middle-distance views. Pickmere embankment, the diverted Flittogate Lane and Footpath Pickmere 9/1 underbridge will be new and uncharacteristic structures introduced into view of the rural landscape. Footpath Pickmere 9/1 will have been diverted south and under Footpath Pickmere 9/1 underbridge. PRoW users will see Footpath Pickmere 9/1 underbridge, Pickmere embankment, train movements and overhead line equipment in near-distance views as they walk close to and under the Proposed Scheme. The diverted Flittogate Lane will be visible in near-distance views from the PRoW and the embankment will form a new backdrop to the view, diminishing the wooded character of the baseline view. In summer, the loss of intervening vegetation during construction means that the diverted lane, embankment and train movements will remain	Level of effect: <b>Major</b> adverse (significant)

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<b>View west from Footpath Pickmere 9/1 (High sensitivity receptors) (VP 314-03-003)</b>	
<p>visible. Mitigation planting will not be sufficiently established to provide any screening or visual integration at this stage.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	
<p>Year 15 – summer:</p> <p>Landscape and woodland planting along the diverted Flittogate Lane and Pickmere embankment will screen the road and embankment and the lower parts of the trains for footpath users along much of the PRoW. The Proposed Scheme will remain highly visible from the short stretch of the PRoW where it passes under Footpath Pickmere 9/1 underbridge.</p> <p>The magnitude of visual change will reduce to <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse            (Significant)</p>
<p>Year 30 – summer:</p> <p>Effects will reduce to non-significant for year 30 due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5: Appendix LV-001-0MA03).</p>	<p>Level of effect:            Non-significant</p>

<b>View south-east from School Lane (High sensitivity receptors) (VP 314-02-004)</b>	
<p>Year 1 - winter and summer:</p> <p>Residents of School Lane of <b>high</b> susceptibility and users of School Lane and Pickmere Lane of lower susceptibility, all with <b>medium</b> value views, will experience noticeable changes to near and middle-distance views. The widened School Lane will be visible in near-distance views from the properties in the lane and will alter the character of the view from a narrow, tree-lined lane to a wider road, built to modern standards. The widened School Lane will urbanise the view and the loss of trees from both sides of the lane during construction will open up new views across the adjacent landscape. Pickmere embankment, train movements and overhead line equipment will be visible in the middle distance, above intervening garden vegetation. Mitigation planting will not be sufficiently established to provide any screening or visual integration at this stage. However, in summer intervening vegetation in leaf will partially screen the Proposed Scheme from dwellings on School Lane.</p> <p>The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse            (significant)</p>
<p>Year 15 and year 30 - summer:</p> <p>Effects will reduce to non-significant for year 15 and remain so for year 30 due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5: Appendix LV-001-0MA03).</p>	<p>Level of effect:            Non-significant</p>

<b>View east from Budworth Road (Medium sensitivity receptors) (VP 314-03-005)</b>	
<p>Year 1 - winter and summer:</p> <p>Golfers, visitors to Heyrose Golf Club and road users of <b>medium</b> susceptibility and with <b>medium</b> value views will experience substantial changes to near and middle-distance views. Heyrose embankment, overhead line equipment and train movements will cross the view in proximity to receptors, screening all but near-distance views of the existing landscape. Heyrose embankment, train movements and overhead line equipment will be highly visible over the majority of the view due to the removal of vegetation during construction from the eastern side of the golf course and along Budworth Road. Mitigation planting will not be sufficiently established to provide any screening or visual integration at this stage.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p>	<p>Level of effect:  <b>Moderate</b> adverse            (significant)</p>

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<b>View east from Budworth Road (Medium sensitivity receptors) (VP 314-03-005)</b>	
The <b>high</b> magnitude of visual change and <b>medium</b> sensitivity will result in a <b>moderate</b> adverse significant effect.	
Year 15 – summer: Landscape mitigation planting along Heyrose embankment will screen the embankment, but train movements and overhead line equipment above will remain clearly visible in near-distance views from the eastern area of the golf course. Vegetation within the golf course will have grown sufficiently to restore the containment of views along the fairways. The landscape mitigation planting along Heyrose embankment will screen views east along Budworth Road and contain views of the agricultural landscape beyond. The magnitude of visual change will reduce to <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (Significant)
Year 30 – summer: Maturing landscape mitigation planting will largely screen Heyrose embankment and train movements from Budworth Road, though the tops of trains and the overhead line equipment may remain visible. The Proposed Scheme will remain prominent in views from the eastern end of the golf course and the wooded embankment will continue to screen long views along the road and contain views over the countryside. The magnitude of visual change will remain <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (Significant)

<b>View west from Budworth Road (High sensitivity receptors) (VP 314-02-006)</b>	
Year 1 - winter and summer: Residents of Budworth Road, Waterless Brook Cottages of <b>high</b> susceptibility and road users of lower susceptibility, all with <b>medium</b> value views, will experience substantial changes to near and middle-distance views. Arley Brook viaduct, Heyrose embankment, overhead line equipment and train movements will cross the view close to residents of Waterless Brook Cottages (on Pickmere Lane) and on Budworth Road. The Proposed Scheme will foreshorten existing views over the wider landscape. Views of the viaduct, embankment and Budworth Road auto-transformer station will be filtered from Pickmere Lane and Budworth Road by intervening vegetation in gardens and lining Tabley Brook. The Proposed Scheme will be continuously visible over the majority of the view from the roads and residential properties. Mitigation planting will not be sufficiently established to provide any screening or visual integration at this stage. The combination of the above will result in a <b>high</b> magnitude of visual change. The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect. A photomontage illustrating this scenario is included in Volume 5: Appendix LV-001-0MA03, Part 3.	Level of effect: <b>Major</b> adverse (Significant)
Year 15 – summer: Arley Brook viaduct will continue to be visible from Waterless Brook Cottages and Pickmere Lane but partially filtered by intervening vegetation. Landscape mitigation planting along Heyrose embankment and around Budworth Road auto-transformer station will partly screen the structures of the Proposed Scheme, but train movements and overhead line equipment will remain visible in gaps between and above the vegetation from Budworth Road. The vegetated embankment will further screen long views over the countryside. The magnitude of visual change will reduce to <b>medium</b> and there will be a <b>moderate</b> adverse significant effect. A photomontage illustrating this scenario is included in Volume 5: Appendix LV-001-0MA03, Part 3.	Level of effect: <b>Moderate</b> adverse (Significant)

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<b>View west from Budworth Road (High sensitivity receptors) (VP 314-02-006)</b>	
<p>Year 30 – summer:</p> <p>Maturing landscape mitigation planting will largely screen Heyrose embankment and train movements from Budworth Road, although the overhead line equipment may remain visible. The wooded embankment will continue to screen long views over the countryside. The magnitude of visual change will remain <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

<b>View north from Frog Lane and Footpath Pickmere 4/1 (High sensitivity receptors) (VP 314-02-007)</b>	
<p>Year 1- winter and summer:</p> <p>Residents of Frog Lane and Budworth Road, Pickmere and users of Footpath Pickmere 4/1 and Aston By Budworth 8/1 of <b>high</b> susceptibility and users of Frog Lane and Pickmere Lane of lower susceptibility, all with <b>medium</b> value views, will experience noticeable changes to near views. The loss of trees and hedgerow along the realigned Frog Lane and School Lane during construction, will open up wider views over the landscape and will alter the character of the view from one of a narrow, tree-lined lane to one of a wider road, built to modern standards. The removal of trees along Budworth Road to facilitate construction will open up views northwards and change the character of the view. Views from the Footpath Pickmere 4/1 and Aston By Budworth 8/1 will be largely filtered by intervening vegetation. Landscape mitigation planting will not be sufficiently mature to contribute to any visual integration or screening at this stage.</p> <p>The combination of the above will result in a <b>medium</b> magnitude of visual change. The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>
<p>Year 15 and year 30 - summer:</p> <p>Effects will reduce to non-significant for year 15 and remain so for year 30 due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5: Appendix LV-001-0MA03).</p>	<p>Level of effect:            Non-significant</p>

<b>View west from Old Hall Lane (High sensitivity receptors) (VP 315-02-001)</b>	
<p>Year 1 - winter and summer:</p> <p>Residents of Old Hall Lane and on the unnamed road off Old Hall Lane including Heyrose Cottages, Heyrose House and Field Cottage of <b>high</b> susceptibility and road users of lower susceptibility, all with <b>medium</b> value views, will experience substantial changes to near and middle-distance views. Train movements and overhead line equipment on Heyrose embankment will be clearly visible from Field Cottage and visible in filtered views from Heyrose Cottages and Heyrose House. The embankment will be a high, wide linear element, uncharacteristic within views and seen against the skyline. It will be largely screened by the undulating landform from Old Hall Lane, though the tops of trains will be visible in the far distance of the view as the Proposed Scheme rises towards the north. The loss of trees during construction along the unnamed road off Old Hall Lane will change the view from a shady tree-lined lane to a more open one. Landscape mitigation planting will not be sufficiently mature to contribute to any visual integration or screening at this stage.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change. The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>Due to its height, Heyrose embankment will remain as a large-scale linear element. However, landscape mitigation planting along Heyrose embankment will screen much of the</p>	<p>Level of effect:  <b>Moderate</b></p>

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<b>View west from Old Hall Lane (High sensitivity receptors) (VP 315-02-001)</b>	
embankment from Field Cottage, Heyrose Cottages and Heyrose House, but train movements along the top of the embankment and overhead line equipment will remain visible from these locations. The tops of trains will also remain visible in views from Old Hall Lane. The magnitude of visual change will reduce to <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.	adverse (Significant)
Year 30 – summer: Effects will reduce to non-significant for year 30 due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5: Appendix LV-001-0MA03).	Level of effect: Non-significant

<b>View west from North Cheshire Way, Restricted Byway Tabley Superior 4/1 (High sensitivity receptors) (VP 315-03-002)</b>	
Year 1 - winter and summer: PRoW users and residents of The Shooting Box of <b>high</b> susceptibility with <b>medium</b> value views will experience substantial changes to near and middle-distance views. Heyrose embankment will be a high, wide linear element, seen against the skyline from this location. Train movements and overhead line equipment on the embankment will be clearly visible from Restricted Byway Tabley Superior 4/1 as it approaches the Proposed Scheme. The view for PRoW users, as they go under the route of the Proposed Scheme, will change from one of a rural landscape to a view of the underside of Restricted Byway Tabley Superior 4/1 accommodation underbridge. The loss of hedgerows and occasional hedgerow trees along the restricted byway in construction, will open up views over the landscape from the road. From more distant locations along the PRoW, intervening vegetation, the winding route of the PRoW and undulating landform means that views of the embankment and train movements will be screened. Views north from the Shooting Box will continue to be largely screened by a woodland belt. Mitigation planting will not be sufficiently established to provide any screening or visual integration at this stage. The combination of the above will result in a <b>high</b> magnitude of visual change. The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.	Level of effect: <b>Major</b> adverse (significant)
Year 15 – summer: Landscape mitigation planting along Heyrose embankment will screen the lower parts of the embankment but the upper part of the embankment, train movements and overhead line equipment will remain clearly visible from the PRoW. Views north from The Shooting Box will continue to be largely screened by woodland. The magnitude of visual change will reduce to <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (Significant)
Year 30 – summer: Effects will reduce to non-significant for year 30 due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5: Appendix LV-001-0MA03).	Level of effect: Non-significant

<b>View east from North Cheshire Way, Footpath Aston by Budworth 6/1 (High sensitivity receptors) (VP 315-02-003)</b>	
Year 1 - winter and summer: Residents of Hollowood Farm and users of North Cheshire Way (Footpath Aston by Budworth 6/1, Footpath Tabley Superior 10/1 and Restricted Byway Tabley Superior 4/1) of <b>high</b> susceptibility with <b>medium</b> value views will experience substantial changes to near and middle-distance views. Heyrose embankment, M6 Mere viaduct, train movements and overhead line equipment will be visible in filtered and partially screened views from Hollowood Farm and clearly visible from North Cheshire Way where it approaches the Proposed Scheme.	Level of effect: <b>Major</b> adverse (significant)

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<b>View east from North Cheshire Way, Footpath Aston by Budworth 6/1 (High sensitivity receptors) (VP 315-02-003)</b>	
<p>The embankment and viaduct will form a high, wide linear element, seen against the skyline. From more distant locations along the PRoW, intervening vegetation, the curving route of the PRoW and the gently undulating landform will screen views of the embankment and train movements for footpath users. Mitigation planting will not be sufficiently established to provide any screening or visual integration at this stage.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	
<p>Year 15 – summer:</p> <p>Landscape mitigation planting along Heyrose embankment will screen the lower parts of the embankment but as the Proposed Scheme will rise to cross the M6 at this point, the upper part of the embankment, train movements and the overhead line equipment will remain clearly visible from the PRoW and partially visible from Hollowood Farm. M6 Mere viaduct will remain a high level structure in views but will be seen in the context of the M6 road corridor.</p> <p>The magnitude of visual change will reduce to <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (Significant)</p>
<p>Year 30 – summer:</p> <p>Effects will reduce to non-significant for year 30 due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5: Appendix LV-001-0MA03).</p>	<p>Level of effect:            Non-significant</p>

<b>View west from Bentleyhurst Farm and Bridleway Mere 1/1 (High sensitivity receptors) (VP 315-03-004)</b>	
<p>Year 1 - winter and summer:</p> <p>Users of Bridleway Mere 1/1 and 1/2 and residents of Bentleyhurst Farm of <b>high</b> susceptibility and with <b>medium</b> value views will experience noticeable changes to near and middle-distance views. Train movements and overhead line equipment on Hoo Green South embankments (No.1-3) will be clearly visible from the PRoW as it approaches and passes under the Proposed Scheme. Views of the Proposed Scheme and diverted overhead power lines will be visible in narrow, filtered views from Bentleyhurst Farm. The embankments will form a high, wide linear element, seen against the skyline from these locations. The view for PRoW users, as they go under the route of the Proposed Scheme, will change from one of a rural landscape to a view of the underside of the wide Bridleway Mere 1/1 accommodation underbridge. From more distant locations along the PRoW, intervening buildings, vegetation, the curving route of the PRoW and undulating landform will screen views of the embankment and train movements. Mitigation planting will not be sufficiently established to provide any screening or visual integration at this stage.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b>            adverse            (significant)</p>
<p>Year 15 – summer:</p> <p>Landscape mitigation planting along Hoo Green South embankments (No.1-3) will screen the lower parts of the embankment but it will rise to cross the M6 at this point, and consequently the top part of the embankment, train movements and the overhead line equipment will remain clearly visible from the PRoW. The diverted overhead power line will be apparent in views north from Bentleyhurst Farm.</p> <p>The magnitude of visual change will reduce to <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (Significant)</p>
<p>Year 30 – summer:</p>	<p>Level of effect:            Non-significant</p>

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<b>View west from Bentleyhurst Farm and Bridleway Mere 1/1 (High sensitivity receptors) (VP 315-03-004)</b>	
Effects will reduce to non-significant for year 30 due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5: Appendix LV-001-0MA03).	

<b>View east from Winterbottom Lane at Winterbottom Farm (High sensitivity receptors) (VP 315-02-005)</b>	
<p>Year 1 - winter and summer:</p> <p>Residents on Winterbottom Lane and users of Restricted Byway Mere 2/1 of <b>high</b> susceptibility and with <b>medium</b> value views will experience substantial changes to the composition of near and middle-distance views. Hoo Green South embankments (No.1-3), train movements and overhead line equipment will be visible in clear views from Winterbottom Farm and in filtered or partly screened views from other dwellings on Winterbottom Lane. Winterbottom Lane telecommunications site and Hoo Green box structure will be visible in the far distance of views to the north due to the removal of intervening vegetation during construction. The embankments will form a high, wide linear element which will cross the skyline and will be uncharacteristic of existing views over the gently, undulating rural landscape. Mitigation planting will not be sufficiently established to provide any screening or visual integration at this stage.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p> <p>A photomontage illustrating this scenario is included in Volume 5: Appendix LV-001-0MA03, Part 3.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>Landscape mitigation planting along Hoo Green South embankments (No.1-3) will screen the lower parts of the structure but their large-scale means that the top of the embankments, train movements and the overhead line equipment will remain clearly visible in filtered views from Winterbottom Lane.</p> <p>The magnitude of visual change will reduce to <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect: <b>Moderate</b> adverse (Significant)</p>
<p>Year 30 – summer:</p> <p>Maturing landscape mitigation planting will screen Hoo Green South embankments (No.1-3) and the lower parts of trains. The Proposed Scheme will remain as a large-scale linear element foreshortening views over the landscape. Train movements and the overhead line equipment will remain visible above the wooded embankments.</p> <p>The magnitude of visual change will remain <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect: <b>Moderate</b> adverse (Significant)</p>

<b>View east from Goodiersgreen Farm (High sensitivity receptors) (VP 316-02-002)</b>	
<p>Year 1 - winter and summer:</p> <p>Residents of Hoo Green Lane and Winterbottom Lane of <b>high</b> susceptibility and road users of Hoo Green Lane and Winterbottom Lane of lower susceptibility, all with <b>medium</b> value views, will experience substantial changes to near and middle-distance views. Hoo Green box structure and Hoo Green South and North embankments will screen existing views of Belt Wood, altering a key characteristic of far distance views. An existing overhead line will have been diverted to the eastern side of the wood and will be visible in the far distance, above the Proposed Scheme. A substantial landscape earthwork will screen the lower parts of Hoo Green box structure and Hoo Green South and North embankments, but the overhead line equipment and train movements will be visible above the earthworks. The Proposed Scheme will introduce a large-scale linear element across the majority of existing views over a rural</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>



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<b>View east from Goodiersgreen Farm (High sensitivity receptors) (VP 316-02-002)</b>	
<p>landscape. Mitigation planting will not be sufficiently established to provide any screening or visual integration at this stage.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	
<p>Year 15 – summer:</p> <p>The mitigation planting on landscape earthworks west of the Proposed Scheme will further screen Hoo Green South and North embankments. However, the large-scale of Hoo Green box structure means that, together with train movements and overhead line equipment, it will remain prominent across the majority of the view.</p> <p>The magnitude of visual change will therefore remain <b>high</b> and there will be a <b>major</b> adverse significant effect.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>The maturity of the mitigation planting along the western boundary will largely screen Hoo Green South and North embankments. However, the large-scale of Hoo Green box structure means that it will remain highly visible across the majority of the view.</p> <p>The magnitude of visual change will reduce to <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect: <b>Moderate</b> adverse (significant)</p>

<b>View west from Hoo Green Lane (High sensitivity receptors) (VP 316-02-003)</b>	
<p>Year 1 - winter and summer:</p> <p>Residents on Oak Wood Road, Hoo Green Lane and at New Cottages on the A50 Cliff Lane/Warrington Road/Knutsford Road of <b>high</b> susceptibility and users of Hoo Green Lane of lower susceptibility, all with <b>medium</b> value views will experience substantial changes to near and middle-distance views. A50 Warrington Road overbridge, the realigned A50 Warrington Road and pumping station (adjacent to the overbridge) will be prominent in views north-west from Oak Wood Road. Hoo Green North cutting will be screened by a landscape earthwork in views west from Oak Wood Road. The Proposed Scheme will descend into Hoo Green North cutting west of Oak Wood Road and consequently views of overhead line equipment and train movements will be screened from properties. Hoo Green box structure, Hoo Green North embankment, overhead line equipment and train movements will be apparent in filtered, distant views south-west from Oak Wood Road. From the diverted Hoo Green Lane looking east, Hoo Green box structure, Hoo Green North embankment and A50 Warrington Road overbridge will be partly screened by a landscape earthwork. Mitigation planting will not be sufficiently established to provide any screening or visual integration at this stage.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and high sensitivity will result in a <b>major</b> adverse significant effect.</p> <p>A photomontage illustrating this scenario is included in Volume 5: Appendix LV-001-0MA03, Part 3.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>The mitigation planting along the eastern boundary of the Proposed Scheme will largely screen Hoo Green North cutting, train movements, overhead line equipment and pumping station from houses on Oak Wood Road. A50 Warrington Road overbridge and Hoo Green box structure will remain apparent in views from the diverted Hoo Green Lane and Oak Wood Road, but they will be largely screened and filtered through mitigation planting east and west of the Proposed Scheme. The existing wide view over open farmland will change in character to a more wooded view.</p>	<p>Level of effect: <b>Moderate</b> adverse (significant)</p>

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<b>View west from Hoo Green Lane (High sensitivity receptors) (VP 316-02-003)</b>	
The magnitude of visual change will reduce to <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.	
Year 30 – summer: Operational effects will remain non-significant by year 30 due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5: Appendix LV-001-0MA03).	Level of effect: Non-significant

<b>View south-west from A50 Cliff Lane/Warrington Road/Knutsford Road (High sensitivity receptors) (VP 316-02-004)</b>	
Year 1 - winter and summer: Residents on the A50 Cliff Lane/Warrington Road/Knutsford Road of <b>high</b> susceptibility and road users of lower susceptibility with <b>medium</b> value views will experience noticeable changes to middle-distance views. Hoo Green box structure and Hoo Green North embankment will be visible, partially screened by landscape earthworks, in views south-west from the A50 Cliff Lane/Warrington Road/Knutsford Road and residential properties along or adjacent to the road. The Proposed Scheme will be a large-scale linear element crossing the majority of the view in a rural landscape setting. Train movements will be uncharacteristic within views. The corridors of vegetation cleared during the diversion of a gas pipeline and overhead power line will be restored to their former condition, but views over the landscape will change as a result of loss of woodland, trees and hedgerows. Trees will not be replaced along the gas pipeline corridor due to the operational requirements of the utility provider. The hedgerows will be restored but they will be immature, leaving gaps in field boundaries. Mitigation planting will not be sufficiently established to provide any screening or visual integration at this stage. The combination of the above will result in a <b>medium</b> magnitude of visual change. The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)
Year 15 – summer: The mitigation planting along the eastern boundary of the Proposed Scheme will screen Hoo Green North embankment and the lower levels of Hoo Green box structure. However, existing wide views over open farmland will become less extensive and more wooded. The magnitude of visual change will remain <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)
Year 30 – summer: Operational effects will become non-significant due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5: Appendix LV-001-0MA03).	Level of effect: Non-significant

<b>View west from Bowden View Lane (High sensitivity receptors) (VP 317-02-001)</b>	
Year 1 - winter and summer: Residents of Bowden View Lane of <b>high</b> susceptibility and road users on Bowden View Lane of lower susceptibility all with <b>medium</b> value views will experience noticeable changes to middle-distance views. The skyline will become more open with the loss of trees during construction from Holly House Farm, Bowden View Farm and the garden of Mere Court Hotel, which will itself become more prominent in views. The loss of Holly House Farm and Bowden View Farm during construction will remove structures from the existing view over a rural landscape and A50 Warrington Road overbridge will be visible in the distance. Landscape mitigation earthworks will screen Hoo Green North cutting eastern slope. Train movements and overhead line equipment in the Hoo Green North cutting will not be visible. Mitigation	Level of effect: <b>Moderate</b> adverse (significant)

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<b>View west from Bowden View Lane (High sensitivity receptors) (VP 317-02-001)</b>	
<p>planting will not be sufficiently established to provide any screening or visual integration at this stage.</p> <p>The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	
<p>Year 15 and year 30 - summer:</p> <p>Effects will reduce to non-significant for year 15 and remain so for year 30 due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5: Appendix LV-001-0MA03).</p>	<p>Level of effect: Non-significant</p>

<b>View south-east from the A50 at Mere Court Hotel (High sensitivity receptors) (VP 317-02-002)</b>	
<p>Year 1 - winter and summer:</p> <p>Residents of the A50 Cliff Lane/Warrington Road/Knutsford Road of <b>high</b> susceptibility and road users of the A50 and guests at Mere Court hotel of lower susceptibility, all with <b>medium</b> value views will experience substantial changes to near and middle-distance views. A50 Warrington Road overbridge over Hoo Green North cutting and the new A50 Warrington Road/Hoo Green Lane junction opposite Mere Court Hotel will be prominent in the near-distance. The removal of trees in the garden of Mere Court Hotel during the construction phase will allow views of Hoo Green North cutting. South of the A50 Warrington Road, where the Proposed Scheme will be on embankment, at grade or in shallow cutting, loss of trees and hedgerows during construction will allow views of overhead line equipment and the train movements. Hoo Green box structure will be apparent in the far distance due to its large-scale and the removal of intervening vegetation in construction. The Proposed Scheme will introduce new infrastructure structures across the majority of existing views over a rural landscape. Mitigation planting will not be sufficiently established to provide any screening or visual integration at this stage.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>A50 Warrington Road overbridge will remain highly visible in near views from the A50 Warrington Road and Mere Court Hotel. The proximity of Hoo Green North cutting to Mere Court Hotel garden means that the cutting will continue to be visible from the garden, however, some views will be partially filtered through a hedgerow planted along the garden boundary. Due to the growth of the mitigation planting between the western boundary of the Proposed Scheme and the diverted Hoo Green Lane, Hoo Green North cutting, overhead line equipment and train movements will be screened from views looking south (except from A50 Warrington Road overbridge). Hoo Green box structure will be largely screened in the distance, by intervening vegetation.</p> <p>The magnitude of visual change will remain <b>high</b> due to the substantial changes to the near-distance views resulting in a <b>major</b> adverse significant effect.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>The maturing mitigation planting along the western boundary of the Proposed Scheme and the diverted Hoo Green Lane will provide further screening and filtering of views from the A50 Warrington Road, residential properties and the hotel. Views to Hoo Green North cutting will be partially filtered through a hedgerow planted along the garden boundary.</p> <p>The magnitude of visual change will reduce to <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect: <b>Moderate</b> adverse (significant)</p>

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<b>View west from Hulseheath Lane (High sensitivity receptors) (VP 317-02-005)</b>	
<p>Year 1 - winter and summer:</p> <p>Residents of Hulseheath Lane and Chapel Lane (in the adjoining Hulseheath to Manchester Airport area (MA06)) of <b>high</b> susceptibility and road users of lower susceptibility both with <b>medium</b> value views will experience substantial changes to near and middle-distance views. Loss of trees, hedgerows and woodland during construction and utilities works will result in open views of Peacock Lane grid supply point, Hulseheath South embankment, train movements and overhead line equipment from residential properties on Hulseheath Lane and Chapel Lane. An overhead power line will have been diverted closer to the viewpoint. The Proposed Scheme will introduce large-scale structures that are out of character with the existing views over a rural and wooded landscape. Landscape earthworks will screen the lower levels of the Peacock Lane grid supply point. However, mitigation planting will not be sufficiently established to provide any screening or visual integration at this stage.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>Growth of landscape mitigation planting, partly on landscape earthworks, will screen much of Peacock Lane grid supply point but train movements and overhead line equipment will remain visible above the vegetation.</p> <p>The magnitude of visual change will reduce to <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect: <b>Moderate</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>Operational effects will reduce to non-significant by year 30 due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5: Appendix LV-001-OMA03).</p>	<p>Level of effect: Non-significant</p>

<b>View north from Broom Manor (High sensitivity receptors) (VP 317-02-006)</b>	
<p>Year 1 - winter and summer:</p> <p>Residents of Broom Manor, Gorse Cottage and Barn and Four Acres of <b>high</b> susceptibility and road users of Peacock Lane of lower susceptibility, all with <b>medium</b> value views will experience substantial changes to near and middle-distance views. Hulseheath South embankment, Hulseheath North embankment (partly in the adjoining Hulseheath to Manchester Airport area (MA06)) and Peacock Lane viaduct will be new, large-scale structures, in the near distance, forming a barrier to views north towards Back Lane and Thowler Lane. Peacock Lane grid supply point will be apparent in views filtered through intervening vegetation. The train movements on the embankments and viaduct will introduce uncharacteristic movement into views. Landscape earthworks will screen the lower levels of the grid supply point. However, mitigation planting will not be sufficiently established to provide any screening or visual integration at this stage.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>Landscape mitigation planting will screen Hulseheath South and Hulseheath North embankments in the near distance and Peacock Lane grid supply point in the middle distance of the view, but Peacock Lane viaduct, train movements and overhead line equipment will be clearly visible.</p> <p>The magnitude of visual change will remain <b>high</b> and there will be a <b>major</b> adverse significant effect.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>

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<b>View north from Broom Manor (High sensitivity receptors) (VP 317-02-006)</b>	
<p>Year 30 – summer:</p> <p>Maturing landscape mitigation planting will result in the screening of train movements and Peacock Lane viaduct. The overhead line equipment will remain visible. The existing view over open fields will become less open, with a linear woodland belt crossing the middle-distance. The magnitude of visual change will reduce to <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

<b>View south from Thowler Lane (High sensitivity receptors) (VP 317-02-008)</b>	
<p>Year 1 - winter and summer:</p> <p>Residents of from Five Acres and other residential properties on Back Lane and Thowler Lane of <b>high</b> susceptibility and road users of lower susceptibility, all with <b>medium</b> value views will experience substantial changes to near and middle-distance views. Hoo Green North cutting and Peacock Lane overbridge will be large-scale structures in the view from Back Lane. Vegetation clearance during construction will open up views of the realigned Peacock Lane, Peacock Lane auto-transformer feeder station, Peacock Lane viaduct and Hulseheath North embankment from Back Lane and Thowler Lane. Some views will be partially screened by intervening farm buildings and garden vegetation. Train movements along the embankment and viaduct will be uncharacteristic within the view. Mitigation planting will not be sufficiently established to provide any screening or visual integration at this stage. The combination of the above will result in a <b>high</b> magnitude of visual change. The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>Landscape mitigation planting along the realigned Peacock Lane will be close to receptors in Back Lane and will effectively filter and screen the lower parts of the Proposed Scheme. Peacock Lane overbridge and the tops of trains and overhead line equipment in Hoo Green North cutting will remain visible from Back Lane. Train movements and overhead line equipment on Hulseheath North embankment and Peacock Lane viaduct will remain visible above intervening vegetation along Thowler Lane. The magnitude of visual change will reduce to <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>Maturing landscape mitigation planting will further screen train movements, Hulseheath North embankment and Peacock Lane viaduct, but due to the height of the structures, the Proposed Scheme will remain visible above intervening vegetation. The magnitude of visual change will remain <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

<b>View east from Moss Lane (High sensitivity receptors) (VP 317-02-009)</b>	
<p>Year 1 - winter and summer:</p> <p>Residents of Moss Lane and Peacock Lane and users of Footpath High Legh 4/1 of <b>high</b> susceptibility and road users of Moss Lane and Peacock Lane of lower susceptibility, all with <b>medium</b> value views, will experience a substantial alteration to near and middle-distance views. Peacock Lane overbridge, Peacock Lane auto-transformer feeder station and Hoo Green North cutting will be large-scale new structures introduced in existing views over the rural landscape. The realigned Peacock Lane will mean Peacock Lane is located further from Little Moss Farm than it is at present. Middle-distance views of the Proposed Scheme from Whyte Cottage on Moss Lane will be screened or filtered through intervening vegetation. Mitigation</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

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<b>View east from Moss Lane (High sensitivity receptors) (VP 317-02-009)</b>	
<p>planting will not be sufficiently established to provide any screening or visual integration at this stage.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	
<p>Year 15 – summer:</p> <p>Landscape mitigation planting along the realigned Peacock Lane and along the route of the Proposed Scheme will largely screen Peacock Lane auto-transformer feeder station from Little Moss Farm and dwellings at Moss Farm and will begin to restore the tree-lined character of Peacock Lane. The landscape mitigation planting along the top of Hoo Green North cutting will screen the cutting from Little Moss Farm. Peacock Lane overbridge will remain visible above intervening vegetation in the middle distance.</p> <p>The magnitude of visual change will reduce to <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>
<p>Year 30 – summer:</p> <p>Operational effects will reduce to non-significant by year 30 due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5: Appendix LV-001-OMA03).</p>	<p>Level of effect:            Non-significant</p>

<b>View south-west from Agden Lane (High sensitivity receptors) (VP 318-02-001)</b>	
<p>Year 1 - winter and summer:</p> <p>Residents on Agden Lane, and at the junction of Thowler Lane with Boothbank Lane of <b>high</b> susceptibility and road users of lower susceptibility, all with <b>medium</b> value views will experience substantial changes to near-distance views. Removal of vegetation in construction will open up views of High Legh cutting, a large-scale structure that will cut cross open fields and alter the appearance of the landscape. Peacock Lane overbridge will be a new element in the background of the view. Views of the cutting and overbridge will be filtered through intervening vegetation from the dwellings at the junction of Thowler Lane and Boothbank Lane. The train movements will introduce uncharacteristic movement into the view south from Middle Moss Farm. Mitigation planting will not be sufficiently established to provide any screening or visual integration at this stage.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse            (significant)</p>
<p>Year 15 – summer:</p> <p>Landscape mitigation planting along High Legh cutting will largely screen the cutting from Middle Moss Farm and Agden Lane, but it will foreshorten existing open views over the landscape. The magnitude of visual change will reduce to <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>
<p>Year 30 – summer:</p> <p>Operational effects will reduce to non-significant by year 30 due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5: Appendix LV-001-OMA03).</p>	<p>Level of effect:            Non-significant</p>

<b>View east from Agden Lane (High sensitivity receptors) (VP 318-02-005)</b>	
<p>Year 1 - winter and summer:</p> <p>Residents of Agden Lane and Moss Lane of <b>high</b> susceptibility and road users of lower susceptibility all with <b>medium</b> value views will experience substantial changes to near-distance views. High Legh cutting will be a large-scale structure crossing the open fields and altering the appearance of the landscape. The cutting will be visible across the majority of the view.</p>	<p>Level of effect:  <b>Major</b> adverse            (significant)</p>

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<b>View east from Agden Lane (High sensitivity receptors) (VP 318-02-005)</b>	
<p>Landscape earthworks along the top of High Legh cutting will partially screen the near cutting slopes, but the far slopes are likely to remain visible. Train movements and overhead line equipment will be uncharacteristic elements in views and will be visible to the south, along the cutting. Mitigation planting will not be sufficiently established to provide any screening or visual integration at this stage.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	
<p>Year 15 – summer:</p> <p>High Legh cutting will be largely screened in views from Agden Lane and Moss Lane by a combination of landscape earthworks, landscape mitigation planting and by garden vegetation. Existing open views south and east over farmland will be replaced by a linear woodland belt along the top of High Legh cutting crossing in the near distance. The cutting and train movements will remain visible in filtered views, due to its width, depth and proximity to the receptor.</p> <p>The magnitude of visual change will reduce to <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>
<p>Year 30 – summer:</p> <p>Maturing mitigation planting will further reduce the visibility of the Proposed Scheme. High Legh cutting will be largely screened by landscape earthworks and mitigation planting, but the loss of the openness of the existing view will remain.</p> <p>The magnitude of visual change will remain <b>medium</b> and there will continue to be a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>

<b>View east from Footpath Agden 2/3 (High sensitivity receptors) (VP 318-02-006)</b>	
<p>Year 1 - winter and summer:</p> <p>Residents of Agden Hall and 'Four Winds' and users of Footpaths Agden 2/3, 2/4 and 3/3 of <b>high</b> susceptibility and with <b>medium</b> value views, will experience substantial changes to near and middle-distance views. Agden cutting and Lymm South embankment will be visible across the majority of the view from an elevated position and will be new, large-scale structures crossing open fields and altering the appearance of the landscape. The Proposed Scheme will be partly screened by the sloping intervening landform and landscape earthworks. Train movements and the overhead line equipment will be visible in the far distance of the view emerging from cutting and onto Lymm South embankment. Train movements and the overhead line equipment will be partly screened by the intervening landform and earthworks, but uncharacteristic elements within the view. The view for PRow users as they pass under Agden Brook Farm accommodation underbridge will change from one of an open rural landscape to one of the underside of the wide underbridge. Mitigation planting will not be sufficiently established to provide any screening or visual integration at this stage.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse            (significant)</p>
<p>Year 15 – summer:</p> <p>Agden cutting and Lymm South embankment will be largely screened in views by a combination of landscape earthworks and landscape mitigation planting. However, the cutting, embankment and train movements will remain visible from properties at Agden Hall. The existing open view over fields will become less open, with a linear woodland belt crossing in the near and middle distance and filtering long views towards Dunham Massey, the hills of the Peak District and Manchester. Train movements and overhead line equipment on Lymm South</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>

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<b>View east from Footpath Agden 2/3 (High sensitivity receptors) (VP 318-02-006)</b>	
embankment will continue to be visible above the landscape mitigation planting in the far distance. The magnitude of visual change will reduce to <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.	
Year 30 – summer: Operational effects will reduce to non-significant by year 30 due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5: Appendix LV-001-0MA03).	Level of effect: Non-significant

<b>View west from Footpath Agden 1/4 (High sensitivity receptors) (VP 318-03-007)</b>	
Year 1 - winter and summer: Users of Footpaths Agden 1/2, 1/4 and 5/1 of <b>high</b> susceptibility and with <b>medium</b> value views will experience substantial changes to views. Agden cutting will be largely screened by the intervening sloping landform, but the Proposed Scheme as it emerges from cutting and rises onto Lymm South embankment will be visible across part of the view. The embankment will be a high, wide new linear element, crossing open fields and seen against the skyline from Footpath Agden 1/4, which will have been diverted to cross under the Proposed Scheme. The view for PRoW Footpath Agden 1/4, as they pass under the Proposed Scheme will change from one of a rural landscape to a view of the underside of Agden Brook Farm accommodation underbridge. The overhead line equipment on the embankment and underbridge will be clearly visible from the PRoW and the train movements will be uncharacteristic within views. Mitigation planting will not be sufficiently established to provide any screening or visual integration at this stage. The combination of the above will result in a <b>high</b> magnitude of visual change. The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse effect.	Level of effect: <b>Major</b> adverse (significant)
Year 15 – summer: Lymm South embankment will be largely screened by landscape mitigation planting, but the upper parts of trains and the overhead line equipment will remain clearly visible above the vegetation. The magnitude of visual change will reduce to <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)
Year 30 – summer: Operational effects will reduce to non-significant by year 30 due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5: Appendix LV-001-0MA03).	Level of effect: Non-significant

<b>View south-west from Footpath Agden 9/2 (High sensitivity receptors) (VP 318-03-010)</b>	
Year 1 - winter and summer: Users of the Cheshire Ring Canal Walk, Footpath Agden 9/2 and recreational boat users on the Bridgewater Canal of <b>high</b> susceptibility and with <b>medium</b> value views will experience substantial changes to near and middle-distance views. Lymm South embankment, A56 Lymm Road viaduct, A56 Lymm Road telecommunications site, Lymm North embankment and Bridgewater Canal viaduct (in the Broomedge to Glazebrook area (MA04)) along with noise fence barriers and boundary fencing, will be new and uncharacteristic structures in views of an otherwise rural landscape and will be visible across a large proportion of the view. Overhead line equipment and noise fence barriers will combine to form a large-scale linear element which will screen almost all but near-distance views of the landscape beyond. Views north-west along the canal will be maintained, but they will be narrower and framed between the embankments and the viaduct. Train movements on the embankments and viaducts will introduce uncharacteristic movement into views. The large balancing pond, access road and	Level of effect: <b>Major</b> adverse (significant)



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<b>View south-west from Footpath Agden 9/2 (High sensitivity receptors) (VP 318-03-010)</b>	
<p>perimeter fencing between Warrington Lane and the A56 Lymm Road will detract from the rural character of the existing field. Mitigation planting will not be sufficiently established to provide any screening or visual integration at this stage.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p> <p>A photomontage illustrating this scenario is included in Volume 5: Appendix LV-001-0MA03, Part 3.</p>	
<p>Year 15 – summer:</p> <p>Landscape mitigation planting on Lymm South embankment and Lymm North embankment and along the Proposed Scheme will partially screen train movements and noise fence barriers but the large-scale of the structures means that A56 Lymm Road viaduct and Bridgewater Canal viaduct (in the Broomedge to Glazebrook area (MA04)) and the overhead line equipment will remain prominent across the majority of the view.</p> <p>The magnitude of visual change will remain <b>high</b> and there will be a <b>major</b> adverse significant effect.</p> <p>A photomontage illustrating this scenario is included in Volume 5: Appendix LV-001-0MA03, Part 3.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>The maturing of the landscape mitigation planting will further reduce the visibility of the Proposed Scheme. The landscape mitigation planting will screen train movements, noise fence barriers and overhead line equipment where they are on Lymm South embankment and Lymm North embankment but where they are on A56 Lymm Road viaduct and Bridgewater Canal viaduct (in the Broomedge to Glazebrook area (MA04)), they will remain visible. The Proposed Scheme will continue to be prominent across the majority of the view.</p> <p>The magnitude of visual change will remain <b>high</b> and there will be a <b>major</b> adverse significant effect.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>

<b>View west from Footpath Agden 6/2 and Spring Lane (High sensitivity receptors) (VP 319-02-001)</b>	
<p>Year 1 - winter and summer:</p> <p>Residents of Woolstencroft Cottage and Woolstencroft Farm and users of Footpath Agden 6/2 of <b>high</b> susceptibility and with <b>medium</b> value views will experience substantial changes to middle-distance views. Lymm North embankment, as well as Heatley South embankment and Bridgewater Canal viaduct (in the Broomedge to Glazebrook area (MA04)) will be large-scale linear structures which, due to their height, will be visible across much of the view. Agden Brow and the woodland belts on higher ground to the west will remain visible above the new structures, but many existing long views west will be restricted. Train movements on the embankments and viaduct will introduce uncharacteristic movement into views. Mitigation planting will not be sufficiently established to provide any screening or visual integration at this stage.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p> <p>A photomontage illustrating this scenario is included in Volume 5: Appendix LV-001-0MA03, Part 3.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>Landscape mitigation planting on Lymm North embankment and Heatley South embankment viaduct (in the Broomedge to Glazebrook area (MA04)) will screen the embankments, but the scale of the structures means train movements and overhead line equipment on Bridgewater</p>	<p>Level of effect: <b>Moderate</b> adverse (significant)</p>

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<b>View west from Footpath Agden 6/2 and Spring Lane (High sensitivity receptors) (VP 319-02-001)</b>	
Canal viaduct (in the Broomedge to Glazebrook area (MA04)) and on the embankments will remain visible across the majority of the view. The magnitude of visual change will reduce to <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.	
Year 30 – summer: The maturing of the landscape mitigation planting will further reduce the visibility of the Proposed Scheme, but train movements across Bridgewater Canal viaduct (in the Broomedge to Glazebrook area (MA04)) will remain visible across the majority of the view. The planting will form a linear woodland which will foreshorten long views of the landscape to the west. The magnitude of visual change will remain <b>medium</b> and there will be a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)

## Other mitigation measures

- 11.5.10 The permanent effects of the Proposed Scheme on landscape and visual receptors have been reduced through integration of the measures described in this section. Effects in year 1 may also be further reduced through establishing planting early or in advance of the main construction programme.

## Summary of likely residual significant effects

- 11.5.11 In many cases, significant effects will reduce over time as the proposed mitigation planting matures and reaches its designed intention. However, the following likely residual significant effects will remain at year 15 of operation:
- major adverse effects in relation to one LCA;
  - major adverse visual effects at three representative residential viewpoint locations;
  - major adverse visual effects at one recreational viewpoint location;
  - moderate adverse visual effects at 14 representative residential viewpoint locations; and
  - moderate adverse visual effects at eight recreational viewpoint locations.

## Cumulative effects

### Cumulative landscape effects

- 11.5.12 No significant cumulative temporary effects during operation are anticipated.

### Cumulative visual effects

- 11.5.13 No significant cumulative temporary effects during operation are anticipated.

## Monitoring

- 11.5.14 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.

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- 11.5.15 There are no area-specific requirements for monitoring landscape and visual mitigation during the operation of the Proposed Scheme in the Pickmere to Agden and Hulseheath area.

## 12 Socio-economics

### 12.1 Introduction

- 12.1.1 This section reports on the environmental baseline, likely economic and employment impacts as well as significant effects during construction and operation of the Proposed Scheme within the Pickmere to Agden and Hulseheath area. The assessment considers existing businesses, community organisations, local employment and local economies, including planned growth and development.
- 12.1.2 Engagement with Cheshire East Council (CEC) and Cheshire West and Chester Council (CWCC) has been undertaken as part of the development of the Proposed Scheme. The purpose of the engagement was to increase the understanding of socio-economic characteristics identified through a review of publicly available data.
- 12.1.3 The socio-economic effects on employment at a route-wide level are reported in Volume 3, Route-wide effects (Section 12). Maps showing the location of the key environmental features (Map Series CT-10) and the key construction (Map Series CT-05) and operational (Map Series CT-06) features of the Proposed Scheme can be found in the Volume 2: MA03 Map Book. The Proposed Scheme is described in Section 2.

### 12.2 Scope, assumptions and limitations

- 12.2.1 The scope, assumptions and limitations for the socio-economics assessment are set out in Volume 1 (Section 8) and the EIA Scope and Methodology Report (SMR)<sup>96</sup>. The assessment of in-combination effects draws upon the findings of other technical disciplines (e.g. air quality, sound, noise and vibration, landscape and visual and traffic and transport).

### 12.3 Environmental baseline

#### Existing baseline

#### Study area description

- 12.3.1 The following provides a brief overview of employment, economic structure, labour market and business premises availability within the Pickmere to Agden and Hulseheath area which lies within the administrative areas of CEC, CWCC and Trafford Metropolitan Borough Council (TMBC) and within the North West region. It also falls within the Cheshire and Warrington Local Enterprise Partnership (LEP) area. Given that the Proposed Scheme does

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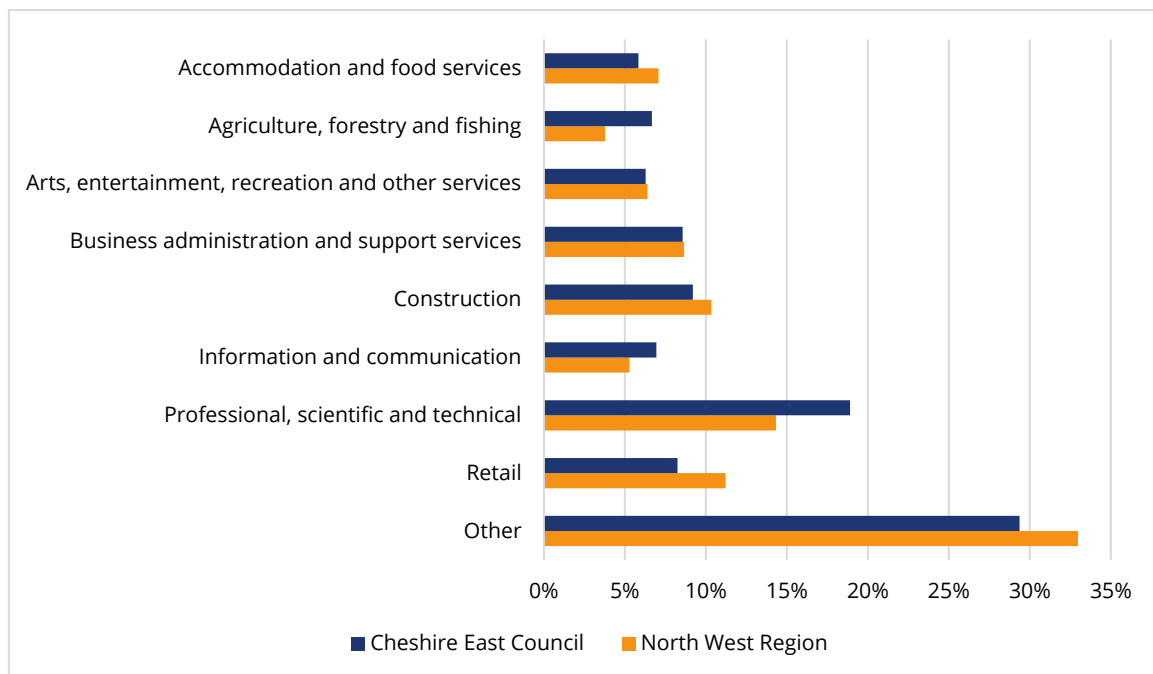
<sup>96</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

not run through CWCC and TMBC, data for these areas are not included in the socio-economic baseline.

## Business and labour market

12.3.2 Within the CEC administrative area there is a wide spread of business types reflecting a diverse range of commercial activities. In 2020, the professional, scientific and technical sector accounted for the largest proportion of businesses (19%), with construction the second largest (9%), followed by business administration and support services (9%) and retail (8%), as shown in Figure 16. For comparison within the North West region, the largest sectors were professional, scientific and technical (14%) and retail (11%), followed by construction (10%) and business administration and support services (9%)<sup>97</sup>.

**Figure 16: Business sector composition in the Cheshire East Council area and the North West region**



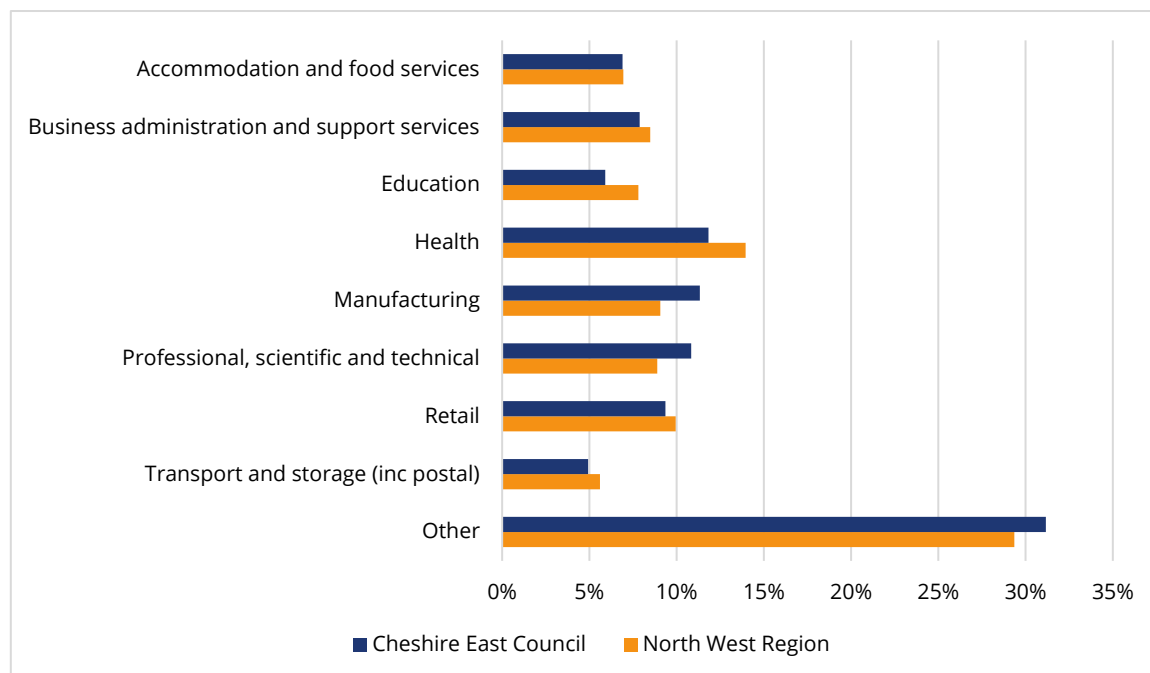
12.3.3 In 2019<sup>98</sup>, approximately 203,000 people worked in the CEC area. According to the Office for National Statistics Business Register and Employment Survey 2019, the top four sectors in terms of share of employment were: health (12%); manufacturing (11%); professional, scientific and technical activities (11%); and retail (9%). These compare with the top four sectors for the North West region, which were: health (14%); retail (10%); manufacturing (9%); and professional, scientific and technical (9%), as shown in Figure 17.

<sup>97</sup> Office for National Statistics (2020), *UK Business Counts - local units by industry and employment size band*. Available online at: <http://www.nomisweb.co.uk/datasets/idbrlu>.

<sup>98</sup> Office for National Statistics (2019), *Business Register and Employment Survey*. Available online at: <http://www.nomisweb.co.uk/datasets/newbres6pub>. This number includes both residents and non-residents of CEC who work within its boundaries.

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**Figure 17: Employment by industrial sector in the Cheshire East Council area and the North West region**



12.3.4 According to the Annual Population Survey (2020)<sup>99</sup>, the employment rate<sup>100</sup> within the CEC area was 76% (171,300 people), which was higher than that recorded for both the North West region (74%) and England (76%). In 2020, unemployment in the CEC area was 3.9%, which was lower than that recorded both for the North West region (4.3%) and England (4.8%).

12.3.5 The Annual Population Survey (2020) also shows that 42% of CEC residents aged 16 – 64 were qualified to National Vocational Qualification Level 4 (NVQ4) and above, which compares to the 39% recorded in the North West region and 43% in England, while 4.5% of residents had no qualifications, which was lower than that recorded both for the North West region (7.5%) and England (6.2%).

## Property

12.3.6 A review of employment land in 2012<sup>101</sup> identified a need by 2030 for up to 323.7ha of additional employment land in the CEC area. It was estimated that CEC had an identified employment land supply of 272.4ha across the borough. The employment land shortfall compared to identified supply was up to 51.3ha to 2030. Across the rural parts of the CEC

<sup>99</sup> Office for National Statistics (2020), *Annual Population Survey*. Available online at: <http://www.nomisweb.co.uk/datasets/apsnew>. This number includes the jobs held by residents of CEC irrespective of where they work.

<sup>100</sup> The proportion of working age (16-64 year olds) residents that is in employment.

<sup>101</sup> Ove Arup and Partners Ltd (2012), *Cheshire East Employment Land Review*. Based on upper range covering 2009-2030. This includes a 30% flexibility factor, which acts as a buffer to ensure that future land supply is flexible enough to provide a range and choice of land to meet demand and in case there are issues such as sites no longer being delivered.

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area there was found to be a lack of vacant industrial premises but better availability of office space. No particular vacant sites were identified in the Pickmere to Agden and Hulseheath area<sup>102</sup>. The importance of providing a portfolio of readily available and market responsive employment land to support growth has been highlighted in the 2017 Cheshire and Warrington LEP Strategic and Economic Plan<sup>103</sup>.

- 12.3.7 Based on the latest available data from the Estates Gazette (February 2021), the average vacancy rates for industrial and warehousing property in the CEC area has been assessed as 15% based on marketed space against known stock<sup>104</sup>.
- 12.3.8 Based on the latest available data from the Estates Gazette (February 2021) the average vacancy rate for office space in the CEC area<sup>105</sup> is 12%.

## Future baseline

### Construction (2025)

- 12.3.9 Volume 5: Appendix CT-004-00000 provides details of the developments in the Pickmere to Agden and Hulseheath area that are assumed to have been implemented by 2025. The following committed development of relevance to socio-economics that would materially alter the future baseline during construction of the Proposed Scheme in this area, is set out in Table 33.

**Table 33: Committed developments of relevance to socio-economics during construction**

Map book reference <sup>106</sup>	Planning reference	Description	How this is considered in the assessment
MA03/050	19/0372M	Location: Agden Hall Farm, Agden Lane, Agden, WA13 0TZ. Full application for the demolition of mixed-use commercial / light industrial buildings and the construction of 14 no. dwellings, a small office building and associated storage building and a stables building with associated works.	Informing future baseline.
MA03/063	19/3594M	Location: Villa Farm off the A556 Chester Road. Conversion of existing farmhouse and farm outbuildings to office use (B1) with associated partial demolition, access improvements, car parking and associated infrastructure works.	Informing future baseline.

<sup>102</sup> Be Group (2009), *Cheshire and Warrington Rural Workspace Study: Cheshire County Council*. CWEA & NWDA.

<sup>103</sup> Cheshire and Warrington Local Enterprise Partnership (2017), *Strategic Economic Plan: Cheshire and Warrington Matters*. Available online at: [https://www.warrington.gov.uk/sites/default/files/2019-10/appendix\\_10\\_-\\_cheshire\\_and\\_warrington\\_strategic\\_economic\\_plan\\_-\\_extract.pdf](https://www.warrington.gov.uk/sites/default/files/2019-10/appendix_10_-_cheshire_and_warrington_strategic_economic_plan_-_extract.pdf).

<sup>104</sup> Vacant space is based on marketed space identified from Estates Gazette data (EGi) (February 2021).

<sup>105</sup> Based on marketed space identified from Estates Gazette data (EGi) (February 2021).

<sup>106</sup> Volume 5: Planning Data/Committed Development Map Book: Maps CT-13-309b to CT-13-312a.

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Map book reference <sup>106</sup>	Planning reference	Description	How this is considered in the assessment
MA03/084	19/3036M	Location: Mere Golf and Country Club, Chester Road, Mere, WA16 6LJ. Proposed alteration and extension to provide additional bedrooms, conferencing and clubhouse floorspace, extension of the Stable Block (Spa) to provide additional leisure and spa facilities, creation of a tennis hut and golf starter hut and other ancillary buildings, alteration and rationalisation of the wider site and car park to provide more parking spaces and additional landscaping and re-development of existing ground store.	Informing future baseline.

- 12.3.10 Implementation of committed developments MA03/050, MA03/063 and MA03/084 could result in approximately 110 additional jobs, altering the future baseline against which the Proposed Scheme is assessed. As such, these committed developments have been included as part of the future baseline and considered within this assessment.
- 12.3.11 The existing composition and numbers of employers, employees and economic sectors in the area is likely to change over time in ways that cannot be accurately forecast.

## Operation (2038)

- 12.3.12 Volume 5: Appendix CT-004-00000 also provides details of the developments in the Pickmere to Agden and Hulseheath area that are assumed to have been implemented by 2038. No additional committed developments of relevance for socio-economics have been identified that would materially alter the future baseline in this area.

## 12.4 Effects arising during construction

### Avoidance and mitigation measures

- 12.4.1 The draft Code of Construction Practice (CoCP)<sup>107</sup> includes a range of provisions that will help mitigate socio-economic effects associated with construction within this area, including:
- reducing nuisance through the sensitive layout of construction sites (Section 5);
  - consulting businesses located close to hoardings on the design, materials used and construction of the hoarding, to reduce impacts on access to and visibility of their premises (Section 12);
  - applying best practicable means during construction works to reduce noise (including vibration) at sensitive receptors (including local businesses) (Section 13);
  - monitoring and managing flood risk and other extreme weather events that may affect socio-economic resources during construction (Section 16);

<sup>107</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.



- site specific traffic management measures including requirements relating to the movement of traffic from business and commercial operators of road vehicles, including goods vehicles (Section 14); and
- maintaining access to businesses for the duration of construction works where reasonably practicable (Section 14).

## Assessment of impacts and effects

### Temporary effects

#### In-combination effects

- 12.4.2 Businesses within the Pickmere to Agden and Hulseheath area may experience a number of effects as a result of the construction of the Proposed Scheme, for example, air quality, landscape and visual, noise and vibration or construction traffic impacts. Taken in-combination, these multiple residual effects could amount to a significant change in the ambiance at these businesses leading to a possible loss of trade for the following affected businesses. Durations of in-combination effects have been identified in this section where information on the duration of contributing effects is provided in the relevant source assessments. The assessment of in-combination effects draws upon: Section 5, Air quality; Section 11, Landscape and visual; Section 13, Sound, noise and vibration; and Section 14, Traffic and transport.
- 12.4.3 Heyrose Golf Club located west of Tabley, which also has a wedding venue facility, will experience significant visual effects and noise effects for two years and seven months as a result of the construction of the Proposed Scheme. The sensitivity of this establishment is assessed to be high as users are considered to be susceptible to changes in the local environment and setting. The construction works may discourage them from using the wedding venue facility. Given the duration of effects and the high level of sensitivity, the Proposed Scheme is assessed to have a significant adverse in-combination effect on this business.

#### Isolation

- 12.4.4 No non-agricultural businesses have been identified within the Pickmere to Agden and Hulseheath area that are expected to experience significant isolation effects as a result of the Proposed Scheme.

#### Construction employment

- 12.4.5 There will be one main civil engineering compound (A50 Warrington Road main compound) and 14 civil engineering satellite compounds in the Pickmere to Agden and Hulseheath area. The main compound and three of the satellite compounds will continue to be used as railway systems compounds following the completion of civil engineering works. Up to 6,700

person years of construction employment opportunities will be created at these sites<sup>108</sup>, broadly equivalent to 670 full time jobs<sup>109</sup>. Depending on the skill levels required and the skills of local people, these jobs are potentially accessible to residents in the locality and to others living further afield. The impact of the direct construction employment creation has been considered as part of the route-wide assessment (see Volume 3, Route-wide effects).

- 12.4.6 Direct construction employment could lead to opportunities for local businesses to supply the Proposed Scheme or to benefit from expenditure of construction workers. The impact of indirect construction employment creation has been considered as part of the route-wide assessment (see Volume 3, Route-wide effects).
- 12.4.7 The resulting effects on employment are reported in aggregate at a route-wide level (see Volume 3, Route-wide effects).

## Permanent effects

### Businesses

- 12.4.8 Businesses directly affected, comprising those that lie within land required for the Proposed Scheme, are reported in groups, where possible, to form defined resources based on their location and operational characteristics. A group could contain either one or a number of businesses reflecting the fact that a building may have more than one occupier or that similar businesses and resources are clustered together.
- 12.4.9 Overall, three resources in the study area will experience direct impacts as a result of the Proposed Scheme. These are as follows:
- Cheshire Showground;
  - Mere Court Hotel; and
  - electrical contractors on Bowden View Lane.
- 12.4.10 The resources listed above are those that are anticipated to experience job losses or displacement as a result of construction of the Proposed Scheme. Additionally, land required for the construction of the Proposed Scheme will directly impact other business resources. These businesses are not listed above, as the effect upon them is not expected to result in job losses or displacement.
- 12.4.11 Two of these three resources are subject to potentially significant effects on business activities and employment. These resources are listed in Table 34.

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<sup>108</sup> Construction labour is reported in construction person years, where one construction person year represents the work done by one person in a year composed of a standard number of working days.

<sup>109</sup> Based on the convention that 10 employment years is equivalent to one full time equivalent job.

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**Table 34: Resources which will potentially experience significant direct effects**

Resource	Description of business activity
Cheshire Showground	Showground hosting the Royal Cheshire Show, a major agricultural show, along with a number of other events throughout the year.
Mere Court Hotel	Hotel containing 34 rooms, wedding venue, conference centre and restaurant as well as seven acres of landscaped gardens containing a lake, lodge and coach house.

- 12.4.12 The magnitude of impact focuses on the number of jobs that will be affected by the Proposed Scheme, either through displacement or possible job loss. It also considers the implications of this impact in relation to the scale of economic activity and opportunity in the area.
- 12.4.13 The following factors were taken into account when considering the sensitivity of resources:
- availability of alternative, suitable premises;
  - size of the local labour market;
  - skill levels and qualifications of local people; and
  - levels of unemployment.
- 12.4.14 Taking account of the sensitivity of the resource and the magnitude of impact, the significance of the resultant effects is set out in Table 35.

**Table 35: Significance of effects**

Resource	Impact magnitude	Sensitivity	Significance of effect
Cheshire Showground	Medium	Medium	Moderate adverse - significant
Mere Court Hotel	Medium	Medium	Moderate adverse - significant

- 12.4.15 The construction of the Proposed Scheme will require the acquisition of land and buildings. An overview of the resource expected to be significantly affected has been included below.
- 12.4.16 The construction of Pickmere embankment, Cheshire Showground South access diversion, Cheshire Showground North access diversion and Footpath Pickmere 9/1 underbridge will require part of the area (approximately 21% or 25ha) used for show rings and car parking (approximately 9,000 spaces) at Cheshire Showground for up to three years and six months, splitting the site in two. A smaller area of the showground (approximately 5% or 5ha) will also be required permanently for the Proposed Scheme.
- 12.4.17 During construction, temporary diversions will be in place and during operation, permanent diversions utilising Footpath Pickmere 9/1 underbridge will be in place, both of which allow movement between the two sections of the showground. The sensitivity is assessed as medium as the identity of the business is tied to this location and it may be difficult for the business to relocate. Based on engagement with the Showground, the viability of the business may be affected by the loss of land. However, HS2 Ltd and the Cheshire Agricultural Society are working to retain the showground activities on the site. It is assumed on a precautionary basis that the Showground will not be able to continue to operate. Therefore, the magnitude is assessed as medium, based on the number of employees that would

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potentially be displaced or lose jobs. The effect is assessed to be moderate adverse and will therefore be significant.

- 12.4.18 The construction of Hoo Green North cutting will require part of the car park and a large section of the gardens (approximately 60% of the total site) at the Mere Court Hotel for up to four years. Approximately 40% of the grounds, including car parking, will also be required permanently for the Proposed Scheme. The viability of the business may be affected by the loss of the grounds as they represent an important part of the venue for the hosting of events such as weddings. The sensitivity is assessed as medium as the identity of the business is based around these premises and it may be difficult for the business to identify similar premises in the area for relocation. The medium magnitude is based on the number of employees affected. The effect is assessed to be moderate adverse and will therefore be significant due to the loss of part of the gardens and car parking.
- 12.4.19 Across all of the employment areas reviewed, it is expected that an estimated 50 jobs<sup>110</sup> will either be displaced or possibly lost within the Pickmere to Agden and Hulseheath area. The impact from the relocation or loss of jobs is considered to be minor in the context of the total number of people employed in the CEC area (approximately 203,000 jobs) and the scale of economic activity and opportunity in the area.
- 12.4.20 It is likely to be difficult for two of the three businesses to find alternative locations. These two businesses may be unable to relocate on a like-for-like basis within the area.

## Isolation

- 12.4.21 Businesses within the Pickmere to Agden and Hulseheath area may experience significant isolation effects as a result of the construction of the Proposed Scheme. As a consequence, this could lead to a loss of trade for the affected businesses.
- 12.4.22 Construction works will require the closure of a section of Budworth Road, which provides direct access to the M6 through Pickmere Lane. Users of the road will be diverted along the realignment of Frog Lane, School Lane and the B5391 Pickmere Lane. One business in this area will experience disruption as a result of construction works. The ability of Heyrose Golf Club to attract customers may be impaired by increased journey length, due to a diversion of up to 3km. Potential customers may also be able to use alternative golf facilities nearby that are unlikely to be affected by the Proposed Scheme. The effect on this resource will begin part way through the construction phase and will continue whilst the Proposed Scheme is in operation. For the reasons stated above, the disruption as a result of the Proposed Scheme is considered to represent a permanent moderate adverse significant isolation effect on this business.

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<sup>110</sup> Employment within businesses has been estimated through a combination of sources, for example, surveys of businesses, the Experian employment dataset, employment floor space and the Homes and Communities Agency (HCA) *Employment Densities Guide 3rd Edition (2015)*. The estimate is calculated using standard employment density ratios and estimates of floor areas and may vary significantly from actual employment at the sites.

## Other mitigation measures

- 12.4.23 Businesses displaced by the Proposed Scheme will be compensated in accordance with the Compensation Code. HS2 Ltd recognises the importance of businesses displaced from their existing premises being able to relocate to suitable alternative premises and will, therefore, offer additional support over and above statutory requirements to facilitate this process<sup>111,112</sup>. Businesses with an interest in land that is either being acquired or possessed temporarily may also be eligible for compensation in accordance with the Compensation Code.
- 12.4.24 The construction of the Proposed Scheme offers considerable opportunities to businesses and residents along the line of route in terms of supplying goods and services and obtaining employment. HS2 Ltd is committed to working with its suppliers to build a skilled workforce that promotes further economic growth across the UK.

## Summary of likely residual significant effects

- 12.4.25 Likely significant residual effects are shown in Volume 5, Socio-economics Map Book: Maps SE-01-309b to SE-01-312a. The Proposed Scheme will require the acquisition of land from the Mere Court Hotel and Cheshire Showground, resulting in an adverse residual significant effect on both resources.
- 12.4.26 Customers may also be discouraged from using Heyrose Golf Club as they are predicted to be affected by highway changes, and landscape and visual and noise effects associated with the Proposed Scheme, which may impair the resource's ability to attract customers. This will result in a temporary adverse residual significant in-combination effect and a permanent adverse residual significant isolation effect.

## Cumulative effects

- 12.4.27 No significant cumulative temporary or permanent effects during construction have been identified.

## 12.5 Effects arising from operation

### Avoidance and mitigation measures

- 12.5.1 No mitigation measures are proposed in relation to business resources during operation of the Proposed Scheme.

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<sup>111</sup> High Speed Two Ltd (2022), *Phase 2b Western Leg Information Paper C7: Business relocation*.

<sup>112</sup> High Speed Two Ltd (2022), *Phase 2b Western Leg Information Paper C8: Compensation code for compulsory purchase*.

## Assessment of impacts and effects

### Businesses

- 12.5.2 No resources are expected to experience significant direct socio-economic effects during the operation of the Proposed Scheme.

### In-combination effects

- 12.5.3 Businesses within the Pickmere to Agden and Hulseheath area may experience a number of effects as a result of the operation of the Proposed Scheme, for example, air quality, landscape and visual, or noise and vibration impacts. Taken in-combination, these multiple residual effects could amount to a significant change in the ambiance at these businesses leading to a possible loss of trade for the following affected businesses. Durations of in-combination effects have been identified in this section where information on the duration of contributing effects is provided in the relevant source assessments above. The assessment of in-combination effects draws upon: Section 5, Air quality; Section 11, Landscape and visual; Section 13, Sound, noise and vibration.
- 12.5.4 Heyrose Golf Club, located west of Tabley, which also has a wedding venue facility, may experience significant noise (permanent) and visual (through to year 30) residual effects during the operational phase of the Proposed Scheme. The sensitivity of this establishment is assessed to be high as customers are considered to be susceptible to changes in the local environment and setting. This is likely to discourage customers of the wedding venue facility. Given the duration of effects and the high level of sensitivity, the Proposed Scheme is assessed to have a significant adverse in-combination effect on this business.

### Isolation

- 12.5.5 No non-agricultural businesses have been identified within the Pickmere to Agden and Hulseheath area that are expected to experience significant isolation effects as a result of the Proposed Scheme.

### Operational employment

- 12.5.6 Operational employment will be created at locations along the route including stations, train crew facilities and infrastructure/maintenance depots. There will be no operational employment created within the Pickmere to Agden and Hulseheath area. Within the adjacent Wimboldsley to Lostock Gralam area (MA02) to the south, there will be Crewe North rolling stock depot north-east of Walley's Green, creating 350 HS2 related jobs. Within the adjacent Hulseheath to Manchester Airport area (MA06) to the east, there will be a station at the Manchester Airport High Speed station creating 160 HS2 related jobs and a further 60

concourse retail jobs<sup>113</sup>. These employment opportunities will be accessible to residents in the locality.

- 12.5.7 Direct operational employment created by the Proposed Scheme could also lead to indirect employment opportunities for local businesses in terms of supplying the project or benefiting from expenditure of directly employed workers on goods and services.
- 12.5.8 Some of these employment opportunities will be accessible to residents in the locality and, given the transport accessibility within the local area, to residents living further afield.
- 12.5.9 The impact of operational employment creation has been assessed as part of the route-wide assessment (see Volume 3).

## **Other mitigation measures**

- 12.5.10 No further mitigation measures have been identified for socio-economic receptors.

## **Summary of likely residual significant effects**

- 12.5.11 Likely significant residual effects are shown on Volume 5, Socio-economic Map Book: Maps SE-01-309b to SE-01-312a. The Proposed Scheme will result in adverse in-combination effect on Heyrose Golf Club, which will be significant.

## **Cumulative effects**

- 12.5.12 No significant cumulative effects on socio-economic receptors have been identified in the Pickmere to Agden and Hulseheath area during operation.

## **Monitoring**

- 12.5.13 There are no area-specific requirements for monitoring socio-economic effects during the operation of the Proposed Scheme in the Pickmere to Agden and Hulseheath area.

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<sup>113</sup> These employment figures are estimates based on the current design and knowledge gained from previous phases of HS2.

## 13 Sound, noise and vibration

### 13.1 Introduction

- 13.1.1 This section reports the assessment of the noise and vibration likely significant effects arising from the construction and operation of the Proposed Scheme within the Pickmere to Agden and Hulseheath area on:
- ‘residential receptors’: people, primarily where they live, in terms of individual dwellings and on a wider community basis including any shared community open areas; and
  - ‘non-residential receptors’ such as:
    - community facilities including schools, hospitals, places of worship and ‘quiet areas’; and
    - commercial properties such as hotels.
- 13.1.2 ‘Shared community open areas’ are amenity spaces that the Planning Practice Guidance<sup>114</sup> identifies may partially offset a noise effect experienced by residents at their dwellings and are either a) relatively quiet nearby external amenity spaces for sole use by a limited group of residents as part of the amenity of their dwellings or b) a relatively quiet external publicly accessible amenity space (e.g. park or local green space) that is nearby.
- 13.1.3 Non-residential receptors with multiple uses were assessed either based on the most noise sensitive use or were subject to multiple assessments as appropriate.
- 13.1.4 ‘Quiet areas’ are defined in the EIA Scope and Methodology Report (SMR)<sup>115</sup> as:
- areas designated under Local Plans as being prized for their tranquillity;
  - areas designated under Local Plans or Neighbourhood Development Plans as Local Green Spaces; and
  - areas identified as Quiet Areas through implementation of the Environmental Noise (England) Regulations<sup>116,117</sup>.

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<sup>114</sup> Ministry of Housing, Communities and Local Government (2019), *National Planning Practice Guidance – Noise*. Available online at: <https://www.gov.uk/guidance/noise--2>.

<sup>115</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

<sup>116</sup> *Environmental Noise (England) Regulations 2006 (SI 2006/2238)*. London, Her Majesty's Stationery Office. Available online at: <https://www.legislation.gov.uk/uksi/2006/2238>.

<sup>117</sup> *Environmental Noise (England) (Amendment) Regulations 2009 (SI 2009/1610)*. London, Her Majesty's Stationery Office. Available online at: <https://www.legislation.gov.uk/uksi/2009/1610>.



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- 13.1.5 The methodology for the assessment of likely significant noise and vibration effects was developed in line with Government noise policy<sup>118</sup>, planning policy, planning practice guidance on noise<sup>114</sup> and EIA Regulations as described in the SMR<sup>119</sup>.
- 13.1.6 Engagement has been undertaken with Cheshire West and Chester Council (CWCC), Cheshire East Council (CEC) and Trafford Metropolitan Borough Council (TMBC) with respect to the sound, noise and vibration assessment. The purpose of this engagement has been twofold. Firstly, engagement has been undertaken on a route-wide basis covering matters including process, scope, method, approach to baseline and mitigation strategy. Secondly, local engagement has been undertaken to obtain relevant information regarding residential and non-residential receptors, existing baseline sound levels and to discuss the development of the mitigation to be included in the Proposed Scheme. Officers from local authorities have been invited to attend and witness baseline sound measurements. Where appropriate, relevant information identified by the authorities has been taken into account in the assessment.
- 13.1.7 More detailed information regarding the sound, noise and vibration assessment for the Pickmere to Agden and Hulseheath area is available in the relevant appendices in Volume 5:
- Sound, noise and vibration, route-wide assumptions and methodology (Appendix SV-001-00000);
  - Sound, noise and vibration baseline and construction assessment (Appendix SV-002-0MA03); and
  - Sound, noise and vibration operation assessment (Appendix SV-003-0MA03).
- 13.1.8 Maps showing the location of the key environmental features (Map Series CT-10) and the key construction (Map Series CT-05) and operational (Map Series CT-06) features of the Proposed Scheme can be found in the Volume 2: MA03 Map Book. Mapping to support the sound, noise and vibration assessment is presented in Map Series SV-05 (Volume 2: MA03 Map Book) and Map Series SV-02, SV-03, SV-08 and SV-09 (Volume 5, Sound, noise and vibration Map Book).
- 13.1.9 The assessment of likely significant effects from noise and vibration on agricultural, community, ecological, health, heritage and socio-economic receptors and the assessment of tranquillity are presented in Section 4, Agriculture, forestry and soils; Section 6, Community; Section 7, Ecology and biodiversity; Section 8, Health; Section 9, Historic environment; Section 12, Socio-economic; and Section 11, Landscape and visual of this report respectively. The Proposed Scheme is described in Section 2.

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<sup>118</sup> Department for Environment, Food and Rural Affairs (2010), *Noise Policy Statement for England*. Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/69533/pb13750-noise-policy.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69533/pb13750-noise-policy.pdf).

<sup>119</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

## 13.2 Scope, assumptions and limitations

- 13.2.1 The approach to assessing sound, noise and vibration and identifying envisaged mitigation is outlined in Volume 1, (Section 8 and Section 9) and the SMR.
- 13.2.2 In this assessment ‘sound’ is used to describe the acoustic conditions that people experience as a part of their everyday lives. Noise is taken as unwanted sound and hence adverse effects are noise effects.
- 13.2.3 Effects can either be temporary from construction or permanent from the operation of the Proposed Scheme. These effects may be direct, resulting from the construction or operation of the Proposed Scheme, and/or indirect, resulting from changes in traffic patterns on existing roads or railways that result from the construction or operation of the Proposed Scheme.
- 13.2.4 It is likely that the majority of receptors adjacent to the Proposed Scheme in the Pickmere to Agden and Hulseheath area are not currently subject to appreciable vibration<sup>120</sup>. The predicted vibration levels at all receptors as a result of the Proposed Scheme has, therefore, been assessed using specific absolute thresholds, below which receptors will not be affected by vibration, rather than vibration change criteria. Further information is provided in Volume 1 (Section 8).

## 13.3 Environmental baseline

### Existing baseline

- 13.3.1 The Pickmere to Agden and Hulseheath area is characterised by a mix of small towns, villages, hamlets and isolated residential properties in a predominantly rural setting. The sound environment is generally dominated by local and distant road traffic. There are also overflying aircraft to and from Manchester Airport, local neighbourhood sounds, and natural and agricultural sounds.
- 13.3.2 There are several main roads that contribute to the sound environment near to the Proposed Scheme within the Pickmere to Agden and Hulseheath area. These include: the M6 affecting Winterbottom and Tabley; the M56 affecting Agden; the A50 Warrington Road/Knutsford Road affecting High Legh, Hoo Green and Mere; the A556 Chester Road affecting Tabley; and the A556 affecting Mere, Bucklow Hill, Hoo Green and Hulseheath, as well as the A56 Lymm Road affecting Agden.
- 13.3.3 Sound levels close to these main transportation routes are high during the daytime and are generally lower at night. Sound levels decrease with increasing distance from the main

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<sup>120</sup> Further information is available in the Volume 5: Appendix SV-001-00000, *Sound, noise and vibration. methodology, assumptions and assessment report* and the Volume 5: Appendix CT-001-00001, *Environmental Impact Assessment Scope and Methodology Report*.

transportation routes. Manchester Airport restricts the operations permitted at night so that the aircraft noise levels are lower than during the daytime.

- 13.3.4 Further information on the existing baseline, including baseline sound levels and baseline monitoring results, is provided for the Pickmere to Agden and Hulseheath area in Volume 5: Appendix SV-002-0MA03.

## Future baseline

- 13.3.5 Without the Proposed Scheme, existing sound levels in this area are likely to increase slowly over time. This is primarily due to road traffic growth, which may be as a result of local or national trends or due to specific committed developments. Changes in car technology may offset some of the expected sound level increases due to traffic growth on low speed roads. On higher speed roads, tyre sound dominates and hence the expected growth in traffic is likely to continue to increase ambient sound levels.
- 13.3.6 The future operational baseline takes account of proposed and likely noise reduction provided in Important Areas identified in Defra's Noise Action Plans for agglomerations<sup>121</sup>, roads<sup>122</sup> or railways<sup>123</sup>. Following engagement with Highways England, trunk roads, likely to be resurfaced under future routine maintenance programmes, before the opening of the Proposed Scheme, are assumed to have a low noise surface. Airborne noise levels from railways in Important Areas are assumed to be controlled, where necessary, to the level where there is no Noise Action Plan requirement to investigate further mitigation. Map Series SV-05 (Volume 2: MA03 Map Book) shows any noise Important Areas in the Pickmere to Agden and Hulseheath area. Further information is reported for the Pickmere to Agden and Hulseheath area in Volume 5: Appendix SV-002-0MA03.
- 13.3.7 Committed developments involving sound or vibration sensitive uses within the relevant study area have been included within the assessment and are reported for the Pickmere to Agden and Hulseheath in Volume 5: Appendix SV-002-0MA03<sup>124</sup>.

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<sup>121</sup> Department for Environment, Food and Rural Affairs (2019), *Noise Action Plan: Agglomerations (Urban Areas)*. Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/813663/noise-action-plan-2019-agglomerations.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/813663/noise-action-plan-2019-agglomerations.pdf).

<sup>122</sup> Department for Environment, Food and Rural Affairs (2019), *Noise Action Plan: Roads (including major roads)*. Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/813666/noise-action-plan-2019-roads.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/813666/noise-action-plan-2019-roads.pdf).

<sup>123</sup> Department for Environment, Food and Rural Affairs (2019), *Noise Action Plan: Railways (including major railways)*. Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/813664/noise-action-plan-2019-railways.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/813664/noise-action-plan-2019-railways.pdf).

<sup>124</sup> Volume 5: Appendix CT-004-00000 provides details of all of the developments assumed to be implemented.

## **Construction (2025)**

- 13.3.8 The assessment of noise from construction activities assumes a future construction baseline year of 2025, which represents the period immediately prior to the start of the construction period. As a reasonable worst case, it has been assumed that no change in baseline sound levels will occur between the existing baseline year of 2018 and the future construction baseline year.

## **Operation (2038)**

- 13.3.9 The operational assessment is based upon the absolute sound level and/or predicted change in sound levels that will result from operation of the Proposed Scheme. The future operational baseline is the sound environment that would exist in 2038 without the Proposed Scheme. This is presented in Table 1 in Volume 5: Appendix SV-002-0MA03.

## **13.4 Effects arising during construction**

### **Assumptions and limitations**

#### **Local assumptions**

- 13.4.1 The construction arrangements that form the basis of the assessment are presented in Section 2.3 of this report, in Volume 1 (Section 8) and in the draft Code of Construction Practice (CoCP)<sup>125</sup>.
- 13.4.2 Piling and vibratory compaction is likely to result in short-term appreciable ground-borne vibration at a small number of receptors, situated very close to these activities. These receptors will also be exposed to appreciable noise from the construction of the Proposed Scheme. The significance of the identified vibration effects has been assessed in combination with the airborne noise effects also identified at these receptors. The assessment is presented in Volume 5: Appendix SV-002-0MA03.
- 13.4.3 Track laying, power system and signalling installation works are unlikely to result in significant construction noise effects, given the short duration close to any communities, and where included in the Proposed Scheme, the presence of the permanent noise fence barriers.

### **Avoidance and mitigation measures**

- 13.4.4 The assessment assumes the implementation of the principles and management processes set out in the noise and vibration section of the draft CoCP (Section 13), which are:

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<sup>125</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

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- best practicable means (BPM) as defined by the Control of Pollution Act 1974 (CoPA) and Environmental Protection Act 1990 (EPA), which will be applied during construction activities to minimise noise (including vibration) at neighbouring residential properties and other sensitive receptors (including local businesses and quiet areas designated by the local authority);
- as part of BPM, mitigation measures are applied in the following order:
  - noise and vibration control at source: for example, the selection of quiet and low vibration equipment, review of construction methodology to consider quieter methods, location of equipment on-site, control of working hours, the provision of acoustic enclosures and the use of less intrusive alarms, such as broadband vehicle reversing warnings;
  - screening: for example, local screening of equipment or 2.4m high perimeter hoarding or the use of temporary stockpiles; and
  - where, despite the implementation of BPM, the noise exposure exceeds the criteria defined in the draft CoCP, noise insulation or ultimately temporary re-housing will be offered at qualifying properties.
- lead contractors will seek to obtain prior consent from the relevant local authority under Section 61 of the CoPA for the proposed construction works. The consent application will set out BPM measures to minimise construction noise and vibration, including control of working hours, and provide a further assessment of construction noise and vibration, including confirmation of noise insulation/temporary re-housing provision;
- contractors will undertake and report such monitoring as is necessary to assure and demonstrate compliance with all noise and vibration commitments. Monitoring data will be provided regularly to, and be reviewed by, the nominated undertaker and made available to the local authorities; and
- contractors will be required to comply with the terms of the CoCP and appropriate action will be taken by the nominated undertaker as required to ensure compliance.

13.4.5 In addition to this mitigation, to avoid or reduce likely community significant effects, taller screening (provided by solid temporary hoarding, temporary stockpiles, screening close to activities or other means to provide equivalent noise reductions), as described in the draft CoCP, has been assumed at the following construction sites and compounds or land required for construction of the Proposed Scheme:

- Budworth Road satellite compound, transfer node and auto-transformer station near Tabley;
- A50 Warrington Road main compound near Hoo Green;
- Bowden View satellite compound near Hoo Green;
- Peacock Lane satellite compound near dwellings on Peacock Lane;
- High Legh cutting retaining wall near dwellings at the junction of Agden Lane and Moss Lane; and
- Agden cutting near dwellings at Agden Hall Farm.

- 13.4.6 Noise insulation will be offered for qualifying buildings as defined in the draft CoCP. Noise insulation or, where appropriate, temporary re-housing will avoid residents being significantly affected by levels of construction noise inside their dwellings. The assessment reported in this section provides an estimate of the buildings that are likely to qualify for noise insulation. None are predicted to qualify for temporary rehousing.
- 13.4.7 Qualification for noise insulation and, where appropriate, temporary re-housing will be confirmed, as part of seeking prior consent from the local authority under Section 61 of the CoPA. Qualifying buildings will be identified, as required in the draft CoCP, so that noise insulation can be installed, or where appropriate any temporary re-housing provided, before the start of the works predicted to exceed noise insulation or temporary re-housing criteria.

## Assessment of impacts and effects

### Residential receptors: direct effects – individual dwellings

- 13.4.8 Taking account of the avoidance and mitigation measures set out in the previous paragraphs, Ovenback Cottage, Agden Lane, High Legh (assessment location ref.: 612796) is forecast to experience noise above the eligibility criteria for noise insulation, but below the eligibility criteria for temporary rehousing, as defined in the HS2 noise insulation and temporary rehousing policy<sup>126</sup>. The location of this dwelling is indicated on Map Series SV-03 (Volume 5, Sound, noise and vibration Map Book).
- 13.4.9 For daytime construction, the threshold for eligibility for noise insulation is 75dB measured outdoors as specified in the draft CoCP.
- 13.4.10 The mitigation measures, including noise insulation, will reduce noise inside the property such that it does not reach a level where it will significantly affect residents.

### Residential receptors: direct effects – communities

- 13.4.11 The avoidance and mitigation measures to be implemented during construction will reduce airborne construction noise adverse effects on receptors and communities. Residual temporary noise or vibration effects are identified later in this section.
- 13.4.12 In locations with lower existing sound levels<sup>127</sup>, construction noise effects are likely to be caused by changes to noise levels outside dwellings relative to existing sound levels. These may be considered by the local community as an effect on the acoustic character of the area and hence be perceived as a change in the quality of life for that community. These effects

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<sup>126</sup> Further information is provided in High Speed Two Ltd (2022), *Phase 2b Western Leg Information Paper E13: Control of construction noise and vibration*.

<sup>127</sup> Further information is presented in Volume 5: Appendix SV-001-00000.

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are considered to be significant when assessed on a community basis taking account of the local context.

- 13.4.13 The temporary adverse effects on the residential areas identified in Table 36, including shared open areas, are considered to be significant on a community basis. The duration of impact is the period where the relevant assessment category is exceeded. The predicted monthly construction noise level will vary throughout this period and as a guide the typical and highest monthly noise levels at the closest properties in the community identified are presented in the 'cause' column of this table.

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**Table 36: Direct adverse construction effects on residential communities and shared open areas that are considered to be significant on a community basis**

Significant effect number (and map reference) <sup>128</sup>	Type of significant effect	Time of day	Location	Cause (construction activities) <sup>129</sup>	Assumed approximate duration of impact
MA03-C-C1 (SV-03-310)	Construction noise	Daytime	Tabley Superior: approximately five dwellings on Budworth Road near the route of the Proposed Scheme.	Site compound operation. The typical and highest monthly noise levels are approximately 65dB and 70dB <sup>130</sup> .	Up to eight months.
MA03-C-C2 <sup>131</sup> (SV-03-312a)	Combined construction site and traffic noise	Daytime	Hulseheath: approximately 20 dwellings in the vicinity of Chapel Lane, Peacock Lane and Thowler Lane.	Site compound operation, earthworks, overbridge and viaduct construction and road works; and vehicles on Chapel Lane and Peacock Lane. The typical and highest monthly noise levels are approximately 60dB to 70dB and 65dB to 75dB <sup>130</sup> .	Up to three years.

<sup>128</sup> See Volume 5: Appendix SV-002-0MA03, Sound, noise and vibration report (MA03) and Volume 5, Map Book SV-03.

<sup>129</sup> The construction activity giving rise to the highest predicted noise or vibration level is reported. Multiple construction activities may contribute to the typical noise levels and the approximate duration of impact.

<sup>130</sup> Equivalent continuous sound level at the facade,  $L_{pAeq,0700-1900}$ .

<sup>131</sup> This community extends across the boundary between the Pickmere to Agden and Hulseheath area and the Hulseheath to Manchester Airport area (MA06), with the majority being in the Pickmere to Agden and Hulseheath area. For further information, see Volume 2, Community Area report: Hulseheath to Manchester Airport (MA06), Section 13 and Volume 5: Appendix SV-002-0MA06.



## **Residential receptors: indirect effects**

- 13.4.14 Construction traffic is likely to cause adverse noise effects on residential receptors along Chapel Lane and Peacock Lane between Hulseheath Lane and Back Lane including properties in the Hulseheath to Manchester Airport area (MA06). Before Peacock Lane is realigned, approximately 10 dwellings located immediately adjacent to Chapel Lane and Peacock Lane are forecast to experience a change in road traffic noise levels of around 8dB  $L_{pAeq,0700-2300}$  during the peak months, due to additional construction vehicles using this route. After Peacock Lane is realigned, most of these dwellings are forecast to experience a similar change in road traffic noise levels during the peak months, due to construction vehicles using this route. This is considered to be a likely significant effect on a community basis at the dwellings on this road, denoted as MA03-C-C2 in Table 2 in Volume 5: Appendix SV-002-0MA03. This temporary adverse effect from combined construction site and traffic noise represents a change in the acoustic character of the area, which may be perceived as a change in the quality of life for that community.
- 13.4.15 Construction traffic is likely to cause adverse noise effects on residential receptors along the B5569 Chester Road between the A50 Chester Road and the A5034 Mereside Road. Approximately 50 dwellings located immediately adjacent to the road are forecast to experience a change in road traffic noise levels of around 5dB  $L_{pAeq,0700-2300}$  during the peak months, due to additional construction vehicles using this route. This is considered to be a likely significant effect on a community basis at the dwellings on this road, denoted as MA03-C-C3 in Volume 5: Appendix SV-002-0MA03. This temporary adverse effect represents a change in the acoustic character of the area, which may be perceived as a change in the quality of life for that community.
- 13.4.16 There is a significant effect at Hulseheath (MA06-C-C4), which extends across the boundary between the Pickmere to Agden and Hulseheath area and Hulseheath to Manchester airport area (MA06), with the minority of properties significantly affected in the Pickmere to Agden and Hulseheath area. Further information is provided in Volume 2: Community Area report: Hulseheath to Manchester airport (MA06), Section 13 and Volume 5: Appendix SV-002-0MA06.

## **Non-residential receptors: direct effects**

- 13.4.17 The assessment has identified predicted vibration levels that exceed the relevant screening criteria at Tabley Brook Kennels and Cattery (lower sensitivity office) (assessment location ref.: 612681), as shown in Map Series SV-03 (Volume 5, Sound, noise and vibration Map Book).
- 13.4.18 The assessment has identified the following non-residential receptors where the predicted airborne noise levels exceed both the relevant screening criteria and the noise change

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criterion (typically a change of greater than 3dB<sup>132</sup> compared with the existing baseline sound level):

- Tabley Brook Kennels and Cattery (lower sensitivity office) (assessment location ref.: 612681);
- Heyrose Golf Club (wedding venue) (assessment location ref.: 612643); and
- Chain & Conveyor (office) (assessment location ref.: 613005).

- 13.4.19 The assessment has identified predicted airborne noise and vibration levels that exceed both the relevant noise and vibration screening criteria and the noise change criterion (typically a change of greater than 3dB compared with the existing baseline sound level) at the Mere Court Hotel (assessment location ref.: 612677).
- 13.4.20 These locations are identified in the Pickmere to Agden and Hulseheath area, as shown in Map Series SV-03 (Volume 5, Sound, noise and vibration Map Book). At each of the non-residential receptors identified above an assessment has been undertaken to determine if this impact would result in a significant effect, using the significance criteria set out in Annex A of Volume 5: Appendix SV-001-00000.
- 13.4.21 The Tabley Brook Kennels and Cattery (lower sensitivity office) is located on Budworth Road in Tabley, Knutsford adjacent to the land required for the Budworth Road satellite compound. The business provides temporary accommodation services for cats and dogs, animal breeding and has an attached shop. The business has been assessed under the office category. The buildings occupied by the business are a mixture of two-storey brickwork buildings and more modern single storey buildings with openable windows. The typical predicted daytime monthly construction vibration levels at the Tabley Brook Kennels and Cattery (lower sensitivity office) are below the screening criteria defined in the SMR for this use. The highest predicted daytime monthly construction vibration levels at these buildings are above the screening criteria defined in the SMR for this use for a period of up to three months. As the Tabley Brook Kennels and Cattery (lower sensitivity office) is likely to only have occasional use, the predicted excess of the screening criterion is marginal and for a relatively short duration, it is not identified as being subject to a likely significant adverse effect.
- 13.4.22 Heyrose Golf Club (wedding venue), Budworth Road, Knutsford hosts wedding ceremonies on Fridays at the clubhouse as well as christenings and funeral receptions. The Heyrose Golf Club is located approximately 340m from the land required for construction of Heyrose embankment. The use of the club has been assessed under the places of meeting for religious worship category. The typical and highest predicted daytime monthly construction noise levels at this building are 1dB and 4dB respectively above the screening criteria defined in the SMR for this use<sup>133</sup> for a period of up to two years and seven months. The

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<sup>132</sup> The exception is where the use and sensitivity of the receptor or land use is very sensitive to noise and have been included in the detailed assessment where there is a change less than 3dB. Further information can be found in Volume 5: Appendix SV-002-0MA03.

<sup>133</sup> 50dB L<sub>pAeq,0700-2300</sub> (free-field) during the day which is equivalent to 53dB L<sub>pAeq,0700-2300</sub> (façade).

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events are held within the clubhouse which is a single-storey brick building with openable double glazed windows. The eastern facade, where the entrance lies, faces the route of the Proposed Scheme. The southern facade faces onto the golf course and is used to exit the venue. The Heyrose Golf Club is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA03-C-N1 in Table 6, Volume 5: Appendix SV-002-0MA03). This temporary adverse effect may take the form of activity disturbance during the daytime to users of the wedding venue at the clubhouse.

- 13.4.23 Chain & Conveyor is an office located along Winterbottom Lane in Knutsford approximately 250m from the land required for construction of Hoo Green South embankment No.2. The business is a supplier of machine components. The business has been assessed under the office category. The highest predicted daytime monthly construction noise levels at this building are 3dB above the screening criteria defined in the SMR for this use<sup>134</sup> for a period of up to one year and three months; the typical predicted daytime monthly construction noise levels are below the screening criteria. The business is located in a two-storey brickwork building with small single-glazed windows. The Chain & Conveyor offices are identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA03-C-N2 in Table 6, Volume 5: Appendix SV-002-0MA03). This temporary adverse effect may take the form of activity disturbance during the daytime to office users.
- 13.4.24 The Mere Court Hotel is a hotel that also hosts weddings and conferences and is located approximately 25m from the land required for the construction of Hoo Green North cutting. The business has been assessed under the hotels category<sup>135</sup>. The typical and highest predicted daytime monthly construction noise levels at this building are 14dB and 20dB respectively above the screening criteria defined in the SMR for this use<sup>136</sup> for a period of up to four years and seven months. The typical and highest predicted night-time monthly construction noise levels at this building are below the screening criteria defined in the SMR for this use<sup>137</sup>. The two-storey brick building has large single-glazed sash openable windows. Weddings are hosted in the gardens and in a large glass conservatory situated on the northern section of the site. The eastern facade and external area face the Proposed Scheme whereas the southern facade and main entrance are perpendicular to the Proposed Scheme. The typical predicted daytime monthly construction vibration levels at the Mere Court Hotel are below the screening criteria defined in the SMR for this use<sup>138</sup>. The highest predicted daytime monthly construction vibration levels at these buildings are above the screening criteria defined in the SMR for this use for a period of up to one month. The Mere Court Hotel is identified, on the basis of a precautionary assessment, as being subject to a

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<sup>134</sup> 55dB L<sub>pAeq,0700-2300</sub> (free-field) during the day which is equivalent to 58dB L<sub>pAeq,0700-2300</sub> (façade).

<sup>135</sup> As the business also hosts weddings, it has been assessed for daytime use under the hotels and place of worship category which have the same criteria. The business has been assessed for night-time use under the hotels category only.

<sup>136</sup> 50dB L<sub>pAeq,0700-2300</sub> (free-field) during the day which is equivalent to 53dB L<sub>pAeq,0700-2300</sub> (façade).

<sup>137</sup> 45dB L<sub>pAeq,2300-0700</sub> (free-field) during the night which is equivalent to 48dB L<sub>pAeq,2300-0700</sub> (façade).

<sup>138</sup> A vibration dose value 0.2 m/s<sup>1.75</sup> VDV.

likely significant adverse effect (denoted by MA03-C-N3 in Table 6, Volume 5: Appendix SV-002-0MA03) due to noise and vibration. This temporary adverse effect may take the form of activity disturbance during the daytime to users of the hotel.

## **Non-residential receptors: indirect effects**

- 13.4.25 The assessment of construction noise and vibration indicates that significant indirect effects are unlikely to occur on non-residential receptors in the Pickmere to Agden and Hulseheath area.

## **Other mitigation measures**

- 13.4.26 No other mitigation measures are proposed in this area.

## **Summary of likely residual significant effects**

- 13.4.27 The proposed avoidance and mitigation measures will reduce construction noise inside all individual dwellings from the construction activities such that residents will not be significantly affected<sup>139</sup>.
- 13.4.28 The measures will also reduce the construction noise effects on the acoustic character in the majority of residential communities. Despite these measures, the noise effects on the acoustic character in the local residential community of Tabley are considered likely to be significant. Noise from specific construction activities and construction traffic has been identified as resulting in significant residual temporary effects on the local residential community of Hulseheath.
- 13.4.29 Construction traffic in this area is likely to cause significant noise effects on adjacent residential properties on:
- the B5569 Chester Road between the A50 Chester Road and the A5034 Mereside Road; and
  - Chapel Lane and Peacock Lane between Hulseheath Lane and Back Lane.
- 13.4.30 Noise from specific construction activities has been identified as resulting in significant residual temporary effects on the non-residential buildings at:
- Heyrose Golf Club (wedding venue), Budworth Road, Knutsford; and
  - Chain & Conveyor (offices), Winterbottom Lane, Winterbottom.
- 13.4.31 Noise and vibration from specific construction activities has been identified as resulting in significant residual temporary effects on the Mere Court Hotel, Warrington Road, Mere, Knutsford.

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<sup>139</sup> Refer to Volume 5: Appendix SV-001-00000.

13.4.32 HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid these significant effects. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the receptors, their use and the benefit of the measures.

## Cumulative effects

13.4.33 This assessment has considered the potential cumulative construction noise effects of the Proposed Scheme and other committed developments<sup>140</sup>. It is not anticipated that there will be any significant cumulative noise effects during construction of the Proposed Scheme.

## 13.5 Effects arising from operation

### Assumptions and limitations

#### Local assumptions

- 13.5.1 The assessment of the effects of noise and vibration from the operation of the Proposed Scheme is based on the envisaged design as described in Section 2.2 of this report and in Volume 1 (Sections 4 and 8) and the highest likely train flows, assuming the service pattern including Phase One and Phase Two services. The expected passenger service frequency for the Proposed Scheme is described in Volume 1 (Section 4) and is outlined below for the Pickmere to Agden and Hulseheath area.
- 13.5.2 For the purpose of the operation sound, noise and vibration assessment it is assumed that passenger services in this area will start around 05:00. Services will increase to the number of trains per hour in each direction on the lines set out in Table 37<sup>141</sup>. This number of services is generally assumed to operate throughout the day then decrease as trains are stabled with services typically finishing by midnight. The number of trains, shown in Table 37, takes account of HS2 Phase One, Phase 2a and the Proposed Scheme in operation, and other services using HS2 as a result of connections to other conventional lines, including Northern Powerhouse Rail (NPR). Assumptions for maximum operational train speeds are also shown in Table 37. Further information is presented in Volume 1 (Section 8).

**Table 37: Local passenger service assumptions**

Description of line	Time period for peak daytime flows	No. of trains per hour in each direction	Speed
Route of the Proposed Scheme between Pickmere and the HS2 Manchester spur	07:00 to 21:00	12	205mph (330kph) for 90% of services and 225mph (360kph) for 10% of services

<sup>140</sup> Refer to Volume 5: Appendix CT-004-00000, *Planning data*.

<sup>141</sup> The effects of noise and vibration from the operation of the Proposed Scheme are assessed based on the reasonably foreseeable worst-case train flows which differ from the train flows described in Section 2. For further information see Volume 1 (Section 8).

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Description of line	Time period for peak daytime flows	No. of trains per hour in each direction	Speed
Route of the Proposed Scheme between the HS2 Manchester spur and Agden	07:00 to 21:00	4	205mph (330kph) for 90% of services and 225mph (360kph) for 10% of services
HS2 Manchester spur	07:00 to 21:00	6	145mph (230kph)
NPR (London to Liverpool junction)	07:00 to 21:00	2	110mph (180kph)

## Avoidance and mitigation measures

- 13.5.3 The development of the Proposed Scheme has sought to reduce noise impact as far as reasonably practicable.
- 13.5.4 Envisaged avoidance and mitigation measures that apply route-wide are described in Volume 1 (Section 9).

### Airborne noise

- 13.5.5 Through the procurement process for the trains and the track, the use of proven international technology will enable the railway to be quieter than implied by current minimum UK<sup>142</sup> and European standards<sup>143</sup>. HS2 trains will include reduction of aerodynamic noise from the pantograph that otherwise would occur above 186mph (300kph) with current pantograph designs. The reduction in aerodynamic noise draws on proven technology in use in East Asia. Overall, it is assumed that proven international technology would reduce noise emissions by approximately 3dB at 225mph (360kph) compared to the current minimum European standards.
- 13.5.6 The Proposed Scheme incorporates noise barriers, in the form of either landscape earthworks and/or noise fence barriers to avoid or reduce significant adverse airborne noise effects. The assessment has been based on the assumption that noise fence barriers are acoustically absorbent on the railway side and are located approximately 5m from the outer rail on surface sections and approximately 3m from the outer rail on viaducts.
- 13.5.7 In the Pickmere to Agden and Hulseheath area, noise barriers have been incorporated into the Proposed Scheme to avoid or reduce adverse effects due to airborne noise at the community in the vicinity of the A56 Lymm Road.
- 13.5.8 The envisaged noise barrier locations based upon the currently available information are shown on Map Series SV-05 (Volume 2: MA03 Map Book) and described in Section 2.2.

<sup>142</sup> Department for Transport (2021), *National Technical Specification Notice (NTSN), Rolling Stock – Noise (NOI)*. Available online at: <https://www.gov.uk/government/publications/railway-interoperability-national-technical-specification-notices-ntsns>.

<sup>143</sup> European Commission (2014), *Technical Specification for Interoperability (TSI) Noise – Regulation No 1304/2014*. Available online at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32014R1304>.

- 13.5.9 In other specific locations along the route of the Proposed Scheme, where there are no noise barriers envisaged, noise will be reduced by landscape earthworks provided to avoid or reduce significant visual effects and engineering structures such as cuttings and safety fences on viaducts. The location of the landscape earthworks and relevant engineering structures is shown on Map Series SV-05 (Volume 2: MA03 Map Book).
- 13.5.10 Significant noise effects from the operational static sources, such as line-side equipment, will be avoided through their design and the specification of noise emission requirements. Further information is presented in Volume 5: Appendix SV-001-00000.
- 13.5.11 As required by statute, noise insulation measures would be offered for qualifying buildings as defined in the Noise Insulation (Railways and Other Guided Transport Systems) Regulations 1996<sup>144</sup> and the Noise Insulation Regulations 1975<sup>145</sup> ('the NI Regulations'). Additionally, HS2 Ltd will apply criteria, to provide the same mitigation as defined in 'the NI Regulations' at residential buildings where noise from the use of the Proposed Scheme measured outside a dwelling exceeds the Interim Target defined by the World Health Organization's (WHO) Night Noise Guidelines for Europe<sup>146</sup> or the maximum noise level criteria<sup>147</sup> defined in the SMR. Noise insulation is designed to avoid residents experiencing any residual significant effect on health and quality of life from resulting noise inside their dwelling.

## **Ground-borne noise and vibration**

- 13.5.12 Significant ground-borne noise or vibration effects from the operation of the Proposed Scheme will be reduced or avoided through the design of the track and track-bed.

## **Assessment of impacts and effects**

### **Residential receptors: direct effects – individual dwellings**

- 13.5.13 Taking account of the avoidance and mitigation measures incorporated into the Proposed Scheme, the assessment has identified three dwellings, close to the Proposed Scheme, where noise levels are predicted to exceed the daytime trigger threshold set out in the NI Regulations<sup>148</sup>. It is, therefore, anticipated that these buildings are likely to qualify for noise insulation under the Regulations. These dwellings are indicated on Map Series SV-02 (Volume 5, Sound, noise and vibration Map Book):

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<sup>144</sup> *The Noise Insulation (Railways and Other Guided Transport Systems) Regulations 1996*. London, Her Majesty's Stationary Office.

<sup>145</sup> *The Noise Insulation Regulations 1975*. London, Her Majesty's Stationary Office.

<sup>146</sup> World Health Organization (2010), *Night Noise Guidelines for Europe*.

<sup>147</sup> Dependent on the number of train passes.

<sup>148</sup> Equivalent to a daytime free-field level of 65dB  $L_{pAeq,0700-2300}$ .

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- two dwellings at Heyrose Farm, Heyrose Lane, Over Tabley (assessment location ref.: 612645); and
- Yew Tree Farm, Warrington Road, Mere (assessment location ref.: 612674).

13.5.14 The assessment has identified 22 additional dwellings close to the Proposed Scheme where the daytime forecast noise level does not exceed the threshold set in the NI Regulations but the predicted night-time noise level exceeds the WHO's Interim Target of 55dB, or the maximum noise level as a train passes exceeds the relevant criteria<sup>149</sup>. It is anticipated that these buildings will also be offered noise insulation as described previously in the avoidance and mitigation measures section. These dwellings are indicated on Map Series SV-02 (Volume 5, Sound, noise and vibration Map Book):

- Smoker Hill Cottage, Chester Road, Plumley (assessment location ref.: 612610);
- Oaklands, Pickmere Lane, Pickmere (assessment location ref.: 612628);
- School Farm, Pickmere Lane, Pickmere (assessment location ref.: 612628);
- 2, 3 and 4 Waterless Brook Cottages, Pickmere Lane, Pickmere (assessment location ref.: 612633);
- Yew Trees Farm, Budworth Road, Tabley (assessment location ref.: 612638);
- new dwelling at Yew Trees Farm, Budworth Road, Tabley (assessment location ref.: 612638);
- The Laurels, Yew Trees Farm, Budworth Road, Tabley (assessment location ref.: 612638);
- Tabley Brook, Budworth Road, Tabley (assessment location ref.: 612638);
- Freshfields, Budworth Road, Tabley (assessment location ref.: 612638);
- Field Cottage, Heyrose Lane, Over Tabley (assessment location ref.: 612647);
- The Shooting Box, Old Hall Lane, Over Tabley (assessment location ref.: 612653);
- Hollowood Farm, Old Hall Lane, Over Tabley (assessment location ref.: 612654);
- White Lodge, Wrenshot Lane, High Legh (assessment location ref.: 612682);
- Legh Cottage, Wrenshot Lane, High Legh (assessment location ref.: 612682);
- Broom Manor, Peacock Lane, High Legh (assessment location ref.: 612712);
- Five Acres, Peacock Lane, High Legh (assessment location ref.: 612736);
- Middle Moss Farm, Agden Lane, Agden (assessment location ref.: 612779);
- Crackling Farm, Agden Lane, High Legh (assessment location ref.: 612796);
- Sunbeam Cottage, Agden Brow, Lymm (assessment location ref.: 617509); and
- Quarry View, Agden Brow, Lymm (assessment location ref.: 617509).

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<sup>149</sup> During the night (2300-0700) a significant effect is also identified where the Proposed Scheme results in a maximum sound level at the façade of a building at or above: 85dB  $L_{pAFmax}$  (where the number of train pass-bys exceeding this value is less than or equal to 20); or 80dB  $L_{pAFmax}$  (where the number of train pass-bys exceeding this value is greater than 20).



13.5.15 The mitigation measures, set out in the previous section, including noise insulation, will reduce noise inside all dwellings such that it will not reach a level where it will significantly affect residents.

## **Residential receptors: direct effects – communities**

13.5.16 The proposed mitigation measures in the Pickmere to Agden and Hulseheath area will avoid or reduce adverse effects due to airborne noise on the majority of receptors, and in the following communities:

- Hoo Green;
- High Legh;
- the residential properties in the vicinity of Agden Lane and Moss Lane;
- the residential properties in the vicinity of the A56 Lymm Road; and
- Hulseheath.

13.5.17 Taking account of the envisaged mitigation, Map Series SV-05 (Volume 2: MA03 Map Book) shows the long-term 40dB<sup>150</sup> night-time and the 50dB daytime sound level contours. In general, below these levels adverse effects are not expected.

13.5.18 Above 40dB during the night and 50dB during the day the community effect of noise is dependent on the baseline sound levels in that area and the change in sound level (magnitude of effect) brought about by the Proposed Scheme. The airborne noise impacts and effects forecast for the operation of the Proposed Scheme are presented on Map Series SV-05 (Volume 2: MA03 Map Book). The changes in noise levels shown on these maps are likely to affect the acoustic character of the area such that taking account of the local context<sup>151</sup>, there may be a significant effect when assessed on a community basis<sup>152</sup>.

13.5.19 Approximately 55 isolated properties within the area have been identified as being subject to a likely adverse noise effect. These effects are likely to be received as an effect on the acoustic character of the area. However, as the affected properties are spatially remote from larger defined residential areas, are subject to smaller magnitudes of noise effect, or are small in number, the effects are not considered to be significant on a community basis.

13.5.20 In this study area, the direct adverse effects on the acoustic character of the areas of the residential communities identified in Table 38 are considered to be significant on a community basis.

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<sup>150</sup> Defined as the equivalent continuous sound level from 23:00 to 07:00 or  $L_{pAeq,night}$ .

<sup>151</sup> Further information is provided in Volume 5: Appendices SV-001-00000 and SV-003-0MA03.

<sup>152</sup> Further information is contained in Volume 1.

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**Table 38: Direct adverse operational effects on residential communities and shared open areas that are considered significant on a community basis**

Significant effect number and map reference <sup>153</sup>	Source of significant effect	Time of day	Location and details
MA03-O-C1 (SV-05-310)	Airborne noise increase from new train services	Daytime and night-time	Over Tabley Approximately 10 dwellings in the vicinity of Old Hall Lane and Heyrose Lane. Forecast increases in sound from the railway are likely to cause a major airborne noise adverse effect on the acoustic character of the area around the properties. The effect on the acoustic character of residential areas that are located further from the railway would be moderate or minor adverse. There are no shared open spaces identified as being affected in this community.
MA03-O-C2 (SV-05-310)	Airborne noise increase from new train services	Daytime and night-time	Tabley Superior Approximately five dwellings in the vicinity of Budworth Road. Forecast increases in sound from the railway are likely to cause a major airborne noise adverse effect on the acoustic character of the area around the properties. There are no shared open spaces identified as being affected in this community.
MA03-O-C3 (SV-05-310)	Airborne noise increase from new train services	Daytime and night-time	Winterbottom Approximately five dwellings in the vicinity of Winterbottom Lane. Forecast increases in sound from the railway are likely to cause a moderate noise increase affecting the acoustic character of the area around the properties. There are no shared open spaces identified as being affected in this community.
MA03-O-C4 <sup>154</sup> (SV-05-311)	Airborne noise increase from new train services	Daytime and night-time	Hulseheath Approximately 15 dwellings in the vicinity of Thowler Lane, Back Lane and Peacock Lane. Forecast increases in sound from the railway are likely to cause a moderate noise increase affecting the acoustic character of the area around the properties. There are no shared open spaces identified as being affected in this community.

## Residential receptors: indirect effects

- 13.5.21 The assessment of operational noise and vibration indicates that significant indirect effects on residential receptors are unlikely to occur in this area.

<sup>153</sup> See Map Series SV-05 (Volume 2: MA03 Map Book).

<sup>154</sup> This community extends across the boundary between the Pickmere to Agden and Hulseheath area and the Hulseheath to Manchester Airport area (MA06), with the majority of dwellings being in the Pickmere to Agden and Hulseheath area. For further information, see Volume 2, Community Area report: Hulseheath to Manchester Airport (MA06), Section 13 and Volume 5: Appendix SV-001-0MA06.

## Non-residential receptors: direct effects

- 13.5.22 The assessment has identified airborne sound levels greater than the screening criteria relevant to the particular building use<sup>155</sup> and typically a change of greater than 3dB<sup>156</sup> compared to the future baseline sound level at the following non-residential receptors in the Pickmere to Agden and Hulseheath area, as shown in Map Series SV-03 (Volume 5, Sound, noise and vibration Map Book):
- Tabley Brook Kennels and Cattery (office), Budworth Road, Tabley (assessment location ref.: 612681);
  - Heyrose Golf Club (wedding venue), Budworth Road, Knutsford (assessment location ref.: 612643);
  - Chain & Conveyor (office) Winterbottom Lane, Knutsford (assessment location ref.: 613005); and
  - Mere Court Hotel, Warrington Road, Knutsford (assessment location ref.: 612677).
- 13.5.23 The assessment has not identified any ground-borne noise or vibration levels greater than the relevant impact screening criteria in the Pickmere to Agden and Hulseheath area.
- 13.5.24 At each of the non-residential receptors identified, an assessment has been undertaken to determine if this impact will result in a significant effect using the significance criteria defined in Section A, Volume 5: Appendix SV-001-00000.
- 13.5.25 Tabley Brook Kennels and Cattery (office), Budworth Road, Tabley includes an office. An adverse operational noise effect has been identified at the office based on the change in operational airborne sound level outside of the receptor of greater than 10dB compared to the future baseline sound level. Daytime operational noise levels at the office are predicted to exceed the impact screening criterion for offices, as defined in the SMR, of 55dB L<sub>pAeq,16hr</sub> by 7dB. Tabley Brook Kennels and Cattery (office), Budworth Road, Tabley is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA03-O-N1 on Map Series SV-05 (Volume 2: MA03 Map Book)). No effect is identified on the animals themselves based upon the assessment approach defined in Annex F, Volume 5: Appendix SV-001-00000.
- 13.5.26 Heyrose Golf Club (wedding venue), Budworth Road, Knutsford hosts wedding ceremonies on Fridays at the clubhouse as well as christenings and funeral receptions. An adverse operational noise effect has been identified at the wedding venue based on the change in operational airborne sound level outside of the receptor of greater than 10dB compared to the future baseline sound level. Daytime operational noise levels at the wedding venue are predicted to exceed the impact screening criterion for places of meeting for religious worship, as defined in the SMR, of 50dB L<sub>pAeq,16hr</sub> by 6dB. The events are held within the

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<sup>155</sup> As defined in the SMR and SV-001-00000.

<sup>156</sup> The exception is where the use and sensitivity of the receptor or land use is very sensitive to noise and have been included in the detailed assessment where there is a change less than 3dB. Further information can be found in Volume 5: Appendix SV-002-0MA03.

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clubhouse which is a single-storey brick building with openable double glazing. Heyrose Golf Club (wedding venue), Budworth Road, Knutsford is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA03-O-N2 on Map Series SV-05 (Volume 2: MA03 Map Book)).

- 13.5.27 Mere Court Hotel, Warrington Road, Knutsford is a hotel which includes a conference centre and wedding venue. An adverse operational noise effect has been identified at the hotel based on the change in operational airborne sound level outside of the receptor of greater than 10dB compared to the future baseline sound level. Daytime operational noise levels at the hotel are predicted to exceed the impact screening criterion for hotels, as defined in the SMR, of 50dB  $L_{pAeq,16hr}$  by 11dB. Night-time operational noise levels at the hotel are predicted to exceed the impact screening criterion for hotels, as defined in the SMR, of 45dB  $L_{pAeq,8hr}$  by 10dB. The two-storey brick building has large single-glazed sash openable windows. Weddings are hosted within the external areas and also in a large glass conservatory situated on the northern section of the site. The eastern facade and external area face the Proposed Scheme whereas the southern facade and main entrance are perpendicular to the Proposed Scheme. Operational airborne noise from the Proposed Scheme has potential to cause activity disturbance during the daytime and sleep disturbance for residents of the hotel during the night-time. As such, Mere Court Hotel, Warrington Road, Knutsford is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA03-O-N3 on Map Series SV-05 (Volume 2: MA03 Map Book)).
- 13.5.28 Chain & Conveyor (office) is located along Winterbottom Lane in Knutsford. The business is a supplier of machine components. An adverse operational noise effect has been identified at the office based on the change in operational airborne sound level outside of the receptor of greater than 5dB compared to the future baseline sound level. Daytime operational noise levels at the office are predicted to exceed the impact screening criterion for offices, as defined in the SMR, of 55dB  $L_{pAeq,16hr}$  by less than 1dB. The building is a two-storey brickwork building with small single-glazed windows which face perpendicular to the Proposed Scheme. Given the marginal exceedance of the screening criterion at the assessment location and the likely marginally lower noise level at the windows of the office than predicted at the assessment location (due to the windows facing perpendicular to the Proposed Scheme), Chain & Conveyor (office) is not identified as being subject to a likely significant adverse effect.
- 13.5.29 The assessment of effects on non-residential receptors has been undertaken on a reasonable worst-case basis. Further information can be found in Volume 5: Appendix SV-003-0MA03. The non-residential receptors, where direct significant effects are likely, are summarised in Table 39.

**Table 39: Likely significant noise or vibration effects on non-residential receptors arising from operation of the Proposed Scheme**

Significant effect number <sup>157</sup> and map reference	Type of significant effect and source	Time of day	Location and details
MA03-O-N1 (SV-01-310)	Activity disturbance of office resulting from operational airborne noise.	Daytime	Tabley Brook Kennels and Cattery (office), Budworth Road, Tabley
MA03-O-N2 (SV-01-310)	Activity disturbance of wedding venue resulting from operational airborne noise.	Daytime	Heyrose Golf Club (wedding venue), Budworth Road, Knutsford
MA03-O-N3 (SV-01-311)	Activity disturbance of wedding venue customers, and activity and sleep disturbance of hotel residents resulting from operational airborne noise.	Daytime and night-time	Mere Court Hotel, Warrington Road, Knutsford

## Non-residential receptors: indirect effects

- 13.5.30 The assessment of operational noise and vibration indicates that significant indirect effects are unlikely to occur on non-residential receptors in this area.

## Other mitigation measures

- 13.5.31 No other mitigation measures are proposed in this area.

## Summary of likely residual significant effects

- 13.5.32 At the majority of individual residences, the proposed mitigation measures will reduce operational noise inside all dwellings such that it does not reach a level where it will significantly affect residents, and therefore, no likely residual significant effects are identified.
- 13.5.33 At the community level, the envisaged mitigation, including landscape earthworks and noise fence barriers, described in this section, and presented in Map Series SV-05 (Volume 2: MA03 Map Book), will substantially reduce the potential operational airborne sound impacts and noise effects that would otherwise arise from the Proposed Scheme. Likely residual significant adverse airborne noise effects due to increased noise levels around the following communities have been identified:
- Over Tabley: occupants of residential properties on Old Hall Lane and Heyrose Lane identified by MA03-O-C1 on Map SV-01-310;
  - Tabley Superior: occupants of residential properties on Budworth Road identified by MA03-O-C2 on Map SV-01-310;

<sup>157</sup> See Map Series SV-05 (Volume 2: MA03 Map Book).

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- Winterbottom: occupants of residential properties on Winterbottom Lane identified by MA03-O-C3 on Map SV-01-310; and
  - Hulseheath: occupants of residential properties on Thowler Lane, Back Lane and Peacock Lane identified by MA03-O-C4/MA06-O-C1 on Map SV-01-311.
- 13.5.34 The assessment has identified a likely residual significant operational airborne noise effect at the following non-residential receptors, identified in Map Series SV-05 Volume 2: MA03 Map Book:
- Tabley Brook Kennels and Cattery (office), Budworth Road, Tabley, identified by MA03-O-N1 on Map SV-01-310;
  - Heyrose Golf Club (wedding venue), Budworth Road, Knutsford, identified by MA03-O-N2 on Map SV-01-310; and
  - Mere Court Hotel, Warrington Road, Knutsford, identified by MA03-O-N3 on Map SV-01-311.
- 13.5.35 HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid these significant effects. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the receptors, their use and the benefit of any identified measures.

## Cumulative effects

- 13.5.36 It is not anticipated that there will be any significant cumulative noise effects during operation of the Proposed Scheme.

## Monitoring

- 13.5.37 Volume 1 (Section 9) sets out the general approach to environmental monitoring during operation of the Proposed Scheme.
- 13.5.38 Operational noise and vibration monitoring will be carried out at different times during the lifetime of the Proposed Scheme at a combination of carefully selected monitoring locations including: adjacent or attached to moving vehicles, at fixed positions or in the vicinity of individual assets; and locations within the surrounding areas and communities alongside the railway corridor.
- 13.5.39 The expected noise and vibration performance of the Proposed Scheme, operational noise and vibration measurement data, associated asset information, description of corrective actions, results of measured performance compared to expected conditions, and monitoring reports will be shared with the relevant local authorities at appropriate intervals.

## 14 Traffic and transport

### 14.1 Introduction

- 14.1.1 This section considers the likely impacts on all forms of transport and the consequential potential significant effects on transport users arising from the construction and operation of the Proposed Scheme through the Pickmere to Agden and Hulseheath area. The effects on traffic and transport are assessed quantitatively, based on existing baseline traffic conditions and future scenarios.
- 14.1.2 Engagement with Highways England, Cheshire East Council (CEC), Cheshire West and Chester Council (CWCC), Trafford Metropolitan Borough Council (TMBC) and Transport for Greater Manchester (TfGM) has been undertaken. An important focus of this engagement has been to obtain relevant baseline information and discuss transport survey requirements and assessment methodology.
- 14.1.3 A detailed report on traffic and transport impacts within the Pickmere to Agden and Hulseheath area is contained in the Transport Assessment (see Volume 5: Appendices TR-001, 002, 003 and 005).
- 14.1.4 Maps showing the location of the key environmental features (Map Series CT-10) and the key construction (Map Series CT-05) and key operational (Map Series CT-06) features of the Proposed Scheme can be found in the Volume 2: MA03 Map Book.
- 14.1.5 Maps showing traffic and transport significant effects during construction (Map Series TR-03) and operation (Map Series TR-04) and construction HGV routes to compounds (Map Series TR-08) can be found in Volume 5, Traffic and transport Map Book.
- 14.1.6 In addition, further traffic and transport data are set out in Background Information and Data (BID)<sup>158</sup> (see BID TR-004-00001: Transport Assessment policy and data report).
- 14.1.7 The Proposed Scheme is described in Section 2.

### 14.2 Scope, assumptions and limitations

- 14.2.1 The scope, key assumptions and limitations for the traffic and transport assessment are set out in Volume 1 (Section 8) and the EIA Scope and Methodology Report (SMR)<sup>159</sup>.
- 14.2.2 The peak level of construction traffic activity is expected to be 2030 and the opening year to be 2038. The forecasts used in the assessment have been produced prior to the development of a full understanding of the likely impact of COVID-19 on economic growth

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<sup>158</sup> High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background Information and Data*. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

<sup>159</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

and travel behaviour. The full impact of COVID-19 is not yet known but is considered likely to result in lower travel demand in the medium term than the forecasts used in the assessment for background traffic and rail, including HS2.

- 14.2.3 Consequently, the assessment is considered to overstate travel demand for both construction and operation scenarios and therefore to present a robust case for traffic and transport. This also means that the operational assessment for 2046 is likely to include a level of growth more representative of 2048 or later, representing likely impacts at least 10 years post-opening of the Proposed Scheme.
- 14.2.4 The study area for traffic and transport includes the communities of Pickmere, Knutsford, High Legh, Tabley, Mere, Hoo Green, Bucklow Hill and Little Bollington, together with Knutsford Station.
- 14.2.5 The study area for traffic and transport also includes all strategic and local roads potentially affected by the Proposed Scheme, including the strategic routes: the M6 (including junctions 19 and 20), the M56 (including junction 9) and the A556 (between the M6 junction 19 and the boundary with the Hulseheath to Manchester Airport area (MA06)).
- 14.2.6 Forecast future year traffic flows, with and without the Proposed Scheme have been derived from a number of sources including the Department for Transport's (DfT) traffic forecasting tool, Trip End Model Presentation Program (TEMPro) and the M6 Junction 19 model developed by Highways England. This model covers an area from Oughtrington in the north to Pickmere in the south, and from the M56 junction 9 in the west to Rostherne in the east. This model represents the average weekday morning (08:00-09:00) and evening (17:00-18:00) peak hours.
- 14.2.7 For operation, passenger demand for future year HS2 and long-distance rail passengers is derived from DfT's Planet Framework Model (PFMv9.6).
- 14.2.8 Junction assessments for construction have been undertaken against the peak month of construction traffic and include robust assumptions on the level of construction traffic in the peak hours. The assessments also address the impact of highway interventions. The effects identified are considered to be a reasonable worst case.
- 14.2.9 Where the effects vary through the construction programme the highest magnitude significant effects are reported. Where there are both adverse and beneficial effects at different times, the highest magnitude adverse and highest magnitude beneficial are both reported.

## 14.3 Environmental baseline

### Existing baseline

- 14.3.1 Existing conditions in the study area have been determined through site visits, traffic and transport surveys, liaison with Highways England, CEC, CWCC, TMBC and TfGM (including



provision of information on public transport, public rights of way (PRoW) and accident<sup>160</sup> data) and desktop analysis.

## Surveys

- 14.3.2 Traffic surveys, comprising junction turning counts, manual classified counts, queue length surveys and automatic traffic counts, were undertaken in November 2017, July 2018 and March 2020. These data have been supplemented by existing traffic data from other sources, including from Highways England, CEC, CWCC, TMBC and TfGM. Assessment of the data indicates that the weekday peak hours in the area are generally 08:00-09:00 and 17:00-18:00 which correspond to the Proposed Scheme assessment hours.
- 14.3.3 PRoW surveys were undertaken in August and September 2017 to establish their nature and usage by non-motorised users (pedestrians, cyclists and equestrians). The surveys included PRoW and roads that will be crossed by the Proposed Scheme, and any additional PRoW and roads that may be affected by the Proposed Scheme. The majority of the PRoW surveys were undertaken during the weekend, at times when recreational use is expected to be highest, but where routes are likely to be used for non-leisure uses such as commuting, surveys were undertaken on a weekday.

## Strategic and local highway network

- 14.3.4 The strategic routes in this area are the M6, the M56 and the A556. The strategic road network in and around the Pickmere to Agden and Hulseheath area is generally busy during peak hours and delays can be experienced.
- 14.3.5 The local roads include (ordered by road class from south to north):
- A556 Chester Road;
  - A537 Adam's Hill/Brook Street/Chelford Road;
  - A50 Toft Road/King Edward Road/Manchester Road/Warrington Road/Chester Road/Knutsford Road/Cliff Lane;
  - A5033 Northwich Road;
  - A5034 Mereside Road;
  - A56 Lymm Road/Dunham Road;
  - B5160 Charcoal Road;
  - B5391 Pickmere Lane;
  - B5085 Hollow Lane/Mobberley Road;
  - B5083 Stanley Road/King Street/Garden Road;
  - B5569 Chester Road;

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<sup>160</sup> The term accident in this report refers to injury related collisions reported to/recorded by the police. This data, known as STATS19, relate only to personal injury accidents on public roads that are reported to the police, and subsequently recorded, using the STATS19 accident reporting form.

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- B5159 West Lane/High Legh Road;
- Flittogate Lane;
- School Lane;
- Frog Lane;
- Budworth Road;
- Old Hall Lane;
- Hoo Green Lane;
- Bowden View Lane;
- Chapel Lane;
- Peacock Lane;
- Back Lane;
- Thowler Lane;
- Boothbank Lane;
- Chester Road;
- Agden Lane; and
- Ashley Road.

- 14.3.6 The local road network in this area generally operates well, although some localised delays can be experienced, particularly at peak times.
- 14.3.7 Relevant accident data for the road network subject to assessment have been obtained from DfT<sup>161</sup>. Data for the three year period from July 2016 to June 2019 have been assessed and any identified clusters (i.e. where there are nine or more accidents in the three year period) have been examined.
- 14.3.8 One accident cluster was identified within the Pickmere to Agden and Hulseheath area at the M6 junction 19/A556 Chester Road junction. In total, there were 13 accidents, of which four were classified as serious and nine were classified as slight.
- 14.3.9 The Proposed Scheme will cross two roads with roadside footways within the Pickmere to Agden and Hulseheath area. These are the A50 Warrington Road and the A56 Lymm Road.

## **Parking and loading**

- 14.3.10 There is on-street marked and unmarked parking on some roads within the Pickmere to Agden and Hulseheath area that may be impacted by the Proposed Scheme. This includes unrestricted on-street parking on Chapel Lane (between the B5569 Chester Road and Crescent Road).

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<sup>161</sup> Department for Transport (2021), *STATS19 Road Safety Data July 2016 - June 2019*. Available online at: <https://www.gov.uk/government/collections/road-accidents-and-safety-statistics>.

14.3.11 There is off-street parking within the Pickmere to Agden and Hulseheath area that may be impacted by the Proposed Scheme. This includes a private off-street car park associated with the Mere Court Hotel, which is located to the north of the A50 Warrington Road in Hoo Green, and land at the Cheshire Showground, which is located to the south of Flittogate Lane and is used as temporary parking areas during events.

## **Public transport network**

14.3.12 Two bus services operate on four roads that will be crossed or could be affected by the Proposed Scheme in the Pickmere to Agden and Hulseheath area. There are also bus stops primarily located to serve the main built-up area. The bus services that could be affected by the Proposed Scheme include:

- B5391 Pickmere Lane: route 89 (Knutsford - Wincham - Northwich);
- A556 Chester Road: route 89 (Knutsford - Wincham - Northwich);
- A50 Manchester Road/Warrington Road/Chester Road/Knutsford Road: route 47 (Warrington - High Legh - Knutsford); and
- B5159 West Lane: route 47 (Warrington - Mere - High Legh - Lymm).

14.3.13 Local rail services are accessible via Knutsford Station, which provides access to local services on the Mid-Cheshire Line.

## **Non-motorised users**

14.3.14 There are pedestrian footways adjacent to many of the roads in the built-up areas of Pickmere, Knutsford, High Legh, Tabley, Mere, Hoo Green, Bucklow Hill and Little Bollington. Roadside footways vary in width and condition within these areas. Where there is no formal roadside footway provision, non-motorised user numbers are generally low.

14.3.15 In the Pickmere to Agden and Hulseheath area, the Proposed Scheme will cross the Cheshire Cycleway (Regional Cycle Network Route 70) in two locations on Peacock Lane.

14.3.16 The Proposed Scheme will cross the route of eight PRow within the Pickmere to Agden and Hulseheath area. Further PRow and roadside footways in the Pickmere to Agden and Hulseheath area could be affected by the Proposed Scheme and have been included in the assessment.

14.3.17 The surveys undertaken to inform the assessment showed that the routes with the greatest daily usage during the survey day were Footpath Agden 2/4 and Footpath Agden 4/1, which were each used by two pedestrians and no cyclists.

## **Waterways and canals**

14.3.18 There is one navigable waterway in the Pickmere to Agden and Hulseheath area. The Bridgewater Canal passes through the north-east section of the study area on a south-west to north-east alignment and extends between Runcorn and Manchester. It is not expected

that there will be any effects on the Bridgewater Canal and therefore this topic is not considered further in this assessment.

## **Air transport**

- 14.3.19 There is no relevant air transport in the Pickmere to Agden and Hulseheath area. Consequently, this topic is not considered further in this assessment.

## **Future baseline**

- 14.3.20 The future baseline traffic volumes have been calculated for the future years of 2030, 2038 and 2046. These have been used to support the assessment of construction and operation of the Proposed Scheme, reflecting the assumed route-wide construction peak (2030), opening year (2038) and a future assessment year (2046). Growth factors have been checked to ensure that committed developments are appropriately reflected in the growth forecasts. The assumptions underlying committed developments and transport schemes for each assessment year have been discussed with Highways England, CEC, CWCC, TMBC and TfGM and are considered to be appropriately reflected in the traffic forecasts.
- 14.3.21 There are two planned committed changes to the transport network in the Pickmere to Agden and Hulseheath area that have been taken into account in the future baseline. These are the M6 junction 19 improvement scheme and the A556 Chester Road/B5931 Pickmere Lane/Tabley Hill junction improvement scheme.
- 14.3.22 The M6 junction 19 improvements scheme is promoted by Highways England. The scheme includes the building of a new bridge across the centre of the junction, providing two new dedicated links, one from the M6 northbound off-slip to the A556 northbound and the other from the M6 southbound off-slip to the A556 southbound.
- 14.3.23 Improvements to the A556 Chester Road/B5391 Pickmere Lane/Tabley Hill Lane junction, located immediately to the south of the M6 junction 19, are promoted by CEC. The scheme comprises the introduction of signal control on the A556 Chester Road and Tabley Hill Lane approaches, improved facilities for pedestrians and cyclists and formalisation of the central reserve island.
- 14.3.24 At the time of the assessment, both the M6 junction 19 improvement scheme and the A556 Chester Road/B5391 Pickmere Lane/Tabley Hill Lane junction improvements were under construction and expected to be completed in September 2021. Both schemes have been assessed within the M6 Junction 19 model in the 2030, 2038, and 2046 future baseline scenarios.
- 14.3.25 It is difficult to forecast how public transport services may change in the future; therefore, unless information on future services is available, it has been assumed that public transport services for the future years of assessment will be the same as those currently operating. Similarly, pedestrian and cycle demand and facilities and parking are assumed to remain unchanged from the base year. For the Pickmere to Agden and Hulseheath area, there are

no known substantial committed changes to the public transport network, parking and pedestrian and cycling facilities.

## Construction

- 14.3.26 Construction of the Proposed Scheme is expected to commence in 2025 with construction activity continuing to 2038 (although activity in 2038 will be limited to testing and commissioning). Construction activities have been assessed against 2030 baseline traffic flows, irrespective of when they occur during the construction period.
- 14.3.27 The year 2030 is the common future baseline year and the impact of individual or overlapping activities are considered against this single year.
- 14.3.28 Future baseline traffic volumes in the peak hours are forecast to grow by an average of 5% by 2030 compared to a baseline year of 2018.

## Operation

- 14.3.29 Future baseline traffic volumes in the peak hours are forecast to grow by an average of 10% by 2038 compared to the baseline year of 2018.
- 14.3.30 Future baseline traffic volumes in the peak hours are forecast to grow by an average of 15% by 2046 compared to the baseline year of 2018.

## 14.4 Effects arising during construction

### Avoidance and mitigation measures

- 14.4.1 The following measures are currently proposed to avoid or reduce effects on transport users:
- new highways (roads and PRow) will be constructed and will be operational prior to the permanent closure of any existing highways, insofar as reasonably practicable;
  - the majority of roads that will be crossed by the Proposed Scheme will be maintained or locally diverted during construction;
  - traffic management measures will be implemented to limit any disruption;
  - road closures will be restricted to overnight and weekends, insofar as reasonably practicable;
  - temporary alternative routes for roadside footways and PRow will be provided during construction, insofar as reasonably practicable, where either the existing or final proposed route is not available;
  - where reasonably practicable, site haul routes will be created adjacent to the Proposed Scheme to transport construction materials and equipment to reduce heavy goods vehicle (HGV) movements on public roads with access taken via the main road network;

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- HGVs will be routed, insofar as reasonably practicable, along the strategic and/or primary road network;
- the use of the local road network will, insofar as reasonably practicable, be limited to use for site set-up, access for surveys and on-going servicing (including refuse collection and general deliveries to compounds) during construction;
- the reuse of excavated material along the Proposed Scheme, insofar as reasonably practicable;
- highway measures including junction improvements, passing places and carriageway widening will be provided, as required, to manage the safe and efficient movement of vehicles on construction HGV routes; and
- on-site welfare facilities will be provided, which will reduce daily travel by site workers.

14.4.2 Section 14 of the draft Code of Construction Practice (CoCP)<sup>162</sup> includes measures that aim to reduce the adverse impacts and effects on local communities and maintain public access. This includes the impacts of deliveries of construction materials and equipment.

14.4.3 The measures in the draft CoCP include controls on vehicle types, hours of site operation and routes for HGVs to reduce the impact of road-based construction traffic. In order to achieve this, general and site-specific traffic management measures will be implemented during the construction of the Proposed Scheme on or adjacent to public roads and PRoW affected by the Proposed Scheme.

14.4.4 The draft CoCP includes the requirement to develop local traffic management plans in consultation with the highway and traffic authorities and the emergency services. These will consider the local traffic management strategy including consideration of sensitive receptors, such that adverse impacts will be reduced, insofar as reasonably practicable.

14.4.5 Specific measures include core site operating hours of 08:00 to 18:00 on weekdays and 08:00 to 13:00 on Saturdays with site staff and workers generally arriving before the morning peak hour and departing after the evening peak hour. Activities such as major concrete pours may involve extended working hours for reasons of engineering practicability, with very few workers travelling within the peak traffic hours.

14.4.6 The number of private car trips to and from the construction compounds (both workforce and visitors) will be reduced by encouraging alternative sustainable modes of transport or vehicle sharing. This will be supported by an overarching framework travel plan that will require construction workforce travel plans to be produced that will include a range of potential measures to mitigate the impacts of workers' traffic and transport movements associated with construction of the Proposed Scheme. The travel plans will promote the use of sustainable transport modes as appropriate to the location and types of trip. They will include measures such as: provision of information on and promotion of public transport services; provision of good cycle and pedestrian facilities; liaison with public transport

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<sup>162</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

operators; promotion of car sharing; and the appointment of a travel plan coordinator to ensure suitable measures are in place and are effective.

## Assessment of impacts and effects

### Temporary effects

14.4.7 The following section considers the impacts on traffic and transport and the likely consequential significant effects resulting from the construction of the Proposed Scheme.

### Key construction transport issues

14.4.8 The assessment takes account of all of the impacts of the Proposed Scheme in the Pickmere to Agden and Hulseheath area. The main traffic and transport impacts during the construction period within this area will include:

- construction vehicle movements to and from the various construction compounds;
- road closures, realignments and diversions; and
- alternative routes for PRow and roadside footways.

14.4.9 The construction assessment has also considered any impacts in the Pickmere to Agden and Hulseheath area that arise from construction of the Proposed Scheme in the adjoining community areas.

14.4.10 Construction vehicle movements required to construct the Proposed Scheme will include the delivery of plant and materials, movement of excavated materials and site worker trips. Works will include utility works, earthworks, underpass, viaduct, bridge and highway construction.

14.4.11 Details of the construction compounds are provided in Section 2.3. Table 40 provides details of the compound set up date and the duration of active use. The duration of active use excludes any period where there are no substantial workforce trips or movement of materials to and from the compound.

14.4.12 Table 40 also provides a summary of the HGV and car/light goods vehicle (LGV) access trips at each compound in the peak month of activity and during the busy period. For each compound, the peak month of activity is the month within which HGV traffic is at its highest for that compound. The busy period is the period during which HGV traffic serving that compound will be greater than 50% of the HGV traffic in the peak month. Two-way trips refer to the total number of vehicle movements in both directions (e.g. with 200 westbound vehicles and 100 eastbound, there would be 300 two-way trips). The average daily combined two-way vehicle trips for the busy period is the lower end of the range shown in Table 40 and the average daily combined two-way vehicle trips for the peak month is the upper end of the range shown. The estimated duration of busy period is also provided.

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**Table 40: Typical vehicle trip generation for construction compounds in the Pickmere to Agden and Hulseheath area**

Compound type	Compound name	Indicative start/set up date (years/quarter)	Estimated duration of active use (years/months)	Average daily combined two-way car/LGV trips during busy period and within peak month of activity	Average daily combined two-way HGV trips during busy period and within peak month of activity	Estimated duration of busy period (months)
Satellite	Smoker Brook viaduct north satellite compound	2027 Q3	3 years and 3 months	195-250	456-506	4
Satellite	Pickmere Lane satellite compound	2027 Q2	4 years	203-286	92-116	6
Satellite	Arley Brook viaduct satellite compound	2027 Q2	4 years	221-272	104-116	6
Satellite	Budworth Road satellite compound	2027 Q2	3 years	160-180	383-476	11
Satellite	M6 viaduct south satellite compound	2027 Q2	4 years and 3 months	224-256	66-84	8
Satellite	M6 viaduct north satellite compound	2027 Q2	4 years and 3 months	199-318	438-440	2
Main	A50 Warrington Road main compound	2027 Q2	5 years and 3 months	401-516	140-234	15
Satellite	Wrenshot Lane satellite compound	2027 Q3	3 years and 9 months	143-198	363-438	7
Satellite	Bowden View satellite compound	2027 Q2	4 years and 6 months	177-248	416-484	11
Satellite	Peacock Lane satellite compound	2028 Q3	3 years	155-182	50-68	5
Satellite	Peacock Lane ATFS satellite compound	2027 Q2	5 years	259-346	75-112	5
Satellite	Agden Lane satellite compound	2027 Q4	4 years	186-252	78-98	7
Satellite	M56 west satellite compound	2027 Q4	4 years	145-164	38-48	8
Satellite	Agden Brow satellite compound	2027 Q2	4 years and 9 months	236-330	400-512	14
Satellite	A56 Lymm Road satellite compound	2027 Q2	4 years and 6 months	237-362	69-80	6

14.4.13 The locations of the compounds and the associated construction HGV routes are shown in Map Series TR-08 (Volume 5, Traffic and transport Map Book). Table 41 summarises the construction HGV routes to and from each compound to the main road network. For some compounds, Table 41 includes multiple construction HGV routes. This is either because the construction HGV route varies depending on the origin/destination of the trip or because the



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construction HGV route varies over time to account for changes to the highway network through the construction period.

14.4.14 The average daily combined two-way HGV trips reported in Table 40 represent the total number of HGV movements to and from each compound during the busy period and in the peak month of activity on all of the available construction HGV routes combined. Where multiple construction HGV routes are shown in Table 41, the split of construction traffic between the available construction HGV routes will vary based on the point in the construction programme and the origin/destination of the construction HGV traffic.

**Table 41: Construction HGV routes for construction compounds in the Pickmere to Agden and Hulseheath area**

Compound name(s)	Access routes to/from compound(s) to main road network
Smoker Brook viaduct north satellite compound	A556 Chester Road
Pickmere Lane satellite compound	B5391 Pickmere Lane and A556 Chester Road
Arley Brook viaduct satellite compound	Budworth Road, B5391 Pickmere Lane and A556 Chester Road (to be used before closure of Budworth Road) Budworth Road, Frog Lane, School Lane, B5391 Pickmere Lane and A556 Chester Road (to be used after closure of Budworth Road)
Budworth Road satellite compound	B5391 Pickmere Lane and A556 Chester Road
M6 viaduct south satellite compound	On-site construction traffic route, Budworth Road, B5391 Pickmere Lane and A556 Chester Road (to be used before closure of Budworth Road) On-site construction traffic route, Budworth Road, Frog Lane, School Lane, B5391 Pickmere Lane and A556 Chester Road (to be used after closure of Budworth Road)
M6 viaduct north satellite compound	Route to/from the north: <ul style="list-style-type: none"> <li>• On-site construction traffic route, Old Hall Lane, B5569 Chester Road, A50 Knutsford Road and A556 (outgoing to the north only)</li> <li>• A556, A5034 Chester Road, B5569 Chester Road, Old Hall Lane and on-site construction traffic route (incoming from the north only)</li> </ul> Route to/from the south: <ul style="list-style-type: none"> <li>• On-site construction traffic route, Old Hall Lane and A556</li> </ul>
A50 Warrington Road main compound	A50 Warrington Road
Wrenshot Lane satellite compound Bowden View satellite compound	On-site construction traffic route, A50 Warrington Road (to be used before and after closure of the A556 temporary construction slip roads) On-site construction traffic route, Peacock Lane, Chapel Lane, A556 temporary construction slip roads and A556 (to be used while the A556 temporary construction slip roads are open)
Peacock Lane satellite compound	Route to/from the west: <ul style="list-style-type: none"> <li>• Peacock Lane, B5159 West Lane and A50 Warrington Road</li> </ul> Route to/from the north and south: <ul style="list-style-type: none"> <li>• Peacock Lane, Chapel Lane, A5034 Chester Road, B5569 Chester Road, Old Hall Lane and A556 (to be used before opening and after closure of the A556 temporary construction slip roads)</li> </ul>

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Compound name(s)	Access routes to/from compound(s) to main road network
	<ul style="list-style-type: none"> <li>Peacock Lane, Chapel Lane, A556 temporary construction slip roads and A556 (to be used while the A556 temporary construction slip roads are open)</li> </ul>
Peacock Lane ATFS satellite compound	Peacock Lane, Chapel Lane, A5034 Chester Road, B5569 Chester Road, Old Hall Lane and A556 (to be used before opening and after closure of the A556 temporary construction slip roads) Peacock Lane, Chapel Lane, A556 temporary construction slip roads and A556 (to be used while the A556 temporary construction slip roads are open)
Agden Lane satellite compound	On-site construction traffic route, Peacock Lane, Chapel Lane, A5034 Chester Road, B5569 Chester Road, Old Hall Lane and A556 (to be used before opening and after closure of the A556 temporary construction slip roads) On-site construction traffic route, Peacock Lane, Chapel Lane, A556 temporary construction slip roads and A556 (to be used while the A556 temporary construction slip roads are open)
M56 west satellite compound	On-site construction traffic route, A56 Lymm Road and M56 junction 7/8
Agden Brow satellite compound A56 Lymm Road satellite compound	A56 Lymm Road and M56 junction 7/8

- 14.4.15 Information on the indicative construction programme is provided in Section 2.3 and the construction methodology is summarised in Volume 1 (Section 6). This illustrates how the phasing of activities at different compounds will generally be staggered and that construction activities at individual compounds may not occur over the whole duration presented in Table 40.
- 14.4.16 The effects of construction of the Proposed Scheme on the highway network in the Pickmere to Agden and Hulseheath area have been assessed by undertaking strategic model runs for a number of 'with HS2' construction scenarios, and by comparing the flows and delays against the 2030 future baseline scenario. The assessment is based on the highest volume of construction traffic on each construction HGV route in each construction scenario. Where construction HGV routes will serve more than one construction compound, the assessment is based on the highest combined volume of construction traffic on each section of each construction HGV route in each construction scenario.
- 14.4.17 In using the strategic model, the impacts and effects have been considered in four scenarios covering the main construction phases. These scenarios ensure that the assessment addresses the different combinations and interactions of advance works, utility works, temporary highway closures and diversions and construction lorry movements through the construction period. The scenarios are:
- scenario 1, peak between 2025 Q1 and 2027 Q2. This corresponds with the setting-up of a number of compounds and the commencement of works in the Pickmere and Hoo Green areas. This scenario equates to 60% of the overall peak in construction traffic across the whole construction period;

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- scenario 2, peak between 2027 Q3 and 2029 Q1. This corresponds with the peak in construction traffic movements prior to the installation of M56 temporary overbridge at Yarwoodheath Lane in the Hulseheath to Manchester Airport area (MA06). This scenario includes the construction of permanent highway realignments and diversions in the Pickmere area and the construction of M6 Mere viaduct, Hoo Green North cutting retaining wall and Hoo Green South cutting retaining wall. This scenario equates to 98% of the overall peak in construction traffic across the whole construction period;
- scenario 3, peak between 2029 Q2 and 2031 Q3. This corresponds with the construction peak following the opening of M56 temporary overbridge at Yarwoodheath Lane in the Hulseheath to Manchester Airport area (MA06). This scenario includes the construction of M6 Mere viaduct, Hoo Green North cutting retaining wall and Hoo Green South cutting retaining wall. This scenario equates to 100% of the overall peak in construction traffic across the whole construction period; and
- scenario 4, peak after 2031 Q3. This corresponds with the peak in construction traffic movements following the removal of M56 temporary overbridge at Yarwoodheath Lane in the Hulseheath to Manchester Airport area (MA06). All permanent realignments, diversions and closures are also included in this scenario. This scenario equates to 46% of the overall peak in construction traffic across the whole construction period.

14.4.18 The construction works and construction traffic movements associated with the Proposed Scheme differ for each of these scenarios. The assessment considers the impacts in all scenarios and reports the highest magnitude of significant effects, regardless of which scenario they arise in. The most relevant highway interventions and works for each scenario are shown in Table 42.

**Table 42: Construction highway interventions by scenario**

Type	Intervention	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Main works	Old Hall Lane access, direct accesses from the A556 in the Hulseheath to Manchester Airport area (MA06) and temporary slip-roads at Chapel Lane	Not included	Included	Included	Included
Main works	M56 temporary overbridge at Yarwoodheath Lane in the Hulseheath to Manchester Airport area (MA06)	Not included	Not included	Included	Not included
Main works	B5391 Pickmere Road, Frog Lane, School Lane, and Peacock Lane realignments	Not included	Not included	Included	Included
Main works	Flittogate Lane, Hoo Green Lane, the A50 Warrington Road and Agden Lane diversions	Not included	Not included	Included	Included
Main works	Budworth Road and Bowden View Lane closures	Not included	Not included	Included	Included
	<b>Construction HGV traffic assessed as a percentage of peak construction HGV traffic</b>	<b>60%</b>	<b>98%</b>	<b>100%</b>	<b>46%</b>

14.4.19 The strategic model has been used to assess these construction scenarios taking account of the construction traffic movements and any road closures, traffic management or changes to junction operations in each scenario. The strategic model outputs for each of these

scenarios are only relevant to the assessment of the effects on traffic delays to vehicle occupants and traffic related severance.

## Highway network

### Strategic and local highway network

14.4.20 The primary HGV access routes for construction vehicles will be the strategic and/or primary road network with the use of the local road network limited, so far as reasonably practicable. The construction HGV routes will also provide access to compounds. Where reasonably practicable, site haul routes alongside the Proposed Scheme will be used to reduce the impact on the local road network. In this area, the main construction HGV routes will be (ordered by road class from south to north):

- M6 (including junctions 19 and 20);
- A556 (between the M6 junction 19 and the boundary with the Hulseheath to Manchester Airport area (MA06));
- A556 Chester Road (between the boundary with the Wimboldsley to Lostock Gralam area (MA02) and the M6 junction 19);
- A50 Warrington Road/Chester Road/Knutsford Road/Cliff Lane;
- A5034 Mereside Road (between A50 Warrington Road and the boundary with the Hulseheath to Manchester Airport area (MA06));
- A56 Lymm Road (between Agden Lane and A556 Chester Road);
- B5391 Pickmere Lane (between School Lane and A556 Chester Road);
- B5569 Chester Road (between Old Hall Lane and Chapel Lane);
- B5159 West Lane (between A50 Warrington Road and Peacock Lane);
- Flittogate Lane;
- School Lane;
- Frog Lane;
- Budworth Road (between Colliers Lane and B5391 Pickmere Lane);
- Colliers Lane;
- Old Hall Lane;
- Winterbottom Lane;
- Hoo Green Lane;
- Chapel Lane;
- Peacock Lane;
- Back Lane;
- Agden Lane (between Thowler Lane and Agden Hall Farm); and
- Ashley Road (between the A5034 Mereside Road and the boundary with the Hulseheath to Manchester Airport area (MA06)).

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- 14.4.21 A number of these construction HGV routes will have limited use (i.e. a low level of HGVs use generally over a short length of time, for example for site set up or minor works) including Budworth Road (between Frog Lane and Colliers Lane), Colliers Lane and Old Hall Lane (between Budworth Road and Hollowood Lane).
- 14.4.22 In addition to changes in traffic flows due to construction traffic, temporary highway closures and diversions or realignments will be required in a number of locations as set out in Section 2.3. The works to construct both temporary and permanent highway diversions/realignments could also result in disruption to highway users. In most cases, these works will be restricted to short-term overnight and/or weekend closures, and are not, therefore, considered significant. The following works will have a longer duration:
- B5391 Pickmere Lane – temporary diversion of traffic using the B5391 Pickmere Lane during construction of Arley Brook viaduct and the B5391 Pickmere Lane realignment. Traffic will be diverted via Flittogate Lane, a section of the permanent Flittogate Lane realignment and the temporary Flittogate Lane realignment. Traffic will be diverted for one year and three months, increasing journey length by 358m;
  - Flittogate Lane – temporary realignment of a 210m section of Flittogate Lane. The temporary realignment will enable Flittogate Lane to remain open during construction of the tie-in to the permanent diversion. The temporary realignment will be in use for one year and six months, resulting in a negligible change in journey length;
  - School Lane – temporary closure to enable the permanent widening of School Lane from its current width of 4m to 7.3m. Widening is required to accommodate diverted traffic associated with the permanent closure of Budworth Road. The works will be undertaken in stages in order to maintain access to the existing properties. School Lane will be closed for through traffic for approximately one year. Temporary traffic signals will be required for the construction of the junction with the B5391 Pickmere Lane. During the temporary closures, traffic will be diverted via Budworth Road and the B5391 Pickmere Lane, increasing journey length by 2.3km;
  - Frog Lane – temporary closure of a section of Frog Lane between Budworth Road and School Lane during construction of the Frog Lane realignment. Traffic will be diverted via the School Lane realignment, the B5391 Pickmere Lane and Budworth Road for six months, increasing journey length by 3km. Access to properties will be retained. Temporary traffic signals will be required for the construction of the junction between Frog Lane realignment and Budworth Road;
  - M6 – the construction of M6 Mere viaduct will require six temporary full closures of the motorway (two off peak weekend closures and four shorter off-peak or night-time closures) between junction 19 and junction 20. During the temporary full closures, traffic will be diverted via the A556 and the M56, increasing journey length for some users by up to 9.5km. Traffic management will also be required for a period of two years, comprising the narrowing of the existing traffic lanes to achieve enough working space and an access route for construction traffic. The existing three ‘live’ traffic lanes will be retained in each direction;

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- A50 Warrington Road – temporary realignment of a 700m section of the A50 Warrington Road between Bucklow Hill Lane and Wrenshot Lane to enable the construction of A50 Warrington Road overbridge and the permanent A50 Warrington Road realignment. The A50 Warrington Road will be temporarily realigned approximately 80m to the south of the existing alignment. The temporary arrangements will be in use for one year and nine months, resulting in an increase in journey length of 32m;
- Hoo Green Lane – the Hoo Green Lane diversion will be constructed up to 450m to the west of its existing alignment and will be constructed offline. The diversion will be constructed in phases, in conjunction with A50 Warrington Road overbridge and the permanent A50 Warrington Road realignment. The southern section of the diversion will be completed up to its intersection with the A50 Warrington Road temporary realignment, where it will form the minor arm of a temporary priority-controlled T-junction. The northern section of the Hoo Green Lane diversion will be completed in conjunction with the construction of A50 Warrington Road overbridge and the permanent A50 Warrington Road realignment. The temporary arrangements will be in use for one year and nine months, resulting in an increase in journey length of up to 792m;
- A556 – temporary slip roads will be constructed between the A556 and Chapel Lane during the area advance works. A temporary off-slip from the A556 northbound to Chapel Lane and a temporary on-slip to the A556 southbound from Chapel Lane will be constructed to provide access to construction compounds in the Hoo Green and Hulseheath area. Access will be restricted to construction traffic associated with the Proposed Scheme only. The new slip roads will take six months to complete and will be in use for approximately four years and six months;
- Peacock Lane and Back Lane – temporary closures will be required during construction of Peacock Lane overbridge, Peacock Lane viaduct and the Peacock Lane realignment. Rolling closures of sections of Peacock Lane will be required during construction of the tie-ins to the existing highway at the eastern and western extents and during construction of the realignment where it crosses the existing Peacock Lane. Closures will be staggered to ensure that access to properties on Peacock Lane and Back Lane is retained. Users travelling between Hulseheath and High Legh will be diverted via Chapel Lane, the B5569 Chester Road, the A50 Knutsford Road/Warrington Road, the B5159 West Lane and Peacock Lane for one year, increasing journey length by up to 8.6km;
- M56 – temporary realignment of an 800m section of the M56 between junctions 8 and 9 to enable the construction of M56 West overbridge. The M56 will be realigned approximately 50m north of its existing alignment for three years and six months, increasing journey length by 20m. Traffic management will be required to construct the crossovers and to reinstate the carriageways at the interface with the existing alignment. Overnight closures will be required during this period. The motorway will be reinstated on its current alignment on completion of M56 West overbridge; and
- A56 Lymm Road – temporary realignment of an 800m section of the A56 Lymm Road to enable to construction of A56 Lymm Road viaduct. The road will be realigned

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approximately 50m to the south-east of its existing alignment for one year and three months, increasing journey length by 14m.

- 14.4.23 The temporary diversions or realignments will change journey length for vehicle occupants. Many of the diversions or realignments are less than 1km in length and will not result in any significant effects with regard to changes in journey times for vehicle occupants. However, some of the diversion or realignments are greater than 1km, which may result in significant effects for vehicle occupants. They may also affect non-motorised users, which is considered separately below. The effects, which are significant, will be:
- School Lane – minor adverse effect from increase in journey length of up to 2.3km;
  - Frog Lane – minor adverse effect from increase in journey length of up to 3km; and
  - Peacock Lane – moderate adverse effect from an increase in journey length of up to 8.6km.
- 14.4.24 During weekend and overnight closures associated with the realignment of the M6, the main increases in traffic flows will occur on roads used as temporary diversion routes. However, this will not have a significant effect on congestion and delays on the diversion routes because the underlying baseline traffic flows at these times are lower than the daytime flows on a weekday.
- 14.4.25 Whilst overnight closures of the M56 described above are not expected to result in significant effects in isolation, the cumulative impact of weekend and overnight closures on the M56 in the adjacent Hulseheath to Manchester Airport area (MA06) will result in a moderate adverse effect, which is significant.
- 14.4.26 The movement of excavated or fill material and construction vehicles accessing construction compounds during the construction of the Proposed Scheme together with temporary road closures and diversions is expected to result in changes in daily traffic flows.
- 14.4.27 These changes in traffic flow will lead to changes in delays to vehicle occupants and congestion, which are significant. The significant effects with the highest magnitude at each junction will be:
- A50 King Edward Road/A50 Toft Road/A537 Adam's Hill/B5083 Stanley Road - minor adverse effect during scenarios 2 and 3;
  - A537 Brook Street/B5085 Hollow Lane/Brook Lane - moderate adverse effect during scenario 2;
  - A537 Brook Street/A537 Adam's Hill/B5083 King Street - moderate adverse effect during scenario 2 and moderate beneficial effect during scenarios 3 and 4;
  - A556 Chester Road/A5033 Northwich Road - major adverse effect during scenarios 2 and 3;
  - A5033 Northwich Road/Ladies Mile - minor adverse effect during scenario 2;
  - Tabley Road/Ladies Mile - minor adverse effect during scenario 1;
  - A556 Chester Road/B5391 Pickmere Lane/Tabley Hill Lane - major adverse effect during scenario 1, 2 and 3;

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- A50 Warrington Road/A50 Chester Road/B5569 Chester Road (south) - major adverse effect during scenarios 3 and 4;
- A50 Warrington Road/B5159 West Lane (east) - major adverse effect during scenarios 2, 3 and 4; and
- M6 junction 20/A50 Cliff Lane/B5158 Cherry Lane - major adverse effect during scenario 2, 3 and 4.

14.4.28 Construction of the Proposed Scheme will result in substantial changes in traffic flows (i.e. more than 30% for HGVs or for all vehicles) in some locations, which can lead to changes in traffic-related severance effects for non-motorised users, which are significant. The significant effects with the highest magnitude in each location are set out in Table 43 and Table 44.

**Table 43: Roads with changes in daily all vehicle movements (more than 30%) resulting in significant effects on traffic-related severance for non-motorised users, 2030**

Road name	Significant effect	Construction scenario
B5391 Pickmere Lane (between School Lane and Budworth Road)	Moderate adverse	Scenario 3
B5391 Pickmere Lane (between Park Lane and School Lane)	Moderate adverse	Scenario 3
B5083 Garden Road (between Tatton Street and A50 Manchester Road)	Minor adverse	Scenario 3
Budworth Road (between Old Hall Lane and B5391 Pickmere Lane)	Moderate adverse	Scenario 2
Tabley Road (between Sugar Pit Lane and Green Lane)	Minor adverse	Scenarios 2 and 3
Old Hall Lane (between Budworth Road and Old Hall Lane West)	Moderate adverse	Scenarios 1, 2, 3 and 4
Tabley Hill Lane (between A556 Chester Road and Green Lane)	Minor adverse	Scenarios 2 and 3
Wrenshot Lane (between A50 Warrington Road and Broadoak Lane)	Moderate adverse	Scenarios 2 and 3
Chapel Lane/Peacock Lane (between Hulseheath Lane and Back Lane)	Moderate adverse	Scenarios 1, 2, 3 and 4
Swineyard Lane (between Heath Lane and A50 Warrington Road)	Moderate adverse	Scenario 2
Heath Lane (between Swineyard Lane and A50 Warrington Road)	Minor adverse	Scenario 3
Broadoak Lane (between Wrenshot Lane and Peacock Lane)	Moderate adverse	Scenario 3
Peacock Lane (between Broadoak Lane and B5159 West Lane)	Moderate adverse	Scenarios 3 and 4
Mag Lane (between Crouchley Lane and A50 Warrington Road)	Minor adverse	Scenario 3
Agden Lane/Agden Park Lane (between Thowler Lane and A56 Higher Lane)	Moderate adverse	Scenario 2
Crouchley Lane/Beechtree Lane (between Mag Lane and B5159 West Lane)	Minor adverse	Scenarios 2 and 3
Reddy Lane (between Millington Lane and A56 Lymm Road)	Major adverse	Scenario 3

**Table 44: Roads with changes in daily HGV movements (more than 30%) resulting in significant effects on traffic-related severance for non-motorised users, 2030**

Road name	Significant effect	Construction scenario
A556 Chester Road (between Plumley Moor Road and A5033 Northwich Road)	Moderate adverse	Scenarios 2 and 3



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Road name	Significant effect	Construction scenario
B5391 Pickmere Lane (between School Lane and Budworth Road)	Moderate adverse	Scenario 3
B5391 Pickmere Lane (between Park Lane and School Lane)	Moderate adverse	Scenario 3
A556 Chester Road (between A5033 Northwich Road and B5391 Pickmere Lane)	Major adverse	Scenarios 2 and 3
Budworth Road (between Old Hall Lane and B5391 Pickmere Lane)	Moderate adverse	Scenarios 1, 2 and 3
B5391 Pickmere Lane (between Budworth Road and A556 Chester Road)	Major adverse	Scenarios 1, 2 and 3
Old Hall Lane (between Budworth Road and Old Hall Lane West)	Moderate adverse	Scenarios 2 and 3
B5569 Chester Road (between Old Hall Lane and A50 Warrington Road)	Major adverse	Scenarios 1, 2, 3 and 4
A50 Warrington Road (between A5034 Mereside Road and Clamhunger Lane)	Major adverse	Scenarios 1, 2, 3 and 4
A5034 Mereside Road (between Mereheath Lane and A50 Warrington Road)	Major adverse	Scenarios 1, 2, 3 and 4
A5034 Mereside Road (between Ashley Road and Mereheath Lane)	Major adverse	Scenarios 1, 2 and 4
A50 Warrington Road (between Clamhunger Lane and B5569 Chester Road)	Major adverse	Scenarios 2 and 4
A50 Chester Road (between B5569 Chester Road (south) and B5569 Chester Road (north))	Moderate adverse	Scenarios 1, 2 and 3
A50 Knutsford Road (between B5569 Chester Road (north) and A556 northbound on-slip)	Major adverse	Scenario 2
B5569 Chester Road (between A50 Knutsford Road and A5034 Mereside Road)	Moderate adverse	Scenarios 1, 2 and 3
A50 Knutsford Road (between A556 northbound on-slip and Hoo Green Lane)	Major adverse	Scenario 2
A50 Knutsford Road/Warrington Road (between Hoo Green Lane and Wrenshot Lane)	Major adverse	Scenario 2
A50 Warrington Road (between Halliwell's Brow and Wrenshot Lane)	Major adverse	Scenario 2
Chapel Lane (between Hulseheath Lane and B5569 Chester Road)	Moderate adverse	Scenarios 1, 2, 3 and 4
A50 Warrington Road (between Halliwell's Brow and B5159 West Lane)	Major adverse	Scenario 2
Chapel Lane/Peacock Lane (between Hulseheath Lane and Back Lane)	Moderate adverse	Scenarios 1, 2, 3 and 4
A50 Warrington Road (between B5159 West Lane and Swineyard Lane)	Major adverse	Scenario 2
Wrenshot Lane (between B5159 West Lane and Broadoak Lane)	Moderate adverse	Scenarios 1, 2, 3 and 4
A50 Warrington Road (between Swineyard Lane and Mag Lane)	Major adverse	Scenario 2
A50 Warrington Road (between Mag Lane and Heath Lane)	Major adverse	Scenario 2
Peacock Lane (between Moss Lane and Thowler Lane/Back Lane)	Moderate adverse	Scenario 3
A50 Warrington Road/Cliff Lane (between Heath Lane and M6 junction 20)	Major adverse	Scenario 2
A56 Lymm Road (between Bowdon Roundabout and Reddy Lane)	Major adverse	Scenarios 2 and 3
A56 Lymm Road (between Reddy Lane and Agden Park Lane)	Major adverse	Scenarios 2 and 3

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Road name	Significant effect	Construction scenario
B5160 Charcoal Road (between A56 Dunham Road and Charcoal Road)	Moderate adverse	Scenarios 1, 2 and 3
B5160 Smithy Lane (between Charcoal Road and School Lane)	Moderate adverse	Scenarios 1, 2, 3 and 4
B5160 Woodhouse Lane (between School Lane and Barns Lane)	Major adverse	Scenarios 1, 2, 3 and 4

14.4.29 Utility works have been included in the assessment where they are major and where the traffic or transport impacts from the works separately, or in combination with other works, will be greater than other construction activities arising within the area. Most utility works are expected to result in only localised traffic and pedestrian diversions, which will be of short-term duration and are not expected to result in significant effects.

### Accidents and safety

14.4.30 There will be no significant effects on accidents and safety as there are no locations where there are both accident clusters and substantial changes in traffic during construction.

### Parking and loading

14.4.31 The Proposed Scheme will have impacts on parking in the local area. This is likely to result in the following effects, which are significant:

- Mere Court Hotel - major adverse effect as a result of the temporary loss of 75 out of 120 car parking spaces for a period of four years due to the construction of the Proposed Scheme; and
- Cheshire Showground - major adverse effect as a result of the temporary loss of 23.4 hectares of parking, which is estimated to have a capacity up to the equivalent of 9,364 car parking spaces for a period of three years and six months due to the construction of the Proposed Scheme.

14.4.32 HS2 Ltd will work with the businesses affected to identify opportunities where reasonably practicable to mitigate effects on parking.

14.4.33 Permanent loss of parking is reported under the operational assessment.

### Public transport network

14.4.34 Construction of the Proposed Scheme will not result in any significant effects upon the operation of existing rail services and stations or bus services and stops.

### Non-motorised users

14.4.35 The construction works associated with the Proposed Scheme will require the temporary closure, diversion or realignment of PRow and roads in the vicinity of the Proposed Scheme, including, where necessary, around construction compounds. In most cases, these will be of a short duration and/or distance and will not have a significant effect on users.

- 14.4.36 Nonetheless, there will be temporary effects, which are significant, on non-motorised users during construction as a result of changes to journey length and/or hindrances such as substantial changes in levels for non-motorised users due to temporary PRoW and road realignments or diversions at:
- Footpath Tabley Inferior 1/1 – minor adverse effect from an increase in journey length of up to 206m;
  - Footpath Tabley Inferior 3/1 – moderate adverse effect from an increase in journey length of up to 1.2km;
  - Footpath Pickmere 9/1 – minor adverse effect from an increase in journey length of up to 345m;
  - Frog Lane – moderate adverse effect from an increase in journey length of up to 3km;
  - School Lane – moderate adverse effect from an increase in journey length of up to 1.7km;
  - Hoo Green Lane – moderate adverse effect from an increase in journey length of up to 781m;
  - Peacock Lane – moderate adverse effect from an increase in journey length of up to 2.7km;
  - Back Lane – moderate adverse effect from an increase in journey length of up to 3.9km;
  - Agden Lane – moderate adverse effect from an increase in journey length of up to 2.1km;
  - Footpath Agden 4/1 – moderate adverse effect from an increase in journey length of up to 701m;
  - Footpath Agden 2/4 – moderate adverse effect from an increase in journey length of up to 500m; and
  - Footpath Agden 1/2 – minor adverse effect from an increase in journey length of up to 500m.
- 14.4.37 Permanent diversions to PRoW and roads are reported under the operational assessment.

## **Permanent effects**

- 14.4.38 Any permanent effects of construction are considered in the assessment of operation for traffic and transport. This is because the impacts and effects of ongoing changes in travel demand and the wider impacts and effects of the operational phase need to be considered together.

## **Other mitigation measures**

- 14.4.39 The implementation of the measures in the draft CoCP, including travel plans, will help mitigate the transport-related effects during construction of the Proposed Scheme.
- 14.4.40 No further appropriate traffic and transport mitigation measures have been identified. HS2 Ltd will, however, continue to work with the relevant highway authorities to identify whether further mitigation measures should be provided.

## Summary of likely residual significant effects

- 14.4.41 The temporary residual significant effects during construction remain as described above. These effects will be temporary and reversible in nature lasting only for the duration of the construction works.
- 14.4.42 The construction of the Proposed Scheme will result in changes in journey lengths for vehicle users during the construction period, resulting in the following temporary effects, which are significant:
- moderate adverse effects on two roads; and
  - minor adverse effects on two roads.
- 14.4.43 The most intensive periods of construction of the Proposed Scheme will cause changes in traffic that will result in the following temporary effects, which are significant, through changes in congestion and/or delays for road users:
- major adverse effects at five junctions;
  - moderate adverse effects at two junctions;
  - minor adverse effects at three junctions; and
  - moderate beneficial effects at one junction.
- 14.4.44 Changes in traffic during the construction period will result in the following temporary effects, which are significant, on traffic-related severance for non-motorised users:
- major adverse effects on 20 roads;
  - moderate adverse effects on 18 roads; and
  - minor adverse effects on six roads.
- 14.4.45 The loss of parking spaces during the construction period will result in temporary major adverse effects, which are significant, at two locations.
- 14.4.46 Changes in journey length for non-motorised users during the construction period will result in the following temporary effects, which are significant:
- moderate adverse effects on users of three PRoW and six roads; and
  - minor adverse effects on users of three PRoW.

## Cumulative effects

- 14.4.47 The assessment includes the cumulative effects of planned and committed development during construction by taking this into account within the background traffic growth.
- 14.4.48 The assessment also takes into account Proposed Scheme construction traffic and transport impacts of works to construct the Proposed Scheme being undertaken in neighbouring community areas.

## 14.5 Effects arising from operation

14.5.1 This section presents the likely significant environmental effects of the operation of the Proposed Scheme in 2038 and 2046.

### Avoidance and mitigation measures

14.5.2 The following measures have been included as part of the design of the Proposed Scheme and will avoid or reduce impacts on transport users:

- reinstatement of roads on or close to their existing alignments, where reasonably practicable; and
- replacement, diversion or realignment of PRoW.

### Assessment of impacts and effects

14.5.3 The following section considers the impacts on traffic and transport and the consequential effects resulting from the operational phase of the Proposed Scheme in 2038 and 2046.

### Key operation transport issues

14.5.4 The assessment takes account of all of the impacts of the Proposed Scheme in the Pickmere to Agden and Hulseheath area. The main impacts of the operation of the Proposed Scheme will be on the highway and public transport networks within this area due to changes in rail users and traffic associated with Manchester Airport High Speed station (located in the adjacent Hulseheath to Manchester Airport area (MA06)) and the permanent diversion, realignment and stopping up of roads. The maintenance of the Proposed Scheme will generate limited vehicular trips and their effect will not be significant.

14.5.5 The operational impacts will, therefore, primarily relate to the permanent diversion, realignment and stopping up of roads, the permanent loss of parking and the permanent diversion or stopping up of PRoW.

## Highway network

### Strategic and local highway network

14.5.6 The Proposed Scheme will require the permanent widening, diversion, closure or realignment of (ordered by road class from south to north):

- M6 – realignment of the M6, comprising widening by 2m over a length of 425m, 1.6km to the north-west of junction 19 to accommodate a pier in the central reservation for M6 Mere viaduct, resulting in a negligible change in journey length;

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- A50 Warrington Road – realignment of the A50 Warrington Road, 15m south of its current alignment for 550m, crossed by the route of the Proposed Scheme on A50 Warrington Road overbridge, resulting in a negligible change in journey length;
- B5391 Pickmere Lane – realignment of the B5391 Pickmere Lane, 62m north of its current alignment for 422m, crossed by the route of the Proposed Scheme beneath Arley Brook viaduct, resulting in a negligible change in journey length;
- Flittogate Lane – diversion of Flittogate Lane, 260m north of its current alignment for 491m, increasing journey length by up to 372m. A new three-arm priority-controlled (give-way) T-junction will be formed at the connection with the B5391 Pickmere Lane realignment;
- School Lane – realignment of School Lane, comprising carriageway widening from its current width of 4m to 7.3m. Widening is required to accommodate diverted traffic associated with the permanent closure of Budworth Road, with a negligible change in journey length;
- Frog Lane – realignment of Frog Lane, 50m west of its current alignment for 323m. The realignment will result in modifications to the junctions of Budworth Road/Frog Lane and Frog Lane/School Lane, decreasing journey length for some users by 30m;
- Budworth Road – closure of Budworth Road where it is crossed by the route of the Proposed Scheme. Traffic will be diverted via the Frog Lane realignment, School Lane realignment and the B5391 Pickmere Lane realignment, increasing journey length for some users by 3km;
- Hoo Green Lane – diversion of Hoo Green Lane, 450m west of its current alignment for 800m. The diversion will connect with the A50 Warrington Road realignment at a new three-arm priority-controlled (give-way) T-junction. The existing Hoo Green Lane will be closed where it is crossed by the Proposed Scheme. Access will be retained on both sides of the route of the Proposed Scheme for properties and fields. Journey lengths will increase for some users by 828m;
- Bowden View Lane – closure of Bowden View Lane where it is crossed by the Proposed Scheme, with access to properties retained on the eastern side of the route, increasing journey length for some users by 783m;
- Peacock Lane – realignment of Peacock Lane over a distance of 1.4km. The western section will be realigned on an embankment up to 47m south of its current alignment and will be crossed by the route of the Proposed Scheme on Peacock Lane overbridge. The realignment will intersect the current alignment of Peacock Lane in the vicinity of its existing junction with Back Lane and continue on the northern side of Peacock Lane, up to 175m north of its current alignment. The realignment will cross HS2 Manchester spur beneath Peacock Lane viaduct. The realignment of Peacock Lane will result in a negligible change in journey length;
- Back Lane – diversion of Back Lane to tie-in with the Peacock Lane realignment, resulting in a negligible change in journey length; and

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- Agden Lane – closure of Agden Lane where it is crossed by the route of the Proposed Scheme, with access to properties retained on the eastern and western sides of the route, increasing the journey length for some users by 2.2km.

14.5.7 The permanent diversions or realignments will increase journey length for vehicle occupants. Many of the diversions or realignments are less than 1km in length and will not result in any significant effects with regard to changes in journey times for vehicle occupants. However, some of the diversion or realignments are greater than 1km and will lead to changes to journey length for highway users. They may also affect non-motorised users, which is considered separately below. The effects, which are significant, will be:

- Budworth Road - minor adverse effect from increase in journey length for some users of 3km; and
- Agden Lane - minor adverse effect from increase in journey length for some users of 2.2km .

14.5.8 The operation of Manchester Airport High Speed station in the adjacent Hulseheath to Manchester Airport area (MA06) will lead to changes to traffic levels in the Pickmere to Agden and Hulseheath area due to passengers accessing the station, particularly by car or taxi.

14.5.9 The diversion of traffic associated with highway changes, including the closure of Budworth Road and Agden Lane combined with changes in traffic due to passengers and staff accessing Manchester Airport High Speed station (in the adjacent Hulseheath to Manchester Airport area (MA06)) will result in changes to congestion and delays at junctions. The junctions with changes in delay in 2038, which are significant, will be:

- A50 King Edward Road/A50 Toft Road/A537 Adam's Hill/B5083 Stanley Road - minor adverse effect;
- A537 Brook Street/A537 Adam's Hill/B5083 King Street - moderate adverse effect;
- A556 Chester Road/A5033 Northwich Road - minor adverse effect;
- B5085 Mobberley Road/B5085 Hollow Lane - moderate adverse effect;
- A5033 Northwich Road/Ladies Mile - minor adverse effect;
- A50 Manchester Road/A50 King Edward Road/A5033 Northwich Road/Canute Place - minor adverse effect; and
- A556 Chester Road/B5391 Pickmere Lane/Tabley Hill Lane - major adverse effect.

14.5.10 The junctions with changes in delay in 2046, which are significant, will be:

- A50 King Edward Road/A50 Toft Road/A537 Adam's Hill/B5083 Stanley Road - minor adverse effect;
- A537 Brook Street/B5085 Hollow Lane/Brook Lane - major adverse effect;
- A537 Brook Street/A537 Adam's Hill/B5083 King Street - moderate adverse effect;
- A556 Chester Road/A5033 Northwich Road - minor adverse effect;

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- A50 Manchester Road/A50 King Edward Road/A5033 Northwich Road/Canute Place - minor adverse effect; and
- A556 Chester Road/B5391 Pickmere Lane/Tabley Hill Lane - major adverse effect.

14.5.11 A change in traffic levels can result in changes to traffic-related severance for non-motorised road users, particularly pedestrians using or seeking to cross a road. The permanent highway changes which are forecast to result in changes in peak hour traffic flow (more than 10% for all vehicles) and that will result in changes in traffic-related severance for non-motorised users, which are significant, are set out in Table 45. Where there is no significant effect on a road during a particular time period it is represented by a dash.

**Table 45: Roads with changes in traffic flow resulting in significant effects on traffic-related severance for non-motorised users, 2038 and 2046**

Road name	2038 AM peak hour	2038 PM peak hour	2046 AM peak hour	2046 PM peak hour
B5391 Pickmere Lane (between School Lane and Budworth Road)	Moderate adverse	Moderate adverse	Moderate adverse	Moderate adverse
B5391 Pickmere Lane (between Park Lane and School Lane)	Moderate adverse	-	Moderate adverse	-
A537 Brook Street (between B5085 Mobberley Road and B5085 Hollow Lane)	-	Moderate adverse	-	Major adverse
B5085 Mobberley Road (between A537 Chelford Road and B5085 Hollow Lane)	-	Moderate beneficial	-	Major beneficial
A5033 Northwich Road (between A50 Manchester Road and B5083 Stanley Road)	-	-	Moderate adverse	Moderate adverse
Tatton Street (between A50 King Edward Road and B5083 Garden Road)	-	Major adverse	-	-
B5083 Garden Road (between Tatton Street and A50 Manchester Road)	-	Moderate adverse	-	Minor adverse
Tabley Road (between Ladies Mille and A50 Manchester Road)	-	Moderate beneficial	-	-
B5569 Chester Road (between Old Hall Lane and A50 Warrington Road)	-	Moderate beneficial	-	Major beneficial
A50 Warrington Road (between A5034 Mereside Road and Clamhunger Lane)	Moderate adverse	-	Moderate adverse	-
A5034 Mereside Road (between Mereheath Lane and A50 Warrington Road)	Moderate beneficial	Moderate beneficial	Moderate beneficial	-
Clamhunger Lane (between A5034 Mereside Road and A50 Warrington Road)	-	Moderate beneficial	-	-
A5034 Mereside Road (between Ashley Road and Mereheath Lane)	Major beneficial	Major beneficial	Moderate beneficial	Major beneficial
A50 Warrington Road (between Clamhunger Lane and B5569 Chester Road)	Moderate adverse	-	Moderate adverse	-
A5034 Mereside Road (between Ciceley Mill Lane and Ashley Road)	-	Major beneficial	-	Major beneficial



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Road name	2038 AM peak hour	2038 PM peak hour	2046 AM peak hour	2046 PM peak hour
A50 Chester Road (between B5569 Chester Road (south) and B5569 Chester Road (north))	Moderate adverse	-	Moderate adverse	Moderate adverse
A50 Knutsford Road (between B5569 Chester Road (north) and A556 northbound on-slip)	Moderate adverse	-	Moderate adverse	Moderate adverse
A50 Knutsford Road/Warrington Road (between Hoo Green Lane and Wrenshot Lane)	-	Moderate adverse	-	Moderate adverse
A50 Warrington Road (between Halliwell's Brow and Wrenshot Lane)	-	-	-	Moderate adverse
B5159 West Lane (between Wrenshot Lane and A50 Warrington Road)	-	Moderate adverse	-	Moderate adverse
Heath Lane (between Swineyard Lane and A50 Warrington Road)	-	Moderate adverse	-	Minor adverse
A50 Warrington Road (between Swineyard Lane and Mag Lane)	-	-	-	Moderate adverse
B5159 West Lane (between Peacock Lane and Wrenshot Lane)	-	Moderate adverse	-	-
B5159 West Lane (between Peacock Lane and Beechtree Lane)	-	Moderate adverse	-	-
Reddy Lane (between Millington Lane and A56 Lymm Road)	Moderate adverse	Moderate adverse	Major adverse	Major adverse
A56 Lymm Road (between Reddy Lane and Agden Park Lane)	-	Moderate adverse	-	-

## Accidents and safety

- 14.5.12 There will be no significant effects on accidents and safety as there are no locations where there are both accident clusters and substantial changes in traffic due to the operation of the Proposed Scheme.

## Parking and loading

- 14.5.13 There will be a permanent loss of car parking at locations along the route of the Proposed Scheme in this area, which is significant. This will include:
- Mere Court Hotel – major adverse effect due to the permanent loss of 28 out of 120 car parking spaces; and
  - Cheshire Showground – major adverse effect due to the permanent loss of 5.3ha of parking, which is estimated to have a capacity up to the equivalent of 2,115 parking spaces.
- 14.5.14 HS2 Ltd will work with the businesses affected to identify opportunities where reasonably practicable to mitigate effects on parking.

## Public transport network

- 14.5.15 The Proposed Scheme is not expected to have a significant effect on public transport operations in the Pickmere to Agden and Hulseheath area.

## Non-motorised users

- 14.5.16 There will be permanent widening, realignment, diversion or extension of eight PRoW and nine roads in the Pickmere to Agden and Hulseheath area that will have an impact on journey lengths or introduce hindrances such as substantial changes in levels for non-motorised users.
- 14.5.17 There will be severance effects, which are significant, on non-motorised users of five of these PRoW and five of these roads as a result of changes in journey length and/or hindrances. These are:
- Footpath Tabley Inferior 3/1 – moderate adverse effect from an increase in journey length of up to 866m;
  - Flittogate Lane – minor adverse effect from an increase in journey length of up to 372m;
  - Footpath Pickmere 9/1 – minor adverse effect from an increase in journey length of up to 248m;
  - Budworth Road – moderate adverse effect from an increase in journey length of up to 3km;
  - Hoo Green Lane – moderate adverse effect from an increase in journey length of up to 828m;
  - Bowden View Lane – moderate adverse effect from an increase in journey length of up to 752m;
  - Agden Lane – moderate adverse effect from an increase in journey length of up to 2.2km;
  - Footpath Agden 4/1 – moderate adverse effect from an increase in journey length of up to 1.4km;
  - Footpath Agden 2/4 – moderate adverse effect from an increase in journey length of up to 736m; and
  - Footpath Agden 1/2 – minor adverse effect from an increase in journey length of up to 309m.

## Other mitigation measures

- 14.5.18 No further appropriate traffic and transport mitigation measures have been identified. HS2 Ltd will, however, continue to work with the relevant highway authorities to identify whether further mitigation measures should be provided.

## Summary of likely residual significant effects

- 14.5.19 The residual significant effects during operation remain as described above. The highest magnitude effects are summarised below. For traffic-related effects, where there are adverse and beneficial effects in different time periods in the same year, only the adverse effects are reported in this summary.
- 14.5.20 The operation of the Proposed Scheme in 2038 and 2046 will result in two minor adverse effects, which are significant, due to changes in journey lengths for vehicle users.
- 14.5.21 The operation of the Proposed Scheme will cause changes in traffic that will result in the following effects, which are significant, through changes in congestion and/or delays for road users in 2038:
- major adverse effects at one junction;
  - moderate adverse effects at two junctions; and
  - minor adverse effects at four junctions.
- 14.5.22 The residual significant effects of changes in congestion and/or delays for road users in 2046 will be:
- major adverse effects at two junctions;
  - moderate adverse effects at one junction; and
  - minor adverse effects at three junctions;
- 14.5.23 Changes in traffic during operation of the Proposed Scheme will result in the following effects, which are significant, on traffic-related severance for non-motorised users in 2038:
- major adverse effects on one road;
  - moderate adverse effects on 15 roads;
  - major beneficial effects on two roads; and
  - moderate beneficial effects on five roads.
- 14.5.24 The residual significant effects on traffic-related severance for non-motorised users in 2046 will be:
- major adverse effects on two roads;
  - moderate adverse effects on 11 roads;
  - minor adverse effects on two roads;
  - major beneficial effects on four roads; and
  - moderate beneficial effect on one road.
- 14.5.25 The loss of parking spaces during the operation period of the Proposed Scheme will result in major adverse effects, which are significant, at two locations.

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- 14.5.26 Changes in journey lengths for non-motorised users due to the operation of the Proposed Scheme will result in the following effects, which are significant:
- moderate adverse effects on users of three PRoW and four roads; and
  - minor adverse effects on users of two PRoW and one road.

## **Cumulative effects**

- 14.5.27 The assessment includes cumulative effects of planned and committed development during operation, by taking into account background traffic growth in the future baseline.

## **Monitoring**

- 14.5.28 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.
- 14.5.29 There are no other area-specific monitoring requirements currently proposed for traffic and transport.

## 15 Water resources and flood risk

### 15.1 Introduction

- 15.1.1 This section provides a description of the current baseline for water resources and flood risk in the Pickmere to Agden and Hulseheath area. The likely impacts and significant effects identified arising from the construction and operation of the Proposed Scheme on surface water and groundwater bodies and their associated water resources are reported. The likely impacts and significant effects of the Proposed Scheme on flood risk and land drainage are also reported.
- 15.1.2 Engagement has been undertaken with:
- the Environment Agency;
  - Natural England;
  - Cheshire East Council (CEC), which is the Lead Local Flood Authority (LLFA);
  - Canal & River Trust; and
  - United Utilities Group plc (the local water and sewerage undertaker).
- 15.1.3 The purpose of this engagement has been to obtain relevant baseline information and to discuss the Proposed Scheme and potential impacts and effects. The engagement has informed the assessments, including potential impacts on The Mere, Mere Site of Special Scientific Interest (SSSI) (part of the Midland Meres and Mosses Phase 1 Ramsar site) and flood risk and associated embedded mitigation around Millington Clough.
- 15.1.4 Maps showing the location of the key environmental features (Map Series CT-10), and the key construction (Map Series CT-05) and key operational (Map Series CT-06) features of the Proposed Scheme can be found in the Volume 2: MA03 Map Book.
- 15.1.5 Map Series WR-01, WR-02, WR-03, WR-05 and WR-06, showing details of the water features referred to in this section, are contained in the Volume 5, Water resources and flood risk Map Book.
- 15.1.6 Detailed information on the water resources and flood risk issues specific to the Pickmere to Agden and Hulseheath area are contained in the Volume 5 appendices. These comprise:
- Appendix WR-003-0MA03 – Water resources assessment;
  - Appendix WR-005-0MA03 – Flood risk assessment; and
  - Appendix WR-006-00001 – Hydraulic modelling report – Millington Clough and Tributaries.
- 15.1.7 Volume 5 also includes a detailed route-wide, stand-alone Water Framework Directive (WFD) compliance assessment (WR-001-000) and a draft route-wide water resources and flood risk operation and maintenance plan (Appendix WR-007-00000).

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- 15.1.8 In addition, the following documents are provided as Background Information and Data (BID)<sup>163</sup>:
- BID WR-004-0MA03 – Water resources baseline; and
  - BID WR-002-00001 – Water Framework Directive compliance assessment baseline data.
- 15.1.9 Volume 3, Route-wide effects, Water resources and flood risk (Section 16) covers the following at a route-wide level:
- the risk to water resources associated with accidents or spillages from trains during operation of the Proposed Scheme;
  - a summary of how the Proposed Scheme aims to demonstrate compliance with the statutory requirements of the WFD; and
  - route-wide flood risk issues related to the Proposed Scheme with the Sequential Test and Exception Test policies in the National Planning Policy Framework (NPPF)<sup>164</sup>.
- 15.1.10 The Proposed Scheme is described in Section 2.
- 15.1.11 All distances, lengths and area measurements in this section are approximate.

## 15.2 Scope, assumptions and limitations

- 15.2.1 The scope, assumptions and limitations for the water resources and flood risk assessment are set out in Volume 1, Section 8 and the EIA Scope and Methodology Report (SMR)<sup>165</sup>.
- 15.2.2 Unless indicated otherwise, the spatial scope of the assessment (the study area) is based upon the identification of surface water and groundwater features within 1km of the Proposed Scheme, as described in Section 2.2 of this report. In the Pickmere to Agden and Hulseheath area, the study area has been extended to include The Mere, Mere SSSI, which is also a part of the Midland Meres and Mosses Phase 1 Ramsar site. Rostherne Mere Ramsar site, SSSI and National Nature Reserve (NNR), is located within the Hulseheath to Manchester Airport area (MA06) and is therefore considered in the Volume 2: Community Area report: Hulseheath to Manchester Airport (MA06).
- 15.2.3 This assessment is based on desk study information, including information provided to date by consultees and stakeholders, as well as surveys of accessible water features.
- 15.2.4 A precautionary approach has been used in the assessment to identify impacts and effects where there is limited information. Where surveys have not been undertaken due to land

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<sup>163</sup> High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background Information and Data*. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

<sup>164</sup> Ministry of Housing, Communities and Local Government (2019), *National Planning Policy Framework*. Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/779764/NPPF\\_Feb\\_2019\\_web.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/779764/NPPF_Feb_2019_web.pdf).

<sup>165</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

access constraints, a precautionary approach has been adopted in the assessments of receptor value and impact magnitude. Where this precautionary approach indicates the requirement for mitigation, preliminary mitigation is described, which may include further data collection and/or assessment.

- 15.2.5 Hydraulic analysis has been undertaken of watercourses and key structures within flood risk areas. This includes modelling of flood risk impacts on Millington Clough and its tributaries, and hydraulic analysis of flood risk impacts on Waterless Brook/Arley Brook. Interpretation of the hydraulic modelling and details of the analysis carried out can be found in Volume 5: Appendix WR-005-0MA03.
- 15.2.6 Groundwater levels have been inferred from the available Environment Agency groundwater level monitoring boreholes, historic borehole logs and topographic data, as well as from spring and watercourse locations.
- 15.2.7 The hydrological impacts on biological receptors such as aquatic fauna and flora are referred to in the Volume 5: Appendix WR-003-0MA03 Water resources assessment and the Volume 5: Appendix WR-001-00000, WFD compliance assessment. Where these impacts have the potential to result in significant effects these are described in Section 7, Ecology and biodiversity, together with any mitigation required.
- 15.2.8 Impacts from existing land contamination which lead to significant effects on groundwater quality are presented in Section 10, Land quality.

## 15.3 Environmental baseline

### Existing baseline - Water resources

#### Surface water

- 15.3.1 All surface water bodies in the study area fall within the Weaver Gowy and Mersey Upper management catchments of the North West river basin district (RBD).
- 15.3.2 The current river basin management plan<sup>166</sup> identifies the chemical and ecological status of surface water bodies, and the quantitative and chemical status of groundwater bodies within this RBD.
- 15.3.3 The statutory objective of the WFD<sup>167</sup> is to achieve 'good status' for all designated water bodies. The purpose of the WFD compliance assessment<sup>168</sup> is to demonstrate that the

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<sup>166</sup> Environment Agency (2015), *Water for life and livelihoods Part 1: North West river basin district: River basin management plan*. Available online at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/718335/North\\_West\\_RBD\\_Part\\_1\\_river\\_basin\\_management\\_plan.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/718335/North_West_RBD_Part_1_river_basin_management_plan.pdf).

<sup>167</sup> *The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (SI 2017 No. 407)*. Her Majesty's Stationary Office, London.

<sup>168</sup> Volume 5: Appendix WR-001-00000 *Water Framework Directive compliance assessment*.

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Proposed Scheme does not result in a deterioration in current water body status, and that water bodies are not prevented from achieving status objectives.

- 15.3.4 Specialist field surveys have been undertaken, where access has been available. Receptor values have been adjusted to reflect the outputs from these surveys, in close consultation with the Environment Agency. In the absence of field surveys, surface water bodies, other than minor ditches or ponds, have been identified within this assessment as being of either moderate, high or very high value based on various criteria including watercourse flow and taking into account any habitat which the watercourse may support.
- 15.3.5 Summary information relating to the surface water bodies potentially affected by the Proposed Scheme within the study area is provided in Table 46. The receptor value attributed to each individual water body is based on the methodologies set out in the SMR. The feature locations are indicated by the grid coordinates on the relevant Volume 5, Water resources and flood risk Map Book: Map Series WR-01, at the point closest to the Proposed Scheme.

**Table 46: Surface water body receptors**

Water body name and location	Type (at closest point to the Proposed Scheme <sup>169</sup> )	Q95 value (m <sup>3</sup> /s) <sup>170</sup>	Receptor value	Parent WFD water body name and identification number <sup>171</sup>	Current WFD status/ Objective <sup>172</sup>	Crossed by the Proposed Scheme?
Tributary of Smoker Brook 1 WR-01-304b – D6	Ordinary watercourse	0.007	Moderate	Smoker Brook (Gale Brook to Wincham Brook) GB112068060410	Bad/good by 2027	No
Leonards Wood Drain WR-01-304b – D6	Minor ditch	<0.002	Low	Smoker Brook (Gale Brook to Wincham Brook) GB112068060410	Bad/good by 2027	No
Tributary of Smoker Brook 2 WR-01-304b – D8	Ordinary watercourse	<0.002	Low	Smoker Brook (Gale Brook to Wincham Brook) GB112068060410	Bad/good by 2027	No

<sup>169</sup> The term 'minor ditch' has been used to denote a small trench or drain that has been constructed for the purpose of draining water from the land or roads and is isolated from the wider river network.

<sup>170</sup> This is the flow within the watercourse that is exceeded for 95% of the time. The Q95 is provided as an indication of watercourse size but is only one of several criteria used to inform receptor value. Other criteria include the WFD watercourse classification which takes into account the value of any habitat which the watercourse supports. Details are provided in the Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

<sup>171</sup> The Environment Agency has attributed each surface water and groundwater body a unique water body identification (ID) number.

<sup>172</sup> Status and objectives are based on those set out in the 2015 River basin management plan. The 2015 RBMP is the most up to date and will be updated in 2021.



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<b>Water body name and location</b>	<b>Type (at closest point to the Proposed Scheme)<sup>169</sup></b>	<b>Q95 value (m<sup>3</sup>/s)<sup>170</sup></b>	<b>Receptor value</b>	<b>Parent WFD water body name and identification number<sup>171</sup></b>	<b>Current WFD status/ Objective<sup>172</sup></b>	<b>Crossed by the Proposed Scheme?</b>
Tributary of Waterless Brook/Arley Brook 1 WR-01-304b – F7	Ordinary watercourse	<0.002	Moderate	Smoker Brook (Gale Brook to Wincham Brook) GB112068060410	Bad/good by 2027	No
Tributary of Waterless Brook/Arley Brook 2 WR-01-304b – F7	Ordinary watercourse	<0.002	Moderate	Smoker Brook (Gale Brook to Wincham Brook) GB112068060410	Bad/good by 2027	No
Pickmere Lane Drain WR-01-304b – F6	Minor ditch	<0.002	Low	Smoker Brook (Gale Brook to Wincham Brook) GB112068060410	Bad/good by 2027	No
School Lane Drain WR-01-304b – F5	Minor ditch	<0.002	Low	Smoker Brook (Gale Brook to Wincham Brook) GB112068060410	Bad/good by 2027	No
Waterless/Arley Brook WR-01-304b – D8	Main river	0.04	High	Smoker Brook (Gale Brook to Wincham Brook) GB112068060410	Bad/good by 2027	Yes
Tabley Brook WR-01-304b – G7	Ordinary watercourse	<0.002	Moderate	Smoker Brook (Gale Brook to Wincham Brook) GB112068060410	Bad/good by 2027	No
Tributary of Waterless Brook/Arley Brook 3 WR-01-304b – F6	Ordinary watercourse	<0.002	Moderate	Smoker Brook (Gale Brook to Wincham Brook) GB112068060410	Bad/good by 2027	No
Tributary of Waterless Brook/Arley Brook 4 WR-01-304b – F5	Ordinary watercourse	<0.002	Moderate	Smoker Brook (Gale Brook to Wincham Brook) GB112068060410	Bad/good by 2027	No
Tributary of Tabley Brook 1 WR-01-304b – G6	Ordinary watercourse	<0.002	Low	Smoker Brook (Gale Brook to Wincham Brook) GB112068060410	Bad/good by 2027	No
Tributary of Waterless Brook/Arley Brook 5 WR-01-304b – G5	Ordinary watercourse	<0.002	Moderate	Smoker Brook (Gale Brook to Wincham Brook) GB112068060410	Bad/good by 2027	No

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<b>Water body name and location</b>	<b>Type (at closest point to the Proposed Scheme)<sup>169</sup></b>	<b>Q95 value (m<sup>3</sup>/s)<sup>170</sup></b>	<b>Receptor value</b>	<b>Parent WFD water body name and identification number<sup>171</sup></b>	<b>Current WFD status/ Objective<sup>172</sup></b>	<b>Crossed by the Proposed Scheme?</b>
Tributary of Tabley Brook 2 WR-01-304b – G7	Ordinary watercourse	<0.002	Moderate	Smoker Brook (Gale Brook to Wincham Brook) GB112068060410	Bad/good by 2027	Yes
Tributary of Tabley Brook 3 WR-01-304b – H6	Ordinary watercourse	<0.002	Moderate	Smoker Brook (Gale Brook to Wincham Brook) GB112068060410	Bad/good by 2027	No
Tributary of Tabley Brook 4 WR-01-304b – H6	Ordinary watercourse	<0.002	Low	Smoker Brook (Gale Brook to Wincham Brook) GB112068060410	Bad/good by 2027	Yes
Tributary of Tabley Brook 5 WR-01-304b – H7	Ordinary watercourse	<0.002	Low	Smoker Brook (Gale Brook to Wincham Brook) GB112068060410	Bad/good by 2027	No
Tributary of Tabley Brook 6 WR-01-304b – H6	Ordinary watercourse	<0.002	Low	Smoker Brook (Gale Brook to Wincham Brook) GB112068060410	Bad/good by 2027	No
Tributary of Tabley Brook 8 WR-01-304b – I6	Ordinary watercourse	<0.002	Low	Smoker Brook (Gale Brook to Wincham Brook) GB112068060410	Bad/good by 2027	Yes
Belt Wood Drains WR-01-304b – I6	Minor ditch	<0.002	Low	Smoker Brook (Gale Brook to Wincham Brook) GB112068060410	Bad/good by 2027	Yes
Tributary of Tabley Brook 7 WR-01-304b – I5	Ordinary watercourse	0.002	Moderate	Smoker Brook (Gale Brook to Wincham Brook) GB112068060410	Bad/good by 2027	No
Tributary of Tabley Brook 9 WR-01-304b – I7	Ordinary watercourse	0.004	Moderate	Smoker Brook (Gale Brook to Wincham Brook) GB112068060410	Bad/good by 2027	No
Winterbottom Lane Drains WR-01-304b – J5	Minor ditch	n/a	Low	Smoker Brook (Gale Brook to Wincham Brook) GB112068060410	Bad/good by 2027	No
Hoogreen Lane Drains WR-01-304b – J5	Minor ditch	<0.002	Low	Gale Brook GB112068060430	Moderate/good by 2027	No

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<b>Water body name and location</b>	<b>Type (at closest point to the Proposed Scheme)<sup>169</sup></b>	<b>Q95 value (m<sup>3</sup>/s)<sup>170</sup></b>	<b>Receptor value</b>	<b>Parent WFD water body name and identification number<sup>171</sup></b>	<b>Current WFD status/ Objective<sup>172</sup></b>	<b>Crossed by the Proposed Scheme?</b>
Hulseheath Lane Drains WR-01-305a – A7	Minor ditch	<0.002	Low	Bollin (Ashley Mill to Manchester Ship Canal) GB112069061382	Moderate/moderate by 2015	No
Chapel Lane Drain WR-01-305a – A7	Minor ditch	<0.002	Low	Bollin (Ashley Mill to Manchester Ship Canal) GB112069061382	Moderate/moderate by 2015	No
Tributary of Millington Clough 1 WR-01-305a – A7	Ordinary watercourse	<0.002	Low	Bollin (Ashley Mill to Manchester Ship Canal) GB112069061382	Moderate/moderate by 2015	Yes
Tributary of Millington Clough 2 WR-01-305a – B6	Ordinary watercourse	<0.002	Low	Bollin (Ashley Mill to Manchester Ship Canal) GB112069061382	Moderate/moderate by 2015	Yes
Kaylane Brook WR-01-305a – C4	Ordinary watercourse	<0.002	Moderate	Bollin (Ashley Mill to Manchester Ship Canal) GB112069061382	Moderate/moderate by 2015	No
Tributary of Millington Clough 3 WR-01-305a – B6	Ordinary watercourse	<0.002	Low	Bollin (Ashley Mill to Manchester Ship Canal) GB112069061382	Moderate/moderate by 2015	Yes
Tributary of Millington Clough 4 WR-01-305a – B7	Ordinary watercourse	<0.002	Low	Bollin (Ashley Mill to Manchester Ship Canal) GB112069061382	Moderate/moderate by 2015	Yes
Froghall Lane Drains WR-01-305a – C6	Minor ditch	<0.002	Low	Bollin (Ashley Mill to Manchester Ship Canal) GB112069061382	Moderate/moderate by 2015	No
Agden Brook WR-01-305a – E8	Main river	0.01	Moderate	Bollin (Ashley Mill to Manchester Ship Canal) GB112069061382	Moderate/moderate by 2015	No
Tributary of Agden Brook 2 WR-01-305a – D8	Ordinary watercourse	<0.002	Low	Bollin (Ashley Mill to Manchester Ship Canal) GB112069061382	Moderate/moderate by 2015	No
Tributary of Agden Brook 3 WR-01-305a – E8	Ordinary watercourse	<0.002	Low	Bollin (Ashley Mill to Manchester Ship Canal) GB112069061382	Moderate/moderate by 2015	No

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Water body name and location	Type (at closest point to the Proposed Scheme <sup>169</sup> )	Q95 value (m <sup>3</sup> /s) <sup>170</sup>	Receptor value	Parent WFD water body name and identification number <sup>171</sup>	Current WFD status/ Objective <sup>172</sup>	Crossed by the Proposed Scheme?
Tributary of Agden Brook 4 WR-01-305a – E8	Main river	<0.002	Moderate	Bollin (Ashley Mill to Manchester Ship Canal) GB112069061382	Moderate/moderate by 2015	No

### Abstractions and permitted discharges (surface water)

15.3.6 Table 47 sets out the surface water abstractions and permitted discharges within 1km of the route of the Proposed Scheme in the Pickmere to Agden and Hulseheath area.

**Table 47: Surface water abstraction and permitted discharges in the Water resources and flood risk study area**

Feature	Details	Value
Licensed surface water abstractions	Frog Lane Farm: abstraction from a pond and two locations on Tributary of Smoker Brook 1, for private water supply with an annual abstraction quantity of up to 6,819m <sup>3</sup> . Agden Brook Farm: abstraction from Agden Brook for private water supply with an annual abstraction quantity of up to 7,092m <sup>3</sup> .	High
Registered private unlicensed surface water abstractions	None	None
Consented discharges to surface water	Fourteen, of which three are within the land required for the Proposed Scheme.	Low

15.3.7 Private unlicensed surface water abstractions comprise those for quantities of less than 20m<sup>3</sup> per day. There is no obligation to register private water supplies, but available records have been obtained from the local authorities. Unregistered private surface water supplies may be present. Private water supplies are assumed to be high value receptors unless details obtained from supply owners indicated otherwise.

15.3.8 The number of abstractions and permitted discharges listed in Section 10, Land quality may be different to that stated here, due to different definitions of spatial scope. This is because the water resources and flood risk study area comprises all land within 1km of the Proposed Scheme, whereas the default land quality study area comprises all land within 250m from the boundary of the Proposed Scheme. The default study areas may be extended where the potential for pathways to more remote receptors exists.

### Groundwater

15.3.9 The location of abstractions, geological formations and indicative groundwater levels, where available, are shown in Volume 5, Water resources and flood risk Map Book: Map Series WR-02.

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15.3.10 The geology of the study area, including distribution and formation description, is described in Section 10, Land quality. The aquifer classification, WFD status and receptor value of the superficial and bedrock hydrogeology is summarised in Table 48 (for superficial deposits) and Table 49 (for bedrock). Unless stated otherwise, the geological groups listed will all be crossed by the Proposed Scheme. The current overall status of, and objective for, the WFD groundwater body is as stated in the current river basin management plan. Where the Environment Agency has not assigned an individual water body ID to a unit, it has been assumed that it is connected to the overlying water body.

**Table 48: Summary of geology and hydrogeology in the study area – superficial deposits**

<b>Geology</b>	<b>Aquifer classification</b>	<b>WFD body (ID) and current overall status</b>	<b>WFD status objective</b>	<b>Receptor value</b>
Alluvium	Secondary A	Weaver and Dane Quaternary Sand and Gravel Aquifer (GB41202G991700) Poor	Good by 2027	Moderate
River terrace deposits (not crossed by the Proposed Scheme)	Secondary A	Weaver and Dane Quaternary Sand and Gravel Aquifer (GB41202G991700) Poor	Good by 2027	Moderate
Shirdley Hill Sand Formation	Secondary A	Weaver and Dane Quaternary Sand and Gravel Aquifer (GB41202G991700) Poor	Good by 2027	Moderate
Glaciofluvial deposits	Secondary A	Weaver and Dane Quaternary Sand and Gravel Aquifer (GB41202G991700) Poor	Good by 2027	Moderate
Glaciofluvial sheet deposits (not crossed by the Proposed Scheme)	Secondary A	Weaver and Dane Quaternary Sand and Gravel Aquifer (GB41202G991700) Poor	Good by 2027	Moderate
Glacial till	Secondary (Undifferentiated)	Weaver and Dane Quaternary Sand and Gravel Aquifer (GB41202G991700) Poor	Good by 2027	Moderate

**Table 49: Summary of geology and hydrogeology in the study area – bedrock**

<b>Geology</b>	<b>Aquifer classification</b>	<b>WFD body (ID) and current overall status</b>	<b>WFD status objective</b>	<b>Receptor value</b>
Mercia Mudstone Group – Sidmouth Mudstone Formation – Northwich Halite Member	Unproductive	Not assessed by the Environment Agency	Not assessed by the Environment Agency	Low
Mercia Mudstone Group – Sidmouth Mudstone Formation, Bollin Mudstone Member	Secondary B	Not assessed by the Environment Agency	Not assessed by the Environment Agency	Moderate

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Geology	Aquifer classification	WFD body (ID) and current overall status	WFD status objective	Receptor value
Mercia Mudstone Group – Tarporley Siltstone Formation	Secondary B	Not assessed by the Environment Agency	Not assessed by the Environment Agency	Moderate
Sherwood Sandstone Group – Helsby Sandstone Formation	Principal	Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone aquifers (GB41201G101700) Poor	Good by 2027	High

### Superficial deposit aquifers

15.3.11 The basis of the receptor values attributed to the superficial deposit aquifers present within the study area, as shown in Table 48, is outlined briefly as follows:

- alluvium, river terrace deposits, Shirdley Hill Sand Formation, glaciofluvial deposits and glaciofluvial sheet deposits are classified as Secondary A aquifers. These aquifers may be capable of supporting water supplies at a local rather than regional scale and may also form an important source of baseflow to rivers. These aquifers have, therefore, been classified as moderate value receptors; and
- glacial till is classified as a Secondary (Undifferentiated) aquifer. This aquifer may supply baseflow to watercourses or store and yield limited amounts of groundwater. It has, therefore, been assessed as a moderate value receptor.

### Bedrock aquifers

15.3.12 The basis of the receptor values attributed to the bedrock aquifers present within the study area, as shown in Table 49, is outlined briefly as follows:

- the Sherwood Sandstone Group (locally comprising sandstone of the Helsby Sandstone Formation) has been classified as a Principal aquifer by the Environment Agency. This aquifer can provide an important component of baseflow to rivers. It has, therefore, been assessed as a high value receptor;
- the Bollin Mudstone Member of the Sidmouth Mudstone Formation, and the Tarporley Siltstone Formation, both of the Mercia Mudstone Group, are classified as Secondary B aquifers by the Environment Agency. These aquifers have traditionally been regarded as predominantly impermeable, or at best poor aquifers. Limited quantities of groundwater suitable for domestic or agricultural use are, however, occasionally obtainable within these bedrock formations. They have, therefore, been assessed as moderate value receptors; and
- the Northwich Halite Member of the Sidmouth Mudstone Formation within the Mercia Mudstone Group is considered to be unproductive. It has, therefore, been assessed as a low value receptor.

## WFD status of groundwater bodies

- 15.3.13 A summary of the locations, current overall WFD status, and future overall status objectives associated with the designated bedrock groundwater bodies within the study area is provided in Table 49. The value attributed to each of these receptors is also indicated.
- 15.3.14 Some of the bedrock aquifers in the study area are not formally designated as WFD groundwater bodies but may be hydraulically connected to the overlying WFD superficial and adjacent WFD bedrock groundwater bodies.

## Abstraction and permitted discharges (groundwater)

- 15.3.15 Table 50 sets out the groundwater abstraction and permitted discharges within 1km of the Proposed Scheme in the Pickmere to Agden and Hulseheath area.

**Table 50: Groundwater abstraction and permitted discharges in water resources and flood risk study area**

Feature	Details	Value
Source Protection Zones (SPZ) associated with licensed public water supplies	None	None
Private licensed groundwater abstractions	None	None
Registered unlicensed private groundwater abstractions	Two abstractions with unknown purpose (assumed potable supply), one located at Frog Lane Farm, Pickmere and one located at Heyrose Farm, Over Tabley.	Assumed high
Consented discharges to groundwater	One septic tank - sewage discharge to underground strata.	Low
Consented discharges to groundwater	Two sewage discharges to unknown receiving water bodies.	Low

## Groundwater – surface water interactions

- 15.3.16 A desk-based assessment using Ordnance Survey maps and detailed river network data provided by the Environment Agency identified 29 features within the study area that had the potential to be springs or sinks. Access was possible to inspect 26 of these features. The value of these features has been determined based on consideration of the feature's importance as a water resource as well as any ecological, heritage, cultural or community asset importance. Further details on these features can be found in BID WR-004-0MA03173. Of the 26 features inspected:
- two potential features were visited but these surveys were unable to confirm the nature of the features. They have, therefore, been assessed as high value receptors on a

<sup>173</sup> High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background Information and Data*. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

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precautionary basis. These two features comprise the potential spring at Clay House Farm, Flittogate Lane and potential spring east of Belt Wood;

- one feature was confirmed as a spring supporting a moderate value watercourse and has, therefore, been assessed as a moderate value receptor;
- two potential features were confirmed to be land drainage outfalls which support undesignated water dependent habitats. They have, therefore, been assessed as moderate value receptors;
- one feature was confirmed to be a spring supporting a low value watercourse. It has, therefore, been assessed as a low value receptor;
- two potential features were identified to be drainage outfalls and not groundwater features;
- seven potential features were verified as land drainage features and are included in the surface water assessment; and
- eleven features were identified to be culverts and not groundwater features.

15.3.17 The remaining three potential spring features are assumed to be high value receptors on a precautionary basis, pending site inspection. None of these remaining potential spring features are within the land required for the construction of the Proposed Scheme.

15.3.18 There are 109 ponds within the land required for the construction of the Proposed Scheme. Where there is the potential for the Proposed Scheme to have significant effects on these features the assessment, and any mitigation required, is presented in Section 7, Ecology and biodiversity.

## **Water dependent habitats**

15.3.19 The following nature conservation sites within the study area are potentially groundwater and surface water dependent:

- The Mere, Mere SSSI (part of the Midland Meres and Mosses (Phase 1) Ramsar site). The Mere, Mere SSSI is located in the upper catchment of Rostherne Mere Ramsar site, SSSI and NNR. Rostherne Mere is located within the Hulseheath to Manchester Airport area (MA06) and is therefore considered in Volume 2: Community Area report: Hulseheath to Manchester Airport (MA06), Section 15. The Mere, Mere SSSI is located approximately 1.8km east of the Proposed Scheme and 260m east of a construction traffic route. The Mere, Mere SSSI consists of two in-line lakes, which form part of the course of Rostherne Brook. The lakes and Rostherne Brook may be partly dependent on groundwater originating from glaciofluvial deposits in the vicinity of the Proposed Scheme; and
- Belt Wood Local Wildlife Site (LWS) and ancient woodland is located partially within land required for the construction of the Proposed Scheme. Two upper reaches of the Tributary of Tabley Brook 9, which are fed by land drains, run through the site. It is unclear at this time if this site is dependent on groundwater underlying the site and has been included on a precautionary basis.



15.3.20 A detailed description of the ecology of these sites is provided in Volume 5 reports relating to ecology and biodiversity.

## Existing baseline – flood risk and land drainage

15.3.21 The Environment Agency's Flood map for planning (rivers and sea)<sup>174</sup> has been used to scope the baseline flood risk for fluvial flooding from main rivers and ordinary watercourses. These plans define Flood Zone 2 (land assessed as having between a 1 in 100 (1%) and 1 in 1,000 (0.1%) annual probability of river flooding) and Flood Zone 3 (land assessed as having a 1 in 100 (1%) or greater annual probability of river flooding). The Risk of Flooding from Surface Water map<sup>175</sup> has been used to scope surface water flood risks and potential fluvial flood risk for ordinary watercourses where no Environment Agency Flood map for planning (rivers and sea) is available. All of these flood zones are shown in Volume 5, Water resources and flood risk Map Book: Map Series WR-01.

15.3.22 Infrastructure failure flood risks have been scoped using the Environment Agency Risks of flooding from reservoirs national dataset<sup>175</sup>. The British Geological Survey (BGS) Susceptibility to groundwater flooding dataset<sup>176</sup> has been used to assess the future risk of groundwater flooding.

15.3.23 The following reports were used to help determine the baseline flood risk within the study area:

- CEC Preliminary Flood Risk Assessment (PFRA) (2011)<sup>177</sup>;
- CEC Strategic Flood Risk Assessment (SFRA) (2014)<sup>178</sup>; and
- CEC Local Flood Risk Management Strategy (LFRMS) (2015)<sup>179</sup>.

15.3.24 Historical flood investigation reports published by the LLFA, under Section 19 of the Flood and Water Management Act<sup>180</sup>, relevant to this area have been reviewed (see Volume 5:

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<sup>174</sup> Environment Agency (2021), *Environment Agency's Flood map for planning (rivers and sea)*. Available online at: <https://flood-map-for-planning.service.gov.uk>.

<sup>175</sup> Environment Agency (2021), Long term flood risk information. Available online at: <https://flood-warning-information.service.gov.uk/long-term-flood-risk/>.

<sup>176</sup> BGS (2021), *Susceptibility to groundwater flooding dataset*. Available online at: <http://www.bgs.ac.uk/products/hydrogeology/groundwaterFlooding.html>.

<sup>177</sup> Jacobs (2011), *Cheshire East Preliminary Flood Risk Assessment (PFRA)*. Available online at: <https://moderngov.cheshireeast.gov.uk/ecminutes/documents/s13286/Cheshire%20East%20PFRA%20-%20Final%20version%20issued%2021st%20June%202011.pdf>.

<sup>178</sup> JBA Consulting (2013), *Cheshire East Council Strategic Flood Risk Assessment (SFRA)*. Available online at: <https://www.cheshireeast.gov.uk/pdf/planning/spatial-planning/researchand-evidence/strategic-flood-assessment/cheshire-east-council-sfra-final-report-v4.0.pdf>.

<sup>179</sup> Cheshire East Council (2017), *Cheshire East Local Flood Risk Management Strategy (LFRMS)*. Draft for Public Consultation. Available online at: <https://moderngov.cheshireeast.gov.uk/ecminutes/documents/s59547/Local%20Flood%20Risk%20Management%20Strategy%20-%20app%202.pdf>.

<sup>180</sup> *Flood and Water Management Act 2010* (c.29). Her Majesty's Stationery Office, London. Available online at: <http://www.legislation.gov.uk/ukpga/2010/29/contents>.

Appendix WR-005-0MA03 for further details). None of these reports include details of any historical flooding within the study area.

## River flooding

- 15.3.25 The study area includes substantial areas of floodplain (Flood Zone 2 and Flood Zone 3) associated with the Waterless Brook/Arley Brook and Millington Clough and its tributaries floodplains. Other floodplains that will be crossed by the Proposed Scheme include those associated with Tributary of Tabley Brook 2 and Tributary of Tabley Brook 8. Table 51 shows all relevant watercourses within the study area with receptors that would potentially be affected by any changes in the level and extent of flooding. The value of these receptors, based on the definitions in Section 21 of the SMR, is also indicated. The location description and figure/coordinate is the location at which the source intersects the Proposed Scheme, as indicated by the grid coordinates on the relevant Volume 5, Water resources and flood risk Map Book: Map Series WR-01.

**Table 51: River flood risk sources and receptors**

Source	Location description and figure/coordinate	Receptor potentially affected	Receptor value/ sensitivity to flooding
Waterless Brook/Arley Brook	Waterless Brook/Arley Brook WR-01-304b - F6	Agricultural land	Moderate
Waterless Brook/Arley Brook	Pickmere Lane and Budworth Road WR-01-304b - F6	Pickmere Lane bridge and Budworth Road bridge	Moderate
Tributaries of Millington Clough 1, 2, 3 and 4	Thowler Lane WR-01-305a - B7	Residential property west of Thowler Lane	High
Tributaries of Millington Clough 1, 2, 3 and 4	Thowler Lane WR-01-305a - B7	Commercial property west of Thowler Lane	Moderate
Tributaries of Millington Clough 1, 2, 3 and 4	Peacock Lane WR-01-305a - B6	Peacock Lane	Moderate
Tributaries of Millington Clough 1, 2, 3 and 4	Hulseheath WR-01-305a - A7	Residential properties at Hulseheath	High
Tributaries of Millington Clough 1, 2, 3 and 4	Hulseheath WR-01-305a - A7	Commercial property at Hulseheath	Moderate
Tributaries of Millington Clough 1, 2, 3 and 4	Tributaries of Millington Clough 1, 2, 3 and 4 WR-01-305a - A7, B7, B6, C6	Agricultural land	Moderate
Tributaries of Tabley Brook 2 and 8	Tributaries of Tabley Brook 2 and 8 WR-01-304b - G6, I6	Agricultural land	Moderate

## Surface water flooding

- 15.3.26 There are two areas that are susceptible to surface water flooding within the study area. The key sources and receptors with potential to be affected are shown in Table 52. The value of these receptors, based on Section 21 of the SMR, is also indicated. The location description and figure/coordinate is the location at which the source intersects the Proposed Scheme, as

indicated by the grid coordinates on the relevant Volume 5, Water resources and flood risk Map Book: Map Series WR-01.

**Table 52: Surface water flood risk sources and receptors**

Source	Location description and figure/coordinate	Receptor potentially affected	Receptor value
Surface water flow path associated with Tributary of Tabley Brook 3	South of Hollowood Farm WR-01-304b – H6	Agricultural land	Moderate
Surface water flow path associated with Tributary of Tabley Brook 1	North of Yew Tree Farm WR-01- 304b – G6	Agricultural land	Moderate

## Artificial water bodies

- 15.3.27 Flooding from artificial water bodies may occur due to failure of an impounding structure, such as a dam or canal embankment. There are no artificial water bodies with potential implications for flood risk within the study area.

## Groundwater flooding

- 15.3.28 Information related to historical incidents of groundwater flooding in the Pickmere to Agden and Hulseheath area is provided within the CEC SFRA<sup>178</sup> and LFRMS<sup>179</sup>. The SFRA and LFRMS state that there is no history of groundwater flooding within the area.
- 15.3.29 The BGS Susceptibility to groundwater flooding dataset indicates that there is some potential for groundwater flooding to occur at the following locations: Pickmere, Tabley Superior, Mere and Agden.

## Land drainage

- 15.3.30 Existing topography, soils and land drainage systems within the study area are described in Section 4, Agriculture, forestry and soils. The rivers and watercourses within the area are connected to an extensive network of existing open drains. Subsurface drainage systems are also likely to be present in fields used for agriculture. The land drainage function of these systems, which is important for crop productivity, is potentially sensitive to increases in water levels within the receiving watercourses.

## Future baseline

### Construction (2025)

- 15.3.31 Volume 5: Appendix CT-004-00000 provides details of the developments in the Pickmere to Agden and Hulseheath area that are assumed to have been implemented by 2025. No committed developments have been identified in this study area that will materially alter the baseline conditions in 2025 for water resources and flood risk.

## Operation (2038)

- 15.3.32 Volume 5: Appendix CT-004-00000 provides details of the developments in the Pickmere to Agden and Hulseheath area that are assumed to have been implemented by 2038. No committed developments have been identified in this study area that will materially alter the baseline conditions in 2038 for water resources and flood risk.

## Climate change

- 15.3.33 Detailed analysis of the potential impacts of climate change on the Proposed Scheme has been undertaken and is reported in Volume 3, Route-wide effects (Section 4). In general, the design of the Proposed Scheme has adopted a precautionary approach to potential future increase in peak river flows and rainfall intensities.
- 15.3.34 Although no definitive guidance is available, climate change may also affect future surface water and groundwater resources. However, any such changes are unlikely to alter the significance of the effects identified in this assessment.

## 15.4 Effects arising during construction

### Avoidance and mitigation measures

- 15.4.1 The principal strategy adopted to limit the temporary and permanent effects of the Proposed Scheme is through avoidance of sensitive receptors wherever reasonably practicable. Where receptors could not be avoided, mitigation measures have been incorporated where appropriate and reasonably practicable, to limit the potential effects. Section 16 of the draft Code of Construction Practice (CoCP)<sup>181</sup> includes a range of mitigation measures to reduce construction impacts as far as is reasonably practicable. The avoidance and mitigation measures that are of particular relevance to water resources and flood risk during construction are described in the following sections of this report.

### Water resources

- 15.4.2 The avoidance of sensitive receptors has reduced the risks associated with the Proposed Scheme not complying with the requirements of the WFD. Examples of this strategy include:
- avoidance of channels and floodplain areas, where reasonably practicable – the alignment of the Proposed Scheme will avoid passing along river or stream valleys, such as that of Waterless Brook/Arley Brook and their associated floodplains. Instead it will pass over these larger watercourses on viaducts spanning the floodplain, with piers set back from the channel;

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<sup>181</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

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- avoidance, where reasonably practicable, of water dependent habitats, including natural springs that can play a key role in the hydrology and hydrogeology of such ecosystems; and
  - avoidance, where reasonably practicable, of major public water supplies and smaller licensed and unlicensed abstractions of surface water and groundwater.
- 15.4.3 The presence of any unregistered private water supplies, their function and the means of protecting or if necessary replacing them would be discussed with any landowners potentially affected by the Proposed Scheme.
- 15.4.4 The temporary works shown on Map Series CT-05 in the Volume 2: MA03 Map Book have been informed by a detailed consideration of the water resources constraints and have sought to avoid sensitive features wherever reasonably practicable.
- 15.4.5 Watercourse realignments are proposed at the following locations:
- Tributary of Tabley Brook 2 (108m in length including 70m of culvert);
  - Tributary of Tabley Brook 4 (95m in length including 50m of culvert);
  - Tributary of Tabley Brook 8 (140m in length including 85m of culvert);
  - Tributary of Millington Clough 1 (240m in length including 35m of culvert);
  - Tributary of Millington Clough 2 (540m in length including 255m of culvert); and
  - Tributary of Millington Clough 4 (435m in length including 79m of aqueduct).
- 15.4.6 Realignments will be designed to have equivalent hydraulic capacity to the existing channels, as far as reasonably practicable. Where such watercourses are natural channels, appropriate features will be incorporated to replicate and, where reasonably practicable, enhance their hydromorphological condition. The hydromorphological condition reflects the extent to which water flow, sediment composition and movement, continuity (in rivers) and the structure of physical habitats departs from that expected of a natural river or stream system. The design of these realignments will be developed in consultation with the Environment Agency and the LLFA, with due consideration of WFD status objectives. The design of the Proposed Scheme will also ensure that existing drainage outfalls can be adapted to discharge into the new channel.
- 15.4.7 Watercourse diversions, which would result in changes in flow regime within discrete sections of channel, have been avoided wherever reasonably practicable. There are two diversions proposed within this study area at:
- Tributary of Millington Clough 1 (260m of channel); and
  - Tributary of Millington Clough 3 (335m of channel including 23m of culvert).
- 15.4.8 For watercourses that are not in their natural condition, where reasonably practicable, the watercourse design will incorporate measures to improve their hydromorphological condition. The design of the diversions will be developed in consultation with Environment Agency and LLFA, with due consideration of WFD status objectives.

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- 15.4.9 Infrastructure required within or in proximity to an existing channel (including bridge abutments, intermediate piers and outfalls) will be designed to reduce impacts on the natural hydromorphology of watercourse channels, as far as is reasonably practicable.
- 15.4.10 The draft CoCP includes requirements to protect water bodies and their associated water resources from the potential impacts of pollution from construction site runoff, including where appropriate:
- provision of maps showing sensitive areas and buffer zones where no pollutants are to be stored or used; and
  - preparation of method statements for silt management, site drainage at compounds and satellite compounds, for the storage and control of oils and chemicals and the prevention of accidental spillages, in consultation with the Environment Agency, and if appropriate, the LLFA and other relevant authorities as part of the approvals process. These method statements will cover, where applicable:
    - the avoidance of discharges of site runoff to ditches, watercourses, drains, sewers or soakaways without the prior approval of the appropriate authority;
    - measures to prevent silt-laden runoff and other pollutants entering the water environment; and
    - restrictions or controls on excavation within watercourses to limit effects on water quality, sedimentation, fisheries and aquatic ecology.
- 15.4.11 Method statements will be required for all watercourse crossings and channel realignments required for site haul routes. The method statements will describe how potential changes to flood risk, water quality and channel hydromorphology will be managed during the establishment, use and decommissioning of all site haul routes.
- 15.4.12 Permanent culverts and aqueducts proposed on the smaller watercourse crossings within the Pickmere to Agden and Hulseheath area include those on:
- Tributary of Tabley Brook 2 (Bongs Wood culvert 70m in length);
  - Tributary of Tabley Brook 4 (50m of culvert);
  - Tributary of Tabley Brook 8 (85m of culvert including Winterbottom culvert 75m in length);
  - Tributary of Millington Clough 1 (35m of culvert including Millington Clough offline culvert No. 2 25m in length and Millington Clough offline culvert No. 3 10m in length);
  - Tributary of Millington Clough 2 (255m of culvert including Millington Clough culvert 235m in length and Millington Clough offline culvert No. 1 20m in length);
  - Tributary of Millington Clough 3 (23m of culvert); and
  - Tributary of Millington Clough 4 (Millington Clough aqueduct 79m in length).
- 15.4.13 The design of these culverts will be developed in general accordance with Construction Industry Research and Information Association (CIRIA) and Environment Agency guidance and in consultation with Environment Agency specialists. The design has sought to mitigate the impact on the hydromorphology of the affected watercourses, as follows:

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- drop inlet culverts and inverted siphons have been avoided;
  - culvert lengths have been made as short as reasonably practicable; and
  - invert levels will be set below the firm bed of the watercourse to allow a natural substrate to develop along the bed of the culvert.
- 15.4.14 The wider issues associated with these culverts, and how, as far as reasonably practicable, the design will ensure no deterioration in the status of any of the relevant water body's WFD quality elements, is considered within the Volume 5: WFD compliance assessment. Any mitigation required in response to significant ecological effects of these culverts is set out in Section 7, Ecology and biodiversity.
- 15.4.15 Existing groundwater abstraction boreholes or monitoring points will be protected from physical damage, insofar as reasonably practicable, including appropriate decommissioning of abandoned boreholes in order to remove potential pollution pathways. If boreholes are to be decommissioned and replaced with alternatives, the contractors will follow the latest industry standard. This principle will also be applicable to springs potentially affected by the Proposed Scheme, although additional measures may be required to mitigate temporary construction impacts. Wherever a spring is to be covered or displaced by design elements then additional mitigation measures may be applied to relocate the spring, where reasonably practicable.
- 15.4.16 Measures will be introduced, as required, to mitigate the temporary and permanent effects on groundwater flows and water quality during excavation and construction of foundations and cuttings, as far as is reasonably practicable. The types of measure that could be adopted include:
- installation of cut-off structures (impermeable barriers preventing water flow) around excavations;
  - ensuring cut-off structures are driven to sufficient depths to meet an underlying strata or zone of lower permeability;
  - promoting groundwater recharge, such as discharging pumped water to recharge trenches around excavations to maintain baseline groundwater and surface water conditions; and
  - incorporating passive bypasses within the design, which could comprise a 'blanket' of permeable material, such as gravel, placed around temporary structures allowing groundwater to bypass the below-ground works, without a rise in groundwater levels on the upstream side.
- 15.4.17 The exact requirements will be refined and method of mitigation will be designed following ground investigation at foundations and cutting locations where appropriate.

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15.4.18 For major utilities, the following specific measures are considered in addition to the above points:

- trenchless crossing techniques will be used wherever reasonably practicable for main rivers/sensitive watercourses and key designations to reduce the impact on these features;
- where temporary watercourse diversions are required, during the reinstatement the watercourse will be returned to its natural course and condition where reasonably practicable after work is complete, with due consideration to its WFD status objectives; and
- at watercourse crossings hard bank reinforcement will be avoided where reasonably practicable.

15.4.19 No borrow pits are proposed in the Pickmere to Agden and Hulseheath area.

## **Flood risk and land drainage**

15.4.20 The design of the Proposed Scheme will as far as reasonably practicable mitigate permanent impacts on flood risk and land drainage as follows:

- the floodplain avoidance strategy will ensure that the impacts on flood flows within rivers and streams, and their floodplains, will be limited to those associated with the intermediate pier structures on Arley Brook viaduct, which will be located in the Waterless Brook/Arley Brook floodplain. The Proposed Scheme includes replacement floodplain storage areas to compensate for the loss of flood storage volume associated with the piers;
- the temporary works shown on Map Series CT-05 in the Volume 2: MA03 Map Book have been informed by a detailed consideration of the flood risk constraints and have sought to avoid flood zones wherever reasonably practicable;
- provision has been made to pass surface water runoff and land drainage flows beneath sections of raised embankment that will cross surface water flow paths where reasonably practicable. This will be achieved using perimeter drainage and culverts, with their inverts set below the likely level of any upstream field subsurface drainage systems;
- in locations where the alignment of the Proposed Scheme will cross watercourses, structures will be designed to accommodate flood flows up to and including the 1 in 100 (1%) annual probability flood with an allowance for climate change;
- runoff from the footprint of the infrastructure could occur more rapidly post-construction due to steeper slope angles and the permeability (or compacted nature) of the newly-created surfaces. The drainage systems will be designed to ensure that there will be no significant increases in flood risk, during storms up to and including the 1 in 100 (1%) annual probability design event, with an allowance for climate change;
- balancing ponds for new sections of highway and railway drainage have been sized on a precautionary basis, pending more detailed information about the permeability and runoff characteristics of existing and proposed ground surfaces;



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- where the Proposed Scheme will pass in cutting, drainage measures will be provided to prevent overland flow into the cutting. This overland flow along with seepage and runoff from the cuttings will, where reasonably practicable, be drained to the catchments to which this water would naturally drain, avoiding transfer of water from one water body to another, which could increase flood risk or impact on land drainage systems; and
- measures will be introduced to reduce any potentially significant effects on groundwater flood risk as far as is reasonably practicable, including the incorporation of passive hydraulic bypasses at cuttings and other below ground structures. These could for example comprise a 'blanket' of permeable material such as gravel.

15.4.21 The nominated undertaker will, as far as reasonably practicable, ensure that flood risk is managed throughout the construction period when planning sites and storing materials. If necessary, temporary provision will be made to reduce the potential for impacts on existing land drainage systems during construction. Some of the specific measures referred to in the draft CoCP, include:

- having regard to the requirement for construction activities to avoid any increases in flood risk to vulnerable receptors;
- preparation of flood risk assessments and method statements for temporary works, including main construction and satellite compound drainage, watercourse crossings and realignments and temporary realignments in consultation with the Environment Agency, and where applicable, the LLFA and other relevant regulators;
- location of storage, machinery, equipment and temporary buildings outside flood risk areas where reasonably practicable;
- construction of outfalls during periods of low flow to reduce the risk of scour and erosion; and
- design of temporary watercourse realignments with equivalent hydraulic capacity to the existing channels, ensuring that field subsurface drainage systems can be adapted to discharge into the new channel.

15.4.22 In accordance with Section 16 of the draft CoCP, monitoring will also be undertaken in consultation with the Environment Agency, and where applicable, the LLFA, to ensure that temporary structures are installed, maintained and removed in accordance with the relevant environmental approvals and that any impacts on existing land drainage systems are managed appropriately.

15.4.23 For major utilities, the following specific measures are considered in addition to the above points:

- trenchless crossing techniques will be used wherever practicable for main rivers/sensitive watercourses to reduce the impact of temporary utility diversions on flood risk; and
- at watercourse crossings hard bank reinforcement and piers in floodplains will be avoided where reasonably practicable.

## Assessment of impacts and effects

- 15.4.24 This section describes the significant effects following the implementation of the avoidance and mitigation measures. The majority of the potential temporary impacts on the water environment during construction will be avoided or mitigated by the working methods outlined in the draft CoCP. The mitigation included in the design has focused on reducing permanent impacts resulting from the presence of the Proposed Scheme to as low a level as is reasonably practicable.

### Temporary effects – Water resources

#### Surface water

- 15.4.25 Potential temporary impacts on surface water quality, due to site runoff and increased pollution risk, are a key concern during construction and have the potential to affect abstractions and the water environment more generally. However, the practices outlined in the draft CoCP are considered adequate to mitigate any impacts, such that there are unlikely to be any significant effects.
- 15.4.26 Construction compounds may have substantial water demands that may require approval through the protective provisions in the Bill for abstractions to augment other supply options. The assessment will include location-specific engagement with the Environment Agency and other water undertakers on the availability of water at that location. The Environment Agency will be able to impose conditions on any abstractions approved so that no significant effects are likely to arise. In this case, in the Pickmere to Agden and Hulseheath area, the current Environment Agency Abstraction Licensing Strategy (ALS)<sup>182</sup> information suggests that there may be some restrictions on obtaining water supplies from surface water sources, particularly in the south where Wincham Brook is assessed as “Water unavailable for licensing”.
- 15.4.27 Where construction highway drainage is discharged to local watercourses, assessments for determining whether routine runoff and spillage risk are likely to have a detrimental impact on water quality have been carried out using the Highways England Water Risk Assessment Tool (HEWRAT)<sup>183</sup>. The construction HEWRAT assessments identified no significant effects to watercourses in this area.

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<sup>182</sup> Environment Agency (2020), *Weaver and Dane abstraction licensing strategy*. Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/938206/Weaver-and-Dane-abstraction-licensing-strategy.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/938206/Weaver-and-Dane-abstraction-licensing-strategy.pdf)

<sup>183</sup> Highways England (2020), *Design Manual for Roads and Bridges (DMRB), LA 113 Road Drainage and the Water Environment Revision 1 (formally HD 45/09)*. Available online at: <https://www.standardsforhighways.co.uk/dmrbs/search/d6388f5f-2694-4986-ac46-b17b62c21727>.

## **Groundwater**

### **Aquifers**

- 15.4.28 The proposed Hoo Green box structure and tunnel, Hoo Green North cutting and retaining wall, Hoo Green South cutting retaining wall, High Legh cutting and retaining wall, and Agden cutting in the study area will intersect the glaciofluvial deposits Secondary A aquifer and the glacial till Secondary (Undifferentiated) aquifer, as well as the Sherwood Sandstone Group Principal aquifer and the Mercia Mudstone Group Secondary B aquifer. Whilst there are likely to be minor localised impacts, the implementation of the measures outlined in the draft CoCP should mean that any impacts on the overall status of these aquifers will not be significant.
- 15.4.29 Where foundations or cuttings could affect local receptors, such as groundwater abstractions or springs, this is reported in the sections below.
- 15.4.30 The construction of the Proposed Scheme will require dewatering activities to take place, which will require approval under protective provisions in the Bill. The current assessment covers the dewatering activities associated with cuttings. As well as assessing the specific impacts of these activities on potential water receptors, an evaluation of water resource policy in this area, using the Environment Agency's ALS<sup>182</sup>, has been carried out. Owing to the nature of the aquifers in the Weaver and Dane catchment, there are no Groundwater Management Units (GWMU) managed as part of the ALS. Restrictions may apply to consents where groundwater availability is limited or to protect the environment (such as surface water flows and water dependent habitats) and are assessed on a case by case basis. There may be restrictions on obtaining approvals for dewatering activities relating to the Sherwood Sandstone Group, with the groundwater management unit classed as 'water not available' due to it being over licensed. Engagement with the Environment Agency will be undertaken in relation to each of the dewatering locations and the Environment Agency will be able to impose conditions on any abstractions approved so that no significant adverse effects are likely to arise.

### **Abstractions**

- 15.4.31 The assessment has not identified any temporary significant effects on abstractions.

### **Groundwater – surface water interactions**

- 15.4.32 The assessment has not identified any temporary significant effects on groundwater – surface water interactions.

### **Water dependent habitats**

- 15.4.33 The assessment has not identified any temporary hydrological impacts on water dependent habitats in the study area.

## Temporary effects – Flood risk and land drainage

- 15.4.34 Construction of the following Proposed Scheme elements will require temporary working within areas at risk of flooding as set out below:
- Arley Brook viaduct within Waterless Brook/Arley Brook floodplain;
  - Bongs Wood culvert within Tributary of Tabley Brook 2 floodplain;
  - unnamed culvert within Tributary of Tabley Brook 4 floodplain;
  - Winterbottom culvert within Tributary of Tabley Brook 8 floodplain;
  - Millington Clough culvert within Tributary of Millington Clough 3 and 2 floodplains;
  - Millington Clough offline culvert No.1 within Tributary of Millington Clough 2 floodplain;
  - Millington Clough offline culvert No.2 and Millington Clough offline culvert No.3 within Tributary of Millington Clough 1 floodplain; and
  - Millington Clough aqueduct within Tributary of Millington Clough 4 floodplain.
- 15.4.35 Construction will include the site haul routes that involve spanning the main channels of Waterless Brook/Arley Brook, Tributary of Tabley Brook 2, Tributary of Tabley Brook 8, Tributary of Millington Clough 3, Tributary of Millington Clough 2, Tributary of Millington Clough 1, Tributary of Millington Clough 1 and Millington Clough.
- 15.4.36 Construction sequencing and temporary works will be designed to reduce potential flood risk to a level that is not significant. Method statements will be produced by the nominated undertaker and subject to approvals required under the protective provisions in the Bill for the EA and LLFA<sup>184</sup>.

## Permanent effects – Water resources

- 15.4.37 Permanent effects are those initially caused by activity to construct the Proposed Scheme, but which will also remain after the Proposed Scheme has been constructed and is present in the area.

### Surface water

- 15.4.38 Where highway drainage will be discharged to local watercourses, assessments for determining whether routine runoff and spillage risk are likely to have a detrimental impact on water quality have been carried out using the HEWRAT<sup>19</sup>. The assessment has not identified any significant effects on surface water quality in this area.
- 15.4.39 The assessment has not identified any permanent significant effects on surface water.

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<sup>184</sup> High Speed Two Ltd (2022), *Phase 2b Western Leg Information Paper E15: Water resources flood risk and authorisation of related works*.

## **Groundwater**

### **Aquifers**

15.4.40 It is anticipated that implementation of the avoidance and mitigation measures will ensure that there are no permanent significant effects related to the impact of the proposed Hoo Green box structure and tunnel, Hoo Green North cutting, Hoo Green South cutting retaining wall, High Legh cutting and retaining wall and Agden cutting on the aquifers intercepted by the Proposed Scheme. Where the impacts of the cuttings on the aquifers could affect additional local receptors that rely on the groundwater resource, for example springs and abstractions, the impacts on these have been assessed and are described below.

### **Abstractions**

15.4.41 The unlicensed private groundwater abstraction at Heyrose Farm, Over Tabley is located on the boundary of land required for the construction of the Proposed Scheme. The purpose of this abstraction is currently unknown and, therefore, it has been assessed as a high value receptor on a precautionary basis. There is the potential for the abstraction to be permanently lost during the construction of the Proposed Scheme, due to the construction of Heyrose embankment and associated works. If the borehole is lost then this is assessed as a major impact, leading to a major adverse effect, which is significant.

### **Groundwater – surface water interactions**

15.4.42 The potential spring east of Belt Wood is located directly adjacent to land required for the construction of the Proposed Scheme. The below ground structures needed to divert a high voltage electricity cable (new pylons) have the potential for an adverse impact on groundwater flow pathways to the potential spring. This is assessed as a minor impact on this high value receptor, leading to a moderate adverse effect, which is significant.

### **Water dependent habitats**

15.4.43 Details of the hydrological impacts to water dependent habitats are as follows:

- The Mere, Mere SSSI is located at least 1.4km from the potential lateral extent of drawdown from drainage in Hoo Green North cutting. However, it is possible there could be a minor impact from the Proposed Scheme on groundwater flows in glaciofluvial deposits which contribute groundwater to The Mere, Mere SSSI. As a result, Hoo Green North cutting could affect groundwater discharge to the water dependent habitat. The Rostherne Mere groundwater recharge trench, located east of Hoo Green North cutting and described in Volume 2: Community Area report: Hulseheath to Manchester Airport (MA06), has been included in the design to mitigate any potential reduction in water level at The Mere, Mere associated with Hoo Green North cutting and retaining wall. This mitigation will ensure there is a negligible impact on the groundwater flow to The Mere, Mere from the cutting and no impact on water levels in The Mere, Mere; and

- two upper reaches of the Tributary of Tabley Brook 9, which run through Belt Wood LWS and ancient woodland, are within the potential lateral extent of drawdown from the drainage in Hoo Green North cutting. A small proportion of groundwater may, therefore, be intercepted that would otherwise discharge to this watercourse. Drainage from the Proposed Scheme will be discharged into one of the reaches upstream of Belt Wood LWS and ancient woodland, which may compensate for some of the flow lost. Since it is unclear at this time whether this site depends on flows in Tributary of Tabley Brook 9, this impact is assessed as minor on this site.

15.4.44 The potential for hydrological impacts to result in local ecological effects is provided in Volume 5: Ecology register of local level effects, and for any significant effects, mitigation is identified in Volume 2: Section 7, Ecology and biodiversity.

## **Permanent effects – Flood risk and land drainage**

15.4.45 Due to mitigation embedded in the design there are no permanent significant impacts on flood risk.

## **Summary of significant effects**

15.4.46 On a precautionary basis the Proposed Scheme is anticipated to result in the following significant effects which require other mitigation:

- a permanent major adverse effect on the unlicensed private groundwater abstraction at Heyrose Farm, Over Tabley; and
- a permanent moderate adverse effect on the potential spring east of Belt Wood.

## **Other mitigation measures**

15.4.47 Additional mitigation measures have been developed to further reduce the temporary and permanent impacts of construction stage activities, where there is potential for the Proposed Scheme to result in significant effects.

## **Surface water**

15.4.48 No requirement for additional mitigation for surface water has been identified in this assessment.

## **Groundwater**

15.4.49 A survey will be undertaken to assess the location, use and value of the unlicensed private abstraction at Heyrose Farm, Over Tabley. If the survey identifies that the feature could be lost, further mitigation will be discussed and agreed with the owner. This could include provision of a new borehole or connection to mains supply. If the feature is not lost, then mitigation for the potential impact on water quality will be discussed with the owner. Mitigation could include provision of an alternative supply during construction works,

connection to mains supply or temporary treatment, to ensure no significant adverse effect on the water user.

## **Groundwater – surface water interactions**

- 15.4.50 Surveys will be undertaken to determine the value of the potential spring east of Belt Wood and identify whether further mitigation is required. If this feature is confirmed to be a spring, mitigation measures will be considered where reasonably practicable. Mitigation might include re-establishing the potential spring or re-instating baseflow through excavation or introduction of gravel channels to facilitate groundwater flow. Any such additional measures will be designed in consultation with the Environment Agency, to ensure no significant adverse effect on spring flow.

## **Flood risk and land drainage**

- 15.4.51 During design development, additional surveys, hydraulic analysis and modelling of replacement floodplain storage will be agreed with the Environment Agency to refine the mitigation, where appropriate, with the aim of ensuring no potential effects on flood risk.

## **Summary of likely residual significant effects**

- 15.4.52 With the implementation of the other mitigation measures as described above there will be no residual significant effects related to water resources and flood risk during construction of the Proposed Scheme in this study area.

## **Cumulative effects**

- 15.4.53 No significant cumulative temporary or permanent effects during construction related to water resources or flood risk are anticipated.

# **15.5 Effects arising from operation**

## **Avoidance and mitigation measures**

- 15.5.1 The principal issue of concern during operation of the Proposed Scheme is the potential for accidental spillages to occur that could result in the release of contaminants into the water environment. This issue has been assessed on a route-wide basis in Volume 3: Route-wide effects (Section 16), where the mitigation measures associated with this risk are described. A draft operation and maintenance plan for water resources and flood risk is provided in Volume 5: Appendix WR-007-00000.
- 15.5.2 The design takes into account the policies in the NPPF and will ensure that the Proposed Scheme is safe from flooding without increasing flood risk elsewhere, as outlined in the Flood risk assessment, Volume 5: Appendix WR-005-0MA03. Evidence of application of the

Sequential Test and Exception Tests in the NPPF is provided on a route-wide basis in Volume 3, Route-wide effects.

- 15.5.3 Sustainable drainage systems will be used where reasonably practicable. These will help to remove any suspended material within runoff from the Proposed Scheme through filtration, vegetative adsorption or settlement. The drainage systems proposed will ensure that the quantity and quality of water draining from the Proposed Scheme during its operational phase will have a negligible impact on the water environment.
- 15.5.4 A route-wide WFD compliance assessment is provided in Volume 5: Appendix WR-001-00000. This describes how the Proposed Scheme complies with the requirements of the WFD.

## **Assessment of impacts and effects**

- 15.5.5 There are considered to be no significant adverse effects related to water resources and flood risk arising from operation of the Proposed Scheme.

## **Other mitigation measures**

- 15.5.6 There are considered to be no further measures required to mitigate adverse effects on surface water resources, groundwater resources or flood risk.

## **Summary of likely residual significant effects**

- 15.5.7 The assessment indicates that there will be no residual significant effects on surface water, groundwater or flood risk during operation of the Proposed Scheme.

## **Cumulative effects**

- 15.5.8 No significant cumulative effects during operation related to water resources or flood risk are anticipated.

## **Monitoring**

- 15.5.9 Volume 1, Section 9 sets out the general approach to monitoring of water resources and flood risk during operation of the Proposed Scheme.
- 15.5.10 There are no area-specific requirements for monitoring water resources and flood risk during operation of the Proposed Scheme.





**High Speed Two (HS2) Limited**

Two Snowhill

Snow Hill Queensway

Birmingham B4 6GA

Freephone: 08081 434 434

Minicom: 08081 456 472

Email: [HS2enquiries@hs2.org.uk](mailto:HS2enquiries@hs2.org.uk)