

# High Speed Rail (Crewe – Manchester) Environmental Statement

## Volume 2: Community Area reports

MA04: Broomedge to Glazebrook

# HS2

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

**Volume 2: Community Area reports**

MA04: Broomedge to Glazebrook



Department  
for Transport

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

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## 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.

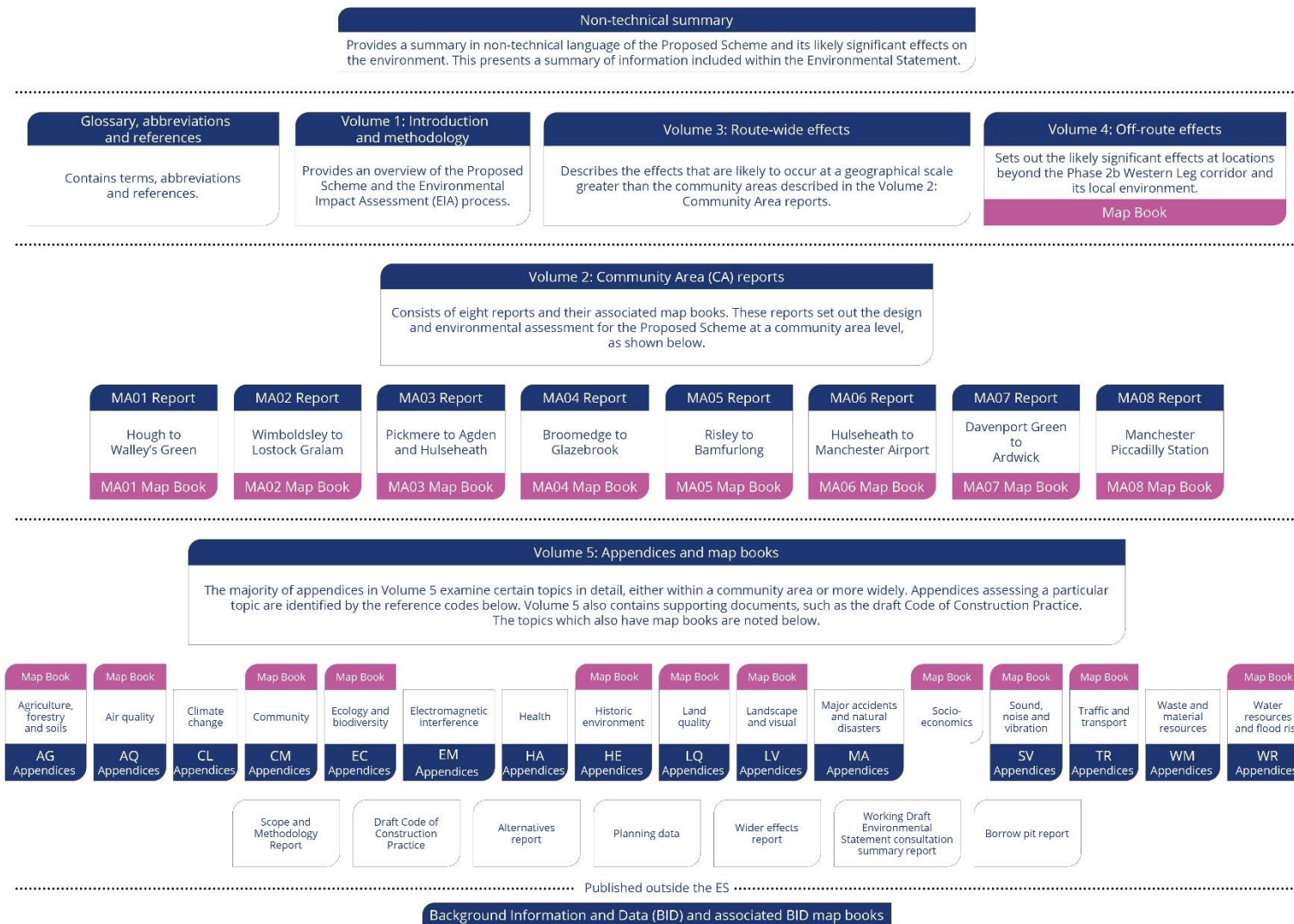
### Structure of the Environmental Statement

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.

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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 Broomedge to Glazebrook area (MA04).

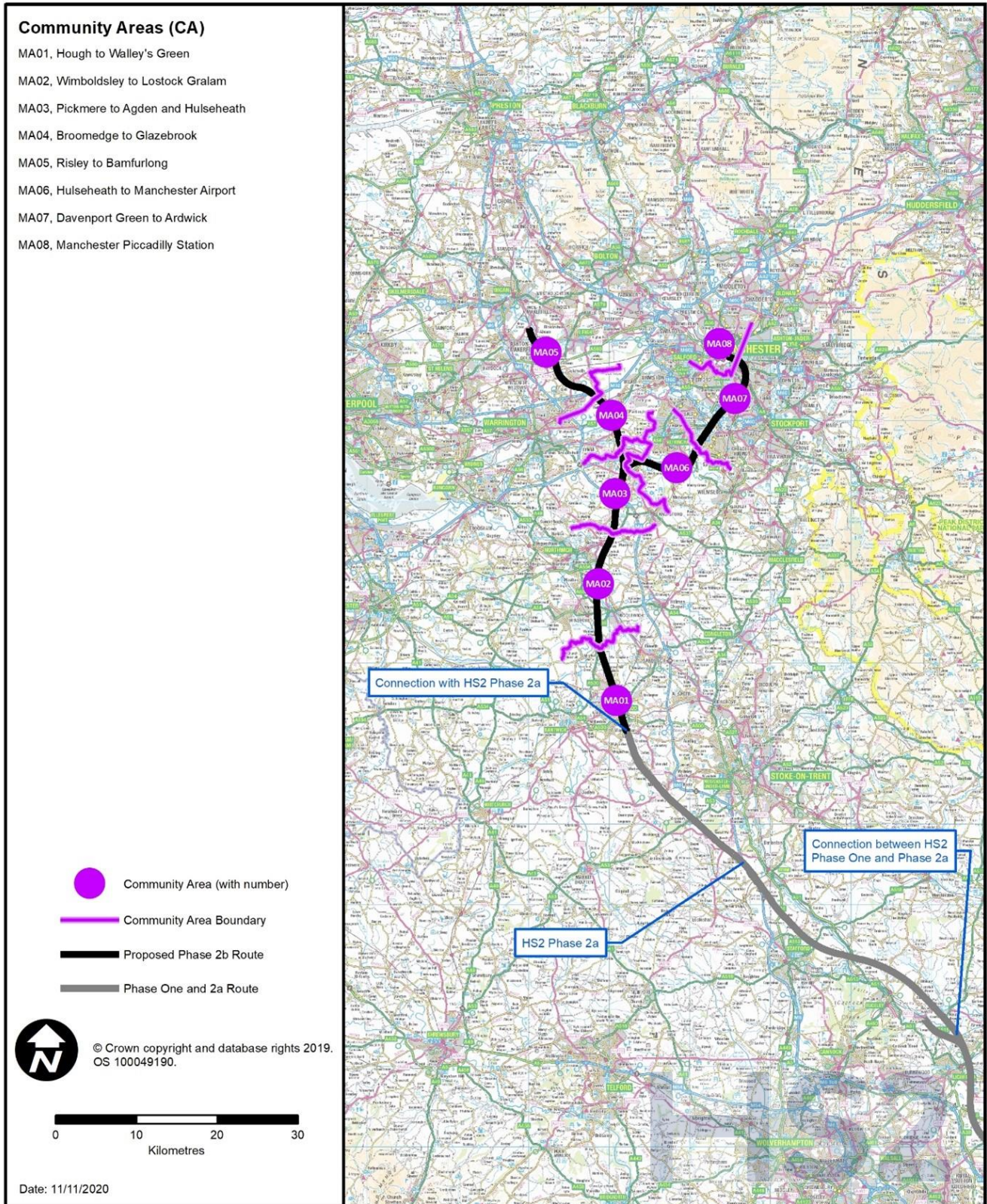
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<sup>1</sup> House of Commons (2019), *Standing Order 27A of the Standing Orders of the House of Commons relating to private business (environmental assessment)*, House of Commons. Available online at: <https://www.parliament.uk/business/publications/commons/sessional-orders-private1/>.



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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 Broomedge to Glazebrook 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 (Section 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 Broomedge to Glazebrook area are provided in a separate corresponding document entitled Volume 2: MA04 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: MA04 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 Broomedge to Glazebrook area covers an approximately 7.3km section of the route of the Proposed Scheme in Cheshire and Greater Manchester. The route passes through the parishes of Lymm, Warburton, Partington and Rixton-with-Glazebrook. Trafford Metropolitan Borough Council (TMBC), Warrington Borough Council (WBC) and Salford City Council (SaCC) are the local authorities in the area. The southern boundary of this area lies within Lymm parish. The boundary between the Rixton-with-Glazebrook parish and Birchwood parish forms the northern boundary of this section.
- 2.1.2 The Pickmere to Agden and Hulseheath area (MA03) lies to the south and the Risley to Bamfurlong area (MA05) lies to the north. The Hulseheath to Manchester Airport area (MA06) also has a short boundary with the Broomedge to Glazebrook area to the east of Altrincham, as shown in Figure 3.

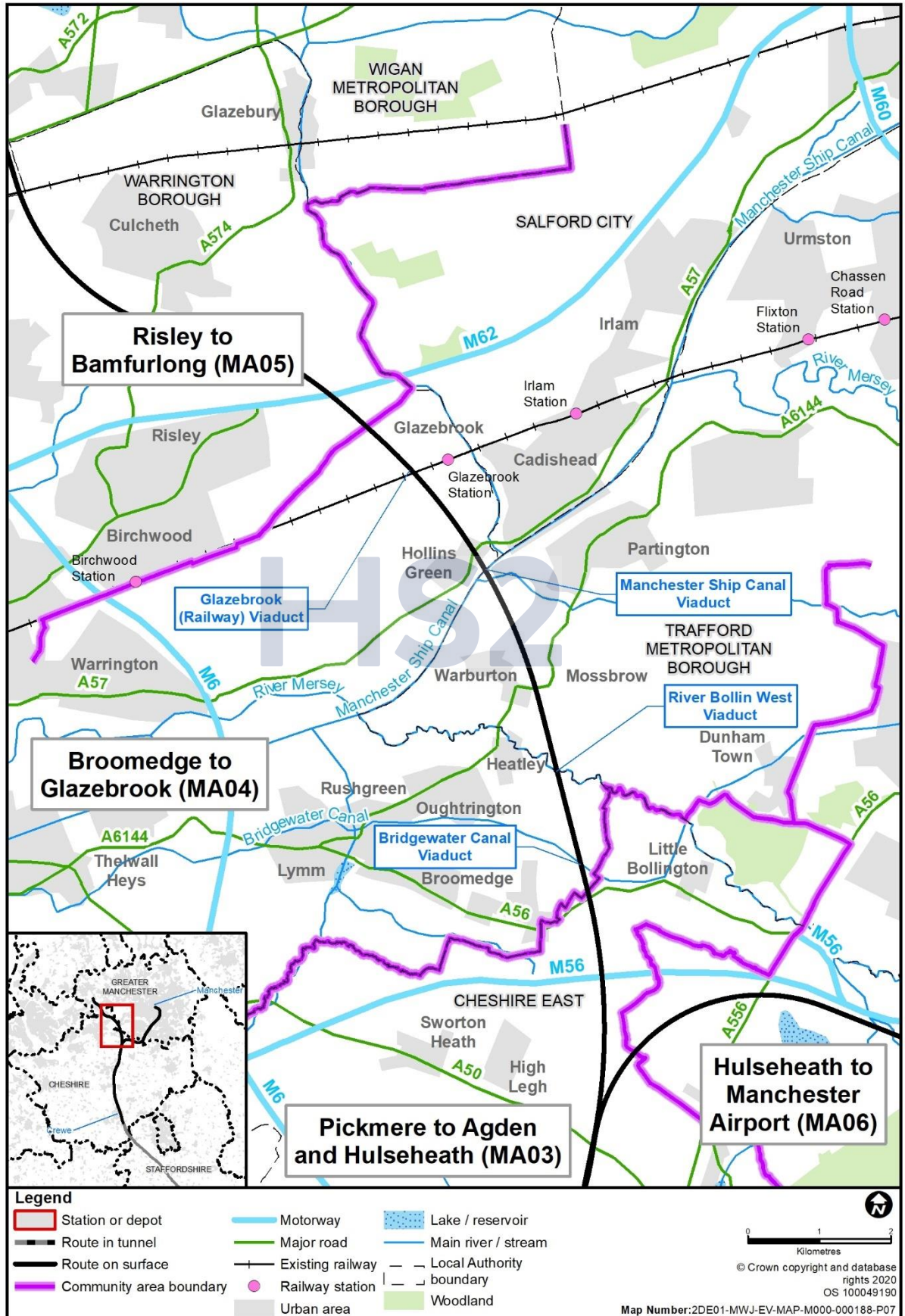
#### **Settlement, land use and topography**

- 2.1.3 The Broomedge to Glazebrook area is predominantly rural in character, with agriculture being the main land use. Historical land uses in the area include steel manufacturing and landfill.
- 2.1.4 The main settlements are Lymm, Partington, Cadishead, Irlam and Hollins Green. There are also a number of hamlets and villages in the area including Broomedge, Little Heatley, Heatley, Mossbrow, Warburton and Glazebrook. These settlements are interspersed with areas of woodland, isolated dwellings and farmsteads.
- 2.1.5 The area is generally flat or gently undulating at around 10m to 20m above Ordnance Datum (AOD).



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**Figure 3: Community area context map**



## Key transport infrastructure

- 2.1.6 The principal highways within this area include the M6, the M62, the A57 Manchester Road/Cadishead Way/Liverpool Road, the A56 Lymm Road and the A6144 Warburton Lane/Paddock Lane/Bent Lane. Local roads include Agden Lane, Warrington Lane, Spring Lane, Wet Gate Lane, Manchester Road, the B5212 Glazebrook Lane, Dam Lane, Dam Head Lane and Bank Street.
- 2.1.7 The Liverpool to Manchester Line (via Warrington Central) railway is located in the north of the area between Dam Lane and Glazebrook. Glazebrook Station offers direct services to both Liverpool and Manchester.
- 2.1.8 The Bridgewater Canal is located in the south of the area. The Manchester Ship Canal, which is a canalised section of the River Mersey, is located in the central section of the area.
- 2.1.9 There are several public rights of way (PRoW) in the area including public footpaths, bridleways as well as local access roads, which provide important links between scattered dwellings and surrounding villages.

## Socio-economic profile

- 2.1.10 The professional, scientific and technical sector accounts for the largest proportion of businesses within the WBC area (24%), followed by the business administration and support services (12%) and construction (10%) sectors. The professional, scientific and technical sector also accounts for the largest proportion of businesses in the TMBC area (20%), followed by the business administration and support services (11%) and information and communication (9%)<sup>3</sup>.
- 2.1.11 According to the Annual Population Survey (2020)<sup>4</sup>, the employment rate (the proportion of residents aged 16-64 in employment) within the WBC and TMBC areas was 80% (103,200 people) and 78% (114,800) respectively. The unemployment rate was 3% in the WBC area and 5% in the TMBC area.
- 2.1.12 The same survey indicates that 41% of residents aged 16-64 in the WBC area were qualified to National Vocational Qualification Level 4 (NVQ4) and above, while 5% of residents had no qualifications. In the TMBC area, 51% of residents aged 16-64 were qualified to NVQ4 and above, with 4% of residents having no qualifications.

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<sup>3</sup> Office for National Statistics (2019), *UK Business Count - local units by industry and employment size band 2020*. Available online at: <https://www.nomisweb.co.uk/datasets/idbrlu>.

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

## **Notable community facilities**

- 2.1.13 The main concentrations of community facilities in the Broomedge to Glazebrook area are located within the larger settlements of Lymm, Partington, Cadishead and Irlam. Broomedge, Heatley, Mossbrow, Warburton, Hollins Green and Glazebrook are villages and hamlets that provide a smaller number of local services.
- 2.1.14 The village of Warburton contains two churches, including the Grade I listed Old Church of St Werburgh. The village also includes the Moss Brow Farm shop and the Saracens Head public house, both on the A6144 Paddock Lane. The western part of the village is designated as a conservation area.
- 2.1.15 Notable community facilities in the village of Lymm include primary schools, a secondary school, shops, places of worship, a community centre and two general practitioner surgeries.
- 2.1.16 Community facilities in Partington include primary schools, Broadoak secondary school, which includes Partington Sports Village, community centres, places of worship, shops and a health centre.
- 2.1.17 Notable community facilities in Cadishead and Irlam include several primary schools, a secondary school, a college, places of worship, shops, healthcare facilities and local libraries.
- 2.1.18 Community facilities within the village of Hollins Green include St Helen's Church of England Primary School, Church of St Helen, Rixton-with-Glazebrook Community Hall, Hollinfare Cemetery, a Scouts centre and a community shop with post office. There are also two public houses located in the village; Ye Old Red Lion and The Black Swan.
- 2.1.19 The village of Glazebrook contains Glazebrook Methodist Church and Camsley Grange Riding for the Disabled Group.

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

- 2.1.20 The Broomedge to Glazebrook area is crossed by several routes that are promoted as destinations for recreation. These include the Mersey Valley Timberland Trail, Cheshire Ring Canal Walk, Trans Pennine Trail, Bollin Valley Way and Glazebrook Timberland Trail.
- 2.1.21 Waterways which pass through the area include the Bridgewater Canal, the River Bollin, Red Brook, the Manchester Ship Canal and the Glaze Brook.
- 2.1.22 Notable recreation, leisure and open space facilities include Lymm Cruising Club, Spud Wood, south of Oughtrington; Ridgeway Grundy Memorial Park, Lymm Dam and Lymm Golf Club, all of which are in Lymm. Other notable facilities include Heatley Flash fishing lake, Coroners Wood to the west of Partington and Rixton Clay Pits Local Nature Reserve, a Site of Special Scientific Interest (SSSI) to the west of Hollins Green.

## **Policy and planning context**

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

## Planning framework

2.1.24 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 Broomedge to Glazebrook area are listed in Volume 5: Appendix CT-004-0000, 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

- 2.1.25 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 Broomedge to Glazebrook area are listed in Volume 5: Appendix CT-004-00000, Planning data are shown in Volume 5, Planning Data/Committed Development Map Book: maps CT-13-312b to CT-13-314a.
- 2.1.26 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 Broomedge to Glazebrook area are reported in the relevant topic sections of this report.

## Changes to the design since the working draft ES

- 2.1.27 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 the route of the Proposed Scheme as a result of design development comprising:
    - realignment of the route of the Proposed Scheme, 70m east of Hollins Green to reduce impacts on local residents and visitors to Hollinfare Cemetery (see Volume 2: MA04 Map Book, map CT-06-325, F5 to G5);
    - Bridgewater Canal underbridge has been replaced by Bridgewater Canal viaduct, which will be 200m in length (see Volume 2: MA04 Map Book, map CT-06-322b, H4 to I4);
    - reduction in height of River Bollin West viaduct from 15m to 11m (see Volume : MA04 Map Book, map CT-06-323, F7 to H7);
    - reduction in height of Lymm North embankment from 14m to 11m (see Volume 2: MA04 Map Book, map CT-06-322b, F4 to H4);

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- Glazebrook embankment has been replaced by Glazebrook North embankment and M62 West viaduct, to reduce potential groundwater flow impacts to Holcroft Moss SSSI (see Volume 2: MA04 Map Book, map CT-06-326a, H5);
- introduction of retaining walls to define the extent of the Manchester Ship Canal and protect Manchester Ship Canal viaduct against ship impact, reducing the width of the Manchester Ship Canal by up to 30m along the length of the retaining walls (see Volume 2: MA04 Map Book, map CT-06-325, D5);
- realignment of Footpath Warburton 3 accommodation access overbridge 80m to the south (see Volume 2: MA04 Map Book, map CT-06-324, B5 to B7);
- Glazebrook (Railway) underbridge changes to a viaduct with the height increasing from 5m to 7m and the length from 25m to 66m (see Volume 2: MA04 Map Book, map CT-06-326a, C5 to D5);
- removal of Dam Head Lane diversion;
- introduction of a roundabout at each end of A6144 Paddock Lane realignment (see Volume 2: MA04 Map Book, map CT-06-324, D5 to E5 and E9);
- introduction of a new PRow at Glazebrook between Bank Street and the retained section of Dam Head Lane to maintain access under the route of the Proposed Scheme for non-motorised users (see Volume 2: MA04 Map Book, map CT-06-326a, C5 to C6);
- removal of Wet Gate Lane and Glazebrook auto-transformer stations and introduction of A6144 Paddock Lane auto-transformer station (see Volume 2: MA04 Map Book, map CT-06-324, D7);
- relocation of Warburton embankment satellite compound to the north of the retained section of the A6144 Paddock Lane (see Volume 2: MA04 Map Book, map CT-05-324, D7 to D8);
- introduction of utility works including the diversion of National Grid and Cadent Gas underground high-pressure gas pipelines and Scottish Power overhead power lines throughout the Broomedge to Glazebrook area, as described in Section 2.2; and
- introduction of three telecommunications sites in the Broomedge to Glazebrook area, as described in Section 2.2 (see Volume 2: MA04 Map Book, map CT-06-323, F7, map CT-06-324, G7, and map CT-06-325, J5).

2.1.28 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 Broomedge to Glazebrook 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 Broomedge to Glazebrook 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 route of the Proposed Scheme through the Broomedge to Glazebrook area will be approximately 7.3km long. The route will extend from the boundary with the Pickmere to Agden and Hulseheath area (MA03) north-westwards to the east of Lymm, passing west of Partington before crossing the Manchester Ship Canal and ending at the boundary with the Risley to Bamfurlong area (MA05).
- 2.2.4 This section of route is illustrated on maps CT-06-322b to CT-06-327-R3 in the Volume 2: MA04 Map Book.
- 2.2.5 All dimensions in the sections below are approximate.
- 2.2.6 The route of the Proposed Scheme will consist of 2.6km of viaducts, 3.6km of embankments and 1.1km of cuttings in the Broomedge to Glazebrook area.
- 2.2.7 These components and their associated key features are described in three separate sections below. In general, the Proposed Scheme is described south to north.
- 2.2.8 In addition to the features described below, the Proposed Scheme 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. Note that modifications to minor utilities described below are generally not included on the volume 2 maps.

## The route of the Proposed Scheme

### Lymm North embankment to River Bollin West viaduct

- 2.2.9 The route of the Proposed Scheme will continue from the Pickmere to Agden and Hulseheath area (MA03) north-westwards on Lymm North embankment and Bridgewater Canal viaduct before passing onto Heatley South embankment and crossing the River Bollin on River Bollin West viaduct.
- 2.2.10 This section of the route is illustrated on maps CT-06-322b to CT-06-323 in the Volume 2: MA04 Map Book.
- 2.2.11 Key features of this 2.1km section will include:
- continuation of Lymm North embankment from the Pickmere to Agden and Hulseheath area (MA03), 250m in length and up to 11m in height in this section. Associated landscape mitigation planting will provide visual screening to Agden Bridge Farm, Agden Lane Farm and residents of properties on the corner of Agden Lane and Warrington Lane, and to help integrate the Proposed Scheme into the surrounding landscape (see Volume 2: MA04 Map Book, map CT-06-322b, F4 to H4);
  - noise fence barriers along Lymm North embankment, as follows:
    - continuation of a noise fence barrier from the Pickmere to Agden and Hulseheath area (MA03), 115m in length and 2m in height in this section, located along the western side of Lymm North embankment, extending from the boundary to 18m north of Agden Lane to provide acoustic screening for the community of Agden (see Volume 2: MA04 Map Book, map CT-06-322b, F4 to G4);
    - a noise fence barrier, 190m in length and 2m in height, located along the eastern side of Lymm North embankment extending from Agden Lane to the southern abutment of Bridgewater Canal viaduct to provide acoustic screening for residential properties on Warrington Lane (see Volume 2: MA04 Map Book, map CT-06-322b, G4 to H4);
  - a balancing pond for railway drainage partially located in the Broomedge to Glazebrook area on the eastern side of the route of the Proposed Scheme, 50m south of Agden Lane. Access will be provided from Agden Lane (see Volume 2: MA04 Map Book, map CT-06-322b, G5 to G6);
  - permanent diversion of minor utilities to accommodate Lymm North embankment, including an Openreach telecommunications cable and a United Utilities potable water main (see Volume 2: MA04 Map Book, map CT-06-322b, F4 to H4);
  - 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 Warrington Lane and the A56 Lymm Road, increasing the length of the journey by 282m (see Volume 2: MA04 Map Book, map CT-06-322b, G4 and G5);
  - Agden Lane culvert, 150m south of the Bridgewater Canal viaduct, for the realignment of Tributary of Agden Brook 1. The watercourse will be realigned by 70m, 40m north of its

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existing alignment, and will cross under the Lymm North embankment (see Volume 2: MA04 Map Book, map CT-06-322b, G4);

- replacement floodplain storage area on the western side of the route of the Proposed Scheme between Agden Lane and Warrington Lane (see Volume 2: MA04 Map Book, map CT-06-322b, H3, H4 and I3);
- Bridgewater Canal viaduct, 200m in length and up to 11m in height (see Volume 2: MA04 Map Book, map CT-06-322b, H4 to I4);
- permanent diversion of a Scottish Power electricity cable to accommodate Bridgewater Canal viaduct (see Volume 2: MA04 Map Book, map CT-06-322b, H4 to I4);
- a noise fence barrier, 90m in length and 2m in height, located along the top of the eastern side of Bridgewater Canal viaduct, extending from the viaduct abutment to the northern bank of the Bridgewater Canal, to provide acoustic screening for residential properties on Warrington Lane and Spring Lane (see Volume 2: MA04 Map Book, map CT-06-322b, H4);
- realignment of a section of Warrington Lane, 9m south of its existing alignment for 214m to avoid the piers of Bridgewater Canal viaduct, resulting in a negligible change in journey length (see Volume 2: MA04 Map Book, map CT-06-322b, H4 to I3);
- diversion of an underground Cadent Gas 100mm high-pressure gas pipeline, for 590m in length, to pass under the route of the Proposed Scheme 190m north of the Bridgewater Canal (see Volume 2: MA04 Map Book, map CT-06-322b, H4 to J2);
- Heatley South embankment, 1.2km in length and up to 13m in height, with associated landscape mitigation planting on both sides to help integrate the Proposed Scheme into the surrounding landscape (see Volume 2: MA04 Map Book, map CT-06-322b, I4 to CT-06-323, C7);
- permanent diversion of minor utilities to accommodate Heatley South embankment, including Scottish Power electricity cables and an Openreach telecommunications cable (see Volume 2: MA04 Map Book, map CT-06-322b, I4 to CT-06-323, C7);
- realignment of a section of Spring Lane, up to 5m north of its existing alignment for 211m, crossing the route of the Proposed Scheme via Spring Lane underbridge, resulting in a negligible change in journey length (see Volume 2: MA04 Map Book, map CT-06-323, B8 to C7);
- Spring Lane underbridge, 35m in length with a height clearance of 7m (see Volume 2: MA04 Map Book, map CT-06-323, C7);
- accommodation access for properties at Little Heatley, located to the east of the route of the Proposed Scheme, from the realigned Spring Lane (see Volume 2: MA04 Map Book, map CT-06-323, C8 to D8);
- diversion of six underground ESSAR 100-200mm fuel pipelines, for 726m in length, to pass under the route of the Proposed Scheme 190m south of River Bollin West viaduct (see Volume 2: MA04 Map Book, map CT-06-323, C5 to E8);
- realignment of a section of Wet Gate Lane, up to 116m west of its existing alignment for 509m reducing the journey length by 166m. The existing Wet Gate Lane will be closed



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where it crosses the route of the Proposed Scheme (see Volume 2: MA04 Map Book, map CT-06-323, C6 to F6);

- a noise fence barrier, 320m in length and 3m in height, located along the eastern side of Heatley South embankment, extending from 110m north of Spring Lane underbridge to 280m south of the River Bollin, to provide acoustic screening for residential properties in Little Heatley (see Volume 2: MA04 Map Book, map CT-06-323, C7 to E7);
- a balancing pond for railway drainage, 80m north of Spring Lane. Access will be provided from Bradshaw Lane (see Volume 2: MA04 Map Book, map CT-06-323, D6);
- underground diversion of a Scottish Power 132kV overhead power line for 1km, to pass under the route of the Proposed Scheme 110m south of River Bollin West viaduct (see Volume 2: MA04 Map Book, map CT-06-323, F7 to I8);
- replacement floodplain storage area on the eastern side of the route of the Proposed Scheme to the south of the River Bollin (see Volume 2: MA04 Map Book, map CT-06-323, F8 to F9);
- Wet Gate 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. Access will be provided from the realigned section of Wet Gate Lane (see Volume 2: MA04 Map Book, map CT-06-323, F7);
- a balancing pond for railway drainage, 90m south of the River Bollin. Access will be provided from Wet Gate Lane (see Volume 2: MA04 Map Book, map CT-06-323, F7);
- River Bollin West viaduct, 400m in length and up to 11m in height, crossing the River Bollin (see Volume 2: MA04 Map Book, map CT-06-323, F7 to H7);
- an area of grassland habitat creation adjacent to the River Bollin extending under River Bollin West viaduct, to provide replacement habitat (see Volume 2: MA04 Map Book, map CT-06-323, F9 to G7);
- an area of landscape mitigation planting to the west of the Proposed Scheme between Wet Gate Lane Farm and the Trans Pennine Trail and National Cycle Route 62, to provide visual screening for the residents of Heatley (see Volume 2: MA04 Map Book, map CT-06-323, G5 to H6);
- lowering of the Trans Pennine Trail and National Cycle Route 62 by up to 1m for 130m, to provide sufficient clearance under River Bollin West viaduct. This will result in no change in journey length (see Volume 2: MA04 Map Book, map CT-06-323, G7); and
- diversion of an underground United Utilities 400mm potable water main for 112m, to pass under the route of the Proposed Scheme 15m east of the River Bollin (see Volume 2: MA04 Map Book, map CT-06-323, G7).

## **River Bollin West viaduct to Manchester Ship Canal viaduct**

- 2.2.12 The route of the Proposed Scheme will continue from River Bollin West viaduct north on Heatley North embankment before passing into Warburton cutting and then onto Warburton embankment on the approach to Manchester Ship Canal viaduct.

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- 2.2.13 This section of route is illustrated on maps CT-06-323 and CT-06-324 in the Volume 2: MA04 Map Book.
- 2.2.14 Key features of this 1.7km section will include:
- Heatley North embankment, 360m in length and up to 7m in height, with landscape mitigation planting on both sides to provide visual screening for residents of properties on Carr Green Lane, users of Footpaths Warburton 3 and 4, and to help integrate the Proposed Scheme into the surrounding landscape (see Volume 2: MA04 Map Book, maps CT-06-323, H7 to CT-06-324, A6);
  - two areas of woodland habitat creation extending east under River Bollin West viaduct to provide replacement habitat at Fox Covert Site of Biological Importance (SBI) (see Volume 2: MA04 Map Book, map CT-06-323 H8 to I5 and H6 to I4);
  - an area of grassland habitat creation to the west of the Proposed Scheme, north of the River Bollin to provide replacement habitat (see Volume 2: MA04 Map Book, map CT-06-323, H7 to I4);
  - a balancing pond for railway drainage within an area of woodland habitat creation, 70m north of the River Bollin. Access will be provided from the A6144 Bent Lane (see Volume 2: MA04 Map Book, map CT-06-323, H7);
  - diversion of an underground National Grid 1,050mm high pressure gas pipeline for 367m in length, to pass under the route of the Proposed Scheme 600m north of the River Bollin (see Volume 2: MA04 Map Book, map CT-06-323, J8 to J6);
  - Warburton cutting, 1.1km in length, up to 4m in depth and 61m in width, with associated landscape mitigation planting to provide visual screening for the Saracens Head public house and residents of properties around Mossbrow, and to help integrate the Proposed Scheme into the surrounding landscape (see Volume 2: MA04 Map Book, map CT-06-324, B7 to G7);
  - landscape earthworks along Warburton cutting, as follows:
    - landscape earthworks, 580m in length and 2m in height, beginning at Footpath Warburton 3 accommodation overbridge and continuing along the eastern side of Warburton cutting as far as A6144 Paddock Lane overbridge. The landscape earthworks will provide visual and acoustic screening for Moss Brow Farm and the community of Mossbrow (see Volume 2: MA04 Map Book, map CT-06-324, B7 to E7);
    - landscape earthworks, 580m in length and 2m in height, beginning at Footpath Warburton 3 accommodation overbridge and continuing along the western side of Warburton cutting as far as A6144 Paddock Lane overbridge. The landscape earthworks will provide visual screening for the new Church of St Werburgh and Church House (see Volume 2: MA04 Map Book, map CT-06-324, B6 to E7);
    - landscape earthworks, 505m in length and 2m in height, beginning at A6144 Paddock Lane overbridge and continuing along the eastern side of Warburton cutting as far as Warburton embankment. The landscape earthworks will provide visual screening for residents of properties on the A6144 Warburton Lane and Moss Lane (see Volume 2: MA04 Map Book, map CT-06-324, E7 to G7);

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- landscape earthworks, 500m in length and 2m in height, beginning at A6144 Paddock Lane overbridge and continuing along the western side of Warburton cutting as far as Warburton embankment. The landscape earthworks will provide visual screening for residents of properties in Warburton (see Volume 2: MA04 Map Book, map CT-06-324, E7 to G7);
- realignment of Footpath Warburton 3, part of the Bollin Valley Way, up to 135m north of its current alignment for 495m, crossing the route of the Proposed Scheme on Footpath Warburton 3 accommodation overbridge, increasing the length of journey by 184m (see Volume 2: MA04 Map Book, map CT-06-324, A7 to B5);
- Footpath Warburton 3 accommodation overbridge, 62m in length, and up to 7m above ground level and 9m above track level, which will provide access to Moss Brow Farm (see Volume 2: MA04 Map Book, map CT-06-324, B6 to B7);
- permanent diversion of minor utilities to accommodate Footpath Warburton 3 accommodation overbridge, including three Scottish Power electricity cables (see Volume 2: MA04 Map Book, map, CT-06-324, B5 to B7);
- diversion of an underground National Grid 1,050mm high pressure gas pipeline, for 786m in length, to pass under the route of the Proposed Scheme 750m north of the River Bollin (see Volume 2: MA04 Map Book, map CT-06-323, I10 to CT-06-324, B5);
- formation of a three-arm roundabout at the junction of the A6144 Warburton Lane/A6144 Paddock Lane/B5160 Dunham Road to replace three existing closely spaced priority controlled (give-way) junctions (see Volume 2: MA04 Map Book, map, CT-06-324, C7);
- A6144 Paddock Lane auto-transformer station, 75m by 26m in area, to the east of the route of the Proposed Scheme, 130m south of the realigned A6144 Paddock Lane, with access provided from the retained section of the A6144 Paddock Lane (see Volume 2: MA04 Map Book, map CT-06-324, D7);
- four ecological mitigation ponds with associated grassland habitat creation to the west of Warburton cutting, 20m south of the realigned A6144 Paddock Lane to provide replacement habitat for great crested newt (see Volume 2: MA04 Map Book, map CT-06-324, D5 to E6);
- a balancing pond for highway drainage 250m west of Warburton cutting. Access will be provided from the realigned A6144 Paddock Lane (see Volume 2: MA04 Map Book, map CT-06-324, E5);
- realignment of the A6144 Paddock Lane, up to 242m north of its current alignment for 535m, crossing the route of the Proposed Scheme on A6144 Paddock Lane overbridge, decreasing the journey length by 254m for users travelling between Partington and Heatley, and increasing the journey length by up to 844m for users travelling between Mossbrow and Warburton. The realignment will connect with the existing A6144 Warburton Lane/Paddock Lane/Bent Lane via new roundabouts (see Volume 2: MA04 Map Book, map CT-06-324, D5 to E9);
- A6144 Paddock Lane overbridge, 63m in length and up to 11m above ground level and 9m above track level. The embankment to the overbridge will have landscape mitigation

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planting on both sides to provide visual screening for the Saracens Head public house and residents of properties in Warburton, and to help integrate the structure into the surrounding landscape (see Volume 2: MA04 Map Book, map CT-06-324, E7);

- a balancing pond for highway drainage 240m to the east of the route of Warburton cutting. Access will be provided from the A6144 Warburton Lane (see Volume 2: MA04 Map Book, map CT-06-324, E9 and F9);
- four ecological mitigation ponds with associated grassland habitat creation to the east of Warburton cutting, 40m north of the realigned A6144 Paddock Lane to provide replacement habitat for great crested newt (see Volume 2: MA04 Map Book, map CT-06-324, E7 to F8);
- realignment of Field Drains A6144 in an unnamed culvert for 70m under the realigned A6144 Paddock Lane (see Volume 2: MA04 Map Book, map CT-06-324, E9);
- a balancing pond for railway drainage, 40m to the east of Warburton cutting. Access will be provided from the realigned A6144 Paddock Lane (see Volume 2: MA04 Map Book, map CT-06-324, F8);
- diversion of an underground Cadent Gas 750mm high-pressure pipeline, for 610m in length, to pass under the route of the Proposed Scheme 300m north of the A6144 Paddock Lane (see Volume 2: MA04 Map Book, map CT-06-324, E8 to F5);
- A6144 Paddock Lane telecommunications site, 49m by 24m in area, to the east of the route of the Proposed Scheme including signalling equipment and a railway telecommunications mast up to 25m in height. Access will be provided from a new track running south to the realigned A6144 Paddock Lane (see Volume 2: MA04 Map Book, map CT-06-324, G7);
- permanent diversion of minor utilities to accommodate A6144 Paddock Lane telecommunications site, including a United Utilities potable water main, Cadent Gas main and Vodafone telecommunications cable (see Volume 2: MA04 Map Book, map CT-06-324, G7);
- Warburton embankment, 290m long and up to 9m in height, with associated landscape earthworks to help integrate the Proposed Scheme into the surrounding landscape (see Volume 2: MA04 Map Book, map CT-06-324, G7 to H7);
- realignment of Footpath Warburton 11, up to 107m north of its current alignment for 475m, crossing the route of the Proposed Scheme under Manchester Ship Canal viaduct increasing the length of the journey by 196m (see Volume 2: MA04 Map Book, map CT-06-324, H6 and H7); and
- realignment of Tributary of Manchester Ship Canal 2 (known locally as Warburton Park Brook) for 140m to accommodate the realignment of Footpath Warburton 11 (see Volume 2: MA04 Map Book, map CT-06-324, H7).

## Manchester Ship Canal viaduct to M62 West viaduct

- 2.2.15 The route of the Proposed Scheme will continue north on Manchester Ship Canal viaduct before passing onto Glazebrook South embankment, Glazebrook North embankment, and then M62 West viaduct to the end of the Broomedge to Glazebrook area.
- 2.2.16 This section of route is illustrated on maps CT-06-324 to CT-06-327-R3 in the Volume 2: MA04 Map Book.
- 2.2.17 Key features of this 3.5km section will include:
- Manchester Ship Canal viaduct, 1.9km long and up to 29m in height crossing the Manchester Ship Canal (see Volume 2: MA04 Map Book, map CT-06-324, H7 to CT-06-325, I5);
  - permanent diversion of minor utilities to accommodate Manchester Ship Canal viaduct, including United Utilities potable water mains and wastewater sewers, Openreach, Vodafone and Virgin telecommunication cables and Electricity North West electricity cables (see Volume 2: MA04 Map Book, map CT-06-324, H7 to CT-06-325, I5);
  - replacement floodplain storage area on the western side of the route of the Proposed Scheme 380m to the west of Manchester Ship Canal viaduct (see Volume 2: MA04 Map Book, map CT-06-324, I3 to J3);
  - noise fence barriers along Manchester Ship Canal viaduct, as follows:
    - a noise fence barrier, 1.1km in length and 2m in height, located along the western side of the viaduct, extending 50m south of Red Brook to 300m north of Hollinfare Cemetery, to provide acoustic screening for the cemetery and properties in Hollins Green (see Volume 2: MA04 Map Book, map CT-06-325, C5 to I5);
    - a noise fence barrier, 20m in length and 2m in height, located along the eastern side of the viaduct, extending from the northern abutment of the viaduct to the beginning of Glazebrook South embankment, to provide acoustic screening for properties in Glazebrook (see Volume 2: MA04 Map Book, map CT-06-325, I5);
  - underground diversion of a Scottish Power 132kV overhead power line for 618m, to pass under the route of the Proposed Scheme 450m to the south of the Manchester Ship Canal (see Volume 2: MA04 Map Book, map CT-06-325, A6 to B3);
  - diversion of an underground Cadent Gas 900mm high-pressure gas pipeline, for 475m in length, to pass under the route of the Proposed Scheme 225m south of the Manchester Ship Canal (see Volume 2: MA04 Map Book, map CT-06-325, C2 to C6);
  - an area of woodland habitat creation extending east under Manchester Ship Canal viaduct to provide compensatory habitat for the loss of ancient woodland at Coroners Wood (see Volume 2: MA04 Map Book, map CT-06-325, B7 to C2);
  - an area of woodland habitat creation between Partington Waste Water Treatment Works and Millbank Hall Farm, to provide compensatory habitat and woodland connectivity (see Volume 2: MA04 Map Book, map CT-06-325, C7 and C8);

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- an area of woodland habitat creation on the western side of Manchester Ship Canal viaduct between the northern bank of Red Brook and the southern bank of the Manchester Ship Canal, to provide compensatory habitat for the loss of ancient woodland at Coroners Wood (see Volume 2: MA04 Map Book, map CT-06-325, C4 and C5);
- retaining walls to define the extent of the Manchester Ship Canal wall and protect Manchester Ship Canal viaduct against ship impact, reducing the width of the Manchester Ship Canal by up to 30m along the length of the retaining walls. The retaining walls will be as follows:
  - Manchester Ship Canal south retaining wall, 148m in length and up to 2m above the water level, located on the south bank of the Manchester Ship Canal under Manchester Ship Canal viaduct (see Volume 2: MA04 Map Book, map CT-06-325, D4 to D6);
  - Manchester Ship Canal north retaining wall, 197m in length and up to 2m above the water level, located on the north bank of the Manchester Ship Canal under Manchester Ship Canal viaduct (see Volume 2: MA04 Map Book, map CT-06-325, D4 to D6);
- an area of grassland habitat creation with four pockets of woodland habitat creation on both sides of the Proposed Scheme extending under Manchester Ship Canal viaduct to provide replacement habitat (see Volume 2: MA04 Map Book, map CT-06-325, D3 to E7);
- replacement floodplain storage area on the eastern side of the route of the Proposed Scheme, 25m west of the Glaze Brook (see Volume 2: MA04 Map Book, map CT-06-325, E7);
- an area of landscape mitigation planting to the west of the route of the Proposed Scheme, extending east under Manchester Ship Canal viaduct adjacent to the A57 Manchester Road as far as the Glaze Brook, to provide visual screening for residents of Hollins Green (see Volume 2: MA04 Map Book, map CT-06-325, D3 to E7);
- an area of landscape mitigation planting to the west of the Proposed Scheme, between Manchester Road and Hollinfare Cemetery, to provide visual screening for residents of properties in Hollins Green (see Volume 2: MA04 Map Book, map CT-06-325, F4 and F5);
- an area of landscape mitigation planting to the west of the Proposed Scheme, extending from Manchester Road to Dam Lane beneath Manchester Ship Canal viaduct to provide visual screening for residents of properties along Dam Lane (see Volume 2: MA04 Map Book, map CT-06-325, F6 to H4);
- realignment of the Tributary of Glaze Brook 1 (known locally as Hollins Green Brook) for 45m to accommodate the piers of Manchester Ship Canal viaduct (see Volume 2: MA04 Map Book, map CT-06-325, F5 to G5);
- diversion of an underground Cadent Gas 900mm high-pressure gas pipeline, for 2.5km in this section to pass under the route of the Proposed Scheme 350m south of Glazebrook South embankment. The diversion will continue for 155m in the Risley to Bamfurlong area (MA05) (see Volume 2: MA04 Map Book, map CT-06-325, G5 to CT-06-326a I9);



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- realignment of three sections of Footpath Rixton-with-Glazebrook 9:
  - section 1, 18m in length up to 2m north of its current alignment, with a negligible increase in journey length (see Volume 2: MA04 Map Book, map CT-05-325, H5);
  - section 2, 22m in length up to 6m west of its existing alignment, with a negligible increase in journey length (see Volume 2: MA04 Map Book, map CT-05-325, H5);
  - section 3, 216m in length up to 8m west of its existing alignment, with a decrease in journey length of 76m (see Volume 2: MA04 Map Book, map CT-05-325, I6 to J6);
- diversion of Footpath Rixton-with-Glazebrook 14 up to 416m to the south of its current alignment for 550m, crossing the route of the Proposed Scheme under Manchester Ship Canal viaduct, increasing the journey length by 210m (see Volume 2: MA04 Map Book, map CT-06-325, J6 to J3);
- Glazebrook South embankment, 703m in length and up to 12m in height, with associated landscape mitigation planting on both sides to provide visual screening for Moss Farm, Church Farm, the users of Footpath Rixton-with-Glazebrook 14 and residents of properties on Dam Lane, Bank Street, the B5212 Glazebrook Lane and to help integrate the Proposed Scheme into the surrounding landscape (see Volume 2: MA04 Map Book, maps CT-06-325, I5 to CT-06-326a, C5);
- a noise fence barrier, 710m in length and 2m in height located along the top of the eastern side of Glazebrook South embankment, to provide acoustic screening for properties in Glazebrook (see Volume 2: MA04 Map Book, map CT-06-325, I5 to CT-06-326a, C5);
- permanent diversion of minor utilities to accommodate Glazebrook South embankment, including Openreach and L3 telecommunication cables and a United Utilities potable water main (see Volume 2: MA04 Map Book, map CT-06-325, I5 to CT-06-326a, C5);
- Dam Lane telecommunications site, 49m by 24m in area, to the west of the route of the Proposed Scheme including signalling equipment and a railway telecommunications mast, up to 20m in height. Access will be provided from Dam Lane (see Volume 2: MA04 Map Book, map CT-06-325, J5);
- an area of woodland habitat creation along the western side of Glazebrook South embankment to provide replacement habitat (see Volume 2: MA04 Map Book, map CT-06-326a, A5 to C5);
- a balancing pond for railway drainage, 50m west of Glazebrook South embankment. Access will be provided from Dam Lane (see Volume 2: MA04 Map Book, map CT-06-326a, A5);
- an area of landscape mitigation planting to the west of the Proposed Scheme, between part of the retained section of Dam Head Lane and the Liverpool to Manchester Line (via Warrington Central) to provide visual screening for Rose Cottage (see Volume 2: MA04 Map Book, map CT-06-326a, C4 to D5);
- closure of Dam Head Lane where it crosses the route of the Proposed Scheme, with access retained to properties on both the western and eastern side of the route. Users will be diverted along Dam Lane, Manchester Road and the B5212 Glazebrook Lane,

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increasing the length of the journey by 2km (see Volume 2: MA04 Map Book, map CT-06-326a, C5 and C7);

- a balancing pond for railway drainage, 100m to the north-west of Glazebrook South embankment. Access will be provided from Dam Head Lane (see Volume 2: MA04 Map Book, map CT-06-326a, D4);
- a new PRoW footpath, 350m in length to connect the retained section of Dam Head Lane on the western side of the route of the Proposed Scheme to Bank Street, passing under Glazebrook (Railway) viaduct, increasing the journey length by 146m (see Volume 2: MA04 Map Book, map CT-06-326a, C5 to C6);
- Glazebrook (Railway) viaduct, 66m in length and up to 7m in height (see Volume 2: MA04 Map Book, map CT-06-326a, C5 and D5);
- a noise fence barrier, 70m in length and 2m in height, located along the eastern side of Glazebrook (Railway) viaduct, to provide acoustic screening for properties in Glazebrook (see Volume 2: MA04 Map Book, map CT-06-326a, C5 to D5);
- diversion of an underground Cadent Gas 200mm high-pressure pipeline, for 1.2km, to pass under the route of the Proposed Scheme, 470m north of the Liverpool to Manchester Line (via Warrington Central) (see Volume 2: MA04 Map Book, map CT-06-326a, C8 to D3);
- diversion of an underground Cadent Gas 400mm high-pressure pipeline, for 1.4km, to pass under the route of the Proposed Scheme, 530m north of the Liverpool to Manchester Line (via Warrington Central) (see Volume 2: MA04 Map Book, map CT-06-326a, C8 to D2);
- diversion of an underground Cadent Gas 1,050mm high-pressure gas pipeline, for 776m in length, to pass under the route of the Proposed Scheme, 580m north of the Liverpool to Manchester Line (via Warrington Central) (see Volume 2: MA04 Map Book, map CT-06-326a, D3 to F7);
- Glazebrook North embankment, 793m in length and up to 11m in height, with associated landscape mitigation planting on both sides to provide visual screening for Moss Farm, Church Farm, for residents of properties on Bank Street and the B5212 Glazebrook Lane, and to help integrate the Proposed Scheme into the surrounding landscape (see Volume 2: MA04 Map Book, map CT-06-326a, D5 to H5);
- a noise fence barrier, 260m in length and 2m in height located along the top of the eastern side of Glazebrook North embankment, to provide acoustic screening for properties in Glazebrook (see Volume 2: MA04 Map Book, map CT-06-326a, D5 to E5);
- an area of woodland habitat creation along the western side of Glazebrook North embankment to provide replacement habitat (see Volume 2: MA04 Map Book, map CT-06-326a, D5 to H4);
- M62 West viaduct, 102m in length in this section and up to 9m in height (see Volume 2: MA04 Map Book, map CT-06-326a, H5);



- groundwater flow channel 30m north of Glazebrook North embankment to reduce potential groundwater flow impacts on Holcroft Moss. Access will be provided from Dam Head Lane (see Volume 2: MA04 Map Book, map CT-06-326a, H5);
- an area of woodland habitat creation on both sides of M62 West viaduct, 20m north of Glazebrook North embankment to provide replacement habitat (see Volume 2: MA04 Map Book, map CT-06-326a, H4);
- an area of wetland habitat creation to the east of the Proposed Scheme, along the southern boundary of Holcroft Moss SSSI, to provide replacement habitat (see Volume 2: MA04 Map Book, map CT-06-326a, H5 to H8); and
- an area of wetland habitat creation at Little Woolden Moss has been included on a precautionary basis at this stage to the east of the Proposed Scheme, to mitigate potential effects on Holcroft Moss (in the Risley to Bamfurlong area) from construction traffic on the M62 (see Volume 2: MA04 Map Book, map CT-06-327-R2, B10 to CT-06-327-R3, G1).

## Demolitions

- 2.2.18 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.
- 2.2.19 Four residential properties have been identified for demolition. 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 Broomedge to Glazebrook 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.

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- 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.

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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).

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.

## **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; changes to the existing rail network; 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 Broomedge to Glazebrook 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;
  - works to the conventional railway; 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

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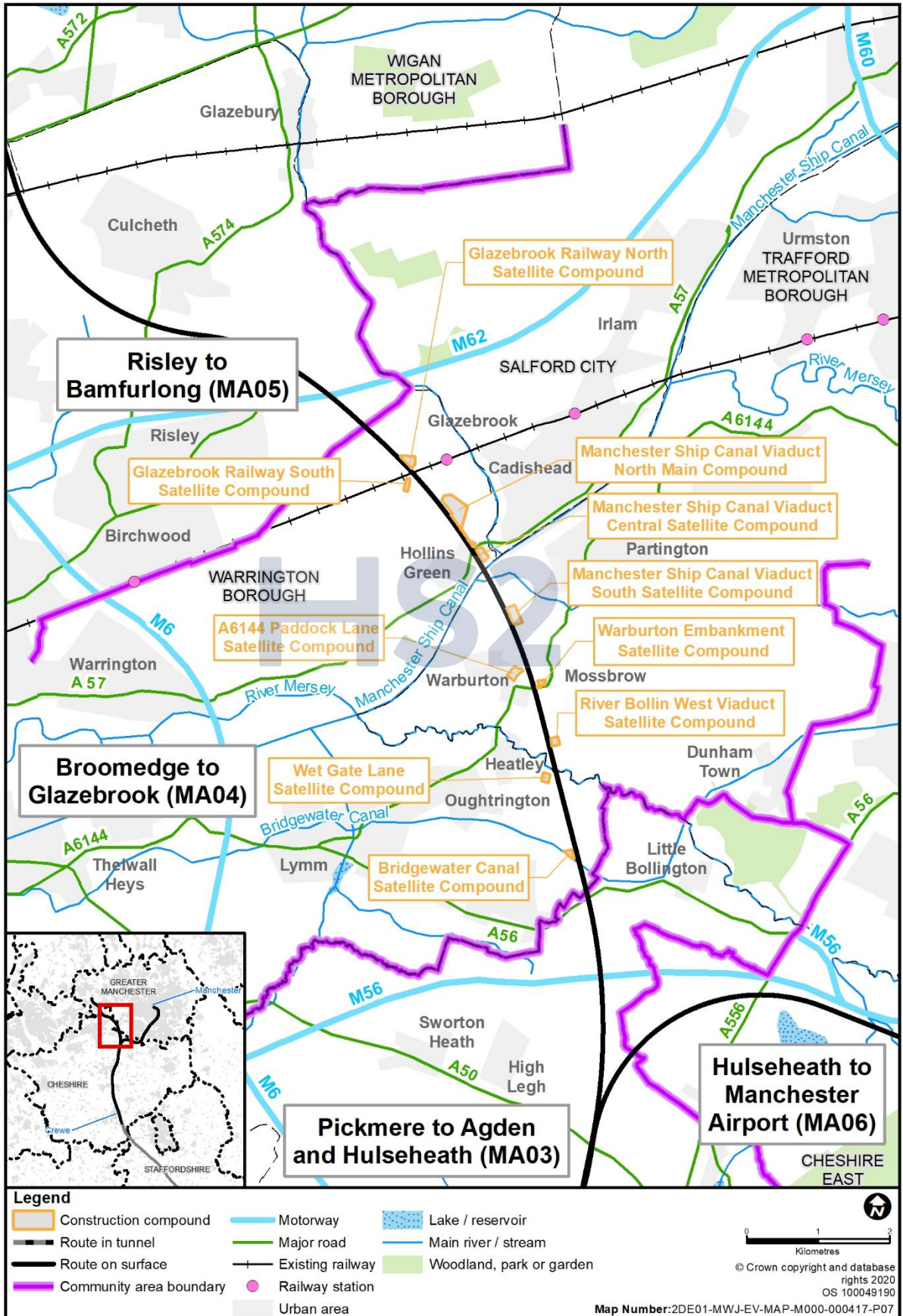
manage some works and coordinate the works at the satellite compounds. In general, a main compound will include:

- 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 The Manchester Ship Canal viaduct north main compound will be located in the Broomedge to Glazebrook area and will manage nine civil engineering satellite compounds in this area. The A56 Lymm Road satellite compound will be located on the boundary between the Pickmere to Agden and Hulseheath area (MA03) and the Broomedge to Glazebrook area. It will be managed from the A50 main compound in the Pickmere to Agden and Hulseheath area (see Volume 2:Community Area report: Pickmere to Agden and Hulseheath (MA03)).
- 2.3.20 The Wet Gate Lane and Warburton embankment satellite compounds will be used to install railway systems after the civil engineering works have been completed. These railway systems compounds will be managed from the A50 main compound, which is in the Pickmere to Agden and Hulseheath area (see Volume 2: Community Area report: Pickmere to Agden and Hulseheath (MA03)).
- 2.3.21 The location of construction compounds in the Broomedge to Glazebrook area is shown on Figure 4. Map Series CT-05 (in the Volume 2: MA04 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 4: Location of construction compounds in the Broomedge to Glazebrook area**





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- 2.3.23 Figure 5 shows the management relationship for civil engineering works compounds and Figure 6 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 Broomedge to Glazebrook area there will be worker accommodation at the Manchester Ship Canal viaduct north 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 and are shown on maps CT-05-322b to CT-05-327-R3, in the Volume 2: MA04 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 Broomedge to Glazebrook area are shown on map CT-05-324 in the Volume 2: MA04 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 and transfer nodes will provide the interface between the construction works and the public road or railway network. The likely road routes to access compounds in the Broomedge to Glazebrook area are described in subsequent sections of this report.

## **Use of borrow pits**

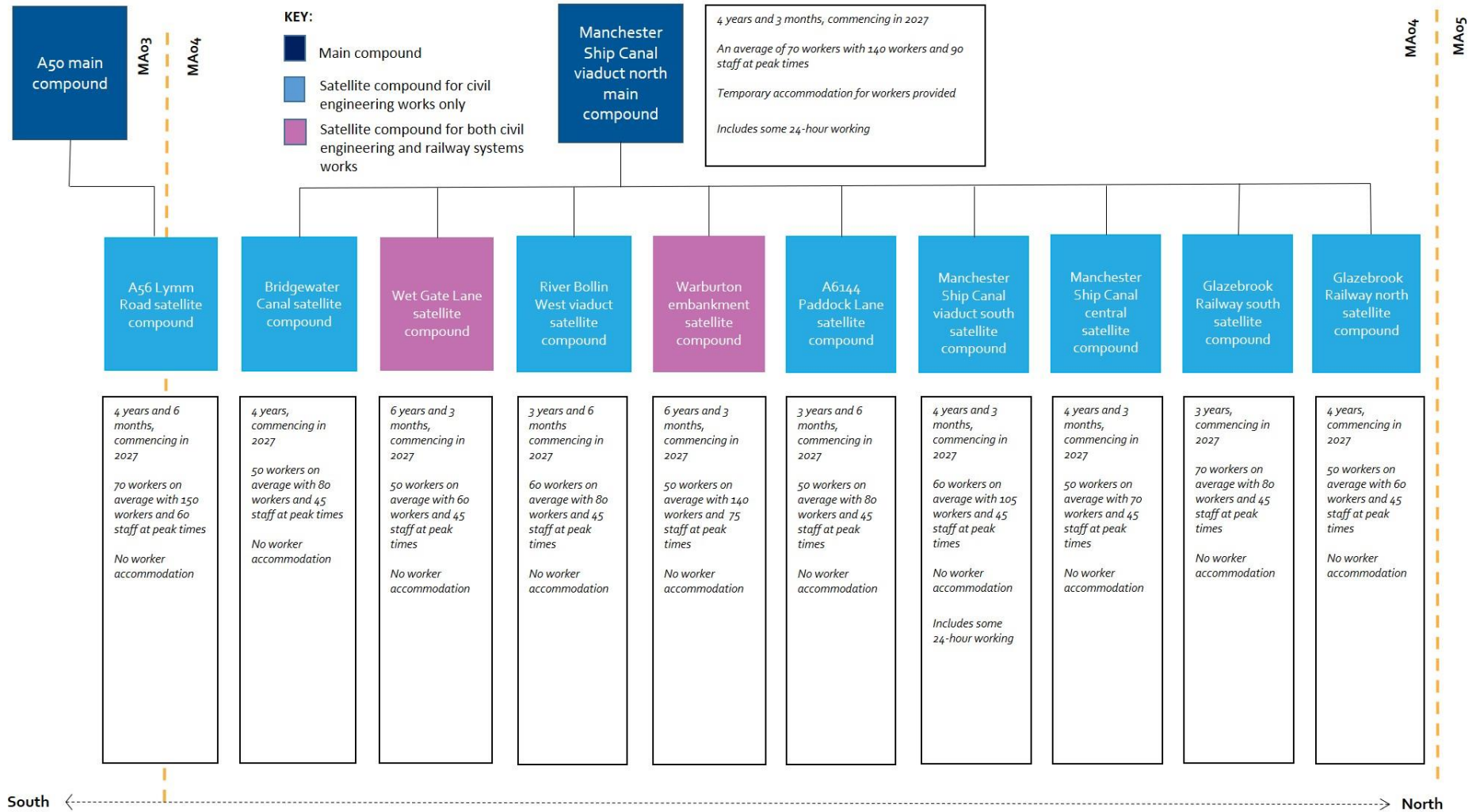
- 2.3.30 The Proposed Scheme will require material with suitable engineering properties for the construction of a high speed railway. This is described as acceptable engineering material and will be provided, in part, through excavation of cuttings and other earthworks undertaken to construct the Proposed 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 Broomedge to Glazebrook area, as illustrated in Figure 5 and Figure 6. 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).

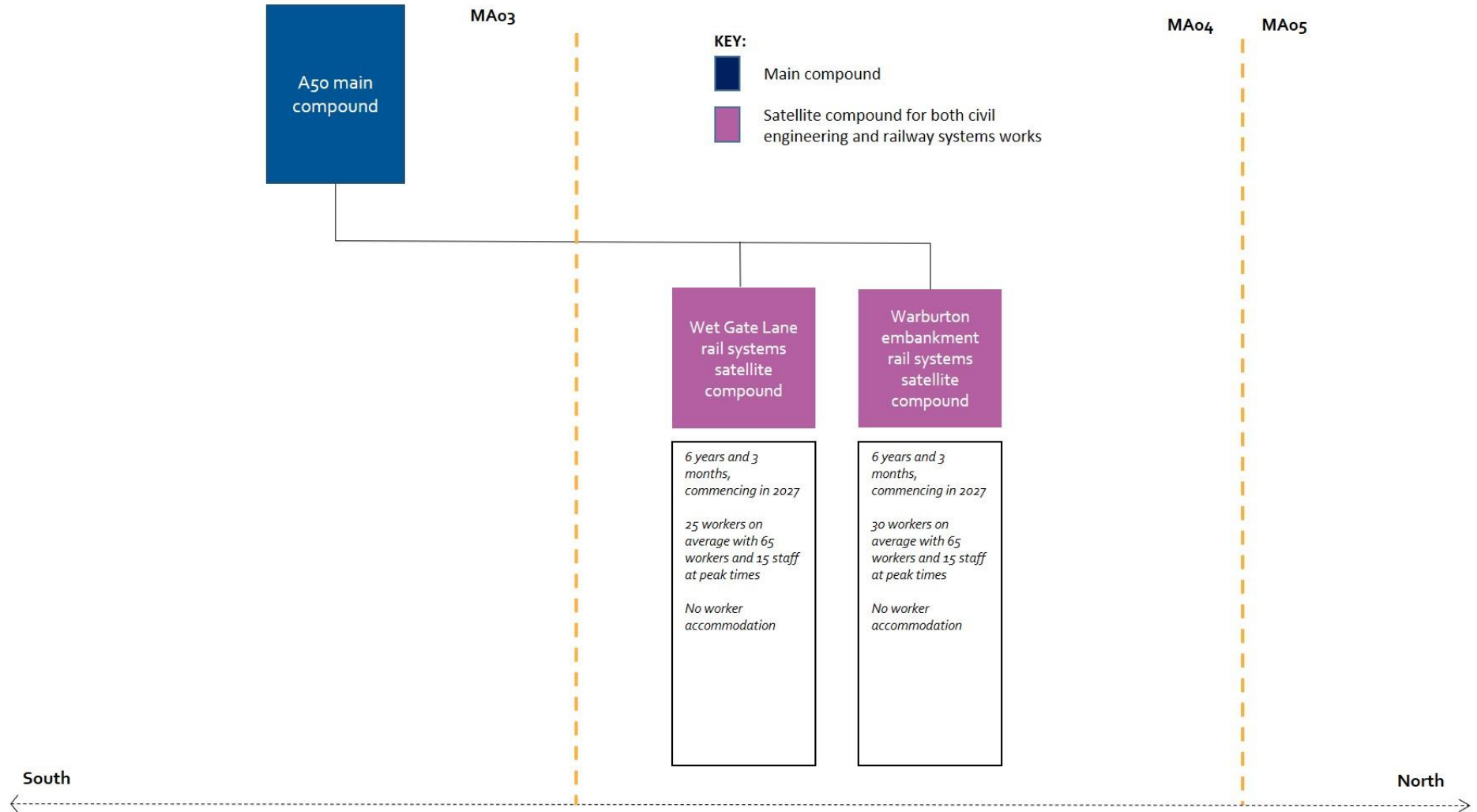
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**Figure 5: Construction compounds for civil engineering works**



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**Figure 6: Construction compounds for railway systems works**



## **Agden Brow satellite compound**

- 2.3.34 This compound will be located within the Pickmere to Agden and Hulseheath area (MA03). It is described in Volume 2:Community Area report: Pickmere to Agden and Hulseheath (MA03). The compound will be used to manage the construction of Lymm North embankment and Heatley South embankment, within the Broomedge to Glazebrook area.
- 2.3.35 The construction of Lymm North embankment will take two years and six months to complete. The construction of Heatley South embankment will take four years to complete.

## **A56 Lymm Road satellite compound**

- 2.3.36 This compound (shown on Volume 2: MA04 Map Book, map CT-05-322b, F3) will be located primarily in the Pickmere to Agden and Hulseheath area (MA03). A small section of this compound will extend into the Broomedge to Glazebrook area. The compound will be used to manage civil engineering works in both areas. It will:
- provide two temporary material stockpiles immediately to the west of the Proposed Scheme (see Volume 2: MA04 Map Book, map CT-05-322b, F4 to G4 and G4 to H4); and
  - be accessed from the A56 Lymm Road.
- 2.3.37 No demolitions will be required in this area as a result of the works to be managed from this compound.
- 2.3.38 The compound, along with the Bridgewater Canal satellite compound, will be used to manage the construction of Bridgewater Canal viaduct, which will take three years and three months to complete.
- 2.3.39 Agden Lane culvert will convey surface water under the route of the Proposed Scheme and will take six months to complete.
- 2.3.40 Warrington Lane will be permanently realigned, which will take one year and nine months to complete. During construction, a section of Warrington Lane will be temporarily closed with users diverted along Burford Lane and the A56 Lymm Road, which will result in an increase in journey length of 2.5km.
- 2.3.41 The works to be managed from this compound will involve the following works to utilities:
- permanent diversion of an Openreach telecommunications cable, which will take three months to complete; and
  - permanent diversion of a United Utilities potable water main, which will take three months to complete.
- 2.3.42 Further details are provided in the Pickmere to Agden and Hulseheath area (see Volume 2: Community Area report: Pickmere to Agden and Hulseheath (MA03)).

## **Bridgewater Canal satellite compound**

- 2.3.43 This compound (shown on Volume 2: MA04 Map Book, map CT-05-322b, I3) will be used to manage civil engineering works. It will:
- provide two temporary material stockpiles immediately to the west of the Proposed Scheme (see Volume 2: MA04 Map Book, map CT-05-323, A7 to B7 and B7 to C7);
  - provide one temporary material stockpile immediately to the east of the Proposed Scheme (see Volume 2: MA04 Map Book, map CT-05-322b I4 to CT-05-323, B8); and
  - be accessed from Spring Lane, to the west of the Proposed Scheme.
- 2.3.44 No demolitions will be required as a result of the works to be managed from this compound.
- 2.3.45 The compound, along with the A56 Lymm Road satellite compound, will be used to manage the construction of Bridgewater Canal viaduct, which will take three years and three months to complete.
- 2.3.46 The compound will be used manage the construction of Spring Lane underbridge, which will take one year and nine months, later followed by a period of one year to complete.
- 2.3.47 Spring Lane will be permanently realigned up to 5m to the north of its current alignment, which will take two years to complete. During construction, a section of Spring Lane will be temporarily realigned with users diverted along the southern part of the Little Heatley accommodation access and a temporary section of new road, which will result in an increase in journey length of 40m.
- 2.3.48 The compound will manage the construction of an accommodation access for Little Heatley, which will take nine months to complete.
- 2.3.49 The works to be managed from this compound will require the temporary diversion of a section of Footpath Lymm 43 (Cheshire Ring Canal Walk) to the north of the area required for construction of the Proposed Scheme for a period of one year and three months, increasing the length of the journey by 102m. On completion of construction, Footpath Lymm 43 will be reinstated along its existing alignment.
- 2.3.50 The works to be managed from this compound will involve the following works to utilities:
- permanent diversion of an underground Cadent Gas 100mm high pressure gas pipeline, which will take nine months to complete; and
  - permanent diversion of a Scottish Power electricity cable, which will take three months to complete.



## **Wet Gate Lane satellite compound**

- 2.3.51 This compound (shown on Volume 2: MA04 Map Book, map CT-05-323, F6) will be used to:
- manage civil engineering works for a period of three years and nine months, later followed by railway system works for a period of one year and three months expected to be between 2030 and 2033, with some activities being undertaken concurrently;
  - provide two temporary material stockpiles immediately to the west of the Proposed Scheme (see Volume 2: MA04 Map Book, map CT-05-323, C7, and D7 to E7);
  - provide one temporary material stockpile immediately to the east of the Proposed Scheme (see Volume 2: MA04 Map Book, map CT-05-323, E8 to F8); and
  - be accessed from Wet Gate Lane, to the west of the Proposed Scheme.
- 2.3.52 No demolitions will be required as a result of the works to be managed from this compound.
- 2.3.53 The compound, along with the River Bollin West viaduct satellite compound, will be used to manage the construction of River Bollin West viaduct, which will take two years to complete.
- 2.3.54 Wet Gate Lane will be permanently realigned to the west of its existing alignment, which will take one year and six months to complete. Wet Gate Lane will remain open during the realignment, which will be constructed offline. A temporary closure of Wet Gate Lane will be required for a period of three months during the construction of the tie-ins and a diversion will be put in place, which will result in an increase in journey length of 91m.
- 2.3.55 The works to be managed from this compound will require the following works to PRow:
- temporary diversion of a section of Footpath Warburton 8 to the north of the area required for construction of the Proposed Scheme for a period of two years, increasing the length of the journey by 430m. On completion of construction, Footpath Warburton 8 will be reinstated along its existing alignment;
  - temporary diversion of sections of Footpath Warburton 4 and Footpath Warburton 37 to the north of the area required for construction of the Proposed Scheme for a period of two years, increasing the length of the journey by 392m. A structure will be provided to carry users over the River Bollin. On completion of construction, Footpath Warburton 4 and Footpath Warburton 37 will be reinstated along their existing alignments; and
  - temporary diversion of a section of the Trans Pennine Trail, which forms part of National Cycle Route 62, to the south of the area required for construction of the Proposed Scheme for a period of two years, increasing the length of the journey by 101m. On completion of construction, the Trans Pennine Trail will be reinstated along its existing alignment.
- 2.3.56 The compound will be used to manage the construction and installation of Wet Gate Lane railway telecommunications site, located 50m north of the Wet Gate Lane realignment. The construction of Wet Gate Lane telecommunications site foundations and buildings will take six months to complete.

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- 2.3.57 Key railway systems installation works to be managed from this compound will include the installation of switches and crossings, which will take nine months to complete.
- 2.3.58 The works to be managed from this compound will involve the following works to utilities:
- permanent diversion of six underground ESSAR 100mm-200mm fuel pipelines, which will take six months to complete;
  - permanent diversion of a Scottish Power 132kV overhead power line, which will take six months to complete;
  - permanent diversion of an Openreach telecommunication cable, which will take three months to complete; and
  - permanent diversion of a United Utilities potable water main, which will take six months to complete.

## **River Bollin West viaduct satellite compound**

- 2.3.59 This compound (shown on Volume 2: MA04 Map Book, map CT-05-323, I8) will be used to manage civil engineering works. It will:
- provide one temporary material stockpile immediately to the east of the Proposed Scheme (see Volume 2: MA04 Map Book, map CT-05-323, I8); and
  - be accessed from A6144 Paddock Lane, to the west of the Proposed Scheme.
- 2.3.60 No demolitions will be required as a result of the works to be managed from this compound.
- 2.3.61 The compound will be used to manage the construction of Footpath Warburton 3 accommodation overbridge, which will take two years and three months to complete.
- 2.3.62 This compound, along with the Wet Gate Lane satellite compound, will also be used to manage the construction of River Bollin West viaduct, which will take two years to complete.
- 2.3.63 The works to be managed from this compound will include the permanent realignment of a section of Footpath Warburton 3 for 495m, which will take two years and three months to complete. Footpath Warburton 3 will remain open during the realignment, which will be constructed offline.
- 2.3.64 The works to be managed from this compound will involve the following works to utilities:
- permanent diversion of a United Utilities 400mm potable water main, which will take three months to complete;
  - permanent diversion of an underground National Grid transmission 1,050mm high pressure gas pipeline, which will take nine months to complete; and
  - permanent diversion of an underground National Grid transmission 1,050mm high pressure gas pipeline, which will take nine months to complete.

## Warburton embankment satellite compound

- 2.3.65 This compound (shown on Volume 2: MA04 Map Book, CT-05-324, D8) will be used to:
- manage civil engineering works for a period of four years and six months, later followed by railway system works for a period of one year and nine months expected to be between 2030 and 2033, with some activities being undertaken concurrently;
  - provide three temporary material stockpiles immediately to the west of the Proposed Scheme (see Volume 2: MA04 Map Book, map CT-06-324, B5 and B6, B5 to C6, and B6 to D6);
  - provide one temporary material stockpile immediately to the east of the Proposed Scheme (see Volume 2: MA04 Map Book, map CT-05-324, B7 to C7);
  - provide a transfer node to the north of the compound, accessed from the A6144 Paddock Lane (see Volume 2: MA04 Map Book, map CT-05-324, D8); and
  - be accessed from the A6144 Paddock Lane, to the east of the Proposed Scheme.
- 2.3.66 The works to be managed from this compound will require demolition of the properties identified in Table 1.

**Table 1: Demolitions required in the Broomedge to Glazebrook area as a result of the works to be managed from the Warburton embankment satellite compound**

Type	Description	Location	Feature resulting in demolition
Residential	Four properties on Wet Gate Lane	Wet Gate Lane, Lymm	Heatley South embankment

- 2.3.67 The compound, along with the Agden Brow satellite compound in the Pickmere to Agden and Hulseheath area (MA03), will be used to manage the construction of Heatley South embankment, which will take four years to complete.
- 2.3.68 The compound will be used to manage the construction of the following earthworks:
- Heatley North embankment, which will take two years to complete;
  - Warburton cutting, which will take two years to complete; and
  - Warburton embankment, which will take three years and six months to complete.
- 2.3.69 Key railway systems installation works to be managed from this compound include:
- A6144 Paddock Lane auto-transformer station, which will take one year and three months to complete; and
  - switches and crossing works, which will take six months to complete.

## **A6144 Paddock Lane satellite compound**

- 2.3.70 This compound (shown on Volume 2: MA04 Map Book, map CT-05-324, E5) will be used to manage civil engineering works. It will:
- provide one temporary material stockpile immediately to the west of the Proposed Scheme (see Volume 2: MA04 Map Book, map CT-05-324, E6 to H7);
  - provide three temporary material stockpiles immediately to the east of the Proposed Scheme (see Volume 2: MA04 Map Book, map CT-05-324, F7 to G7, G7 to H7, and H7); and
  - be accessed from A6144 Paddock Lane, to the west of the Proposed Scheme.
- 2.3.71 No demolitions will be required as a result of the works to be managed from this compound.
- 2.3.72 The compound will be used to manage the construction of A6144 Paddock Lane overbridge, which will take two years and three months to complete.
- 2.3.73 A section of the A6144 Paddock Lane will be permanently realigned, which will take two years and three months to complete. The A6144 Paddock Lane will remain open during the realignment, which will be constructed offline.
- 2.3.74 The works to be managed from this compound will require the temporary diversion of Footpath Warburton 11 to the north of the area required for construction of the Proposed Scheme for a period of six months, increasing the length of the journey by 964m. On completion of construction, Footpath Warburton 11 will be permanently realigned up to 107m north of its existing alignment.
- 2.3.75 The compound will be used to manage the construction of A6144 Paddock Lane auto-transformer station, located 130m south of A6144 Paddock Lane overbridge. The construction of A6144 Paddock Lane auto-transformer station foundations and building will take one year to complete.
- 2.3.76 The compound will be used to manage the construction of A6144 Paddock Lane railway telecommunications site, located 445m north of A6144 Paddock Lane overbridge. The construction of the telecommunications mast foundations and building will take six months to complete.
- 2.3.77 The works to be managed from this compound will involve the following works to utilities:
- permanent diversion of an underground Cadent Gas 750mm high pressure gas pipeline, which will take nine months to complete;
  - permanent diversion of two Scottish Power electricity cables, each of which will take three months to complete;
  - permanent diversion of a United Utilities potable water main, which will take six months to complete;
  - permanent diversion of a Cadent Gas main, which will take six months to complete; and

- permanent diversion of a Vodafone telecommunications cable, which will take three months to complete.

## **Manchester Ship Canal viaduct south satellite compound**

- 2.3.78 This compound (shown on Volume 2: MA04 Map Book, map CT-05-324, I7) will be used to manage civil engineering works. It will:
- provide two temporary material stockpiles immediately to the west of the Proposed Scheme (see Volume 2: MA04 Map Book, map CT-05-324, I6 and CT-05-324, A4 to C5);
  - provide one temporary material stockpile immediately to the east of the Proposed Scheme (see Volume 2: MA04 Map Book, map CT-05-325, A5 to C5); and
  - be accessed from the A6144 Warburton Lane, to the east of the Proposed Scheme.
- 2.3.79 No demolitions will be required as a result of the works to be managed from this compound.
- 2.3.80 This compound will be used to manage the construction of the section of Manchester Ship Canal viaduct between the southern abutment and the middle of the Manchester Ship Canal, which will take two years and six months to complete.
- 2.3.81 The works to be managed from this compound will require the temporary diversion of a section of Bridleway Partington 6 to the south of the area required for construction of the Proposed Scheme for a period of four years, increasing the length of journey by 136m. A structure will be provided to carry users over Red Brook. On completion of construction, Bridleway Partington 6 will be reinstated along its existing alignment.
- 2.3.82 The works to be managed from this compound will involve the following works to utilities:
- permanent diversion of a 132kV Scottish Power overhead power line, which will take six months to complete; and
  - permanent diversion of an underground Cadent Gas 900mm high pressure gas pipeline, which will take nine months to complete.

## **Manchester Ship Canal viaduct central satellite compound**

- 2.3.83 This compound (shown on Volume 2: MA04 Map Book, map CT-05-325, E6) will be used to manage civil engineering works. It will be accessed from the A57 Manchester Road to the east of the Proposed Scheme.
- 2.3.84 No demolitions will be required as a result of the works to be managed from this compound.
- 2.3.85 This compound will be used to manage the construction of the section of Manchester Ship Canal viaduct between the northern abutment and the middle of the Manchester Ship Canal, which will take three years and nine months to complete.

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- 2.3.86 A section of Manchester Road will be temporarily closed for a period of three months during the construction of Manchester Ship Canal viaduct, with users diverted via an alternative route along the A57 Manchester Road connecting with Manchester Road to the south of Hollins Green, resulting in a 649m increase in journey length. On completion of construction Manchester Road will be reinstated along its existing alignment.
- 2.3.87 The works to be managed from this compound will require the temporary diversion of a section of an informal footpath on the northern bank of the Manchester Ship Canal to the north of the area required for construction of the Proposed Scheme for a period of four years, increasing the length of journey by 369m. On completion of construction this informal footpath will be reinstated along its existing alignment.
- 2.3.88 The works to be managed from this compound will involve the following works to utilities:
- permanent diversion of two United Utilities clean water mains, each of which will take three months to complete;
  - permanent diversion of three United Utilities waste sewers, each of which will take three months to complete;
  - permanent diversion of three Electricity NorthWest cables, each of which will take three months to complete; and
  - permanent diversion of an Openreach and Vodafone telecommunications cable, each of which will take three months to complete.

## **Manchester Ship Canal viaduct north main compound**

- 2.3.89 This compound (shown on Volume 2: MA04 Map Book, map CT-05-324, H6) will be used to manage civil engineering works. It will:
- provide main compound support to nine satellite compounds in the Broomedge to Glazebrook area, as illustrated in Figure ;
  - provide one temporary material stockpile immediately to the west of the Proposed Scheme (see Volume 2: MA04 Map Book, map CT-05-325, F5 to H5);
  - provide one temporary material stockpile immediately to the east of the Proposed Scheme (see Volume 2: MA04 Map Book, map CT-05-325, G6 to H8);
  - be accessed from Manchester Road to the east of the Proposed Scheme; and
  - provide temporary worker accommodation for 115 workers, including welfare facilities and parking for three years and six months.
- 2.3.90 A batching plant will be located at this compound for a period of four years and three months.
- 2.3.91 No demolitions will be required as a result of works to be managed from this compound.
- 2.3.92 This compound will be used to manage the construction of the deck of Manchester Ship Canal viaduct, which will take four years to complete.



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- 2.3.93 The A57 Manchester Road will be temporarily realigned for a period of three months to accommodate the construction of Manchester Ship Canal viaduct. This will result in a negligible increase in journey length. On completion of construction the A57 Manchester Road will be reinstated along its existing alignment.
- 2.3.94 The works to be managed from this compound will require the following works to PRow:
- temporary diversion of Footpath Rixton-with-Glazebrook 7 to the west of the area required for construction of the Proposed Scheme for a period of three years and six months, increasing the length of the journey by 219m. On completion of construction, Footpath Rixton-with-Glazebrook 7 will be reinstated along its existing alignment;
  - temporary diversion of Footpath Rixton-with-Glazebrook 8 to the west of the area required for construction of the Proposed Scheme for a period of three years and six months, increasing the length of the journey by 574m. On completion of construction, Footpath Rixton-with-Glazebrook 8 will be reinstated along its existing alignment; and
  - temporary diversion of Footpath Rixton-with-Glazebrook 9 to the east of the area required for construction of the Proposed Scheme for a period of three years and six months, increasing the length of the journey by 161m. On completion of construction, Footpath Rixton-with-Glazebrook 9 will be permanently realigned to avoid the piers of Manchester Ship Canal viaduct and Glazebrook South embankment.
- 2.3.95 The compound will be used to permanently divert an underground Cadent Gas 900mm high pressure gas pipeline, which will take nine months to complete.

## **Glazebrook Railway south satellite compound**

- 2.3.96 This compound (shown on Volume 2: MA04 Map Book, map CT-05-326a, C4) will be used to manage civil engineering works. It will:
- provide one temporary material stockpile immediately to the west of the Proposed Scheme (see Volume 2: MA04 Map Book, map CT-05-326a, A4 to C4); and
  - be accessed from the retained section of Dam Head Lane to the west of the Proposed Scheme.
- 2.3.97 No demolitions will be required as a result of works to be managed from this compound.
- 2.3.98 This compound, along with the Glazebrook Railway north satellite compound, will be used to manage the construction of Glazebrook (Railway) viaduct, which will take two years and nine months to complete.
- 2.3.99 The compound will be used to manage the permanent closure of Dam Head Lane, which will take three months to complete.
- 2.3.100 The works to be managed from this compound will require the following works to PRow:
- temporary diversion of a section of Footpath Rixton-with-Glazebrook 14 to the south of the area required for construction of the Proposed Scheme for a period of three years and six months, increasing the length of journey by 384m. On completion of

construction, Footpath Rixton-with-Glazebrook 14 will be permanently diverted up to 416m south of its existing alignment: and

- construction of a new PRow footpath to connect the retained section of Dam Head Lane with Bank Street, which will pass under Glazebrook (Railway) viaduct. This will take six months to complete.

## **Glazebrook Railway north satellite compound**

- 2.3.101 This compound (shown on Volume 2: MA04 Map Book, map CT-05-326a, D6) will be used to manage civil engineering works. It will:
- provide one temporary material stockpile immediately to the west of the Proposed Scheme (see Volume 2: MA04 Map Book, map CT-05-326a, D5 to H4);
  - provide one temporary material stockpile immediately to the east of the Proposed Scheme (see Volume 2: MA04 Map Book, map CT-05-326a, E5 to H5); and
  - be accessed from the retained section of Dam Head Lane on the east side of the route of the Proposed Scheme.
- 2.3.102 No demolitions will be required as a result of the works to be managed from this compound.
- 2.3.103 This compound, along with the Glazebrook Railway south satellite compound, will be used to manage the construction of Glazebrook (Railway) viaduct, which will take two years and nine months to complete.
- 2.3.104 The compound will be used to manage the construction of Dam Lane railway telecommunications site. The construction of the telecommunications mast foundations and building will take six months to complete.
- 2.3.105 The works to be managed from this compound will involve the following works to utilities:
- permanent diversion of two underground Cadent Gas 200mm-400mm high pressure gas pipelines, which will take nine months to complete;
  - permanent diversion of one underground Cadent Gas 1,050mm high pressure gas pipeline, which will take nine months to complete;
  - permanent diversion of an Openreach telecommunication cable, which will take three months to complete;
  - permanent diversion of two L3 telecommunication cables, each of which will take three months to complete; and
  - permanent diversion of a United Utilities potable water main, which will take six months to complete.

## **M62 West viaduct south satellite compound**

- 2.3.106 This compound will be located within the Risley to Bamfurlong area (MA05). It is described in the Volume 2:Community Area report: Risley to Bamfurlong (MA05). The compound will be

used to manage the construction of the following features in the Broomedge to Glazebrook area:

- Glazebrook South embankment, which will take three years and nine months to complete;
- Glazebrook North embankment, which will take four years to complete; and
- M62 West viaduct, which will take two years and nine months to complete.

## **M62 West viaduct north satellite compound**

2.3.107 This compound will be located within the Risley to Bamfurlong area (MA05). It is described in the Volume 2:Community Area report: Risley to Bamfurlong (MA05).

2.3.108 The compound will be used to manage the construction of M62 West viaduct, within the Broomedge to Glazebrook area. This will take two years and nine months to complete.

## **Construction waste and material resources**

2.3.109 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.

2.3.110 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.

2.3.111 Local excess or shortfall of excavated material within the Broomedge to Glazebrook 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.

2.3.112 Forecasts of the amount of waste generated at temporary worker accommodation sites will be reported in Volume 3, Section 15.

## **Commissioning of the railway**

2.3.113 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**

2.3.114 A construction programme illustrating indicative periods for each of the core construction activities described above is provided in Figure 7.

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**Figure 7: Indicative construction programme between 2025 and 2035**

Broomedge to Glazebrook 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	1	2	3	4
Area advance works (MA04)		█	█	█	█	█	█	█	█	█	█	█	█																																							
<b>Agden Brow satellite compound (MA03)</b>																																																				
Site preparation and setup									█																																											
Heatley South embankment (MA04)													█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█																								
Lymm North embankment																	█	█	█	█	█	█	█	█	█	█	█	█																								
Site reinstatement																																																				
<b>A56 Lymm Road satellite compound (MA03/MA04)</b>																																																				
Site preparation and setup									█																																											
Bridgewater Canal viaduct (MA04)																	█	█	█	█	█	█	█	█	█	█	█	█																								
Agden Lane culvert (MA04)																					█	█																														
Warrington Lane realignment (MA04)																																																				
Site reinstatement																																																				

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<b>Broomedge to Glazebrook area</b>	<b>2025 Quarters</b>	<b>2026 Quarters</b>	<b>2027 Quarters</b>	<b>2028 Quarters</b>	<b>2029 Quarters</b>	<b>2030 Quarters</b>	<b>2031 Quarters</b>	<b>2032 Quarters</b>	<b>2033 Quarters</b>	<b>2034 Quarters</b>	<b>2035 Quarters</b>
<b>Bridgewater Canal satellite compound</b>											
Site preparation and setup											
Little Heatley accommodation access											
Spring Lane underbridge											
Bridgewater Canal viaduct											
Site reinstatement											
<b>Wet Gate Lane satellite compound</b>											
Site preparation and setup											
Wet Gate Lane realignment											
River Bollin West viaduct											
Wet Gate Lane telecommunications site (civil and rail systems works)											
Rail systems - switches and crossings											
Site reinstatement											
<b>River Bollin West Viaduct satellite compound</b>											
Utilities											

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Broomedge to Glazebrook area	2025 Quarters	2026 Quarters	2027 Quarters	2028 Quarters	2029 Quarters	2030 Quarters	2031 Quarters	2032 Quarters	2033 Quarters	2034 Quarters	2035 Quarters
Site preparation and setup											
Footpath Warburton 3 accommodation overbridge											
River Bollin West viaduct											
Site reinstatement											
<b>Warburton Embankment satellite compound</b>											
Site preparation and setup											
Warburton embankment											
Heatley South embankment											
Heatley North embankment											
Warburton cutting											
A6144 Paddock Lane auto-transformer station (rail systems works)											
Rail systems - switches and crossings											
Site reinstatement											
<b>A6144 Paddock Lane satellite compound</b>											
Site preparation and setup											



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Broomeedge to Glazebrook area	2025 Quarters	2026 Quarters	2027 Quarters	2028 Quarters	2029 Quarters	2030 Quarters	2031 Quarters	2032 Quarters	2033 Quarters	2034 Quarters	2035 Quarters
A6144 Paddock Lane overbridge and realignment											
A6144 Paddock Lane auto-transformer station (civil works)											
A6144 Paddock Lane telecommunications site (civil and rail systems works)											
Site reinstatement											
<b>Manchester Ship Canal Viaduct South satellite compound</b>											
Utilities											
Site preparation and setup											
Manchester Ship Canal viaduct											
Site reinstatement											
<b>Manchester Ship Canal Viaduct Central satellite compound</b>											
Site preparation and setup											
Manchester Ship Canal viaduct											
Site reinstatement											

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<b>Broomeedge to Glazebrook area</b>	<b>2025 Quarters</b>	<b>2026 Quarters</b>	<b>2027 Quarters</b>	<b>2028 Quarters</b>	<b>2029 Quarters</b>	<b>2030 Quarters</b>	<b>2031 Quarters</b>	<b>2032 Quarters</b>	<b>2033 Quarters</b>	<b>2034 Quarters</b>	<b>2035 Quarters</b>
<b>Manchester Ship Canal Viaduct North main compound</b>											
Site preparation and setup											
Manchester Ship Canal viaduct											
Site reinstatement											
<b>Glazebrook Railway South satellite compound</b>											
Site preparation and setup											
Glazebrook (Railway) viaduct											
Dam Head Lane realignment											
Site reinstatement											
<b>Glazebrook Railway North satellite compound</b>											
Site preparation and setup											
Glazebrook (Railway) viaduct											
Dam Lane telecommunications site (civil and rail systems works)											

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Broomedge to Glazebrook area	2025 Quarters	2026 Quarters	2027 Quarters	2028 Quarters	2029 Quarters	2030 Quarters	2031 Quarters	2032 Quarters	2033 Quarters	2034 Quarters	2035 Quarters
Site reinstatement											
<b>M62 West Viaduct South satellite compound (MA05)</b>											
Site preparation and setup											
Glazebrook South embankment											
Glazebrook North embankment											
M62 West viaduct											
Site reinstatement											
<b>M62 West Viaduct North satellite compound (MA05)</b>											
Site preparation and setup											
M62 West viaduct											
Site reinstatement											
<b>Track laying and testing and commissioning</b>											
Area track laying											
Testing and commissioning											

## Monitoring during construction

- 2.3.115 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.
- 2.3.116 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 Broomedge to Glazebrook 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 up to three trains per hour each way passing through the Broomedge to Glazebrook area. Services are expected to operate between 05:00 and midnight from Monday to Saturday and between 08:00 and midnight on Sunday.
- 2.4.3 In this area, trains will run at speeds of 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

- 2.4.4 Volume 1, Section 4 describes the maintenance regime for the Proposed Scheme.
- 2.4.5 Provision for railway maintenance vehicles will be made at the 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

- 2.4.6 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.

2.4.7 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**

2.4.8 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.

2.4.9 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**

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 Broomedge to Glazebrook area are reported in Volume 5:

- route alignment over Manchester Ship Canal viaduct; and
- M62 West viaduct.

## **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 Broomedge to Glazebrook 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 to the EIA SMR. A revised EIA SMR was published in October 2018 (the 2018 SMR) as part of the working draft ES (described in the following section).



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 SMR.

## 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 Broomedge to Glazebrook area, an event was held at Hollins Green (November 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 Broomedge to Glazebrook area included commentary on:
- impact of construction traffic on local highways in and around Hollins Green, Mossbrow and Warburton, particularly along Dam Lane, Bank Street, Dam Head Lane and the A6144 Paddock Lane, as well as temporary and permanent highway diversions;
  - access to public rights of way (PRoW) both during construction and operation, particularly during construction in and around the Manchester Ship Canal viaduct north main construction compound in Hollins Green;
  - proximity of the Proposed Scheme to Hollinfare Cemetery and impact on its setting and tranquillity;
  - impact on local businesses, including the Black Swan public house at Hollins Green and the Saracens Head public house at Warburton;
  - potential impacts on navigation and shipping on the Manchester Ship Canal;
  - noise, visual and landscape impacts due to the height of the Proposed Scheme approaching and crossing the Manchester Ship Canal and its proximity to Hollins Green;
  - location of both main and satellite construction compounds within, and close to, the local communities of Hollins Green, Warburton and Mossbrow, and associated noise, air quality, visual and traffic impacts; and
  - impact on local service provisions (including local public transport) associated with the construction compounds (including the Manchester Ship Canal viaduct north main compound and the A6144 Paddock Lane satellite compound) close to Hollins Green,

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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*.

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

Warburton and Mossbrow. Previous development schemes in and around the local area, such as the A556 Knutsford to Bowdon improvement scheme, have required a temporary reduction in services including restricted school bus routing.

- 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 Broomedge to Glazebrook area.

## Consultation on design refinements

- 3.2.9 There were no route refinements consulted on in the Broomedge to Glazebrook area, although the Proposed Scheme's design and mitigation has continued to evolve, taking in to account ongoing assessment and stakeholder feedback. Further detail on the approach to consultation and route-wide engagement is outlined in Volume 1, Section 3.

## 3.3 Engagement and consultation with stakeholder groups

### Communities

- 3.3.1 Community stakeholders in the Broomedge to Glazebrook 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

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

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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, organisation 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 2 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.

**Table 2: Engagement to date with community stakeholders**

Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Friends of Carrington Moss	Meeting to discuss the Proposed Scheme and understand potential impacts, particularly in relation to concerns regarding the impacts of construction traffic on the A6144 Warburton Lane.	Information has been used to improve understanding of baseline conditions, inform the community assessment and provide an opportunity to consider any mitigation that may be required.
Friends of Hollinfares Cemetery	Meeting to discuss the Proposed Scheme and understand potential impacts, particularly regarding proximity to and impacts on Hollinfares Cemetery in Hollins Green.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required. In response to local engagement in and around Hollins Green, the Proposed Scheme in this location has been refined and realigned by 70m further east, increasing the distance between the route of the Proposed Scheme and Hollinfares Cemetery.
Hollins Green HS2 Action Group	To inform the group of the Proposed Scheme and the consultation process, collate local data and understand members' areas of interest and concern. This included concerns over the impacts of construction traffic, construction compounds and wider transport facilities, including understanding impacts to the community from the temporary realignment of the A57 Manchester Road.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required. In response to local engagement in and around Hollins Green, the Proposed Scheme in this location has been revised to address some of the issues raised by local stakeholders. This has included a realignment of the Proposed Scheme by 70m to the east and further from the community of Hollins Green and the inclusion of a new PRoW to maintain non-motorised user access along Dam Head Lane.
Lymm Cruising Club and Bridgewater Canal Trust	Meeting to inform the group of the Proposed Scheme and consultation activities. The meeting also provided an opportunity to understand areas of interest and collate local information.	Information has been used to improve understanding of baseline conditions, inform the community assessment and provide an opportunity to consider any mitigation that may be required.

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Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Lymm High School	Interactive workshop on the Proposed Scheme and to discuss opportunities it may provide for younger people, as well as provide an update on consultation activities. Discussions were also held around accessibility, catchment areas and school activities.	Information has been used to improve understanding of baseline conditions, inform the community assessment and provide an opportunity to consider any mitigation that may be required, as well as identify any educational opportunities.
Lymm Library	Meeting to discuss the Proposed Scheme and provide an update on consultation activities.	Information used to improve understanding and inform assessment of baseline conditions and any mitigation that may be required.
Lymm Marina	Meeting to inform the group of the Proposed Scheme and consultation activities.	Information has been used to improve understanding of baseline conditions, inform the community assessment and provide an opportunity to consider any mitigation that may be required.
Rixton-with-Glazebrook Action Group	To inform the group of the Proposed Scheme and the consultation process, collate local data and understand their areas of interest and concern. This included concerns over the proximity of the Proposed Scheme to Hollinfare Cemetery, and the impacts of construction traffic, construction compounds and the local transport network in and around Hollins Green.	Information used to improve understanding of baseline conditions, inform the assessment of the Proposed Scheme and provide an opportunity to consider mitigation that may be required. In response to local engagement in and around Hollins Green, the Proposed Scheme in this location has been revised to address some of the issues raised by local stakeholders. This has included a realignment of the Proposed Scheme by 70m to the east and further from the community of Hollins Green and the inclusion of a new PRoW to maintain non-motorised user access along Dam Head Lane.
Rixton Methodist Church	Meeting to inform the group on the Proposed Scheme and consultation activities. The meeting also provided an opportunity to understand areas of interest, collate local information and understand perspectives on community engagement with faith groups.	Information has been used to improve understanding of baseline conditions, inform the community assessment and provide an opportunity to consider any mitigation that may be required.
Rixton-with-Glazebrook Community Hall	Meeting to inform the group on the Proposed Scheme and consultation activities. The meeting also provided an opportunity understand areas of interest, collate local information and understand perspectives on community engagement with vulnerable groups.	Information has been used to improve understanding of baseline conditions, inform the community assessment and provide an opportunity to consider any mitigation that may be required.
Scouts of Croft and Hollins Green	Meeting to discuss the Proposed Scheme, discuss opportunities it may provide for younger people and provide an update on consultation activities.	Information has been used to improve understanding of baseline conditions, inform the community assessment and provide an opportunity to consider any mitigation that may be required.

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Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
St Helens Church of England (Hollinfare)	Meeting to inform the group on the Proposed Scheme and consultation activities. The meeting also provided an opportunity to inform the EQIA through an understanding of their areas of interest, collate local information and understand perspectives on community engagement with faith groups.	Information has been used to improve understanding of baseline conditions, inform the community assessment and provide an opportunity to consider any mitigation that may be required.
Warrington Ethnic Communities Association	Meeting to inform the group on the Proposed Scheme and consultation activities. This also provided an opportunity to understand members' areas of interest, collate local information and understand perspectives on engagement with ethnic community groups.	Information has been used to improve understanding of baseline conditions, inform the community assessment and provide an opportunity to consider any mitigation that may be required.
Warrington Islamic Association	Meeting to provide an update on the Proposed Scheme and consultation activities. This also provided an opportunity to understand potential impacts on the local Islamic community and particularly patterns of movement within the congregation.	Information has been used to improve understanding of baseline conditions, inform the community assessment and provide an opportunity to consider any mitigation that may be required.
Warrington Youth Club	Meeting to inform the group on the Proposed Scheme and consultation activities. The meeting also provided an opportunity to understand members' areas of interest, collate local information and understand perspectives on community engagement with vulnerable groups.	Information has been used to improve understanding of baseline conditions, inform the community assessment and provide an opportunity to consider any mitigation that may be required.
Warrington Voluntary Action Group	Meeting to inform the group on the Proposed Scheme and consultation activities. The meeting also provided an opportunity to understand members' areas of interest, collate local information and understand perspectives on community engagement with vulnerable groups.	Information has been used to improve understanding of baseline conditions, inform the community assessment and provide an opportunity to consider any mitigation that may be required.
Woolston Learning Village	To provide an update on the Proposed Scheme, including discussions with three schools with a Special Educational Needs base covering the area of Warrington (Green Lane, Woolston Brook and Fox Wood). Discussion held regarding construction traffic, highway realignments, catchment areas and school activities.	Information has been used to improve understanding of baseline conditions, inform the community assessment 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 borough, district and parish councils within the Broomedge to Glazebrook 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 3 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 3: Engagement to date with MPs, local authorities and parish councils**

Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Andy Carter, MP for Warrington South	Engagement to discuss the Proposed Scheme, seek feedback on areas of concern and interest, including concerns raised by local stakeholders, the Golborne Link and interface with HS2 as part of the Integrated Rail Plan.	Feedback has been used to improve understanding of key areas of local interest and provide opportunity for further discussion.
Charlotte Nichols, MP for Warrington North	Engagement to discuss the Proposed Scheme and seek feedback on areas of local interest, including concerns raised by a local constituent.	Feedback has been used to improve understanding of key areas of local interest and provide opportunity for further discussion.
Faisal Rashid, former MP for Warrington South	Engagement has taken place via Nusrat Ghani who served as Parliamentary Under-Secretary of State at the Department for Transport. regarding the Golborne Link.	Information used to gather feedback on the Proposed Scheme.
Helen Jones, former MP for Warrington North	Feedback has been received through constituent letters, particularly regarding impacts at Hollins Green, and via debate in Westminster Hall and engagement with Nusrat Ghani who served as Parliamentary Under-Secretary of State at the Department for Transport.	Information used to gather feedback on the Proposed Scheme.
Kate Green, MP for Stretford and Urmston	Engagement to discuss the Proposed Scheme with a particular focus on impacts relating to Carrington Moss.	Feedback has been used to improve understanding of key areas of local interest and provide opportunity for further discussion.

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Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Salford City Council	Meetings to provide information on the Proposed Scheme with a particular focus on wider impacts on highways and traffic and transport.	Information used to improve understanding of baseline conditions and inform the assessment of the Proposed Scheme, as well as provide an opportunity to consider any mitigation that may be required.
Trafford Metropolitan Borough Council	Series of meetings to discuss the Proposed Scheme and consultation activities, collate local information and understand areas of interest and concern. Key discussion points included impacts on the local highways network around Warburton and Mossbrow, landscape and visual impacts associated with the crossing of the Manchester Ship Canal and PRow access throughout the area.	Information used to improve understanding of baseline conditions and inform the assessment of the Proposed Scheme, as well as provide an opportunity to consider any mitigation that may be required.
Transport for Greater Manchester (TfGM)	Meetings to discuss the Proposed Scheme and consultation activities, collate local information and understand areas of interest and concern.	Information used to improve understanding of baseline conditions and inform the assessment of the Proposed Scheme, as well as provide an opportunity to consider any mitigation that may be required.
Warrington Borough Council	Series of meetings held to provide information on the Proposed Scheme, the proposed engagement and consultation activities and to gather any feedback and local concerns. Key discussion points included revisions to the local highways network around Hollins Green, landscape and visual impacts associated with the crossing of the Manchester Ship Canal and PRow access throughout the area. Meetings have also included specific briefings for Members, particularly in relation to traffic issues in and around Lymm.	Information used to improve understanding of baseline conditions and inform the assessment of the Proposed Scheme, as well as provide an opportunity to consider any mitigation that may be required. In response to local engagement in and around Hollins Green, the Proposed Scheme in this location has been revised to address some of the issues raised by local stakeholders. This has included a realignment of the Proposed Scheme by 70m to the east and further from the community of Hollins Green and the inclusion of a new PRow at Glazebrook to maintain non-motorised user access along Dam Head Lane.
Lymm Parish Council	Series of meetings to discuss the Proposed Scheme, provide an update on consultation activities and support at drop-in sessions, and gather any feedback and concerns. A drop-in session was also facilitated at the request of Lymm Parish Council.	Information used to improve understanding of baseline conditions and inform the assessment of the Proposed Scheme, as well as provide an opportunity to consider any mitigation that may be required.
Partington Parish Council	Meeting to discuss the Proposed Scheme, provide an update on consultation activities and collate local information and understand areas of interest and concern.	Information used to improve understanding of baseline conditions and inform the assessment of the Proposed Scheme, as well as provide an opportunity to consider any mitigation that may be required.



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Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Rixton-with-Glazebrook 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 location of construction compounds, construction traffic and the impacts on the local highways network, impacts on Hollinfare Cemetery and the proximity of the Proposed Scheme to Hollins Green.	Information used to improve understanding of baseline conditions, inform the assessment of the Proposed Scheme and provide an opportunity to consider any mitigation that may be required. In response to local engagement in and around Hollins Green, the Proposed Scheme in this location has been revised to address some of the issues raised by local stakeholders. This has included a realignment of the Proposed Scheme by 70m to the east and further from the community of Hollins Green and the inclusion of a new PRoW at Glazebrook to maintain non-motorised user access along Dam Head Lane.
Warburton Parish Council and residents' group	Meetings to provide an update on the Proposed Scheme and consultation activities, gather information on the baseline conditions and collate local information and understand areas of interest and concern.	Information used to improve understanding of baseline conditions and inform the assessment of the Proposed Scheme, as well as provide an opportunity to consider any mitigation that may be required.
Winwick Parish Council	Meeting to discuss the Proposed Scheme, provide an update on consultation activities and collate local information and understand areas of interest and concern.	Information used to improve understanding of baseline conditions and inform the assessment of the Proposed Scheme, as well as provide an opportunity to consider any mitigation that may be required.

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. This includes engagement with statutory bodies, local authorities and utility companies operational within the Broomedge to Glazebrook area.

3.3.11 Engagement with statutory bodies, local authorities and utility companies within the Broomedge to Glazebrook 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.

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

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- 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 4 includes engagement undertaken with technical and specialist groups and how this has informed the design and assessment of the Proposed Scheme in the Broomedge to Glazebrook area.

**Table 4: 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, ecological and 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.
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.

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Type	Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
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 works by Highways England, including junctions along the M6, M62 and M60.
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.
Statutory and national	National Farmers Union	Farming issues	Information has been used to improve understanding of route-wide issues for farmers and growers.
Statutory and national	Country Land and Business Association	Farming issues	Information has been 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, particularly in regard to National Trust owned land and estate in and around Dunham Massey.
Statutory and national	Natural England	Ecology, agricultural land quality, surface water, groundwater and landscape and visual related issues	Provided 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 at Rixton Clay Pits Special Area of Conservation (SAC) and Site of Specific Scientific Interest (SSSI) and Local Wildlife Site (LWS).
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.

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Type	Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Statutory and national	The Woodland Trust	Woodland and ancient woodland issues	Information has been 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 (NPR)	Discussions around integration of HS2 with NPR including, where necessary, passive provisions in the Proposed Scheme.
Local Authority technical meetings	Greater Manchester Combined Authority	Meeting with technical leads to collate data and discuss the socio-economic environment assessment.	Informed understanding of local baseline conditions and the design and assessment of the Proposed Scheme.
Local Authority technical meetings	Salford City Council	Meetings with technical leads to collate data and discuss the air quality assessment.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
Local Authority technical meetings	Salford City 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. Obtained information to improve understanding of baseline conditions.
Local Authority technical meetings	Salford City 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	Meetings to discuss the air quality and sound, noise and vibration assessment including proposed mitigation.	Information on local conditions and factors used to refine the scheme design and assessment including issues surrounding Manchester Ship Canal viaduct and proposed mitigation.
Local Authority technical meetings	Trafford Metropolitan Borough Council	Meetings with technical leads to collate data and discuss the historic environment assessment.	Information on local conditions and factors used to refine the design of the Proposed Scheme and assessment.
Local Authority technical meetings	Trafford Metropolitan Borough Council	Meeting to discuss known and potential contaminated land, proposed assessment and mitigation measures for land quality.	Identified local areas of land contamination, potential impacts and proposed mitigation.

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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	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. Obtained 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	Trafford Metropolitan Borough Council	Meeting with technical leads to collate data and discuss the socio-economic environment assessment.	Informed understanding of local baseline conditions and the design and assessment of the Proposed Scheme.
Local Authority technical meetings	Trafford Metropolitan Borough 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.	Informed understanding of local infrastructure and baseline conditions, including flood risks, assessment, and proposed mitigation.
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 Authority technical meetings	Warrington Borough Council	Meeting to discuss the air quality and sound, noise and vibration assessment including proposed mitigation.	Information on local conditions and factors used to refine the scheme design and assessment including issues surrounding Manchester Ship Canal viaduct and proposed mitigation around Hollins Green.
Local Authority technical meetings	Warrington Borough Council	Meetings with technical leads to collate data and discuss the historic environment assessment.	Information on local conditions and factors used to refine the design of the Proposed Scheme and assessment.
Local Authority technical meetings	Warrington Borough Council	Meeting to discuss known and potential contaminated land, proposed assessment and mitigation measures for land quality.	Identified local areas of land contamination, potential impacts and proposed mitigation.

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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	Warrington 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. Obtained information to improve understanding of baseline conditions.
Local Authority technical meetings	Warrington Borough Council	Meeting to collate baseline data on socio-economic characteristics.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
Local Authority technical meetings	Warrington 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	Warrington Borough 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.
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	Meetings 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.	Identified sensitive ecological sites and appropriate mitigation and compensation for habitat loss associated with the Proposed Scheme.
Local technical specialist group	Lancashire Wildlife Trust	Meetings 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.	Identified sensitive ecological sites and appropriate mitigation and compensation for habitat loss associated with the Proposed Scheme.
Local technical specialist group	Greater Manchester Archaeological Advisory Service	Meeting 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 Local Records Centre	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 and decommissioning of existing Cadent high pressure gas pipeline at several locations such as Holcroft Moss, Bridgewater Canal viaduct, Manchester Ship Canal viaduct, Wet Gate Lane realignment, the A6144 Manchester Road, and Warrington Lane realignment.
Utilities	Electricity Northwest Limited	Network provision of electricity	Informed considerations relating to the utilities network and factors to be considered in the design and assessment of the Proposed Scheme including Bridgewater Canal viaduct, Manchester Ship Canal viaduct, Wet Gate Lane realignment, and Warrington Lane realignment. Discussions were held regarding the telecommunications supply to satellite compounds at the Bridgewater Canal and Wet Gate Lane satellite compound and the diversion and decommissioning of the existing high-pressure gas pipeline crossings at several locations including at the Bridgewater Canal close to Spring Lane, Dam Head Lane closure and Warburton embankment satellite compound.
Utilities	ESSAR	Network provision of fuel	Informed considerations relating to the utilities network and factors to be considered in the design and assessment of the Proposed Scheme including the diversion of existing fuel pipelines close to the Wet Gate Lane satellite compound.
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 existing Level 3 assets at the Dam Lane telecommunications site, and the proposed A57 Manchester Road temporary realignment.
Utilities	National Grid	Network provision of electricity and gas	Informed route-wide considerations relating to the utilities network and factors to be considered in the design and assessment of the Proposed Scheme on the existing National Grid high pressure gas pipeline at Mossbrow.



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Type	Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Utilities	Openreach	Network provision of telecommunications services	Identified telecommunication services and informed understanding of potential impacts of the Proposed Scheme and mitigation requirements for Openreach assets at a number of locations including Bridgewater Canal viaduct, Wet Gate Lane realignment, and Warrington Lane realignment as well as supply of telecommunication services to Dam Lane telecommunication site, Bridgewater Canal satellite compound and Wet Gate Lane satellite compound.
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 at several locations including Bridgewater Canal viaduct, Wet Gate Lane realignment and Warrington Lane realignment. Discussions were also held regarding the provision of electricity supply to satellite compounds at Mossbrow, Glazebrook, Manchester Ship Canal, and River Bollin West viaduct, as well as the proposed diversion of the existing 132kV overhead line at Wet Gate Lane, and Manchester Ship Canal viaduct.
Utilities	United Utilities	Network provision of water and wastewater services	Informed considerations relating to the utilities network and factors to be considered in the design and assessment of the Proposed Scheme, as well as mitigation requirements. This included the provision of potable water and sewerage services to the Dam Lane telecommunications site, Bridgewater Canal satellite compound and Wet Gate Lane satellite compound, as well as understanding impacts on assets at Bridgewater Canal viaduct, Wet Gate Lane realignment, and Warrington Lane realignment.
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 Virgin Media assets at several locations including Dam Lane telecommunications site, and the A57 Manchester Road temporary realignment.
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 Vodafone assets at several locations including Dam Lane telecommunications site, and the A57 Manchester Road temporary realignment.

- 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 Proposed 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 Broomedge to Glazebrook 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 likely long-term viability of the farm holdings, holding severance, access to severed land parcels, impacts on land drainage and additional land requirements for ecological, landscape and other mitigation.
- 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 Broomedge to Glazebrook 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 Broomedge to Glazebrook area including Black Swan public house, Bridgewater Canal Company, Moss Brow farm shop, Peel Ports, Saracens Head public house and The Beeches. 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 been:
- land requirements and impacts on property and business viability;
  - highways and traffic impacts, including the A57 Manchester Road, Dam Head Lane and the A6144 Paddock Lane, both during the construction and operational phases of the Proposed Scheme;
  - technical requirements relating to the crossing of the Manchester Ship Canal (owned by Peel Ports) including the potential to impact on use of the canal during both the construction and operational phases of the Proposed Scheme; and
  - impacts on the operational activities of the Bridgewater Canal as a result of the Bridgewater Canal viaduct.
- 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 Broomedge to Glazebrook 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-001-0MA04 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: MA04 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.

- 4.2.3 The quality of agricultural land in England and Wales is assessed according to the Agricultural Land Classification (ALC) 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 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 Broomedge to Glazebrook 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 Broomedge to Glazebrook area is provided in Volume 5: Appendix AG-001-0MA04, 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>12</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 Glaciofluvial deposits comprising sand and gravel are present intermittently within the study area around Heatley and Hollins Green. Where this parent material is seasonally waterlogged by a fluctuating groundwater table, it produces soils in the Blackwood association. Where these deposits form gently undulating or hummocky ground, shallow, well-drained, and acidic soils in the Crannymoor association are found.
- 4.3.4 Alluvial deposits comprising variable proportions of clay, sand and gravel underlie the parts of the study area within the vicinity of streams and rivers. Alluvium is present in the area associated with the River Bollin and the former alignment of the River Mersey, which has been canalised as the Manchester Ship Canal, around Heatley and Hollins Green respectively. This parent material gives rise to deep, stoneless silty clay and clay soils in the Conway association.
- 4.3.5 There is reddish glacial till in the southern section of the study area to the south of the A56 Higher Lane and around the Helmsdale Brook, and to the north of the study area around the Glaze Brook and south-west of Glazebrook Moss. This parent material gives rise to clay loam over clay soils in the Salop association.
- 4.3.6 An area of peat forms Glazebrook Moss at the northern end of the study area. This parent material gives rise to deep, peat soil in the Turbary Moor association.

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<sup>12</sup> British Geological Survey (2011), *Soil Parent Material Model*. Available online at: [Soil Parent Material Model - British Geological Survey \(bgs.ac.uk\)](https://www.bgs.ac.uk/soil-parent-material-model/).

## Topography and drainage

- 4.3.7 In the south of the study area, the land dips over a gentle slope (approximately two degrees) from the Bridgwater Canal, at an elevation of 28m above Ordnance Datum (AOD), to the River Bollin at 16m AOD. To the north of the River Bollin, there is a gentle incline (approximately two degrees) to higher ground at Warburton Lane at 21m AOD. From Warburton Lane, the land along the route of the Proposed Scheme is broadly level at 20m AOD until Warburton Park, where the land dips gently (approximately two degrees) to the Manchester Ship Canal at 16m AOD. To the north of the Manchester Ship Canal, the land rises up a gentle slope (approximately two degrees) to higher ground at the A57 Manchester Road at 21m AOD. The land over the remainder of the study area gently rises and falls between elevations of 21m and 23m AOD.
- 4.3.8 Flood risk is potentially limiting to agricultural land quality within the study area in the floodplain of the River Bollin, Red Brook and Glaze Brook. The land in these floodplains is classed as predominantly Flood Zone 3, 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

- 4.3.9 The broad characteristics of the soils present in the study area are described by the Soil Survey of England and Wales<sup>13</sup> and their general distribution is shown on the National Soil Map<sup>14</sup> which is replicated in Volume 5, Agriculture, forestry and soils (Map AG-02-104 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-001-0MA04.
- 4.3.10 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.
- 4.3.11 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. The detailed surveys and existing survey records have identified five soil or groups of associations within this study area.
- 4.3.12 The most prevalent group, comprising deep, permeable sandy and sandy loam soils in the Blackwood association, are found across the whole study area. They 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 WC IV). These soils experience fluctuating

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<sup>13</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>14</sup> Cranfield University (2001), *The National Soil Map of England and Wales 1:250,000 scale*, Cranfield University: National Soil Resources Institute.



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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 next most prevalent group comprises very acidic and well drained (WC I) sandy soils in the Crannymoor association. This association is found south of the Manchester Ship Canal and is developed in glaciofluvial sands and gravels. These soils are slightly to moderately droughty for most arable crops and very droughty for grass.
- 4.3.14 The next most prevalent group comprises slowly permeable and seasonally waterlogged clay loams over clay soils (WC III to IV) in the Salop association. These soils occur in the north of the study area near Glazebrook and are developed in reddish glacial deposits, i.e., till and glaciofluvial sand and gravel deposits.
- 4.3.15 The next most prevalent group comprises deep, earthy peat soils of the Turbary Moor association located between Glazebrook Moss and the M62 motorway. If these soils are improved for arable crops, usually with the use of pumped ditches combined with field drains, they are well drained (WC I). Wetness class will vary depending on the level of the water-table and duration of waterlogging during the winter months. These peat soils hold large amounts of water available for crops.
- 4.3.16 The least prevalent group comprises deep, stoneless, fine silty soils in the Conway association developed in alluvium in the floodplains of the River Bollin and adjacent to the River Mersey/Manchester Ship Canal. These soils are usually greyish brown or grey and are affected by high groundwater. They are waterlogged for long periods during the winter (WC IV).
- 4.3.17 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.
- 4.3.18 The soils in this study area are predominantly of low sensitivity due to high sand fractions where FCD are between 196 and 204 days. Soils of this sensitivity category make up approximately 110ha (48%) of the study area.
- 4.3.19 Peaty, clayey and seasonally waterlogged soils (including Turbary Moor, Salop and Conway associations) are found in the north of the area, to the south-west of Glazebrook and make up approximately 41ha (18%) of the study area. These soils are of high sensitivity due to peat or high silt fractions/heavy textured soils where FCD are between 196 and 204 days per annum.

## Soil and land use interactions

### Agricultural land quality

- 4.3.20 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.
- 4.3.21 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.
- 4.3.22 Local agro-climatic data have been interpolated from the Meteorological Office's standard 5km grid point dataset<sup>15</sup> for three points within the study area and are set out in Volume 5: Appendix AG-001-0MA04. The data show climate in the area to be cool and moist. The number of FCD when the moisture deficit<sup>16</sup> is zero, ranges from 196 to 204 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.
- 4.3.23 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.
- 4.3.24 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.
- 4.3.25 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.
- 4.3.26 The most prevalent group of soil associations comprises seasonally waterlogged (WC III and IV), coarse-textured soil profiles in the Blackwood association. The quality of agricultural land

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<sup>15</sup> Meteorological Office (1989), *Gridpoint Meteorological data for Agricultural Land Classification of England and Wales and other Climatological Investigations*.

<sup>16</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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is limited by soil wetness to Grade 2 where the subsoil is seasonally waterlogged (WC III). Where the subsoil is waterlogged for long periods over the winter (WC IV), the land is limited by soil wetness to Subgrade 3a. Where the agricultural land with Blackwood soils is drained (WC I and WC II), it is limited by soil droughtiness to Grade 2 or Subgrade 3a. Survey data has confirmed that sandy loam topsoils over loamy sand subsoils near Heatley and Cadishead are a mixture of Grade 2 and Subgrade 3a.

- 4.3.27 The next most prevalent group comprises very acidic and well drained (WC I) sandy soils in the Crannymoor association. Agricultural land quality is mainly limited by soil droughtiness during the summer to Grade 2 or Subgrade 3a, with some Subgrade 3b where factors such as stone content make droughtiness more pronounced. Survey data in Volume 5: Appendix AG-001-0MA04 has confirmed that Crannymoor soils at Warburton Park are classified as mainly Grade 2.
- 4.3.28 The next most prevalent group comprising clay loam over clay soils in the Salop association are slowly permeable and seasonally waterlogged for long periods during the winter (WC IV). Agricultural land quality is limited mainly by soil wetness to mainly Subgrade 3a or Subgrade 3b, with Grade 4 where the topsoil is heavy clay loam over clay subsoil which is waterlogged for long periods over the winter (WC IV). Survey data has confirmed that Salop soils at Glazebrook is a mixture of Grades, including Subgrade 3a and Subgrade 3b.
- 4.3.29 The next most prevalent group comprises deep earthy peat soil of the Turbary Moor association. Wetness class varies depending on the level of the water-table and duration of waterlogging during the winter months. Ministry of Agriculture, Fisheries and Food (MAFF) detailed ALC at Chat Moss, approximately 1km to the north-east of the study area, has determined that agricultural land with peaty Turbary Moor soils is Grade 1 (see Volume 5: Appendix AG-001-0MA04). Survey data confirms that Turbary Moor soils at Church Farm, north east of Glazebrook, are classified mainly as Grade 1.
- 4.3.30 The least prevalent group comprises deep, stoneless, fine silty soils in the Conway association. The quality of agricultural land is limited by soil wetness to mainly Subgrade 3b. Survey data confirms that the Conway soils at Mossbrow is mainly Subgrade 3b.
- 4.3.31 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>17</sup> shows that there is a high likelihood of encountering BMV agricultural land in the locality, which makes such land a resource of low sensitivity in this study area.
- 4.3.32 The distribution of agricultural land quality in the study area is shown in Table 5, described in more detail in Volume 5: AG-001-0MA04 and shown on Map AG-04-113b to Map AG-04-115a (Volume 5, Agriculture, forestry and soils Map Book).

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<sup>17</sup> Department for Environment, Food and Rural Affairs (2005), *Likelihood of Best and Most Versatile Agricultural Land*.

**Table 5: 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	14.8	6.5
Grade 2	144.0	62.8
Subgrade 3a	34.3	15.0
<b>BMV subtotal</b>	<b>193.1</b>	<b>84.3</b>
Subgrade 3b	31.0	13.5
Grade 4	5.0	2.2
Grade 5	0.0	0
<b>Total agricultural land</b>	<b>229.1</b>	<b>100</b>

## Other soil interactions

- 4.3.33 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>18</sup> and the Government's White Paper, *The Natural Choice: securing the value of nature*<sup>19</sup> and reinforced in the policies set out in the 25 year Environment Plan<sup>20</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;
  - the provision of raw materials; and
  - the provision of a platform for human activities, such as construction and recreation.
- 4.3.34 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.
- 4.3.35 The floodplains of the River Bollin, Red Brook and Glaze 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 function as water stores for flood attenuation, as well as providing ecological habitat as reported in Section 7, Ecology and biodiversity.

<sup>18</sup> Department for Environment, Food and Rural Affairs (2009), *Soil Strategy for England*.

<sup>19</sup> HM Government (2011), *The Natural Choice: securing the value of nature*.

<sup>20</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>.

## Land use

### Land use description

- 4.3.36 Agricultural land use in this study area is predominantly arable, although some grassland with beef cattle and sheep is also present. Around Glazebrook, some smaller equestrian holdings are also to be found.
- 4.3.37 Woodland is limited to small parcels across the study area. Part of an ancient semi-natural woodland is located within land required for the construction of the Proposed Scheme at Coroners Wood, near Partington to the south of Glazebrook. A full description of all woodland habitats in the Broomedge to Glazebrook area is set out in Section 7, Ecology and biodiversity.
- 4.3.38 No areas of commercial forestry land have been identified in this study area. As such, no further assessment has been made of the effects on commercial forestry.
- 4.3.39 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. The three holdings that have land entered into an agri-environment scheme are identified in Table 6. These schemes are under review following the introduction of the Agriculture Act 2020<sup>21</sup>.

### Number, type and size of holdings

- 4.3.40 Table 6 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 91% 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.
- 4.3.41 Arable farming predominates in the Broomedge to Glazebrook area and is a reflection of the higher quality of the agricultural land. Holdings range in size from approximately 2ha to 600ha, with a number of holdings renting additional land in the wider area. The boundaries of the holdings are shown on Maps AG-01-312b to AG-01-314a (Volume 5, Agriculture, forestry and soils Map Book) along with the location of the main farm buildings. Field drainage is widely installed throughout the study area.

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<sup>21</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>.

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4.3.42 Table 6 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-01-312b to AG-01-314a (Volume 5, Agriculture, forestry and soils Map Book) and Volume 5: Appendix AG-001-0MA04.

**Table 6: Summary characteristics of holdings**

Holding reference/name	Holding type	Holding size (ha)	Diversification	Agri-environment scheme	Sensitivity to change
MA04/1 Agden Lane Farm*	Arable	2.4	Not known	None	Low
MA04/2 Land at Rose Cottage	Grassland	1.7	Not known	None	Low
MA04/3 Wet Gate Lane Farm	Arable, beef cattle and a livery stable business	40	Caravan storage	None	Medium
MA04/4 Heatley Heath Farm	Equestrian livery	4.3	None	None	Medium
MA04/5 Wet Gate Farm	Arable and grassland	100	None	None	Medium
MA04/6 Lower Carr Green Farm	Arable and beef cattle	32	None	None	Medium
MA04/7 Moss Brow Farm	Mixed holding and vegetables and free-range hens to service the farm shop	83	Farm shop and phone mast	ELS	Medium
MA04/8 Yew Tree House Farm	Arable and grassland holding	263	None	ELS	Medium
MA04/9 Land at Moss Brow	Arable and grassland	49	None	None	Medium
MA04/10 Land at Warburton Lane*	Grassland	0.7	Not known	None	Low
MA04/11	Grassland	0.6	Not known	None	Low

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Holding reference/name	Holding type	Holding size (ha)	Diversification	Agri-environment scheme	Sensitivity to change
Land at Partington*					
MA04/12 Millbank Hall Farm	Grassland	5.0	None	None	Low
MA04/13 Mount Pleasant Farm	Arable	18	None	None	Medium
MA04/14 Bridge Farm	Arable with horticultural glasshouses	97	None	None	Glasshouses high Land medium
MA04/15 Southwall Hall Farm	Arable	546	Agricultural contracting	None	Medium
MA04/16 Rixton New Hall Farm	Arable and beef cattle	119	None	None	Medium
MA04/17 Brush Farm, Rixton	Arable	55	Land let for shoot	None	Medium
MA04/18 Moss Farm, Glazebrook	Grassland holding	3.0	None	None	Low
MA04/19 Hole Mill Farm*	Arable	62	Not known	None	Medium
MA04/20 Church Farm	Equestrian livery	12	Riding for the disabled	None	Medium
MA04/21 Land at Moss Lane*	Grassland	7.0	Not known	None	Medium
MA04/22 Holcroft Hall Farm	Arable and sheep	607	None	Mid-tier CSS	Medium
MA04/23 Beechfield Farm	Arable and equestrian	23	Livery and agricultural engineering	None	Medium

\* 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)

4.3.43 Volume 5: Appendix CT-004-00000 provides details of the developments in the Broomedge to Glazebrook area that are assumed to have been implemented by 2025.



4.3.44 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)**

4.3.45 Volume 5: Appendix CT-004-00000 provides details of the developments in the Broomedge to Glazebrook area that are assumed to have been implemented by 2038.

4.3.46 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:

- realignment of the public highways at Spring Lane and Wet Gate Lane thus mitigating severance of Wet Gate Lane Farm (MA04/3) (CT-06-323 in the Volume 2: MA04 Map Book); and
- provision of Footpath Warburton 3 accommodation overbridge (with agricultural vehicular access) mitigating severance at Moss Brow Farm (MA04/7) (CT-06-324 in the Volume 2: MA04 Map Book).

4.4.2 Once construction is complete, the effect of severance of agricultural land for Wet Gate Farm (MA04/5) will also be reduced by the ability of agricultural machinery to pass under River Bollin West viaduct and access severed land; likewise, for Mount Pleasant Farm (MA04/13), Bridge Farm (MA04/14) and Southall Farm (MA04/15) to pass under Manchester Ship Canal viaduct and access severed land.

4.4.3 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 earthwork slopes to improve agricultural land use or steepened earthwork slopes to limit the area of agricultural land required for the construction of the Proposed Scheme;
- rationalisation of road realignments to limit the area of agricultural land required for the construction of the Proposed Scheme;
- the provision of agricultural tracks to gain access to severed land; and
- rationalisation and siting of mitigation planting to limit the area of agricultural land required and reduce impacts on holdings.

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- 4.4.4 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.
- 4.4.5 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>22</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);
  - 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);
  - special provisions for handling peat and peaty soils, where the disturbance of these soils cannot be avoided (Section 6);
  - 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).
- 4.4.6 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.
- 4.4.7 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,

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<sup>22</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

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 the Salop and Conway 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

- 4.4.8 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.
- 4.4.9 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

- 4.4.10 During the construction phase, the total area of agricultural land used within the Broomedge to Glazebrook area will be approximately 229ha as shown in Table 7. Of this total, it is anticipated that approximately 158ha will be restored and available for agricultural use following construction.

**Table 7: 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	14.8	6.5	7.1
Grade 2	144.0	62.8	110.3
Subgrade 3a	34.3	15.0	19.5

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Agricultural land quality	Area required (ha)	Percentage of agricultural land (%)	Area to be restored (ha)
<b>BMV subtotal</b>	<b>193.1</b>	<b>84.3</b>	<b>136.9</b>
Subgrade 3b	31.0	13.5	19.4
Grade 4	5.0	2.2	1.5
Grade 5	0.0	0	0.0
<b>Total agricultural land</b>	<b>229.1</b>	<b>100</b>	<b>157.8</b>

- 4.4.11 The disturbance during construction to approximately 193ha of BMV land is assessed as an impact of high magnitude, comprising 84% of the agricultural land requirement. BMV land is assessed as a receptor of low 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 moderate adverse, which is significant.
- 4.4.12 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

- 4.4.13 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.
- 4.4.14 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>23</sup>. These principles will be followed throughout the construction period.
- 4.4.15 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 low magnitude on the displaced soils. The sensitivity of the majority of soil in the study area is low, and therefore, the significance of the effect on soils of low sensitivity is negligible, which is not significant.
- 4.4.16 Peaty, clayey and seasonally waterlogged soils (including Turbary Moor, Salop and Conway associations) are most vulnerable to structural degradation if moved in wet conditions or by

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<sup>23</sup> Department for Environment, Food and Rural Affairs (2009), *Construction Code of Practice for the Sustainable Use of Soils on Construction Sites*. Available online at: <https://www.gov.uk/government/publications/code-of-practice-for-the-sustainable-use-of-soils-on-construction-sites>.

inappropriate equipment. These soils are of high sensitivity. Peaty soils are susceptible to drying out and shrinking and can become very acidic where iron sulphides are oxidised to form sulphuric acid. Salop and Conway soils are susceptible to compaction and smearing which could affect successful reinstatement. These soils are found in the north of the study area, to the west of Glazebrook covering a total area of approximately 41ha (18%) within the study area. This is an impact of low magnitude. The significance of the effect is moderate adverse, which is significant.

- 4.4.17 The disturbance of peat soils has implications for carbon emissions and biodiversity. The Proposed Scheme seeks to reduce disturbance of any deep peat soils as far as reasonably practicable. Where disturbance cannot be avoided, the peat soils will be handled with particular care to avoid compaction when wet and wind erosion when dry. When reinstated, opportunities will be taken to use peat soils to create habitats, enhance biodiversity and build carbon reserves.

### **Impacts on holdings**

- 4.4.18 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.
- 4.4.19 The effects of the Proposed Scheme on individual agricultural and related interests during the construction period are summarised in Table 8. 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.
- 4.4.20 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-001-0MA04.
- 4.4.21 Woolstencroft Farm (MA03/37) and Agden Brook Farm (MA03/40), which includes agricultural land at Little Heatley Farm and Warburton Park, both manage farmland in the Pickmere to Agden and Hulseheath area (MA03) and the Broomedge to Glazebrook area. The impacts and effects on these holdings are assessed and reported in the Pickmere to Agden and Hulseheath area report (MA03) as the main farm buildings are in that area. Southwall Hall Farm (MA04/15) has land in both the Broomedge to Glazebrook area and the Risleigh to Bamfurlong area (MA05); the impacts and effects for this holding are assessed and reported in this report.

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4.4.22 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 8: 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
MA04/1 Agden Lane Farm	Low	1.8ha (75%) High	Negligible	Negligible	Moderate adverse due to the proportion of land required.	0.4ha
MA04/2 Land at Rose Cottage	Low	0.6ha (33%) High	Negligible	Negligible	Moderate adverse due to the proportion of land required.	0.3ha
MA04/3 Wet Gate Lane Farm	Medium	6.2ha (16%) Medium	Negligible	Low	Moderate adverse due to the proportion of land required.	3.1ha
MA04/4 Heatley Heath Farm	Medium	1.7ha (39%) High	Negligible	Low	Major/moder ate adverse due to the proportion of land required.	0.1ha
MA04/5 Wet Gate Farm	Medium	11.7ha (12%) Medium	Medium	Negligible	Moderate adverse due to the proportion of land required and severance.	6.5ha
MA04/6 Lower Carr Green Farm	Medium	12.1ha (38%) High	Negligible	Negligible	Major/moder ate adverse due to the proportion of land required.	4.0ha
MA04/7 Moss Brow Farm	Medium	28.2ha (34%) High	Low	Low	Major/moder ate adverse due to the proportion of land required.	18.1ha
MA04/8 Yew Tree House Farm	Medium	4.5ha (2%) Negligible	Negligible	Negligible	Negligible	2.0ha

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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
MA04/9 Land at Moss Brow	Medium	5.0ha (>10%) Medium	Negligible	Negligible	Moderate adverse due to the proportion of land required.	1.6ha
MA04/10 Land at Warburton Lane	Low	0.2ha (31%) High	Negligible	Negligible	Moderate adverse due to the proportion of land required.	0.2ha
MA04/11 Land at Partington	Low	0.6ha (100%) High	Negligible	Negligible	Moderate adverse due to the proportion of land required.	0ha
MA04/12 Millbank Hall Farm	Low	0.9ha (18%) Medium	Medium	Negligible	Minor adverse	0.5ha
MA04/13 Mount Pleasant Farm	Medium	11.3ha (63%) High	Medium	Negligible	Major/moder ate adverse due to the proportion of land required.	10.8ha
MA04/14 Bridge Farm	Medium	14.4ha (15%) Medium	Negligible	Negligible	Moderate adverse due to the proportion of land required.	11.5ha
MA04/15 Southwall Hall Farm	Medium	8.3ha (2%) Negligible	Negligible	Negligible	Negligible	4.4ha
MA04/16 Rixton New Hall Farm	Medium	<0.1ha (<1%) Negligible	Negligible	Negligible	Negligible	<0.1ha
MA04/17 Brush Farm, Rixton	Medium	20.4ha (37%) High	Negligible	Negligible	Major/moder ate adverse due to the proportion of land required.	12.7ha
MA04/18 Moss Farm, Glazebrook	Low	2.7ha (89%) High	Negligible	Negligible	Moderate adverse due to the proportion of land required.	1.4ha



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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
MA04/19 Hole Mill Farm	Medium	9.4ha (15%) Medium	Negligible	Negligible	Moderate adverse due to the proportion of land required.	9.4ha
MA04/20 Church Farm	Medium	7.3ha (61%) High	Negligible	Medium	Major/moderate adverse due to the proportion of land required.	3.6ha
MA04/21 Land at Moss Lane	Medium	1.7ha (25%) High	Negligible	Negligible	Major/moderate adverse due to the proportion of land required.	1.7ha
MA04/22 Holcroft Hall Farm	Medium	8.8ha (1%) Negligible	Negligible	Negligible	Negligible	8.2ha
MA04/23 Beechfield Farm	Medium	6.6ha (29%) High	Negligible	Negligible	Major/moderate adverse due to the proportion of land required.	4.2ha

4.4.23 Overall, 23 holdings in the Broomedge to Glazebrook area will be affected during construction, of which 18 will experience moderate or moderate/major adverse effects, which are significant for each holding.

4.4.24 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

4.4.25 Following construction and restoration, the area of agricultural land that will remain permanently required will be approximately 71ha, as shown in Table 9.

**Table 9: Agricultural land required permanently**

Agricultural land quality	Total area required (ha)	Percentage of agricultural land (%)
Grade 1	7.8	10.9
Grade 2	33.7	47.2
Subgrade 3a	14.8	20.7
<b>BMV subtotal</b>	<b>56.3</b>	<b>78.8</b>
Subgrade 3b	11.6	16.3

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Agricultural land quality	Total area required (ha)	Percentage of agricultural land (%)
Grade 4	3.5	4.9
Grade 5	0.0	0.0
<b>Total agricultural land</b>	<b>71.4</b>	<b>100</b>

- 4.4.26 Of this total requirement, approximately 8.5ha (11.9%) 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.
- 4.4.27 Replacement floodplain storage will occupy a total area of 3.3ha of agricultural land (see Volume 2: MA04 Map Book, CT-06-322b, CT-06-323, CT-06-325). 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 be returned to agricultural use.
- 4.4.28 The permanent requirement for approximately 56ha of BMV land within the Broomedge to Glazebrook area is assessed as an impact of high magnitude, comprising 79% of the overall agricultural land requirement. BMV land is assessed as a receptor of low sensitivity because of its relative abundance in this area. The permanent effect on BMV land is, therefore, assessed as moderate adverse, which is significant.

### Impacts on holdings

- 4.4.29 The permanent effects from the construction of the Proposed Scheme on individual agricultural and related interests are summarised in Table 10. The land required column 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-001-0MA04.
- 4.4.30 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 10: 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
MA04/1 Agden Lane Farm	Low	1.4ha (58%) High	Negligible	Negligible	Moderate adverse due to the proportion of land required.
MA04/2 Land at Rose Cottage	Low	0.3ha (20%) Medium	Negligible	Negligible	Minor adverse

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Holding reference/ name	Sensitivity to change	Land required from holding	Severance	Infrastructure	Scale of effect
MA04/3 Wet Gate Lane Farm	Medium	3.1ha (8%) Low	Negligible	Negligible	Minor adverse
MA04/4 Heatley Heath Farm	Medium	1.6ha (38%) High	Negligible	High	Major/moderate adverse due to the proportion of land required and property demolition.
MA04/5 Wet Gate Farm	Medium	5.2ha (>5%) Low	Low	Negligible	Minor adverse
MA04/6 Lower Carr Green Farm	Medium	8.1ha (25%) High	Negligible	Negligible	Major/moderate adverse due to the proportion of land required.
MA04/7 Moss Brow Farm	Medium	10.1ha (12%) Medium	Low	Negligible	Moderate adverse due to the proportion of land required.
MA04/8 Yew Tree House Farm	Medium	2.5ha (<1%) Negligible	Negligible	Negligible	Negligible
MA04/9 Land at Moss Brow	Medium	3.4ha (7%) Low	Negligible	Negligible	Minor adverse
MA04/10 Land at Warburton Lane	Low	0ha (0%) Negligible	Negligible	Negligible	Negligible
MA04/11 Land at Partington	Low	0.6ha (100%) High	Negligible	Negligible	Moderate adverse due to the proportion of land required.
MA04/12 Millbank Hall Farm	Low	0.4ha (7%) Low	Negligible	Negligible	Negligible
MA04/13 Mount Pleasant Farm	Medium	0.5ha (3%) Negligible	Low	Negligible	Minor adverse
MA04/14 Bridge Farm	Medium	2.9ha (3%) Negligible	Negligible	Negligible	Negligible
MA04/15 Southwall Hall Farm	Medium	3.9ha (1%) Negligible	Negligible	Negligible	Negligible
MA04/16	Medium	0ha (0%) Negligible	Negligible	Negligible	Negligible

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Holding reference/ name	Sensitivity to change	Land required from holding	Severance	Infrastructure	Scale of effect
Rixton New Hall Farm					
MA04/17 Brush Farm, Rixton	Medium	7.7ha (14%) Medium	Negligible	Negligible	Moderate adverse due to the proportion of land required.
MA04/18 Moss Farm, Glazebrook	Low	1.3ha (43%) High	Negligible	Negligible	Moderate adverse due to the proportion of land required.
MA04/19 Hole Mill Farm	Medium	0ha (0%) Negligible	Negligible	Negligible	Negligible
MA04/20 Church Farm	Medium	3.7ha (31%) High	Negligible	Negligible	Major/moderate adverse due to the proportion of land required.
MA04/21 Land at Moss Lane	Medium	0ha (0%) Negligible	Negligible	Negligible	Negligible
MA04/22 Holcroft Hall Farm	Medium	0.6ha (<1%) Negligible	Negligible	Negligible	Negligible
MA04/23 Beechfield Farm	Medium	2.4ha (>10%) Medium	Negligible	Negligible	Moderate adverse due to the proportion of land required.

- 4.4.31 Overall, the construction of the Proposed Scheme will affect 19 holdings in the Broomedge to Glazebrook area permanently, with nine holdings experiencing moderate or major/moderate adverse permanent effects, which are significant for each holding. Four holdings are only affected temporarily during construction with negligible permanent effects remaining.
- 4.4.32 For the majority of the holdings, it is the proportion of land required that is the greatest impact, but for one holding, Heatley Heath Farm (MA04/4), property demolition is the greatest impact.
- 4.4.33 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

- 4.4.34 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.

- 4.4.35 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**

- 4.4.36 During construction, the total area of agricultural land required will be approximately 229ha, of which approximately 193ha is BMV land. This is assessed as a moderate adverse effect, which is significant.
- 4.4.37 Twenty-three holdings will be affected temporarily, of which 18 will experience temporary moderate or major/moderate adverse residual effects, which are significant for each holding.
- 4.4.38 Once construction is complete and land required temporarily has been restored, 71ha of agricultural land will continue to be required permanently, of which 56ha is BMV land. This is assessed as a permanent moderate adverse effect, which is significant.
- 4.4.39 Nineteen holdings will be affected permanently, of which nine will experience moderate or moderate/major permanent effects following construction, which is significant for each holding.

## **Cumulative effects**

- 4.4.40 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 Farm livestock buildings at Moss Brow Farm (MA04/7, noise assessment reference: 618118) and Church Farm (MA04/20, noise assessment reference: 617642) lie within approximately 100m of the route of the Proposed Scheme. Operational airborne sound levels at these locations are included in the assessment and the results are presented in Volume 5: Appendix SV-003-0MA04.
- 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.

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- 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 Broomedge to Glazebrook 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 Broomedge to Glazebrook 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 Warrington Borough Council (WBC), Salford City Council (SaCC) and Trafford Metropolitan Borough Council (TMBC) 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-001-0MA04. Additional information on air quality monitoring and traffic data used in the assessment is set out in Background Information and Data (BID), BID AQ-002-0MA04<sup>24</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: MA04 Map Book. Air quality mapping is presented in the Volume 5, Air quality Map Book, map AQ-01-304.
- 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>25</sup> and Volume 5: Appendix AQ-001-0MA04.
- 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>24</sup> High Speed Two Ltd (2022), High Speed Rail (Crewe-Manchester), *Background Information and Data, Air quality*, BID AQ-002-0MA04. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

<sup>25</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>26</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). Two 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-001-0MA04. 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 Broomedge to Glazebrook area are emissions from road vehicles and agricultural activities. The main roads within the area are the M6, the M62, the A6144 Mill Lane/Bent Lane/Warburton Lane/Manchester Road/Carrington Lane, the A56

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<sup>26</sup> High Speed Two Ltd (2022), *Phase 2b Western Leg Information Paper E14: Air quality*.

Booths Hill Road/Church Road/Higher Lane/Lymm Road, Spring Lane, Warrington Lane and the A57 Manchester Road/Cadishead Way.

- 5.3.2 There are nine industrial installations (regulated by the Environment Agency) with permits for emissions to air for NO<sub>x</sub> and/or PM<sub>10</sub>, namely J Priestner Partnership (poultry farm), National Grid Gas Plc (combustion), Collier Industrial Waste Limited, Cleansing Service Group Limited, SAICA Paper UK Ltd, Carrington Power Limited, UK Power Reserve Limited, Wainstone Energy Limited and Kingsland Drinks Limited. Their details are presented in BID AQ-002-0MA04. The contribution of these industrial processes 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>27</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 Broomedge to Glazebrook area.

## Local monitoring data

- 5.3.4 There are currently three local authority diffusion tube sites located within the Broomedge to Glazebrook area for monitoring NO<sub>2</sub> concentrations. These are located in Irlam (Prince's Park off Liverpool Road and Irlam locks) and near the M6.
- 5.3.5 There is also one continuous air quality monitoring site within the Broomedge to Glazebrook area for monitoring NO<sub>2</sub> concentrations. This is located in Glazebury.
- 5.3.6 HS2 Ltd has undertaken additional monitoring for the purpose of verifying the air quality assessment at three locations in this area.
- 5.3.7 Measurements of NO<sub>2</sub> were within the air quality standard at six sites in 2018. At one site near the M6 annual mean NO<sub>2</sub> concentrations were above the air quality standard in 2018.
- 5.3.8 Details of the location of all monitoring sites are presented in Map AQ-01-304 and the monitoring data are presented in Volume 5: Appendix AQ-001-0MA04 and BID AQ-002-0MA04.

## Air quality management areas

- 5.3.9 There are two air quality management areas (AQMA) within the Broomedge to Glazebrook area: the Warrington AQMA No.1 and the Greater Manchester Combined Authority AQMA. The Warrington AQMA No.1 covers a 50m-wide continuous strip on both sides of the M6, M62 and M56 corridors and was declared in November 2001. The Greater Manchester Combined Authority AQMA covers a number of areas in Greater Manchester and was declared in May 2016. Both AQMA have been designated for exceedances of the annual

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<sup>27</sup> Department for Environment, Food and Rural Affairs (2021), *Defra Background Pollutant Concentration Maps*. Available online at: <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>.

mean NO<sub>2</sub> standard. Details of their locations are presented in Map AQ-01-304 and Volume 5: Appendix AQ-001-0MA04.

## Receptors

- 5.3.10 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.
- 5.3.11 Most of the receptors which may be affected by the Proposed Scheme are residential. Other receptors include: St Helen's Church of England Primary School; businesses in Hollinfare, Warburton and Partington; Broadoak High School; Partington Central Academy; and several nursing homes.
- 5.3.12 The air quality assessment has also included receptors in ecological sites sensitive to nitrogen deposition and dust. There is one national designated ecological site of relevance to the air quality assessment identified in the Broomedge to Glazebrook area, namely the Woolston Eyes Site of Special Scientific Interest (SSSI). Other relevant local sensitive ecological sites identified close to the Proposed Scheme include Fox Covert and Meadows Site of Biological Importance (SBI), Coroners Wood Ancient Woodland (AW) and SBI, and Partington Nature Reserve SBI.

## Future baseline

- 5.3.13 Volume 5: Appendix CT-004-00000 provides details of the developments in the Broomedge to Glazebrook 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)

- 5.3.14 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.
- 5.3.15 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-001-0MA04. 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)

- 5.3.16 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.
- 5.3.17 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-001-0MA04. 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>28</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.

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<sup>28</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

- 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.

## 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 Broomedge to Glazebrook area are shown in Table 11. 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 11: Summary of risks for construction dust assessment**

Activity	Dust soiling	Human health	Ecological effects
Demolition	Medium	Low	Not applicable
Earthworks	Medium to high	Low to medium	Low
Construction	Medium to high	Low to medium	Low
Trackout	Low 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-001-0MA04 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 two construction scenarios assessed in this area.
- 5.4.12 Receptors expected to experience the greatest change in concentrations have been included in the air quality model. One residential receptor is predicted to experience a significant adverse effect for NO<sub>2</sub> concentrations in the Broomedge to Glazebrook area. This receptor is located adjacent to the M6 and Nicol Avenue. No significant effects are predicted in relation to annual mean PM<sub>10</sub> and PM<sub>2.5</sub> concentrations.
- 5.4.13 Nitrogen deposition is predicted to increase by more than 1% of the critical load at only one ecological receptor in this area, Woolston Eyes SSSI, as a result of the Proposed Scheme. The potential for this increase to result in significant ecological effects is addressed further in Section 7, Ecology and biodiversity.

## **Permanent effects**

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

## **Other mitigation measures**

- 5.4.15 Measures to monitor, manage and reduce significant air quality effects are set out in Section 7 of the draft CoCP. No further mitigation measures in relation to air quality during construction of the Proposed Scheme have been identified in this area.

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

- 5.4.16 The methods outlined within the draft CoCP are considered effective at reducing dust emissions, and therefore, no significant residual effects are anticipated from this source. There will be a residual significant adverse effect in relation to NO<sub>2</sub> concentrations at one modelled residential receptor adjacent to the M6 and Nicol Avenue.

## **Cumulative effects**

- 5.4.17 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, 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 nine roads screened in for further assessment in the Broomedge to Glazebrook area which were the A56 Higher Lane, Wet Gate Lane, Spring Lane, Dam Head Lane, Dam Lane, the A6144 Bent Lane, the A6144 Warburton Lane, the B5160 Dunham Road and Paddock Lane.
- 5.5.6 No designated ecological receptors of relevance to the operational phase air quality have been identified within 200m of the screened in roads in the area. No further assessment of ecological receptors was therefore required for this area.
- 5.5.7 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.

### Other mitigation measures

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

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

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

## **Cumulative effects**

- 5.5.10 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**

- 5.5.11 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.
- 5.5.12 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 Broomedge to Glazebrook 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 Broomedge to Glazebrook 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 Broomedge to Glazebrook area are contained in Volume 5: Appendix CM-001-0MA04.
- 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: MA04 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>29</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>30</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>29</sup> Volume 5: Appendix CT-001-00001, *Environmental Impact Assessment Scope and Methodology Report*.

<sup>30</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.

- 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 reinstated 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 the Manchester Ship Canal viaduct north 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 Proposed Scheme through the Broomedge to Glazebrook area will be 7.3km in length and will lie within the Warrington Borough Council (WBC), Trafford Metropolitan Borough Council (TMBC) and Salford City Council (SaCC) areas. It will extend from Broomedge in the south, passing close to the settlements of Agden, Little Heatley, Heatley, Mossbrow, Warburton, Partington, Hollins Green, Cadishead, and to Glazebrook in the north.
- 6.3.2 The Broomedge to Glazebrook area is predominantly rural in nature, with a mix of settlements and agriculture being the main land use. The majority of community facilities are located in the larger settlements of Lymm, Partington, and Cadishead, some of which are partially inside the study area.

## **Broomedge, Warburton, Partington and surrounds**

- 6.3.3 Broomedge comprises approximately 250 residential properties. The nearest residential properties are located 850m south-west of the route of the Proposed Scheme. Community resources in Broomedge include the Wheatsheaf Inn and Jolly Thresher public houses, Paws 4 Positive dog training school, and a post office.
- 6.3.4 Agden is a settlement of approximately 150 residential properties. The nearest residential properties are located 100m east of the route of the Proposed Scheme. Lymm Riding School and the Agden moorings of the Lymm Cruising Club, a boat club headquartered in Lymm, are located on the outskirts of Agden both along the Bridgewater Canal.
- 6.3.5 Little Heatley comprises of approximately 10 residential properties that are close to each other, to the east of the route of the Proposed Scheme, four of which are on the route of the Proposed Scheme. There are a number of individual properties along Wet Gate Lane that are to the west of these properties, and along Spring Lane to the east of these properties.
- 6.3.6 Heatley comprises approximately 150 residential properties. The nearest residential properties are located 550m west of the route of the Proposed Scheme. There are a number of community resources in Heatley including the La Boheme restaurant and the Green Dragon public house.
- 6.3.7 Warburton encompasses the settlements of Warburton and Mossbrow; together they comprise approximately 150 residential properties. The nearest residential properties are located 65m west of the route of the Proposed Scheme. There are a number of community resources in Warburton including the Old Church of St Werburgh, the new Church of St Werburgh and the Parish Rooms, Moss Brow Farm shop and the Saracens Head public house.
- 6.3.8 Partington comprises approximately 3,400 residential properties. The nearest residential properties are located 500m north-east of the route of the Proposed Scheme. The south-west of Partington, which is within the study area, has several community resources including Little Oaks Nursery School, Our Lady of Lourdes Roman Catholic Primary School, Broadoak Secondary School and Forest Gate Academy Primary School. In addition, there are three care homes, a number of General Practitioner (GP) surgeries, several recreational facilities and Coroners Wood.
- 6.3.9 Promoted routes and PRoW in the area include the Trans Pennine Trail, of which National Cycle Route 62 forms the west and central sections. Other promoted routes include part of the Cheshire Ring Canal Walk (along Footpath Lymm 43) along the Bridgewater Canal towpath, the Mersey Valley Timberland Trail, and the Bollin Valley Way (a 40km walking route linking Macclesfield with Partington) alongside part of the Manchester Ship Canal. Sections of the Trans Pennine Trail, the Cheshire Ring Canal Walk and the Bollin Valley Way are crossed by the route of the Proposed Scheme.

## **Hollins Green, Cadishead, Glazebrook and surrounds**

- 6.3.10 This area covers the settlements of Hollins Green, Cadishead, Glazebrook and surrounds, extending from the Manchester Ship Canal to the northern boundary of the Broomedge to Glazebrook area.
- 6.3.11 Hollins Green comprises approximately 400 residential properties. The nearest residential properties are located 120m south-west of the route of the Proposed Scheme. Hollins Green has a number of community facilities, including St Helen's Church of England (CoE) Primary School, Church of St Helen, Hollinfare Cemetery, Rixton-with-Glazebrook Community Hall, Hollins Green Scout Centre, a community shop, a post office, two public houses (The Black Swan and Ye Olde Red Lion) and a recreation ground. The A57 Manchester Road runs to the south of Hollins Green.
- 6.3.12 Cadishead is a suburb of Salford, comprising approximately 2,000 residential properties. The nearest residential properties are located 350m north-east of the route of the Proposed Scheme. The south-west of Cadishead, which is within the study area, has several community resources, including St Mary's CoE Primary School, Jitterbugz Day Nursery, the Longfield Lodge NHS Medical and Dental Centre, St Mary's Playground and Cadishead Recreation Ground.
- 6.3.13 Glazebrook comprises approximately 100 residential properties. The nearest residential properties are located 350m north-east of the route of the Proposed Scheme. There are several community facilities in Glazebrook, namely Glazebrook Methodist Church and Glazebrook Village Green. Camsley Grange Riding for the Disabled Group is located on the outskirts of Glazebrook and is adjacent to the route of the Proposed Scheme.
- 6.3.14 There is one promoted PRow in the area, which is the Glazebrook Timberland Trail. It is an 18km long-distance walking route which runs west of Cadishead, linking the Manchester Ship Canal with Pennington Flash Country Park 9km to the north; 2km of the PRow is within the study area.

## **Future baseline**

### **Construction (2025)**

- 6.3.15 Volume 5: Appendix CT-004-00000 provides details of the developments in the Broomedge to Glazebrook area that are assumed to have been implemented by 2025. The following committed developments of relevance to the community assessment that would materially alter the future baseline during construction of the Proposed Scheme in this area, are set out in Table 12.

**Environmental Statement**  
**Volume 2: Community Area report**  
**MA04 Broomedge to Glazebrook**

**Table 12: Committed developments of relevance to community during construction**

Map book reference <sup>31</sup>	Planning reference	Description	How this is considered in the assessment
MA04/026	Saved Policies of the City of Salford Unitary Development Plan 2004-2016 Allocation R6.2	Location: Liverpool Road/Mytholme Avenue, Cadishead. New and improved recreation land and facilities.	Informing future baseline.
MA04/032	2017/31705	Location: Hollingreave Farm, Dam Lane, Rixton-with-Glazebrook, Warrington, WA3 6LE. Demolition of existing farmhouse and erection of a replacement dwelling. Conversion of two existing agricultural buildings to create 5 dwellings; removal of redundant structures and provision of landscaping.	Informing future baseline.
MA04/105	86160/OUT/15	Location: land at Lock Lane, adjoining the Manchester Ship Canal, Partington. Application to extend the time limit for the implementation of planning permission H/OUT/68617 (Outline application, including details of access, for residential development of up to 550 dwellings; associated footpath, landscaping and ecological works.)	Informing future baseline.
MA04/121	97897/FUL/19	Location: land North of Oak Road and West of Warburton Lane, Partington. Erection of 75 new affordable dwellings and ancillary infrastructure including new main site access of Oak Road.	Informing future baseline.

6.3.16 It is assumed that the following committed developments will be implemented and have been included as part of the future baseline and considered within this assessment:

- MA04/026 will result in the development of recreational land and facilities, located 35m north-east of the land required for the construction of the Proposed Scheme;
- MA04/032 will result in the development of six residential properties located 13m south-west of the land required for the construction of the Proposed Scheme;
- MA04/105 will result in a residential development located immediately east of the land required for the construction of the Proposed Scheme; and
- MA04/121 will result in a residential development located 428m north-east of the land required for the construction of the Proposed Scheme.

## Operation (2038)

6.3.17 Volume 5: Appendix CT-004-00000 also provides details of the developments in the Broomedge to Glazebrook area that are assumed to have been implemented by 2038. No

<sup>31</sup> Volume 5, Planning Data/Committed Development Map Book: Maps CT-13-312b to CT-13-314a.



additional 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 route of the Proposed Scheme has been realigned to be 70m to the east of Hollins Green as part of the design development process to avoid or reduce, insofar as reasonably practicable, the environmental impacts on Hollinfare Cemetery and on residents of Hollins Green.
- 6.4.2 The draft Code of Construction Practice (CoCP)<sup>32</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 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).

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<sup>32</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

## **Assessment of impacts and effects**

### **Broomedge, Warburton, Partington and surrounds**

#### **Temporary effects**

##### **Residential properties**

- 6.4.3 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-001-0MA04.
- 6.4.4 Construction of the Proposed Scheme will be in proximity to a group of approximately 15 residential properties on Agden Lane, Agden Brow, Warrington Lane and Spring Lane in Agden. Residents of these properties will experience a combination of noise and visual effects due to Agden culvert and Heatley South embankment works in the daytime. Significant noise effects from these works will last for approximately three years and 10 months. 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.
- 6.4.5 Construction of the Proposed Scheme will be in proximity to a group of approximately 15 properties in the vicinity of Spring Lane and Wet Gate Lane, Little Heatley. Residents of these properties will experience a combination of noise and visual effects due to the construction of Heatley South embankment and River Bollin West viaduct. Significant noise effects from these works will continue for approximately one year and six months, during the daytime. Wet Gate Lane is a designated route for construction traffic to enable access to the Wet Gate Lane satellite compound, and properties along the road are expected to experience significant traffic noise effects. 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.

##### **Community facilities**

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

##### **Recreational facilities**

- 6.4.7 Construction of Bridgewater Canal viaduct, north-east of Broomedge, will temporarily affect 250m of the 400m stretch of mooring facilities at Agden on the Bridgewater Canal. This will result in the temporary loss of approximately 12 out of an estimated 25 moorings between Agden Bridge and Lymm Marina. The construction period will last for three years and three months. The moorings at Agden are owned by Lymm Cruising Club, which is a members-only boating club based in the settlement of Lymm, 3km west of the moorings at Agden. The Lymm Cruising Club comprises three recreational mooring sites along the Bridgewater Canal

(Lymm Clubhouse, Oughtrington and Agden), and a clubhouse and bar which are not open to the public, located at the cruising club in Lymm. Electricity points are available for each boat at the Lymm Clubhouse and the moorings at Agden.

- 6.4.8 There is currently a two-year waiting list for moorings at the three locations operated by Lymm Cruising Club. The nearest alternative is Hesford Marine, which is adjacent to the Agden mooring site, and is not directly affected by the construction of the Proposed Scheme. Hesford Marine has approximately 10 moorings and 70 hardstanding (out of water) spaces<sup>33</sup>. The relatively small number of moorings means that it is not a comparable alternative for those currently using the Agden site. There are other mooring locations nearby; however, availability at these sites is not known. The temporary loss of approximately half of the Agden moorings will result in a moderate adverse effect, which is significant.

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

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

### **Permanent effects**

#### **Residential properties**

- 6.4.10 The construction of Heatley South embankment will require the demolition of four residential properties on Wet Gate Lane in Little Heatley. These residential properties will be permanently lost. The loss of these four residential properties represents a high proportion of this small community of only nine residential properties. This will result in a major adverse effect, which is significant.
- 6.4.11 The construction of Warburton cutting will require the permanent realignment of the A6144 Paddock Lane, which provides a link between the village of Warburton and hamlet of Mossbrow. The two settlements share community facilities. A small number of community facilities (Saracens Head public house, Old Church of St Werburgh, the new Church of St Werburgh and the Parish Rooms) are located to the west of the Proposed Scheme, whilst the Moss Brow farm shop is located to the east of the Proposed Scheme. Impacts on pedestrian and vehicle access including road closures and diversions, as described in Section 14, Traffic and transport, will affect temporary access (vehicle and non-motorised users) between the two settlements and community facilities. Permanent realignment of the A6144 Paddock Lane will result in an increase in journey length of 950m between the Saracens Head public house and the Moss Brow farm shop. Significant visual effects on residential properties are predicted to occur both temporarily and permanently as a result of construction of the Proposed Scheme. Stakeholder engagement feedback identifies that the community considers the Proposed Scheme will separate the settlements. Therefore, the reduced

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<sup>33</sup> Hesford Marine currently has hardstanding spaces available, which may be able to accommodate some of the losses at the Agden mooring site. However, this possibility has not been assumed in this assessment.

access, the creation of a visual barrier and feelings of separation from their fellow residents and community facilities will result in isolation permanently affecting some residents in Warburton and Mossbrow. This will result in a moderate adverse effect, which is significant.

### **Community facilities**

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

### **Recreational facilities**

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

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

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

## **Hollins Green, Cadishead, Glazebrook and surrounds**

### **Temporary effects**

#### **Residential properties**

- 6.4.15 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-001-0MA04.
- 6.4.16 Construction of the Proposed Scheme will be in proximity to a group of approximately 15 residential properties in Hollins Green (on St Helen's Close and Manchester Road). Residents of these properties will experience a combination of noise and visual effects due to construction of Manchester Ship Canal viaduct. Significant noise effects from these works will last for approximately 11 months. Manchester Road is a designated route for construction traffic to enable access to the Manchester Ship Canal viaduct north main compound and the Manchester Ship Canal viaduct central satellite compound. Manchester Road is expected to experience a significant increase in HGV traffic movements, between Dam Lane and Glazebrook Lane. 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**

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

#### **Recreational facilities**

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

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

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

## **Permanent effects**

6.4.20 No permanent construction effects are anticipated in this area.

## **Other mitigation measures**

6.4.21 HS2 Ltd is continuing to engage with owners and operators of Lymm Cruising Club, to identify reasonably practicable measures to help mitigate the likely significant effects identified in this assessment.

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

6.4.22 The construction of the Proposed Scheme will result in significant temporary residual effects on the following community resources:

- approximately 15 residential properties in Agden due to the combination of significant noise and visual effects;
- approximately 15 residential properties in Little Heatley due to the combination of significant noise and visual effects;
- the loss of 12 mooring sites at Agden moorings, part of the Lymm Cruising Club on the outskirts of Broomedge; and
- approximately 15 residential properties in Hollins Green due to the combination of significant noise, visual and HGV traffic effects.

6.4.23 The construction of the Proposed Scheme is likely to result in the following permanent residual significant effects:

- loss of four residential properties in Little Heatley; and
- isolation permanently affecting some residents in Warburton and Mossbrow.

## **Cumulative effects**

6.4.24 No temporary or permanent cumulative effects have been identified in the Broomedge to Glazebrook 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:

- noise fence barriers extending from Agden Lane to the Bridgewater Canal to provide acoustic screening for residents of properties on Warrington Lane and in Agden;
- a noise fence barrier located along Heatley South embankment to provide acoustic screening for residents of properties in Little Heatley;
- landscape mitigation planting between Wet Gate Lane Farm and the Trans Pennine Trail to provide visual screening for the residents of properties in Heatley;
- landscape mitigation planting along Heatley North embankment to provide visual screening for residents of properties on Carr Green Lane, and users of Footpath Warburton 3 and Footpath Warburton 4;
- landscape earthworks along Warburton cutting to provide visual and acoustic screening for community facilities and residents of properties in Warburton and Partington;
- noise fence barriers along Manchester Ship Canal viaduct and landscape mitigation planting adjacent to the A57 Manchester Road to provide acoustic and visual screening for residents of properties in Hollins Green and Glazebrook;
- landscape mitigation planting along Glazebrook South embankment and Glazebrook North embankment to provide visual screening for residents of Moss Farm, Church Farm, the users of Footpath Rixton-with-Glazebrook 14 and residents of properties on Dam Lane, Bank Street and the B5212 Glazebrook Lane; and
- a noise fence barrier along the top of the eastern side of Glazebrook South embankment and Glazebrook (Railway) viaduct to provide acoustic screening for residents of properties in Glazebrook. There will also be a noise fence barrier on the eastern side of part of Glazebrook North embankment.

### Assessment of impacts and effects

#### Broomedge, Warburton, Partington and surrounds

6.5.2 A group of approximately 15 residential properties located along Agden Lane, Warrington Lane and Spring Lane in Agden will be adjacent to the route of the Proposed Scheme. The operation of the Proposed Scheme will result in significant noise effects on these properties during the daytime and night-time due to the running of the trains on Lymm North embankment, Bridgewater Canal viaduct and Heatley South embankment. All of the properties will experience significant adverse visual effects due to views of the Proposed Scheme, passing trains and overhead line equipment. 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. By year 15, visual effects will reduce to a level which is not significant. As such, there will be no significant in-combination effect for this community by year 15.

- 6.5.3 A group of approximately 10 residential properties on Wet Gate Lane in Little Heatley will be adjacent to Heatley South embankment. The operation of the Proposed Scheme will result in significant noise effects on these properties during the daytime and night-time due to the running of the trains on Heatley South embankment. All of the properties will experience significant adverse visual effects due to views of the Proposed Scheme, passing trains and overhead line equipment. 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. By year 15, visual effects will reduce to a level which is not significant. As such, there will be no significant in-combination effect for this community by year 15.

## **Hollins Green, Cadishead, Glazebrook and surrounds**

- 6.5.4 No operational effects are anticipated in this area.

## **Other mitigation measures**

- 6.5.5 No further mitigation is proposed.

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

- 6.5.6 The operation of the Proposed Scheme will result in residual significant effects on the following resources:
- approximately 15 residential properties in Agden due to the combination of noise and visual effects; and
  - approximately 10 residential properties in Little Heatley due to the combination of noise and visual effects.

## **Cumulative effects**

- 6.5.7 No cumulative effects have been identified in the Broomedge to Glazebrook area.

## **Monitoring**

- 6.5.8 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.
- 6.5.9 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 Broomedge to Glazebrook 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, Cheshire Wildlife Trust, Lancashire Wildlife Trust, Woodland Trust, Canal & River Trust and Greater Manchester Local Record Centre. 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-001-00001);
  - an ecological register of local level effects, which are not reported individually in Volume 2 (Volume 5: Appendix EC-015-0MA04);
  - documents to support the Habitats Regulations Assessment (HRA) for the Manchester Mosses Special Area of Conservation (SAC) (Volume 5: Appendix EC-016-00002); and
  - documents to support the HRA for Rixton Claypits SAC (Volume 5: Appendix EC-016-00005).
- 7.1.4 Map Series EC-01 showing statutory and non-statutory designated sites of relevance to the assessment in the Broomedge to Glazebrook 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: MA04 Map Book.
- 7.1.6 In addition, ecological baseline information relating to habitats and species recorded in the Broomedge to Glazebrook 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 (BID)*. 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-003-0MA04.
- 7.2.3 Access was obtained for the majority of the land where general habitat survey (Phase 1 habitat survey) was proposed. 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. With respect to utility works, on a precautionary basis 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.

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

## 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-01-312b to 314a, 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 Broomedge to Glazebrook area consists largely of low-lying land in mixed agricultural use. Large fields of arable crops and improved grassland with largely intact hedgerows, interspersed with areas of woodland, are present. The Proposed Scheme crosses several watercourses, including the Bridgewater Canal, the River Bollin, Red Brook and the Manchester Ship Canal, as well as numerous smaller watercourses and drainage ditches. The land required for construction of the Proposed Scheme lies within the southern part of the Great Manchester Wetlands local Nature Improvement Area<sup>37</sup> (NIA).

#### Designated sites

- 7.3.3 There are two statutory designated sites of international importance of potential relevance to the assessment in the Broomedge to Glazebrook area. They are:
- Rixton Clay Pits SAC, covering an area of 13.7ha, is designated for its population of great crested newt, an Annex II species that is known to breed in at least 20 ponds across the SAC. The SAC comprises parts of an extensive disused brickworks which was excavated from glacial till. The SAC is located west of Hollins Green, 961m west of the land required for construction of the Proposed Scheme, adjacent to the A57 Manchester Road, a proposed construction traffic route; and
  - Manchester Mosses SAC, covering an area of 170.5ha, is designated for its degraded raised bog capable of natural regeneration, which is an Annex I habitat<sup>38</sup>. The SAC consists of three Sites of Special Scientific Interest (SSSI): Holcroft Moss, Risley Moss and Astley and Bedford Mosses. Holcroft Moss is 23m from the land required for

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<sup>37</sup> Lancashire Wildlife Trust (2013), *Great Manchester Wetlands*. Available online at: <https://www.lancswt.org.uk/greatmanchesterwetlands>.

<sup>38</sup> A rare habitat consisting of wetland on peat: <https://www.lancswt.org.uk/mosslands>.

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construction of the Proposed Scheme in the Broomedge to Glazebrook area but is located in the Risley to Bamfurlong area (MA05), 44m east of the land required for the construction of M62 West viaduct. The land between that required to construct the viaduct and the boundary of the SSSI has been identified for the purpose of habitat creation or enhancement, as part of the Proposed Scheme. The M62, which will be used as a construction traffic route, is situated immediately north of the SSSI. Risley Moss SSSI is located east of Warrington, and Astley and Bedford Mosses SSSI is located south of Leigh. They are respectively 1km north-west and 3.7km north-east of land required for construction of the Proposed Scheme in the Broomedge to Glazebrook area.

7.3.4 There are three nationally important SSSIs that are of potential relevance to the assessment in the Broomedge to Glazebrook area. For each of these sites, the land required for construction of the Proposed Scheme in this area is within the Impact Risk Zone (IRZ)<sup>39</sup> relevant to railway infrastructure as identified by Natural England. They are:

- Woolston Eyes SSSI, covering an area of 261ha, is designated for its breeding bird assemblage, including nationally important numbers of black-necked grebe, gadwall and pochard. It also supports nationally important wintering numbers of teal and shoveler. This SSSI is located east of Warrington, 2.7km west of the land required for construction of the Proposed Scheme. The M6, proposed construction traffic route crosses the SSSI on viaduct, however, the Proposed Scheme within the Broomedge to Glazebrook area is not within the IRZ for this SSSI;
- Rixton Clay Pits SSSI, covering an area of 14.9ha and encompassing Rixton Clay Pits SAC, is designated for its breeding population of great crested newts. It is also designated for species-rich calcareous grassland and assemblage of wetland plants, including species that are rare or uncommon in Cheshire such as northern marsh orchid, creeping willow, slender spike-rush, lesser marshwort and blunt-leaved pondweed. The SSSI is located west of Hollins Green, adjacent to the A57 Manchester Road, a proposed construction traffic route and 961m west of the land required for construction of the Proposed Scheme; and
- Holcroft Moss SSSI, covering an area of 19.1ha, is a component of the Manchester Mosses SAC. It is designated as the only known uncut area of raised bog remaining in Cheshire. The surface vegetation of the moss is dominated by purple moor-grass with abundant heather, cross-leaved heath and cranberry. Wetter hollows support common cottongrass, deergrass and five species of bog moss. The SSSI is 23m from the land required for construction of the Proposed Scheme in the Broomedge to Glazebrook area. However, the SSSI is located in the Risley to Bamfurlong area (MA05) and the M62, which will be used as a construction traffic route, is situated immediately to its north.

7.3.5 There is one statutory Local Nature Reserve (LNR) that is of relevance to the assessment in the Broomedge to Glazebrook area. This is Rixton Clay Pits LNR, covering an area of 33.6ha

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<sup>39</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.

and designated due to a population of great crested newt and supporting habitats of meadow, woodland and waterbodies. The LNR incorporates both Rixton Clay Pits SAC and SSSI and is larger than the extent of those designated sites. The LNR is located east of Warrington, adjacent to the A57 Manchester Road, which will be a construction traffic route, and 800m west of the land required for construction of the Proposed Scheme. It is of county/metropolitan value.

- 7.3.6 There are four Local Wildlife Sites (LWS) and six Sites of Biological Importance (SBI) that are of potential relevance to the assessment in the Broomedge to Glazebrook area, each of which is of county/metropolitan value. They are:
- Woolstencroft Farm Meadow LWS, covering an area of 6.1ha is designated for its woodland, neutral and semi-improved grassland, floodplain grazing marsh, ponds, ditches and hedgerows. The LWS is located north of Broomedge, 543m south of the land required for utilities work associated with the construction of the Proposed Scheme and 330m north of the A56 Lymm Road, which will be a construction traffic route. The LWS is also relevant to the Pickmere to Agden and Hulseheath area (MA03) assessment, where it is located 543m north-east of the land required for the construction of the Proposed Scheme;
  - Heatley Lake LWS, covering an area of 2.2ha, is designated for its lake with dense marginal vegetation, reed swamp, wet neutral grassland and wet woodland. The LWS is located west of Heatley and 117m west of land required for construction of the Proposed Scheme;
  - Rixton Brickworks LWS, covering an area of 20.1ha, is designated for wetland habitats including a lake rich in submerged, floating and marginal vegetation and two smaller water bodies. There is also woodland with wildflowers and scrub. The LWS is located adjacent to the A57 Manchester Road, which will be a construction traffic route and 855m west of land required for construction of the Proposed Scheme. Part of the LWS overlaps with Rixton Clay Pits SAC, SSSI and LNR;
  - Rixton Moss LWS, covering an area of 278ha, is designated as an area of reclaimed mossland, comprising arable land with an extensive network of ditches. It has notable breeding populations of corn bunting and yellow wagtail and is also important for black darter dragonfly and brown hare. The LWS is located adjacent to the A57 Manchester Road, which will be a construction traffic route, 937m west of the land required for construction of the Proposed Scheme;
  - Fox Covert and Meadows SBI, covering an area of 5.1ha, is designated for grassland, lowland broadleaved and wet woodland habitats. The SBI is located north of Heatley and is partially within the land required for construction of the Proposed Scheme;
  - Wigsey Lane Meadows SBI, covering an area of 5.6ha, is designated for its marshy grassland and its assemblage of breeding birds including lapwing, grasshopper warbler, snipe and teal. Willow tit have been recorded at the site. The SBI is located south of Warburton, 637m west of the land required for the construction of the Proposed Scheme;

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- Coroners Wood SBI, covering an area of 1.9ha, is designated for its ancient woodland habitat. The SBI is located south of Hollins Green, 15m east of the land required for construction of the Proposed Scheme;
- Partington Nature Reserve SBI, covering an area of 7.3ha, is designated for its open water habitat and habitat mosaic including woodland, scrub, neutral grassland and swamp. The SBI is located east of Partington, adjacent to the A6144 Manchester Road, which will be a construction traffic route, and 1.4km north-east of land required for construction of the Proposed Scheme;
- Old River Irwell SBI, covering an area of 4.1ha, is designated for its wintering bird populations including tufted duck and goldeneye. The SBI is located south of Irlam, 25m from the A57 Manchester Road, which will be a construction traffic route, and 2.5km east of land required for construction of the Proposed Scheme; and
- Great Woolden Wood SBI, covering an area of 5.7ha, is designated for its woodland habitat. The SBI is adjacent to the M62, west of Irlam and 242m east of the land required for construction of the Proposed Scheme.

7.3.7 There is one Ancient Woodland Inventory (AWI) site of relevance to the assessment in the Broomedge to Glazebrook area. Coroners Wood AWI site is an area of 6ha of ancient semi-natural woodland of which 1.9ha is also Coroners Wood SBI. It is of national value. Coroners Wood is located south of the Manchester Ship Canal and partially within land required for construction of the Proposed Scheme.

7.3.8 An additional woodland was identified as ancient woodland, but due to its size will not be added to the AWI. Woodland north of Wet Gate Lane Farm, covers an area of 0.2ha and comprises of semi-natural broadleaved woodland. It is located adjacent to Wet Gate Lane Farm and adjacent to land required for the construction of the Proposed Scheme.

7.3.9 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>40</sup> and a conservation priority of the Cheshire Biodiversity Action Plan<sup>41</sup> (local BAP).

7.3.10 The Proposed Scheme will cross the Great Manchester Wetlands local NIA, covering an area of 48,000ha. Whilst not a designated site, locally determined NIAs are identified and agreed by nature partnerships and local planning authorities. The Great Manchester Wetlands local NIA incorporates the wetlands known as the Flashes around Wigan, the Mosslands in the vicinity of Salford and Warrington, and the River Mersey corridor from Rixton to Warrington including the Manchester Ship Canal. The NIA objectives include improving species dispersal

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<sup>40</sup> *Natural Environment and Rural Communities Act 2006* (c.16). London, Her Majesty's Stationery Office. Available online at: <https://www.legislation.gov.uk/ukpga/2006/16/contents>.

<sup>41</sup> Cheshire Wildlife Trust (2007), *Cheshire Region Biodiversity Action Plan*. Available online at: <https://www.cheshirewildlifetrust.org.uk/sites/default/files/2018-06/BAP%20list%20-%20updated%20April%202011.pdf>.

and providing habitat connectivity, optimising the carbon storage of lowland raised bog and restoring key designated sites.

## 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 seven 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:
- woodland covering 3.3ha within Fox Covert and Meadows SBI comprises abundant pedunculate oak and sycamore and species-rich ground-flora. The woodland is located east of Heatley, partially within the land required for construction of the Proposed Scheme, and is of county/metropolitan value;
  - woodland at Rixton Clay Pits LNR and Rixton Brickworks LWS, covering an area of 5.2ha. It is located west of Hollins Green, 1km west of the land required for construction of the Proposed Scheme and adjacent to the A57 Manchester Road, which will be a construction traffic route. It is of county/metropolitan value;
  - an unnamed woodland north of the Manchester Ship Canal covering an area of 0.9ha. The canopy is dominated by sycamore, with silver birch, pedunculate oak, goat willow and ash. The ground flora is species-poor. The woodland is partially within the land required for construction of the Proposed Scheme and is of district/borough value;
  - an unnamed woodland, on the south bank of the Manchester Ship Canal adjacent to Coroners Wood, covering an area of 2.8ha. The canopy is dominated by sycamore, with silver birch, pedunculate oak, goat willow and ash. The ground flora is species-poor. The woodland is partially within the land required for construction of the Proposed Scheme and is of district/borough value;
  - an unnamed woodland, covering an area of 5.4ha, located north of the Manchester Ship Canal at Hollins Green. It consists of frequent lime species and occasional ash, sycamore, horse chestnut, silver birch and conifers. The shrub layer is sparse and contains a few tree saplings and bramble. The ground flora is species-poor and there is high proportion of bare ground. The woodland is adjacent to the land required for construction of the Proposed Scheme. It is of district/borough value;
  - an unnamed woodland within a former campsite, covering an area of 7.4ha and located at Glazebrook, south-west of Bank Street. Part of this area comprises recently colonised woodland/scrub including frequent sycamore, silver birch, willow species, ash, pedunculate oak, hawthorn and hazel. The ground flora is species-rich in both the drier and wetter areas. Small areas of grassy, open habitat containing species-rich ground flora including several species of moss are present throughout the woodland. This habitat may qualify as open mosaic on previously developed land. The woodland is



partially within the land required for construction of the Proposed Scheme and is of up to county/metropolitan value;

- an unnamed woodland at Glazebrook Moss, covering an area of 0.8ha, consists of silver birch, elder, rowan and Himalayan balsam and willow-herb species. It is located within land required for construction of the Proposed Scheme and is of local/parish value; and
- a further eight unnamed woodlands (each less than 1.5ha, and none within wildlife site designations) at the following locations: adjacent to the River Bollin; adjacent to the Saracens Head public house in Warburton; adjacent to the A6144 Paddock Lane at Mossbrow; Warburton Park; between the A57 Manchester Road and Manchester Road at Hollins Green; disused railway line south of Glazebrook Moss; at Glazebrook Moss; and immediately south of Holcroft Moss SSSI at Glazebrook. These woodland habitats are of up to local/parish value.

## Grassland

- 7.3.13 Marshy grassland, covering an area of 0.9ha, is present within Fox Covert and Meadows SBI. The species composition has affinities to MG10a *Holcus lanatus-Juncus effusus* typical sub-community and to M23b *Juncus effusus/acetiflorus-Galium palustre* rush-pasture, *Juncus effusus* sub-community and M27c *Filipendula ulmaria-Angelica sylvestris* mire, *Juncus effusus-Holcus lanatus* sub-community. It contains abundant soft rush and Yorkshire fog and occasional meadowsweet, rough meadow-grass, greater bird's-foot-trefoil and broad-leaved dock. This marshy grassland habitat is a conservation priority of the local BAP. The grassland is located adjacent to the River Bollin and within land that has been identified for the purpose of habitat creation or enhancement as part of the Proposed Scheme. It is of county/metropolitan value.
- 7.3.14 Lowland calcareous grassland covering an area of 13.4ha is present within Rixton Clay Pits SSSI and LWS. The grassland includes locally uncommon plants such as blue fleabane and yellow-wort. This habitat is likely to qualify as a habitat of principal importance. It is a qualifying feature of the SSSI and a conservation priority of the local BAP. The grassland is located adjacent to the A57 Manchester Road, which will be a construction traffic route, and is of national value.
- 7.3.15 Marshy grassland, covering an area of 0.5ha, is present adjacent to the River Bollin at Heatley and adjacent to land required for the construction of the Proposed Scheme. Species include common reed with occasional Himalayan balsam, purple loosestrife, marsh willowherb and common nettle. The grassland is of district/borough value.
- 7.3.16 Species-poor semi-improved and marshy grassland covers an area of 41.7ha throughout the Broomedge to Glazebrook area within the land required for construction of the Proposed Scheme. Areas of species-poor, semi-improved and marshy grassland are of local/parish value.

## Hedgerows

- 7.3.17 In total, there is 31.7km of hedgerow within the land required for construction of the Proposed Scheme in the Broomedge to Glazebrook area. Hedgerow with at least 80% cover of native woody species is a habitat of principal importance.
- 7.3.18 Of the 31.7km of hedgerow, 16.6km 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:
- 14.7km of species-poor; and
  - 17km of species-rich, of which 400m are also classified as 'Important' according to the 'Wildlife and Landscape' criteria described in The Hedgerows Regulations 1997<sup>42</sup>.
- 7.3.19 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 Proposed Scheme. The hedgerows within the area also function as wildlife corridors. The hedgerow network as a whole is of country/metropolitan value.

## Watercourses

- 7.3.20 The Bridgewater Canal, the River Bollin, Red Brook and the Manchester Ship Canal will be crossed by the route of the Proposed Scheme. The River Bollin and Red Brook qualify as habitats of principal importance and local BAP habitats. These watercourses and adjacent habitats are intrinsically important and provide corridors for wildlife dispersal; as such they are of up to county/metropolitan value.
- 7.3.21 Several smaller watercourses, including a tributary of the Manchester Ship Canal and a tributary of Old Bollin, will also be crossed by the route of the Proposed Scheme. These unnamed tributaries are of up to local/parish value.

## Water bodies

- 7.3.22 There are 23 waterbodies located within, or partly within, the land required for construction of the Proposed Scheme, and a further 57 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

- 7.3.23 Ancient and veteran trees with potential relevance to the assessment in the Broomedge to Glazebrook area have been considered. An ancient tree is one that has passed maturity and

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<sup>42</sup> *The Hedgerow Regulations 1997. (No. 1160)*, Her Majesty's Stationery Office, London. Available online at: <https://www.legislation.gov.uk/uksi/1997/1160/made>.

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. The Ancient Tree Inventory includes some ancient and veteran trees in the Broomedge to Glazebrook area.

- 7.3.24 There are no trees recorded on the Ancient Tree Inventory within land required for the construction of the Proposed Scheme. However, the Phase 1 survey identified two trees within the land required for construction of the Proposed Scheme that are considered to be of a sufficient age and/or support features to indicate they are of veteran status. These are two silver birches at Hollins Green that are located within the land required for construction of the Proposed Scheme and are considered to be of national value.

### **Lowland fen**

- 7.3.25 Lowland fen habitat is present within Rixton Clay Pits SAC, SSSI and LNR and Rixton Brickworks LWS, covering an area of 0.7ha. This habitat qualifies as a habitat of principal importance and as a conservation priority of the local BAP. It is located west of Hollins Green, 1km west of land required for construction of the Proposed Scheme and adjacent and north of the A57 Manchester Road, which will be a construction traffic route. It is of national value.

### **Traditionally managed orchards**

- 7.3.26 There are two orchards adjacent to land required for the construction of the Proposed Scheme, within the hamlet of Mossbrow at Onion Farm and Villa Farm, covering an area of 0.3ha and 0.1ha respectively. They contain scattered fruit trees including apple, plum and walnut. They are set within species-poor, semi-improved grassland dominated by Yorkshire fog. These orchards qualify as a habitat of principal importance and a conservation priority of the local BAP and are of district/borough value.

### **Lowland raised bog**

- 7.3.27 Lowland raised bog, covering an area of 11.8ha is present within Holcroft Moss SSSI. Purple moor grass is the dominant species with sphagnum moss species present throughout and soft rush occasionally present. The habitat is referable to M17a *Trichophorum cespitosum-Eriophorum vaginatum blanket mire-Drosera rotundifolia Sphagnum spp.* sub-community due to the constant frequencies of common heather, purple moor-grass, cross-leaved heath, papillose bog-moss and common cottongrass. It is located 40m from the land required for the construction of the Proposed Scheme. This area is a habitat of principal importance and a conservation priority of the local BAP and is of international value due to the habitat being a reason for the designation of Manchester Mosses SAC.

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

- 7.3.28 A summary of the likely value of protected and/or notable species of relevance to the assessment is provided in Table 13.

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**Table 13: Protected and/or notable species within the Broomedge to Glazebrook area**

Resource/feature	Value	Receptor	Baseline and rationale for valuation
Amphibians	National	A metapopulation <sup>43</sup> (a group of at least four spatially separated populations which interact) of great crested newts in a network of at least 20 ponds at Rixton Clay Pits SAC and SSSI.	Desk study identified a large metapopulation of great crested newt at Rixton Clay Pits that is known to breed in at least 20 ponds across the site. The ponds are located at least 850m from land required for the construction of the Proposed Scheme. The SAC is adjacent to the A57 Manchester Road, a proposed construction traffic route. The SAC is designated due to the great crested newt population.
Amphibians	County/ metropolitan	An assumed metapopulation (GCNMP 1.4.5) of great crested newts in a network of 19 ponds south of Partington.	A medium metapopulation of great crested newt was identified across 19 ponds. Field surveys recorded an assumed medium population of great crested newt (due to the presence of larvae) in one pond. The nearest ponds lie within the land required for the construction of the Proposed Scheme. The furthest ponds are more than 500m from the land required for the construction of the Proposed Scheme.
Amphibians	County/ metropolitan	A metapopulation (GCNMP 1.4.8) of great crested newts in a network of 36 ponds east of Risley.  This metapopulation extends into the Risley to Bamfurlong area (MA05).	A medium metapopulation of great crested newt was identified across 36 ponds. Field surveys recorded a medium population of great crested newts in one pond. The nearest pond is 93m from the land required for the construction of the Proposed Scheme. The furthest ponds are more than 500m from 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 palmate newt, smooth newt, common toad and common frog.	These common amphibian species have been identified within ponds throughout the Broomedge to Glazebrook area during surveys and are assumed to be present within the ponds that have not 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.

<sup>43</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
Bats	Regional	Bat assemblage bounded by the M56, the River Bollin and the Bridgewater Canal within the Pickmere to Agden and Hulseheath area (MA03) and the Broomedge to Glazebrook area.	<p>Field surveys confirmed the presence of common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, Pipistrellus 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, Daubenton's bat, Natterer's bat and <i>Myotis</i> species; and</li> <li>a common pipistrelle possible maternity roost in a barn at Moss Brow Farm, Paddock Lane, Warburton, 20m east of land required for construction of the Proposed Scheme within the Broomedge to Glazebrook area;</li> <li>the relatively high levels of activity indicate the River Bollin and Bridgewater Canal in the Broomedge to Glazebrook area 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>
Bats	Up to regional	Bat assemblage at Coroners Wood and Manchester Ship Canal.	<p>Field surveys confirmed the presence of soprano pipistrelle, common pipistrelle, pipistrelle species, <i>Myotis</i> species, noctule, brown long-eared bat, Brandt's bat, Daubenton's bat and whiskered/Brandt's bats within this assemblage:</p> <ul style="list-style-type: none"> <li>activity levels of foraging Daubenton's bat, <i>Myotis</i> species and noctule bats were highest along woodland edges and bankside vegetation of the Manchester Ship Canal;</li> <li>Coroners Wood has high suitability as a potential roosting site, including maternity roosts for noctule and <i>Myotis</i> species which are considered to be 'rarer' species in England; and</li> <li>there is good habitat connectivity between Coroners Wood, other mature woodlands and the Manchester Ship Canal.</li> </ul> <p>All bat species in the assemblage are a conservation priority within the Cheshire BAP<sup>44</sup>. Noctule and <i>Myotis</i> species including whiskered bat, Brandt's bat and Daubenton's bat are considered to be</p>

<sup>44</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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Resource/feature	Value	Receptor	Baseline and rationale for valuation
			<p>'rarer' species in England<sup>45</sup>. However, noctule is considered to be more common in Cheshire. Brown long-eared bat, noctule and soprano pipistrelle are species of principal importance. Taking a precautionary approach, the assemblage is considered to be of up to regional value, due to the potential presence of maternity roosts for noctule and <i>Myotis</i> species which are considered to be 'rarer' species in England. Maternity roosts, including those of the more common species, are relatively uncommon and are important in maintaining bat populations.</p>
Bats	County/ metropolitan	Bat assemblage from woodland south of Holcroft Moss (MA04) to the M62 (MA05).	<p>Field surveys confirmed the presence of common pipistrelle, soprano pipistrelle, brown long-eared bat, noctule, Leisler'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 and brown long-eared bat;</li> <li>• low to moderate levels of common pipistrelle, soprano pipistrelle and noctule activity and low levels of <i>Myotis</i> species activity within the Risley to Bamfurlong area (MA05) using woodland blocks and mossland.</li> </ul> <p>The assemblage is considered to be of county/metropolitan value on the basis that low numbers of <i>Myotis</i> species and low noctule were recorded, which are considered to be 'rarer' species in England.</p>
Mosses and liverworts	Regional	Freiberg's screw-moss at Bridgewater Canal.	<p>Freiberg's screw-moss was identified during field surveys to be sporadically present along a 2km stretch of the Bridgewater Canal towpath on the sandstone canal walls. Field surveys identified three colonies within the land required for construction of the Proposed Scheme and one colony adjacent. Desk study records identified two colonies within land required for construction of the Proposed Scheme.</p> <p>This species is globally rare and is a species of principal importance. It is present in 33 10km squares in the UK (recorded between 1990 and 2013), 24 of which are in north-west England. The Bridgewater Canal is at present a stronghold for Freiberg's screw-moss in the north-west of England, being one of the largest populations in Britain. It is not listed within the Revised Red List of Bryophytes in Britain and is not regarded as nationally scarce.</p>

<sup>45</sup> Wray S, Wells D, Long E, Mitchell-Jones T (2010), *Valuing Bats in Ecological Impact Assessment*, IEEM In-Practice, p23-25.

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Resource/feature	Value	Receptor	Baseline and rationale for valuation
Birds	County/ metropolitan	Barn owl at Lower Carr Green Farm and Hollingreave Farm and suitable habitat in the Broomedge to Glazebrook area.	A barn owl was recorded in a tree in the vicinity of Lower Carr Green Farm, located 100m east of the land required for construction of the Proposed Scheme during field surveys. Two barn owl nest boxes and a tree roost at Hollingreave Farm were noted between Little Heatley and Mossbrow. There is suitable habitat for barn owl and the desk study also identified records of barn owl in the Broomedge to Glazebrook area, but neither the field surveys nor the desk study confirmed breeding barn owls. Barn owl is a conservation priority species of the Cheshire local BAP and a Schedule 1 species.
Birds	District/ borough	Hobby at Lymm.	Field surveys recorded one active hobby nest in the area of Lymm, located 75m from the land required for construction of the Proposed Scheme. Desk study data also contains a record for hobby nesting in this area. Hobby is a scarce migrant breeder <sup>46</sup> , but is not listed as a bird of conservation concern or on the Cheshire LWS selection criteria <sup>47</sup> . Due to their mobility, the presence of a single occupied territory is not considered to be of greater than district/borough value.
Birds	Local/parish	Kingfisher at the River Bollin.	A kingfisher was observed during surveys at the River Bollin, adjacent to land required for construction of the Proposed Scheme. Breeding was not confirmed. Kingfisher is a Schedule 1 species.
Birds	Local/parish	Breeding bird assemblage between Agden Brow and Bent Lane.	Field surveys recorded a total of 47 bird species, including 25 notable species, between Agden Brow and Bent Lane both within and adjacent to the land required for construction of the Proposed Scheme. Breeding territories of 19 species were recorded, of which seven are notable including four Red List species <sup>48</sup> and five species of principal importance. The species recorded are considered to be common and widespread in the habitat types surveyed, and/or no large or important populations were recorded.

<sup>46</sup> Royal Society for the Protection of Birds (RSPB) (2016), *Cheshire and Wirral Bird Report 2016*. Available online at: <https://www2.rspb.org.uk/groups/images/05032019163802.pdf>.

<sup>47</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>.

<sup>48</sup> British Trust for Ornithology (2015), *Birds of Conservation Concern*. Available online at: <https://www.bto.org/our-science/publications/psob>.



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Resource/feature	Value	Receptor	Baseline and rationale for valuation
Birds	Local/parish	Winter bird assemblage between Agden Brow and Bent Lane.	Field surveys recorded a total of 32 bird species, including 11 notable species with five Red List species, between Agden Brow and Bent Lane both within and adjacent to the land required for construction of the Proposed Scheme. The species recorded included four species of principal importance, but all are considered to be common and widespread in the habitat types surveyed, and/or no large or important populations were recorded.
Birds	Local/parish	Winter bird assemblage south of Holcroft Moss.	Field surveys recorded a total of 38 bird species, including 16 notable species with nine Red List species, south of Holcroft Moss both within and adjacent to the land required for the construction of the Proposed Scheme. The species recorded included six species of principal importance, but all are considered to be common and widespread in the habitat types surveyed, and/or no large or important populations were recorded.
Vascular plants	County/metropolitan	Wild service trees at Coroners Wood.	Field surveys identified wild service trees in Coroners Wood ancient woodland habitat, adjacent to the Manchester Ship Canal at Partington, partially within the land required for construction of the Proposed Scheme. Wild service trees are rare in Cheshire <sup>49</sup> .
Vascular plants	County/metropolitan	Early marsh-orchid at Fox Covert.	Field surveys identified early marsh-orchid at Fox Covert and Meadows, 25m north of land that has been identified for the purpose of habitat creation or enhancement as part of the Proposed Scheme on the opposite side of the River Bollin. Early marsh-orchid is rare in Cheshire.
Vascular plants	District/borough	Lesser chickweed at Glazebrook.	Field surveys identified lesser chickweed in an improved grassland bund as a ruderal, within the land required for construction of the Proposed Scheme. Lesser chickweed is locally scarce in Cheshire as it is usually found in coastal areas, or inland on bare or sandy soil.

<sup>49</sup> Kay, G. M. (2015), *Cheshire County Rare Plant Register*, Cheshire Wildlife Trust.

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Resource/feature	Value	Receptor	Baseline and rationale for valuation
Water vole	County/ metropolitan	Water vole population at the River Bollin.	The presence of water vole on the River Bollin north of Wet Gate Lane Farm was confirmed during field surveys within land required for the construction of the Proposed Scheme, suggesting that water vole is present at low densities along the River Bollin.  Water vole is a species of principal importance and a conservation priority of the local BAP <sup>50</sup> . Water vole populations are widespread and locally common in Greater Manchester, although populations are often fragmented and susceptible to local extinctions. Water vole numbers have reduced significantly in the Cheshire area.
Water vole	County/ metropolitan	Water vole population at Tributary 1 of Glaze Brook.	The presence of water vole was confirmed during field surveys at Tributary 1 of Glaze Brook, 80m west of the land required for the construction of the Proposed Scheme. An old feeding station was also found within land required for the construction of the Proposed Scheme.
Water vole	Up to county/ metropolitan	Water vole population at Red Brook.	Presence of water vole at Red Brook was identified by four desk study records. The closest record was for seven burrows 347m to the east of the land required for the construction of the Proposed Scheme. The records suggest that water vole is likely to be present at low densities along Red Brook. Although suitable habitat is present, evidence of water vole was not recorded during field surveys within land required for the construction of the Proposed Scheme.
Water vole	Up to county/ metropolitan	Water vole population at Helsdale Brook.	Possible evidence of water vole was recorded during field surveys at Helsdale Brook, suggesting that water vole could be present at low densities within land required for the construction of the Proposed Scheme.
Reptiles	County/ metropolitan	Population of common lizard within Holcroft Moss and land adjacent to its south-east boundary.	Common lizard was identified at Holcroft Moss SSSI, which is located adjacent to land required for the Proposed Scheme for the purposes of mitigation or enhancement, through 36 records from the desk study and field surveys. Two common lizard records were returned from adjacent and south-east of Holcroft Moss within the Broomedge to Glazebrook area. Common lizard is a species of principal importance and any significant populations of common lizard is a criterion for LWS selection.
Reptiles	Up to local/parish	Potential small populations of reptiles in the Broomedge to Glazebrook area	Potentially suitable but un-surveyed habitats were largely constrained to field boundaries of close grazed pasture and arable fields, which are not considered suitable to support a widespread population of reptiles. However, there is potential for isolated populations in other semi-natural habitat. Grass snake, slow worm and common lizard are all species of principal importance.

<sup>50</sup> Cheshire Wildlife Trust (2006), *Water Vole Local Biodiversity Action Plan*. Available online at: <https://www.cheshirewildlifetrust.org.uk/sites/default/files/2018-06/Water%20vole.pdf>.

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Resource/feature	Value	Receptor	Baseline and rationale for valuation
Terrestrial invertebrates	Up to county/metropolitan	Invertebrate assemblage at Rixton Clay Pits.	White-letter hairstreak and alder leaf beetle were noted in the desk study as being present at Rixton Clay Pits SSSI. White-letter hairstreak is a species of principal importance and probable/confirmed breeding sites of this species is a criterion for LWS selection. Alder leaf beetle currently has nationally rare status, but this status is regarded as data deficient as there is insufficient information to fully understand its distribution in the UK <sup>51</sup> .
Terrestrial invertebrates	District/borough	Invertebrate assemblage at Coroners Wood.	Over 100 terrestrial invertebrate species, including alder leaf beetle were recorded during field surveys at Coroners Wood. The remaining species were common and widespread and typical of the habitat types present.
Terrestrial invertebrates	District/borough	Population of southern silver stiletto-fly at Heatley bridge	Records of the southern silver stiletto-fly, an arboreal species, were identified from the desk study data at Heatley along the River Bollin and Old Bollin. It is assumed that this species is present along the watercourses as it is highly mobile. Southern silver stiletto-fly is nationally scarce and a species of principal importance.
Terrestrial invertebrates	Local/parish	Invertebrate assemblage at unnamed woodland south-west of Bank Street at Glazebrook.	Sixty-nine terrestrial invertebrate species were recorded during field surveys at the unnamed woodland south-west of Bank Street, all of which were common and widespread and typical of the habitat types present.
Otter	District/borough	Population of otter using the River Bollin for breeding.	Evidence of otter was identified during field surveys at the River Bollin, within the land required for construction of the Proposed Scheme. One active holt was recorded 296m east of the land required for the construction of the Proposed Scheme. Three potential holts were recorded 38m east, 237m south and 140m south-east of land required for construction of the Proposed Scheme respectively, but these holts were considered to be unoccupied at the time of survey. It is assumed that in addition to breeding, otter will make use of the River Bollin for foraging and as a corridor for movement. Otter is an Annex 2 species, a species of principal importance and a conservation priority of the local BAP <sup>52</sup> .

<sup>51</sup> The status of alder leaf beetle is unreliable as it awaits formal review. However, National Biodiversity network (NBN, <https://nbnatlas.org/>) data show that the species has expanded significantly over the last 12 years and its distribution no longer qualifies it as nationally rare.

<sup>52</sup> Cheshire Wildlife Trust (2006), *Otter Local Biodiversity Action Plan*. Available online at: <https://www.cheshirewildlifetrust.org.uk/sites/default/files/2018-06/Otter.pdf>.

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Resource/feature	Value	Receptor	Baseline and rationale for valuation
Otter	District/ borough	Populations of otter using the major and minor watercourses in the Broomedge to Glazebrook area.	Given the availability of suitable habitat, it is assumed that otters are using Red Brook, the Manchester Ship Canal and Glaze Brook within the Broomedge to Glazebrook area for foraging and dispersal.  There are two desk study records for otter within 2km of the land required for construction of the Proposed Scheme.
Aquatic macro-invertebrates	Up to county/ metropolitan	Aquatic macro-invertebrates in the River Bollin.	A macro-invertebrate assemblage of high to very high conservation value was identified during the Environment Agency monitoring of the River Bollin in 2015, 500m downstream of the land required for construction of the Proposed Scheme. Overall, the monitoring indicated a 'moderate' Community Conservation Index (CCI) score and 'good' biological water quality. True flies, mayflies, caddisflies, leeches, worms, crustacea and snails were recorded. The current WFD quality class of invertebrates is 'good'. No species of notable conservation value have been recorded.
Aquatic macro-invertebrates	District/ borough	Aquatic macro-invertebrates in Glaze Brook.	The aquatic macro-invertebrate field surveys recorded 139 individual specimens from 20 taxa in spring 2018, with a CCI score indicating that the macro-invertebrate community was of 'moderate' conservation value with a 'poor' WFD quality class. A variety of taxa were present, including the damselfly <i>Calopteryx virgo</i> , which has a conservation score of five, indicating that there may be regionally notable or locally important species present. Flat worms, snails, mussels, worms, leeches, crustacea, damselfly, true bugs, beetles, caddisflies and true bugs were also present. Glaze Brook is adjacent to land required for construction of the Proposed Scheme.
Aquatic macro-invertebrates	Up to district/ borough	Aquatic macro-invertebrates in Red Brook.	Aquatic invertebrate species associated with good water quality in Red Brook were identified from the desk study. No CCI score and no species of notable conservation value were recorded. The current WFD quality class for aquatic invertebrates is 'moderate'. Red Brook is within land required for construction of the Proposed Scheme.
Fish	County/ metropolitan	Fish assemblages within the River Bollin.	European eel, brown trout, gudgeon, chub, minnow, stone loach, three-spined stickleback and bullhead were recorded during field surveys. Large individuals of trout and European eel were recorded in low abundance. Barbel, common roach, flounder, dace, perch, common bream and pike were also identified as being present in the River Bollin from the desk study.  Bullhead is an Annex 2 species. European eel and brown trout are species of principal importance and are a criterion for LWS species selection. They are widespread in suitable habitat in England.
Fish	Up to district/ borough	Fish assemblages within the Manchester Ship Canal.	European eel, gudgeon, perch, dace, common bream, three-spined stickleback, common roach and rudd were identified in the desk study data as being present in the Manchester Ship Canal.

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Resource/feature	Value	Receptor	Baseline and rationale for valuation
Fish	District/ borough	Fish assemblages within Red Brook.	Three-spined stickleback, European eel, gudgeon, chub, minnow and stone loach were recorded during electrofishing surveys approximately 3km upstream of the land required for the construction of the Proposed Scheme.
Fish	District/ borough	Fish assemblages within Glaze Brook.	Common roach, perch, European eel, dace, gudgeon, chub, common bream, stone loach and three-spined stickleback were recorded during electrofishing surveys at Glaze Brook. Minnow was also identified as being present in Glaze Brook in the desk study data. Glaze Brook is located adjacent to the land required for construction of the Proposed Scheme.
Badger	Local/parish	At least four social groups at undisclosed locations.	Four badger main setts have been recorded during field surveys in the Broomedge to Glazebrook area, two within the land required for construction of the Proposed Scheme, and a further seven active outlier or subsidiary setts within land required for construction for the Proposed Scheme. There is suitable habitat for badger throughout the land required for construction of the Proposed Scheme in the area in the mosaic of pasture, arable and woodland habitat.

## Future baseline

### Construction (2025)

- 7.3.29 Volume 5: Appendix CT-004-0000 provides details of the developments in the Broomedge to Glazebrook area that are assumed to have been implemented by 2025.
- 7.3.30 The following committed development of relevance to ecology and biodiversity that would materially alter the future baseline during construction of the Proposed Scheme in this area, is set out in Table 14.

**Table 14: Committed developments of relevance to ecology and biodiversity during construction**

Map book reference <sup>53</sup>	Planning reference	Description	How this is considered in the assessment
MA05/105	86160/OUT/15	Location: land at Lock Lane, adjoining the Manchester Ship Canal, Partington. Application to extend the time limit for the implementation of planning permission H/OUT/68617 (outline application, including details of access, for residential development of up to 550 dwellings; associated footpath, landscaping and ecological works.)	Informing future baseline.

- 7.3.31 Implementation of committed development MA05/105 will result in the loss of woodland adjacent to the unnamed woodland, on the south bank of the Manchester Ship Canal, altering the future baseline the Proposed Scheme is assessed against. As such, this committed development has been included as part of the future baseline and considered within this assessment.

### Operation (2038)

- 7.3.32 Volume 5: Appendix CT-004-0000 also provides details of the developments in the Broomedge to Glazebrook area that are assumed to have been implemented by 2038.
- 7.3.33 No additional 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

<sup>53</sup> Volume 5, Planning Data/Committed Development Map Book: Maps CT-13-312b to CT-13-314a.

the Proposed Scheme, which will be largely a mixture of woodland/scrub and grassland), and contribute towards limiting effects on habitats and species:

- careful design to ensure no effects on Coroners Wood SBI; and
- Bridgewater Canal viaduct, River Bollin West viaduct, Manchester Ship Canal viaduct and M62 West viaduct will provide ecological connectivity under the route of the Proposed Scheme to adjacent habitats. Ecological connectivity beneath the route of the Proposed Scheme will be maintained for a combined length of 2.6km of viaducts in the Broomedge to Glazebrook area. This will allow free passage of wildlife at these locations.

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-015-0MA04.

### Designated sites

7.4.5 Rixton Clay Pits SAC is located 961m west of the land required for construction of the Proposed Scheme but it is immediately adjacent to the A57 Manchester Road, which will be

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



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used as a construction traffic route. The increase in traffic close to the SAC will increase nitrogen deposition. However the documents to inform the Appropriate Assessment concluded the increase will not result in any adverse effects to the great crested newt population which is the sole reason for the designation. Therefore adverse effects on the integrity of Rixton Clay Pits can be ruled out both alone or in-combination with other plans or projects.

7.4.6 A study to inform the HRA Screening Report was undertaken for the Manchester Mosses SAC during the Appraisal of Sustainability stage of the project. 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 SAC due to changes in the hydrological regime of the site. However, the report also concluded that this effect could be addressed through appropriate viaduct design in the vicinity of Holcroft Moss to retain groundwater movements to this component of the SAC. Updated documents to inform the Appropriate Assessment for hybrid Bill design have been completed as set out in Volume 5: Appendix EC-016-00002. The documents to inform the Appropriate Assessment have concluded that there will be no significant adverse effects on the integrity of the SAC from construction of the Proposed Scheme, either alone or in combination with other projects and plans, for the following reasons:

- there will be no adverse effects on the integrity of the raised bog habitat at Holcroft Moss SSSI from decommissioning of a high pressure gas pipeline, which will remain in-situ beneath the site;
- M62 West viaduct, together with a groundwater recharge trench to convey groundwater to the site at the northern end of Glazebrook North embankment will ensure that groundwater flows to Holcroft Moss are retained, with a residual reduction which will not be significant; and
- there will be no adverse effects on the SAC from the increase in nitrogen deposition associated with the use of the M62 as a construction traffic route for the Proposed Scheme.

7.4.7 Woolston Eyes SSSI which is designated for its nationally important water bird populations is crossed by the M6 on viaduct, which will be used as a construction traffic route. The increase in traffic close to the SSSI will result in modest increase in nitrogen deposition in the immediate vicinity of the viaduct. However, the ability of the habitats present at the SSSI to support bird populations that form the reason for designation will not be affected. Therefore, there will be no adverse effects on the qualifying features and structure and function of the SSSI from the increase in nitrogen deposition associated with the use of the M6 as a construction traffic route for the Proposed Scheme.

7.4.8 Rixton Clay Pits SSSI is located 961m west of the land required for construction of the Proposed Scheme, and the A57 Manchester Road, a construction traffic route, is immediately adjacent to the SSSI. The SSSI is designated for great crested newts, fen and calcareous grassland. Air quality modelling demonstrated that modest exceedance in nitrogen deposition will be restricted to a narrow belt of woodland adjacent to the A57, which is not a

qualifying feature of the SSSI. Therefore, there will be no adverse effects on the qualifying features or structure and function of the SSSI due to changes in air quality.

- 7.4.9 Holcroft Moss SSSI is a component part of the Manchester Mosses SAC and is designated for the same reasons as the SAC. Consequently, it is anticipated that the implementation of measures set out in the documents that will inform the Appropriate Assessment will reduce the magnitude of potential impacts to a level where there will be no significant effect on the structure and function of the SSSI.
- 7.4.10 Construction of Manchester Ship Canal viaduct will result in the loss of 0.5ha (8%) from Coroners Wood AWI site. The loss of irreplaceable ancient woodland habitat from Coroners Wood AWI site will result in a permanent adverse effect on its structure and function, which is significant at the national level.
- 7.4.11 Construction of Heatley North embankment will result in the loss of 0.1ha (3%) from Fox Covert and Meadows SBI, all of which is woodland habitat. This loss will result in a permanent adverse effect on the structure and function of the SBI that will be significant at the county/metropolitan level.
- 7.4.12 The Proposed Scheme will pass through the southern part of the Great Manchester Wetlands local NIA, the objectives of which include improving species dispersal and providing habitat connectivity. The Proposed Scheme will not directly impact any target sites of the NIA within the Broomedge to Glazebrook area, and a combined length of 2.6km of viaducts with associated riparian habitats will maintain connectivity along watercourses.

## Habitats

### Woodland

- 7.4.13 As well as the effects on 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.
- 7.4.14 Construction of Manchester Ship Canal viaduct will result in the loss of 0.5ha (18%) from the unnamed woodland south of the Manchester Ship Canal. The permanent loss of woodland will have a permanent adverse effect on the conservation status of the woodland that will be significant at the district/borough level.
- 7.4.15 Construction of Glazebrook South embankment and the diversion of a high pressure gas pipeline associated with the construction of the Proposed Scheme will result in the permanent loss of 7.2ha (97%) of both woodland and grassland habitat, which could qualify as open mosaic habitat within a former campsite located at Glazebrook, south-west of Bank Street. The permanent loss of woodland and grassland habitat will have a permanent adverse effect on the conservation status of the woodland that will be significant at up to county/metropolitan level.

## **Hedgerows**

- 7.4.16 On a precautionary basis, it is assumed that all hedgerows (31.7km) within the land required for the construction of the Proposed Scheme in the Broomedge to Glazebrook area will be permanently lost and the remaining hedgerow network will be fragmented. This includes native species-rich hedgerows at Mossbrow. This total, however, includes some hedges 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 construction of the Proposed Scheme will have a permanent adverse effect on the conservation status of the hedgerows that is significant at the county/metropolitan level.

## **Watercourses**

- 7.4.17 The route of the Proposed Scheme will cross the Bridgewater Canal, the River Bollin, Red Brook and the Manchester Ship Canal on viaduct. A viaduct pier will be constructed on the northern bank and a retaining wall will be constructed on the northern and southern bank of the Manchester Ship Canal. The implementation of measures within the draft CoCP, such as monitoring plans and restrictions on excavation methods, will reduce impacts associated with this construction to a level where they will not be significant. The other watercourses crossed by viaduct 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.

## **Water bodies**

- 7.4.18 On a precautionary basis it is assumed that 21 of the 23 ponds located within the land required for construction of the Proposed Scheme in the Broomedge to Glazebrook 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. It is assumed that two ponds within land required for habitat creation will be retained. 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**

- 7.4.19 It is assumed that works associated with the establishment of the Manchester Ship Canal north main compound will result in the loss of two veteran silver birch trees within the land required for construction of the Proposed Scheme in the Broomedge to Glazebrook area will be permanently lost. The loss of veteran trees is significant at the national level in each case. Where reasonably practicable, measures will be taken to protect ancient and veteran trees within and adjacent to construction works to reduce the number that will be lost.

## Species

### Amphibians

- 7.4.20 There is one assumed meta-population of great crested newt, GCNMP 1.4.5 within the Broomedge to Glazebrook 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.
- 7.4.21 Of the 23 water bodies providing potential breeding sites within the land required for construction of the Proposed Scheme that require survey within the Broomedge to Glazebrook area, none have been confirmed as supporting great crested newt, three have been assessed as being unsuitable for this species and four have been found not to support the species. The remaining 16 ponds have not been surveyed due to access constraints and are assumed to support populations of great crested newts. On a precautionary basis the loss of these ponds would result in a permanent adverse effect on amphibian populations that will be, in each case, significant at up to county/metropolitan level.

### Bats

- 7.4.22 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.
- 7.4.23 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.
- 7.4.24 An assemblage of both common and rarer bat species, including noctule, Leisler's bat and *Myotis* species utilise the habitats (watercourses, woodland and grassland) bounded by the M56, the River Bollin and the Bridgewater Canal within Pickmere to Agden and Hulseheath area (MA03) and the Broomedge to Glazebrook area. Construction of Heatley South embankment, Heatley North embankment, Warburton embankment and Warburton cutting within the Broomedge to Glazebrook area 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. Construction of the Proposed Scheme in the Broomedge to Glazebrook area could result in the disturbance of a common pipistrelle possible maternity roost at Warburton, which is 20m of land required for 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 this roost will be lost. The combined effect in the Broomedge to Glazebrook area and the Pickmere to Agden and Hulseheath area (MA03) from the impacts on foraging and commuting habitat of rarer species including noctule, Leisler's bat and *Myotis* species, represent a permanent adverse effect on the bat assemblage that is significant at the regional level.

- 7.4.25 Construction of Manchester Ship Canal viaduct will result in the loss of 1.7ha of woodland habitat at Coroners Wood and nearby woodland that provide commuting and foraging habitat and potential roosting sites for the bat assemblage at Coroners Wood and the Manchester Ship Canal. Taking a precautionary approach, it is considered that construction of Manchester Ship Canal viaduct could result in the loss of maternity roosts that may be present in these areas, as well as the loss of foraging and impacts to commuting habitat associated with the Manchester Ship Canal. The loss of maternity roosts, which are important to the continued breeding success of bat populations, and loss of habitat connectivity will result in a permanent adverse effect that is significant at up to regional level.
- 7.4.26 An assemblage of both common and rarer bat species, including noctule, Leisler's bat and *Myotis* species utilise the habitats (woodland and grassland) from woodland south of Holcroft Moss (MA04) to the M62 within the Risley to Bamfurlong area (MA05). Construction of Glazebrook South embankment and Glazebrook north 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. Construction of the Proposed Scheme will also result in the disturbance of common pipistrelle and brown long-eared occasional roosts. 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 and, on a precautionary basis, it is assumed the roosts will be lost. The combined effect on the Broomedge to Glazebrook area and the Risley to Bamfurlong area (MA05) from the impacts on foraging and commuting habitat of rarer species including noctule, Leisler's bat and *Myotis* species, all with low or moderate levels of activity in this area, represents an adverse effect on the bat assemblage that is significant at the county/metropolitan level.
- 7.4.27 Loss of other suitable habitats within the land required for 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.

## **Mosses and liverworts**

- 7.4.28 Freiberg's screw-moss has been recorded adjacent to land required for the construction of the Proposed Scheme identified for use as Bridgewater Canal satellite construction

compound, and it could be present on the southern bank of the Bridgewater Canal within land required for construction of the Proposed Scheme where access for survey was not available. The bank of the Bridgewater Canal within the land required for construction of the Proposed Scheme does not provide optimal growing conditions for this species, due to the nature of the stone substrate present. Construction of Bridgewater Canal viaduct will not involve loss or physical disturbance of the canal and immediately adjacent habitat, and the risk of pollution or dust deposition, should this species be present in un-surveyed areas, will be avoided by the implementation of measures in the CoCP. Although found in open habitats, in this area Frieberg's screw-moss also occurs in shaded habitats and it is not considered that the viaduct will adversely affect habitat suitability or, given the scattered distribution of records, affect a significant part of the population. Therefore, it is unlikely that there will be a significant adverse effect on the population of Frieberg's screw-moss associated with the Bridgewater Canal.

## **Birds**

- 7.4.29 Construction of Heatley North embankment will result in the permanent loss of two tree-mounted nest boxes providing potential nesting sites for barn owl in the Little Heatley and Mossbrow area. It will also remove semi-improved and improved grassland and margins of arable fields in the vicinity of Lower Carr Green Farm that are of value to foraging barn owl. This loss of nesting and foraging habitat represents a permanent adverse effect on the barn owl population that is significant at up to the county/metropolitan level.
- 7.4.30 Construction of Heatley South embankment will result in the loss of a hobby nest located within land required for the construction of the Proposed Scheme. However, alternative nest sites are available for the pair of hobby in the wider area and therefore no significant effect is predicted.

## **Vascular plants**

- 7.4.31 Construction of Manchester Ship Canal viaduct will result in the loss of wild service trees in Coroners Wood. On a precautionary basis, it is assumed that a significant proportion of the population will be lost. This will represent a permanent adverse effect on the wild service tree population which is significant at the county/metropolitan level.

## **Terrestrial invertebrates**

- 7.4.32 Construction of Manchester Ship Canal viaduct will result in the loss of 0.5ha (8%) of Coroners Wood, which supports an invertebrate assemblage of over 100 terrestrial invertebrate species. Habitat loss is likely to have an adverse effect on the conservation status of the invertebrate assemblage which will be significant at the district/borough level.

## **Other mitigation measures**

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

## Habitats

### Woodland

- 7.4.34 The Proposed Scheme will result in the loss of 0.5ha of ancient woodland, which is irreplaceable, from Coroners Wood AWI site, which will be significant at the national level.
- 7.4.35 In addition, the Proposed Scheme will result in the loss of 0.1ha of lowland mixed deciduous woodland at Fox Covert and Meadows SBI and 0.5ha of woodland south of the Manchester Ship Canal which will be significant at the district/borough level, and 7.2ha of woodland at the former campsite located at Glazebrook, which will be significant at up to county/metropolitan level.
- 7.4.36 There will be further loss and fragmentation from eight other woodlands across the Broomedge to Glazebrook area, including loss of 2.4ha of lowland mixed deciduous woodland, as reported within the register of local/parish effects (Volume 5: Appendix EC-015-0MA04). 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.
- 7.4.37 The loss of ancient woodland will be partly compensated through a range of measures, including planting of native broadleaved woodland as follows:
- 2.7ha on the southern, northern and western sides of Coroners Wood to enhance the ecological connectivity of the retained ancient woodland and help maintain the structure and function of this AWI site; and
  - 0.7ha on the northern side of Coroners Wood to enhance ecological connectivity with woodland to the north.
- 7.4.38 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.
- 7.4.39 Within the Broomedge to Glazebrook area, 8.5ha of further woodland habitat creation will be undertaken to compensate primarily for adverse effects upon non-ancient woodland, at locations including the following:
- 3.7ha of wet woodland will be planted adjacent to Fox Covert and Meadows SBI. The proposed woodland planting will compensate for the woodland lost within the SBI and for losses elsewhere, including at the former campsite at Glazebrook, and provide enhanced ecological connectivity along the River Bollin;



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- 1.5ha of woodland copses will be included in an area of grassland enhancement adjacent to the Manchester Ship Canal and compensate for areas of woodland that will be lost to the south of the Manchester Ship Canal. They will also provide enhanced ecological connectivity of habitats along the Manchester Ship Canal;
- 1.6ha of woodland in proximity to existing woodland, south-west of Bank Street, Glazebrook. The woodland planting will partially compensate for the woodland lost at the former campsite in Glazebrook; and
- 1.7ha of woodland at Glazebrook Moss. The woodland will partially compensate for the woodland lost at Glazebrook Moss and provide ecological connectivity to existing woodland and hedgerows.

7.4.40 The creation of 3.7ha of wet woodland at the River Bollin will also provide wetland habitat which is an objective of the Great Manchester Wetlands local NIA and may also provide habitat for willow tit which is a target species of the NIA.

7.4.41 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 integrity 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.

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

## **Grassland**

7.4.43 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 compensate for the loss of grassland habitat in the local area as well as 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.

7.4.44 The 1.3ha and 1.4ha of wet grassland being created adjacent to the River Bollin and adjacent to Fox Covert and Meadows SBI respectively, will compensate for grassland lost at the former campsite at Glazebrook and provide foraging habitat for barn owls and foraging and commuting habitat for bats. The creation of wet grassland and connective habitat is also an objective of the Greater Manchester Wetlands local NIA.

## **Hedgerows**

7.4.45 New hedgerows will be planted as replacement for those lost as a result of the Proposed Scheme. A total of 9.6km 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

22.1km after mitigation, which is a residual adverse effect that is significant at the district/borough level.

## **Watercourses**

- 7.4.46 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**

- 7.4.47 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**

- 7.4.48 Where practicable, measures will be taken to protect the two 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. Ancient and veteran trees are irreplaceable and the loss of each of these trees represents a residual adverse effect that will be significant at the national level.

## **Species**

### **Amphibians**

- 7.4.49 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 habitat creation areas south of the River Bollin and to the west and north of Mossbrow. 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 potentially present in the Broomedge to Glazebrook 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.

### **Bats**

- 7.4.50 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 construction of the Proposed Scheme as detailed below.

- 7.4.51 The loss of foraging, commuting and potential roosting habitat used by the bat assemblage at Coroners Wood and the Manchester Ship Canal will be addressed by provision of suitable replacement roosts in retained areas and suitable foraging habitat comprising woodland planting connecting Coroners Wood to other woodlands in this area. Following the implementation of these measures, the effects on the bat assemblage at Coroners Wood and the Manchester Ship Canal will be reduced to a level that is not significant.
- 7.4.52 The loss of foraging and commuting habitat used by the bat assemblage bounded by the M56, the River Bollin and Bridgewater Canal within the Broomedge to Glazebrook area and the Pickmere to Agden and Hulseheath area (MA03) will be addressed by provision of woodland planting and creation of hedgerows, grassland, wetland habitat and ponds in both areas. The loss of a common pipistrelle possible maternity roost at Moss Brow Farm, Warburton will be addressed through the provision of suitable replacement roosts within habitat creation and enhancement areas within the Broomedge to Glazebrook 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.
- 7.4.53 The loss of foraging and commuting habitat used by the bat assemblage from woodland south of Holcroft Moss (MA04) to the M62 within the Broomedge to Glazebrook area and the Risley to Bamfurlong area (MA05) will be addressed by provision of woodland planting and creation of hedgerows, grassland, wetland habitat and ponds within both areas. 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.

## **Birds**

- 7.4.54 Habitat creation measures to address the adverse effects on barn owl in the Broomedge to Glazebrook area will include the provision of grassland adjacent to the River Bollin east of Heatley, and woodland and grassland adjacent to Fox Covert and Meadows SBI, adjacent to Coroners Wood AWI site and south of Glazebrook. These habitat creation measures will provide foraging opportunities for barn owl populations in the Broomedge to Glazebrook area. Once the habitats have become established, the adverse effect on barn owl populations resulting from the loss of foraging habitat and potential nesting sites in the Broomedge to Glazebrook area will be reduced to a level that is not significant.

## **Vascular plants**

- 7.4.55 To address the adverse effect on wild service trees at Coroners Wood, this species will be included in areas of new woodland planting connecting to the retained areas of Coroners

Wood and affected trees will be translocated where feasible. Following the implementation of these measures, the adverse effects on the population of wild service trees will be reduced to a level that is not significant.

## **Terrestrial invertebrates**

- 7.4.56 Habitat translocation and compensation carried out in response to the loss of ancient woodland habitat at Coroners Wood AWI site and woodland creation adjacent to Coroners Wood AWI will provide suitable conditions for the invertebrate assemblage at Coroners Wood AWI site. Following the implementation of these measures, the adverse effects on the invertebrate assemblage at Coroners Wood AWI site will be reduced to a level that is not significant.

## **Badger**

- 7.4.57 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 and the implementation of measures in the draft CoCP. This will include the provision of badger proof fencing and replacement setts where necessary.

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

- 7.4.58 This section describes likely significant residual ecological effects during construction, taking account of the mitigation and compensation proposed.
- 7.4.59 Ancient woodland is irreplaceable and the loss of 0.5ha of this habitat will result in a permanent adverse residual effect upon ancient woodland at Coroners Wood, that will be significant at the national level.
- 7.4.60 On a precautionary basis it is assumed that there will be a net loss in hedgerow of 22.1km, which will result in a permanent adverse residual effect that is 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.
- 7.4.61 The assumed loss of two veteran trees will result in a permanent adverse residual effect that will be significant at national level in each case.

## **Cumulative effects**

- 7.4.62 No cumulative effects on ecological receptors have been identified from other committed developments in the Broomedge to Glazebrook 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:
- Bridgewater Canal viaduct, River Bollin West viaduct, Manchester Ship Canal viaduct and M62 West viaduct will provide ecological connectivity under the route of the Proposed Scheme to adjacent habitats. Ecological connectivity beneath the route of the Proposed Scheme will be maintained for a combined length of 2.6km of viaducts in the Broomedge to Glazebrook area. This will reduce habitat fragmentation and barrier effects, allowing free passage of wildlife at these locations;
  - Footpath Warburton 3 accommodation overbridge and Spring Lane underbridge will maintain farm access and/or public access over or beneath the route of 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 bridges will facilitate wildlife movement across the Proposed Scheme; and
  - where the route of the Proposed Scheme will cross a watercourse, an appropriately designed culvert 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-015-0MA04.

### 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>55</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 route of the Proposed Scheme bisects, or is 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 route of the Proposed Scheme is in cutting, at grade or on embankment) at the point the impact occurs.
- 7.5.7 Hedgerow and woodland habitat creation along Warrington Lane and adjacent to Bridgewater Canal viaduct will encourage bats flying east-west to cross beneath the route of the Proposed Scheme at Bridgewater Canal viaduct. Woodland habitat creation adjacent to the Proposed Scheme and hedgerow planting will connect foraging habitats along the Bridgewater Canal with woodland adjacent to the River Bollin, to the north.
- 7.5.8 Woodland planting and hedgerow creation at Spring Lane, Little Heatley will encourage bats associated with the Bridgewater Canal assemblage to cross under the Proposed Scheme, east-west via Spring Lane underbridge. Hedgerow creation and woodland planting will connect this area to foraging and commuting habitats along the Trans Pennine Trail and the River Bollin, and to wet grassland and wet woodland habitat creation, at Fox Covert and Meadows SBI.
- 7.5.9 Hedgerow creation at Warburton Park will encourage bats to pass under Manchester Ship Canal viaduct and will also connect woodland created along the route of the Proposed Scheme to Coroners Wood.
- 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 Broomedge to Glazebrook area.

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<sup>55</sup> Schaub, A., Ostwald, J. & Simeers, B.M. (2008), *Foraging bats avoid noise*, Journal of Experimental Biology, 211, 3174-3180.

## **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 embankments and are slow moving and are, therefore, likely to be subject to collision with high speed trains. Whilst no evidence of breeding was found, a barn owl was recorded in the vicinity of Lower Carr Green Farm and two barn owl nest boxes were noted between Heatley and Mossbrow. 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>56</sup>. This means that more barn owls are likely to be affected than those that may be present in the vicinity of the Proposed Scheme, such as at Lower Carr Green Farm. This will result in a permanent residual adverse effect on barn owls that is 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 route 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.

## **Cumulative effects**

- 7.5.14 No cumulative effects on ecology receptors have been identified from other committed developments in the Broomedge to Glazebrook area.

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<sup>56</sup> Pringle, H., Siriwardena, G. & Toms, M. (2016), *Informing best practice for mitigation and enhancement measures for Barn Owls*, British Trust for Ornithology, Thetford.



## **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 Broomedge to Glazebrook area.

## 8 Health

### 8.1 Introduction

- 8.1.1 This section identifies the communities within the Broomedge to Glazebrook 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 operators of Lymm Cruising Club, an affected resource within the Broomedge to Glazebrook study area.
- 8.1.4 This section deals specifically with impacts at a local level within the Broomedge to Glazebrook 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>57</sup>, are contained in Volume 5: Appendix HA-001-0MA04 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: MA04 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>57</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-001-0MA04. 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 Broomedge to Glazebrook 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 Broomedge to Glazebrook 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 Broomedge to Glazebrook area

8.3.1 The route of the Proposed Scheme will run from Broomedge in the south, passing close to the settlements of Agden, Little Heatley, Heatley, Mossbrow, Warburton, Partington, Hollins Green, Cadishead, and to Glazebrook in the north. The Broomedge to Glazebrook area is predominantly rural in nature; the majority of community facilities are located in the larger settlements of Lymm, Partington, and Cadishead. A more detailed description of community facilities is provided in Section 6, Community.

#### Broomedge, Warburton, Partington and surrounds

- 8.3.2 This area covers the settlements of Broomedge, Agden, Heatley, Warburton, Partington and surrounds, from the southern boundary of the Broomedge to Glazebrook area to the Manchester Ship Canal to the north.
- 8.3.3 The route of the Proposed Scheme will be located to the east of the village of Broomedge, which has approximately 250 residential properties. The nearest residential properties are 850m from the route of the Proposed Scheme. Agden is a settlement of approximately 150 residential properties, the nearest of which are approximately 10 properties located 100m east of the route of the Proposed Scheme.
- 8.3.4 The route of the Proposed Scheme will be to the west of Little Heatley, a hamlet with approximately 10 residential properties that are close to each other; some residential properties in Little Heatley are on the route of the Proposed Scheme. There are a number of individual properties located along Wet Gate Lane that are to the west of these properties, and along Spring Lane that are to the east of the approximately 10 properties. The route of the Proposed Scheme will be located to the east of Heatley, which has approximately 150 residential properties, approximately 550m from the nearest residential properties.
- 8.3.5 Warburton is a settlement comprising the village of Warburton and hamlet of Mossbrow; together they comprise approximately 150 residential properties. The nearest residential properties are located approximately 65m west of the Proposed Scheme. Warburton and Mossbrow have close links and share local facilities.
- 8.3.6 The route of the Proposed Scheme will be to the south-west of Partington, which has approximately 3,400 residential properties. The Proposed Scheme will be approximately 500m from the nearest residential properties. Community facilities within Partington

including schools, several care homes, a number of General Practitioner (GP) surgeries, Partington Children's Centre, recreational facilities such as the Partington Sports Village, and open spaces such as Coroners Wood.

- 8.3.7 Promoted routes and public rights of way (PRoW) in the area include the Trans Pennine Trail, which also forms part of National Cycle Route 62. The Trans Pennine Trail is a predominantly traffic-free route which links Fleetwood (in Lancashire) with Selby (North Yorkshire). Other promoted routes include the Cheshire Ring Canal Walk along the Bridgewater Canal towpath, the Mersey Valley Timberland Trail, and the Bollin Valley Way (a 40km walking route linking Macclesfield with Partington) alongside part of the Manchester Ship Canal.

### **Hollins Green, Cadishead, Glazebrook and surrounds**

- 8.3.8 This area covers the settlements of Hollins Green, Cadishead, Glazebrook and surrounds, from the Manchester Ship Canal in the south to the northern boundary of the Broomedge to Glazebrook area.
- 8.3.9 The route of the Proposed Scheme will be located to the east of the village of Hollins Green, which has approximately 400 residential properties. The route of the Proposed Scheme will be approximately 120m from the nearest residential properties. Hollins Green has a small number of community facilities, including St Helen's Church of England (CoE) Primary School, Church of St Helen, Hollinfare Cemetery, Rixton-with-Glazebrook Community Hall, a community shop, a post office, two public houses and a recreation ground.
- 8.3.10 The route of the Proposed Scheme will be located to the west of Cadishead, a suburb of Salford. The settlement has approximately 2,000 residential properties and the nearest residential properties will be located approximately 350m from the route of the Proposed Scheme. The south-west of Cadishead, which is within the study area, has several community resources, including the Longfield Lodge NHS Medical and Dental Centre and two recreation grounds.
- 8.3.11 The route of the Proposed Scheme will be located to the west of the village of Glazebrook, which has approximately 100 residential properties, the nearest of which are located 350m north-east of the Proposed Scheme. Camsley Grange Riding for the Disabled (a charity to enable access to horse riding for disabled people in the Warrington, Lymm and Irlam areas) is located on the outskirts of Glazebrook and will be adjacent to the route of the Proposed Scheme.
- 8.3.12 There is one promoted PRoW in the area, which is the Glazebrook Timberland Trail. It is an 18km long-distance walking route which runs west of Cadishead, linking the Manchester Ship Canal with Pennington Flash Country Park 9km to the north.

### **Demographic and health profile of the Broomedge to Glazebrook area**

- 8.3.13 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.

- 8.3.14 The communities affected by the Proposed Scheme in the Broomedge to Glazebrook area have a relatively low population density compared to the national average.
- 8.3.15 Public health indicators have been benchmarked by Public Health England<sup>58</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.
- 8.3.16 The English Indices of Deprivation<sup>59</sup> rank neighbourhoods from most to least deprived, according to a range of criteria and an overall (combined) ranking. The neighbourhoods in the Broomedge to Glazebrook area are generally more deprived than the national average, falling mainly within the 10% to 50% most deprived bands.
- 8.3.17 This area as a whole is considered to be slightly less resilient than the national average with regard to changes in the relevant health determinants, with some specific vulnerabilities in terms of the health status of the population.
- 8.3.18 The available data provide detail down to local authority and ward level and enable a profile to be made of the population within the Broomedge to Glazebrook 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)

- 8.3.19 Volume 5: Appendix CT-004-00000 provides details of the developments in the Broomedge to Glazebrook area that are assumed to have been implemented by 2025. The following committed developments of relevance to the health assessment that would materially alter the future baseline during construction of the Proposed Scheme in this area, are set out in Table 15.

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<sup>58</sup> Public Health England (2019), *Local Authority health profiles*. Available online at: <https://fingertips.phe.org.uk/profile/health-profiles>.

<sup>59</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>.

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**Table 15: Committed developments of relevance to health during construction**

Map book reference <sup>60</sup>	Planning reference	Description	How this is considered in the assessment
MA04/026	Saved Policies of the City of Salford Unitary Development Plan 2004-2016 Allocation R6.2	Location: Liverpool Road/Mytholme Avenue, Cadishead. New and improved recreation land and facilities.	Informing future baseline.
MA04/032	2017/31705	Location: Hollingreave Farm, Dam Lane, Rixton-with-Glazebrook, Warrington, WA3 6LE Demolition of existing farmhouse and erection of a replacement dwelling. Conversion of two existing agricultural buildings to create 5 dwellings; removal of redundant structures and provision of landscaping.	Informing future baseline.
MA04/105	86160/OUT/15	Location: land at Lock Lane, adjoining the Manchester Ship Canal, Partington. Application to extend the time limit for the implementation of planning permission H/OUT/68617 (Outline application, including details of access, for residential development of up to 550 dwellings; associated footpath, landscaping and ecological works).	Informing future baseline.
MA04/121	97897/FUL/19	Location: land North of Oak Road and West of Warburton Lane, Partington. Erection of 75 new affordable dwellings and ancillary infrastructure including new main site access of Oak Road.	Informing future baseline.

8.3.20 It is assumed that the following committed developments will be implemented and have been included as part of the future baseline and considered within this assessment:

- MA04/026 will result in the development of recreational land and facilities, located 35m north-east of the land required for the construction of the Proposed Scheme;
- MA04/032 will result in the development of six residential properties located 13m south-west of the land required for the construction of the Proposed Scheme;
- MA04/105 will result in a residential development located immediately east of the land required for the construction of the Proposed Scheme; and
- MA04/121 will result in a residential development located 428m north-east of the land required for the construction of the Proposed Scheme.

## Operation (2038)

8.3.21 Volume 5: Appendix CT-004-00000 also provides details of the developments in the Broomedge to Glazebrook area that are assumed to have been implemented by 2038. No

<sup>60</sup> Volume 5, Planning Data/Committed Development Map Book: Maps CT-13-312b to CT-13-314a.



additional 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 Broomedge to Glazebrook area are described in Section 2 and include the relocation of the Proposed Scheme 70m further to the east of Hollins Green to reduce impacts on Hollinfare Cemetery and on residents of Hollins Green.
- 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>61</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.
- 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;

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<sup>61</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

- 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-001-0MA04. 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 route of 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 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>62</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 The construction of Agden culvert and Heatley South embankment will be visible from street level around Agden Lane, Agden Brow, Warrington Lane and Spring Lane in Agden. Construction noise will be noticeable outdoors for approximately three years and ten months. People in these communities are likely to experience these features of the

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<sup>62</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.

Proposed Scheme as changing the quality of their neighbourhood and to regard that change as adverse, in diminishing the amenity of the settlement.

- 8.4.11 The construction of Heatley South embankment and River Bollin West viaduct will be visible from street level in the vicinity of Spring Lane and Wet Gate Lane, Little Heatley. Construction noise will be noticeable outdoors for approximately one year and six months. Wet Gate Lane will be a designated route for construction traffic to enable access to Wet Gate Lane satellite compound, and noise effects from construction traffic are expected to affect some properties along the road. 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, in diminishing the amenity of the settlement.
- 8.4.12 The construction of Manchester Ship Canal viaduct will be visible from street level in the vicinity of St Helen's Close and Manchester Road, Hollins Green. Construction noise will be noticeable outdoors for approximately 11 months. Manchester Road will be a designated route for construction traffic to enable access to Manchester Ship Canal viaduct north main compound and Manchester Ship Canal viaduct central satellite compound. There will be a significant increase in HGV traffic movements, between Dam Lane and Glazebrook Lane, during the construction period. 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, in diminishing the amenity of the settlement.

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

- 8.4.13 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.
- 8.4.14 The Proposed Scheme will intersect some public rights of way (PRoW) in the Broomedge to Glazebrook 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>63</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)

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<sup>63</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>.

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 Broomedge to Glazebrook area.

- 8.4.15 Construction traffic, including HGVs, will be present on local roads within the Broomedge to Glazebrook area as described in Section 14, Traffic and transport. The presence 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 Broomedge to Glazebrook area.

## **Social capital**

- 8.4.16 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>64</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.”

- 8.4.17 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

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<sup>64</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).

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evidence linking social capital with health and wellbeing can be found in Volume 5: Appendix HA-002-00000.

- 8.4.18 Settlements along the route of the Proposed Scheme 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. The majority of workers will reside at the Manchester Ship Canal viaduct north main compound, adjacent to Hollins Green and Glazebrook, which will provide temporary accommodation for up to 115 workers for approximately three years and six months. During the day, the workforce will be present on construction sites and compounds throughout the area, including work sites and satellite compounds in the vicinity of the settlements of Heatley, Mossbrow, Warburton, Partington, Hollins Green and Glazebrook. The daily average number of workers at each site will typically be between 50 and 70, 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 be noticeable, with construction vehicles using local roads to access compounds, and workers using facilities within local settlements, particularly Hollins Green.
- 8.4.19 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.
- 8.4.20 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.
- 8.4.21 Loss of residential properties can cause changes to the social environment within the remaining community. This could involve the direct loss of contacts in the local area and/or a noticeable reduction in the number of people using local facilities. For this to have an adverse impact on overall levels of social capital, the loss of homes would need to make up a sizeable proportion of the local community. This has been judged on a case-by-case basis, taking account of the size of the community and its characteristics. Therefore, not all of the significant effects from residential demolitions identified in Section 6, Community, will result in adverse effects on social capital.
- 8.4.22 The Proposed Scheme will result in the demolition of four of the concentrated properties at Little Heatley. This represents a sizable proportion of the local community. The erosion of social networks resulting from these demolitions will have the potential to reduce social capital, reducing the beneficial health effects that are gained through social contact and support.

8.4.23 The construction of Warburton cutting will require the permanent realignment of the A6144 Paddock Lane, which provides a link between the village of Warburton and hamlet of Mossbrow. The two settlements share community facilities. A small number of community facilities (Saracens Head public house, the Old Church of St Werburgh, the new Church of St Werburgh and the Parish Rooms) are located to the west of the Proposed Scheme, whilst Moss Brow farm shop is located to the east of the Proposed Scheme. Impacts on pedestrian and vehicle access including road closures and diversions, as described in Section 14, Traffic and transport, will temporarily affect access (vehicle and non-motorised users) between the two settlements and community facilities. Permanent realignment of the A6144 Paddock Lane will result in an increase in journey length of 950m between the Saracens Head public house and Moss Brow farm shop. Significant visual effects on residential properties are predicted to occur both temporarily and permanently as a result of construction of the Proposed Scheme. Stakeholder engagement feedback identifies that the community considers the Proposed Scheme will separate the settlements. Therefore, the reduced access, introduction of a visual barrier and feelings of separation from their fellow residents and community facilities will result in a loss of social capital and increased social isolation resulting from journey delays and increased travel time. This will reduce the beneficial health effects gained through social contact for some residents of Warburton and Mossbrow.

## Other mitigation measures

8.4.24 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.

8.4.25 No other mitigation measures are proposed in the Broomedge to Glazebrook area.

## Cumulative effects

8.4.26 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. No cumulative health effects have been identified.

8.4.27 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.

8.4.28 In Little Heatley, the construction of the Proposed Scheme will affect the neighbourhood quality and social capital of residents. It is expected that the whole population at Little Heatley will experience impacts on two or more health determinants during the construction of the Proposed Scheme, and this may therefore result in a cumulative effect on health.

## 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 Broomedge to Glazebrook area are described in Section 2 and include:

- noise fence barriers and landscape earthworks to provide acoustic screening for residents of properties in Broomedge, Agden, Little Heatley, Mossbrow, Warburton, Hollins Green, Glazebrook and users of the Bridgewater Canal;
- earthworks to soften viaduct abutments, and landscape mitigation planting to help integrate the Proposed Scheme into the surrounding landscape at Heatley, Mossbrow, Warburton, Partington and Glazebrook; and
- realignment of Footpath Warburton 3, which will carry part of the Bollin Valley Way across the route of the Proposed Scheme, to avoid severance of this promoted PRoW.

### 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-001-0MA04. 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 around Agden and Little Heatley. These operational impacts will be experienced alongside permanent construction impacts, including the presence of the railway infrastructure within the local landscape.

8.5.4 The trains running on Lymm North embankment, Bridgewater Canal viaduct and Heatley South embankment will be visible from residential streets around Agden. Noise from passing trains will also be noticeable in these areas. Residents living in these areas are likely to experience these features of the Proposed Scheme as changing the quality of their neighbourhood and to regard that change as adverse.



- 8.5.5 The trains running on Heatley South embankment and River Bollin West viaduct will be visible from residential properties in Little Heatley. Noise from passing trains will also be noticeable in this area. These changes are likely to be regarded as adverse to the neighbourhood quality of Little Heatley by the residents of this area.

## **Other mitigation measures**

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

## **Cumulative effects**

- 8.5.7 No cumulative effects have been identified.

## **Monitoring**

- 8.5.8 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.
- 8.5.9 Proposals for monitoring of precursors to health effects, such as air quality and noise, are reported in Sections 5 and 13.
- 8.5.10 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 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 Broomedge to Glazebrook 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, Warrington Borough Council, Trafford Metropolitan Borough Council, Cheshire Archaeology Planning Advisory Service, Greater Manchester Archaeological Advisory Service, National Trust and Canal & River 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>65</sup>) reports accompany this section of the report. These are:
- Volume 5: Appendix HE-002-OMA04 – Summary gazetteer, impact assessment table and archaeological character areas;
  - Volume 5: Appendix HE-003-OMA04 – 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-OMA04 – Historic environment baseline report (including a full gazetteer of heritage assets);
  - BID HE-004-OMA04 – Historic environment field survey report (geophysical survey), and Map Book HE-004; and
  - BID HE-005-OMA04 – Historic environment remote sensing survey report (aerial photograph and LiDAR<sup>66</sup> assessment), and Map Book HE-005.
- 9.1.4 Heritage assets have been given a Unique gazetteer identifier (UID), for example MA04\_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>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>.

<sup>66</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: MA04 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>67</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 heritage 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 the 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. However, the 2km study area is not included in reporting for utilities and/or highway improvement works in instances where there is very limited potential for significant effects from those works beyond the 500m 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.
- 9.2.7 For the purpose of this assessment, it is generally assumed that heritage assets within the land required for the construction of the Proposed Scheme will be removed. Exceptions to

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<sup>67</sup>Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

this are linear heritage assets (canals and railways) which although partially located within the land required for the construction of the Proposed Scheme will not be removed.

## 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-001-0MA04. In addition to the desk-based assessment, the following surveys have been undertaken in the Broomedge to Glazebrook area:

- 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-005-0MA04); and
- a programme of non-invasive geophysical survey in areas identified as suitable for this survey method and where access was granted (BID HE-004-0MA04).

### Designated assets

9.3.2 Designated heritage assets within the 2km study area are described in Volume 5: Appendix HE-002-0MA04. There are no designated heritage assets located partially or wholly within the land required for the construction of the Proposed Scheme.

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 9.5, are named below:

- three scheduled monuments, all of which are of high heritage value, comprising two moated sites and a promontory fort;
- a Grade I listed church of high heritage value;
- seventy-five Grade II listed buildings of moderate heritage value including: six associated with the Bridgewater Canal; a church and three other assets in Lymm; seven buildings within the Dunham Woodhouses Conservation Area, 10 within the Dunham Town Conservation Area and a further two assets related to the Dunham estate; eight buildings in the Warburton Village Conservation Area and a further 10 on the periphery of Warburton village including The School (MA04\_0052) and Post Office House (MA04\_0042); 12 farmhouses or farm structures e.g. barns, across the landscape; nine 18th or 19th century halls or houses or their associated structures e.g. wells; two assets within Partington; three assets in Hollins Green; one asset west of Hollins Green; and one asset near Glazebrook;
- one Grade II\* registered park and garden of high heritage value; and

- five conservation areas of moderate heritage value, including Warburton Village Conservation Area (MA04\_0061).

## 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 9.5, are named below:

- there are no non-designated heritage assets of high heritage value located wholly or partially within land required for the Proposed Scheme;
- two non-designated assets of moderate heritage value lie wholly or partially within the land required for the construction of the Proposed Scheme. This includes two canals; and
- fourteen non-designated assets of low heritage value lie wholly or partially within land required for the Proposed Scheme, including; a pillow mound east of Warburton Park Farm (MA04\_0142), Warburton Park (MA04\_0147), the site of a brick yard, east of Millbank Hall (MA04\_0153), irregular linear cropmarks north-west of Warburton Park (MA04\_0156), Rixton Corn Mill (MA04\_0178), Heatley Heath Farmhouse (MA04\_0193), Dam Head Lane Bridge over Glazebrook Railway (also known as the Liverpool to Manchester Line (via Warrington Central) (MA04\_0195), training area HMS Gosling (MA04\_0204), firing range (MA04\_0205), military camp HMS Gosling (MA04\_0206), possible park pale (MA04\_0260), possible salters (MA04\_0262) and two other assets.

9.3.5 The non-designated heritage assets summarised below lie wholly or partially within the 500m study area:

- one non-designated asset of high heritage value within Hollins Green, Hollinfare Cemetery (MA04\_0085); and
- one hundred and four archaeological and built heritage assets of moderate and low heritage value providing evidence of activity from the Roman period through to the post-medieval in Warburton including farms, cottages and associated assets which reflect the rural landscape of the area.

## Historic environment overview

9.3.6 The bedrock geology of the Broomedge to Glazebrook area mainly comprises mudstone and siltstone of the Mercia Mudstone Group. The bedrock for the majority of the area is overlain by superficial deposits of glacial till. Alluvium, comprising organic rich silty clay, silt, sand and gravel is present along the courses of the River Mersey and River Bollin, and an area of peat is located within the northern extent of the study area at Warburton and Glazebrook Moss. Areas of drier superficial glacial deposits have been the focus for early settlement and activity above lower lying river valleys and mosses.

9.3.7 Evidence for Palaeolithic activity in north-west England is scarce, possibly because much of the region at this time was at the edge of, or under, glacial ice. Climatic warming led to a rise in sea levels and a change in vegetation patterns. Open landscapes were replaced by areas

of woodland habitat and species such as arctic hare and reindeer gave way to boar and deer. Mesolithic hunter-gatherer societies began to develop and allowed for the subsequent emergence of early agricultural societies in the Neolithic period. Evidence of activity in the Mesolithic period is limited to worked flint scatters from tools recovered from a sand and gravel ridge east of Warburton. The ridge is likely to have served as an access route across inaccessible wetland and moss. This may indicate that humans were hunting deer and wildfowl and gathering resources from the surrounding wetlands.

- 9.3.8 The Neolithic period is when hunting and gathering societies moved towards a more settled farming lifestyle. Palaeoenvironmental evidence from within peat layers at Warburton Moss indicate that there were farming settlements in the area during the Late Neolithic or the Early Bronze Age. Archaeological evidence from the Bronze Age is rare and there is no definitive evidence of settlement in the study area. Find spots in Warburton, Lymm and Hollins Green, of stone tools, axes and deer antler implements, also suggest people were hunting, farming or clearing woodland in this period.
- 9.3.9 The Iron Age is characterised nationally by the introduction of iron metalwork including swords, horse equipment and decorative items. However, the introduction of new metalwork may not have resulted in changes in society, which largely continued unchanged from the end of the Bronze Age. The area of the River Mersey was controlled by tribal groups called the Brigantes and Cornovii. The first settlement evidence in the study area is the Iron Age promontory fort located 300m west of Great Woolden Hall Farm (MA04\_0186). This is an example of a defended settlement, which may have acted as a centre for an emerging elite. The asset comprises a double-ditched enclosure encompassing a farmstead and several roundhouses of timber construction. Pottery associated with the process of salt production was identified at the site and is indicative of trade with salt-working sites in mid-Cheshire.
- 9.3.10 Although Britain came under Roman control after AD 43 it was not until AD 70 that the Romans began to occupy the area of Cheshire and Greater Manchester. Forts were present at Wigan, Manchester, Wilderspool and Walton-le-Dale (Preston). A network of roads spread out across the north-west England connecting these forts. Archaeological evidence suggests settlement was restricted to isolated settlements or farmsteads. Excavations in Warburton, south of Moss Brow Farm (MA04\_0115), noted the presence of Prehistoric or Roman fields and metalwork findspots of a brooch and spindle whorl provided evidence for occupation in this period. There was also continued occupation of the Iron Age site near Great Woolden Hall Farm (MA04\_0186) into the Roman period.
- 9.3.11 After the withdrawal of Roman rule in the 5th century AD, the region fragmented into smaller kingdoms. Mercia, Northumbria and, finally, Wessex controlled the region between the 7th and 10th centuries. In the early medieval period, archaeological evidence becomes increasingly scarce and knowledge of the period is largely dependent on documentary sources. Visibility of archaeological sites, particularly in the lowlands, is poor and no early medieval archaeology is recorded within the study area. This may be due in part to the fact the period is under-studied in the north-west of England. However, there are also few confirmed early medieval rural settlement sites across the region.

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- 9.3.12 In the medieval period, the rural settlement pattern in the study area was small hamlets and isolated farmsteads. The only settlement in the study area recorded in the Domesday Survey of 1086 is Warburton, first noted as 'Warburgetune'. Warburton Park (MA04\_0147) is a medieval deer park which covered much of the north-western quarter of the village and it is possible that the boundary partially survives. Warburton Lane forms the eastern limit, whilst the former course of the River Mersey to the west and Red Brook to the north, form the remaining boundary. A low bank may indicate the northern park pale used to stop the deer from straying outside of the park (MA04\_0260). Some linear cropmarks (MA04\_0156) may be a further park pale or a salter, which was a form of park management used to bring deer into the park, but stopped them from exiting. Similarly, two large, irregular depressions are also possibly salters (MA04\_0262). Within the extents of the park are a series of interconnected cut features which are probably fishponds (MA04\_0259). The park also contains a pillow mound, a square earthwork platform which is an artificial rabbit warren (MA04\_0142), previously interpreted as a possible burial mound.
- 9.3.13 The Old Church of Saint Werburg (MA04\_0001) retains elements dating to the 12th century. An associated Norbertine priory and the site of a mill are also of this date. The Hollins Ferry (MA04\_0140), first noted in 1352, crossed the Mersey from Warburton to Hollins Green. The original focus of settlement to the north of the river is also likely to be medieval in date. The peat mosses across the north of the study area, including Glazebrook Moss, Little Woolden Moss and Great Woolden Moss played an important role for seasonal pasture, hunting and peat cutting for fuel in this period.
- 9.3.14 The post-medieval period witnessed the transformation of much of north-west England from relatively impoverished to a key region in the early stages of the industrialisation of Britain. Until the later 18th century involvement in agriculture formed the employment of most working people. Agricultural activity, particularly dairy farming, was extended and waste land, common land and other marginal areas were increasingly enclosed, bringing them in to use for farming. This is particularly prevalent within the Warburton village and mosslands historic landscape character area (HLCA; MA04\_HLCA01). Large, amalgamated fields are characteristic of the HLCA and represent the post-medieval agricultural improvement of the area. Much of the enclosed agricultural land was former mossland, such as Warburton Moss, that was drained and improved. In recent times, areas of moss have been cleared and destroyed by development, peat cutting and deterioration due to environmental change. However, the deep stratigraphy provides a highly suitable environment for the preservation of archaeological and palaeoenvironmental material. The intensification of agricultural practices such as dairy farming would have supported growing populations in the north-western industrial heartland, such as Manchester and Liverpool. Many small farmsteads, such as Heatley Heath Farmhouse (MA04\_0193), are evident throughout the study area and were likely used for dairy farming. The mosses, such as Glazebrook Moss within the study area, also underwent great change as part of this process of industrialisation. Nightsoil (human excrement), from Manchester was often added to the mosses as fertiliser and many areas were converted to farmland.



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- 9.3.15 Transport links were improved from the 18th century including the turnpiking of roads, such as the A57 Manchester Road in the study area, and the construction of the Bridgewater Canal (MA04\_0082) which was completed in 1765. The Manchester Ship Canal (MA04\_0083), constructed in 1894, enabled Manchester to develop as an inland port. This allowed for greater access to raw materials and an increased number of outlets for its products. The canal is closely associated with the route of the River Mersey and following its construction the boundaries of the parish of Warburton and the counties of Cheshire and Lancashire were moved northwards to the centre of the new canal. At Warburton, the curve of the River Mersey was bypassed. The original meander can still be seen to the rear of the Old Church of Saint Werburg (MA04\_0001) and its adjacent rectory.
- 9.3.16 The 18th and early 19th centuries brought significant development of the iron industry, which, in conjunction with the innovations in steam and industry, allowed railway technology to develop rapidly. The extension and improvement of rail transportation links necessitated the need for more train infrastructure. Dam Head Lane Bridge (MA04\_0195) over the Glazebrook Railway (also known as the Liverpool to Manchester Line (via Warrington Central)) reflects how improvements in the railway allowed access to smaller villages, such as Hollins Green.
- 9.3.17 During the late 19th century Warburton village, now a conservation area (MA04\_0061), went through a period of regeneration undertaken by Roland Egerton-Warburton, the estate owner, to the designs of the famous Chester architect John Douglas. Egerton-Warburton was responsible for the construction of a number of new buildings in the village, including the new Church of Saint Werburg (MA04\_0049), the School (MA04\_0052) and Post Office House (MA04\_0042), along with the renovation of other buildings. The Douglas style, heavily influenced by the Arts and Crafts movement, was adopted in other later restorations throughout the village, creating an element of consistency and cohesion in architectural styles.
- 9.3.18 The building of the Manchester Ship Canal transformed Partington, to the east of the Proposed Scheme, into a major coal exporting port. The growth of Partington continued into the 20th century when the construction of a steel works was begun in 1910 by the Partington Iron and Steel Company. As the steel works grew, a wharf on the canal was built that allowed for ocean going ships to directly offload. Other industry, including a brick yard, east of Millbank Hall (MA04\_0153) was also attracted to the area. The development of new roads and motorway links, by the mid-20th century, allowed people to live away from Manchester and led to the construction of large-scale housing development. This increase in housing and infrastructure made a particular impact on the areas around Birchwood, Cadishead and Partington. Despite the growth of Manchester and surrounding areas during the 19th and 20th century, the study area has witnessed little in the way of change, remaining predominantly rural in nature. Small scale growth in Hollins Green necessitated the dedication of a new cemetery, Hollinfare Cemetery (MA04\_0085), as the old graveyard at the Church of St Helen (MA04\_0054) reached capacity.
- 9.3.19 Warburton village significantly changed during the 20th century, when it was sold by the Warburton family in 1918, to the Co-operative Wholesale Society (Co-op). For the Co-op, this

was part of a wider policy of purchasing estates and farms, mainly for the extraction of salt deposits. When the extraction of salts proved unviable the Co-op began selling off parts of the estates, with the final piece of farmland sold in 2008. Other 20th century developments in Warburton included the closure of the railway in 1965, and the amalgamation of many fields and consequent removal of field boundaries in the middle decades of the century. From the late 1960s onwards, there was a shift away from dairy farming back towards arable production. This is reflected in the abandonment of many of the shippens (cattle sheds) on the farms of the townships, as seen at Paddock Lane Farm (MA04\_0106) and Wigsey Farmhouse (MA04\_0040), Warburton.

- 9.3.20 Within the study area, military sites are also evident. The Royal Navy Air Training Establishment (RNATE) opened HMS Gosling in July 1942, as a training depot. HMS Gosling comprised five separate, dispersed sites with the headquarters and administrative centre at camp 1, New Road, Croft. The other four sites were training camps; camp 2 at Risley, camp 3 at Lady Lane Croft and camp 4 at Lowton. Camp 5 (MA04\_0206) was located within the study area at Glazebrook. Although the military camp (MA04\_0206) and associated training ground (MA04\_0204) no longer exist, the remains of the firing range (MA04\_0205) are still standing. In March 1946 HMS Gosling became a general service training establishment. The camps associated with HMS Gosling closed in October 1947.

## **Future baseline**

### **Construction (2025)**

- 9.3.21 Volume 5: Appendix CT-004-00000 provides details of the developments in the Broomedge to Glazebrook 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)**

- 9.3.22 Volume 5: Appendix CT-004-00000 provides details of the developments in the Broomedge to Glazebrook area that are assumed to have been implemented by 2038. No committed developments of relevance for historic environment have been identified that would materially alter the future baseline in this area.

## **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>68</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.
- 9.4.3 The following design measures have also been included to reduce impacts on heritage assets in the Broomedge to Glazebrook area:
- the realignment of the route of the Proposed Scheme to 70m east of Hollins Green, which will reduce impacts on Hollinfare Cemetery (MA04\_0085); and
  - the inclusion of landscape mitigation planting within the Warburton area. As it matures the planting will increasingly reduce the effect of changes to the setting of assets within the study area. This includes the Warburton Village Conservation Area (MA04\_0061).

## 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-002-0MA04). 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-003-0MA04, 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 heritage 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 heritage value.
- 9.4.7 Hollinfare Cemetery (MA04\_0085) is a non-designated, locally listed asset of high heritage value. The land required for construction of the Proposed Scheme is to the immediate north and east of the asset. The cemetery opened in 1894 as an overflow for the old churchyard at

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<sup>68</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

the Church of St Helen (MA04\_0054) and has become a multi-denominational cemetery to reflect the diverse society of the area. It includes six Commonwealth War Graves. The asset derives its heritage value from its historical use as a cemetery and as a place of remembrance and reflection. The setting of the cemetery comprises its edge-of-village location and the arable fields which lie north of the cemetery. The character of the cemetery is peaceful which is accentuated by the tall trees and fence which surround the cemetery, creating a quiet experience for contemplation, reflection and remembrance. The location of the Manchester Ship Canal viaduct north main construction compound to the immediate north-east of the asset will introduce noise, movement of traffic, machinery and lighting into the agricultural land around the cemetery. This will detract from the peaceful character of the asset and change the experience of quiet contemplation. This will constitute a medium impact and will result in a major adverse significant effect.

- 9.4.8 Warburton Village Conservation Area (MA04\_0061) is a designated heritage asset of moderate value located approximately 180m at its nearest point to land required for the construction of the Proposed Scheme. Warburton Village Conservation Area has heritage value from its long history of settlement from the medieval period. The architectural style of John Douglas, heavily influenced by the Arts and Crafts movement, was adopted in other later restorations throughout the village. This created an element of consistency and cohesion in architectural styles, which contributes to the heritage value of the conservation area. The buildings within the conservation area include farm buildings and farmhouses, which are inextricably linked with the surrounding fields. Although the roads that skirt the village, the B5159 Townfield Lane to the west and the A6144 Bent Lane to the east, are relatively well-used, the A6144 Paddock Lane within Warburton remains in keeping with its small rural village location. The setting of the conservation area is rural agricultural land to the immediate south of the Manchester Ship Canal and former route of the River Mersey. Long distance views over the surrounding agricultural land are characteristic of the conservation area. The surrounding agricultural landscape has remained largely unchanged by the spread of Manchester to the north-east. The presence of construction machinery and the A6144 Paddock Lane satellite compound, east of the asset, will alter the rural setting. This will alter the distinct rural character of the conservation area and will disrupt the key views into the surrounding agricultural landscape. This will constitute a medium impact and will result in a moderate adverse significant effect.

## **Permanent effects**

- 9.4.9 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 heritage value.
- 9.4.10 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.

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- 9.4.11 The site of a pillow mound, east of Warburton Park Farm (MA04\_0142), a non-designated asset of low heritage value, is located within land required for the construction of the Proposed Scheme. The asset has been recorded as a burial mound but has recently been reinterpreted as a possible pillow mound associated with the medieval deer park at Warburton (MA04\_0147). It will be removed as a result of the construction of the Proposed Scheme. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.12 Warburton Park (MA04\_0147), the remains of a medieval deer park, a non-designated asset of low heritage value, is located partially within land required for the construction of the Proposed Scheme. Warburton Park has heritage value due to its medieval history and its surviving remains, in the form of the park outline. The park has group value with archaeological remains that help explain its former function. These include the pillow mound (MA04\_0142) east of Warburton Park Farm, the possible park pale (MA04\_0260), possible salters (MA04\_0262) and irregular linear cropmarks north-west of Warburton Park (MA04\_0156), that represent medieval features of the deer park including an artificial rabbit warren, deer fences and deer leaps. The asset will be partially removed to establish the A6144 Paddock Lane satellite compound, the Warburton embankment, the Manchester Ship Canal viaduct south satellite compound, and Manchester Ship Canal viaduct. The Proposed Scheme will bisect the park, entirely altering its character and removing associated archaeological remains that contribute to its heritage value. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.13 The possible park pale (MA04\_0260) and possible salters (MA04\_0262), located within Warburton Park (MA04\_0147), are non-designated assets of low heritage value and are both partially located within the land required for the construction of the Proposed Scheme. Both assets will be removed to establish the Manchester Ship Canal viaduct. This will constitute a high impact and result in a moderate adverse significant effect, for both assets.
- 9.4.14 The site of irregular linear cropmarks north-west of Warburton Park (MA04\_0156), a non-designated asset of low heritage value, is located within land required for the construction of the Proposed Scheme. It is likely that the asset is associated with Warburton Park (MA04\_0147) and possibly represents the remains of a salter or the park pale. The asset will be removed as a result of the construction of the Proposed Scheme. This will constitute a high impact and a moderate adverse significant effect.
- 9.4.15 The training area (MA04\_0204), firing range (MA04\_0205) and military camp (MA04\_0206) are all non-designated assets of low heritage value, located within the land required for the construction of the Proposed Scheme. The three assets are all associated with the former Second World War HMS Gosling military camp 5, which was part of the RNATE at Risley. All three assets will be removed as a result of the construction of the Proposed Scheme. This will constitute a high impact and a moderate adverse significant effect for each asset.
- 9.4.16 Heatley Heath Farmhouse (MA04\_0193), a non-designated heritage asset of low heritage value, is located within land required for the construction of the Proposed Scheme. The asset is the 19th century farmhouse but does not include the modern stable buildings. The

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

- 9.4.17 The site of a post-medieval brick yard, east of Millbank Hall (MA04\_0153), a non-designated asset of low heritage value, is located within land required for the construction of the Proposed Scheme. The asset will be removed as a result of the construction of the Proposed Scheme. This will constitute a high impact resulting in a moderate adverse significant effect.
- 9.4.18 The site of a post-medieval Rixton Corn Mill (MA04\_0178), a non-designated asset of low heritage value, is located within land required for the construction of the Proposed Scheme. The asset will be removed as a result of the construction of the Proposed Scheme. This will constitute a high impact resulting in a moderate adverse significant effect.
- 9.4.19 Dam Head Lane Bridge over Glazebrook Railway (MA04\_0195), a non-designated asset of low heritage value, is located within land required for the construction of the Proposed Scheme. The 19th century bridge will be demolished to accommodate the construction of Glazebrook South embankment. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.20 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.
- 9.4.21 Warburton Village and reclaimed mosslands HLCA (MA04\_HLCA01) is of moderate heritage value. It comprises Warburton village, Warburton Park and the surrounding agricultural land which includes large areas of reclaimed mossland. The HLCA has heritage value because it retains elements of its historic rural landscape, such as medieval field patterns of piecemeal enclosure, which represent traces of the former medieval deer park at Warburton. Agricultural practices have removed field boundaries associated with the former Warburton and Dunham Moss. Despite the proximity of the industrial areas of Partington to the north and the construction of the Manchester Ship Canal, the HLCA has remained rural in character. The route of the Proposed Scheme runs against the grain of existing infrastructure such as the Manchester Ship Canal and the former route of the Warrington and Stockport railway line. The Proposed Scheme will adversely impact the heritage value of the HLCA as it will cut through the area of medieval piecemeal enclosure to the north-east. The Proposed Scheme will alter the overall character of the HLCA by disconnecting the village of Warburton from the surviving elements of its historic rural landscape and severing its relationship with the area of Warburton deer park. This will constitute a medium impact and result in a moderate adverse significant effect.
- 9.4.22 The following significant effect will occur as a result of permanent impacts on designated or non-designated heritage assets due to changes to their settings.
- 9.4.23 The School (MA04\_0052) and Post Office House (MA04\_0042) at Warburton village are Grade II listed buildings of moderate heritage value. The School is located approximately 200m west and the Post Office House directly south of the land required for the construction of the Proposed Scheme. The assets are a former school and post office to the east of



Warburton village which were constructed during the late 19th century regeneration of the village. Both buildings were designed by John Douglas. The assets derive much of their heritage value from their architectural and historic interest. They share group value with those assets within Warburton that underwent restoration in the style of John Douglas. The relationship between these assets and the rest of Warburton village to the west is legible, particularly through the architectural style of the John Douglas buildings at Mossbrow and Warburton. This setting makes a positive contribution to the heritage value of these assets. The construction of the Proposed Scheme will result in a visible division between the assets and Warburton village, which will reduce the legibility of the group value described above. In addition, the presence of Warburton cutting will change the rural character of these assets. This will constitute a medium impact and result in a moderate adverse significant effect.

## Other mitigation measures

- 9.4.24 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 heritage assets can be reduced through the detailed design of the works.

## Summary of likely residual significant effects

- 9.4.25 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.
- 9.4.26 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

- 9.4.27 No cumulative effects on heritage assets during construction have been identified in the Broomedge to Glazebrook 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: MA04 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 including Hollinfare Cemetery (MA04\_0085).

## **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 settings 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 Hollinfare Cemetery (MA04\_0085) a locally listed non-designated asset of high heritage value, located to the west of land required for the Proposed Scheme. The peaceful character of the asset contributes to its heritage value as described above. The character will be altered by the noise and movement of trains associated with the operation of the Proposed Scheme. This will reduce the experience of quiet contemplation within the cemetery and adversely impact its heritage value. This will constitute a low impact and result in 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 Broomedge to Glazebrook 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 No area-specific heritage monitoring requirements during operation of the Proposed Scheme have been identified.

## 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 Broomedge to Glazebrook 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 Warrington Borough Council (WBC), Trafford Metropolitan Borough Council (TMBC), the Environment Agency and the Animal and Plant Health Agency (APHA). 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-001-0MA04. Baseline data relevant to land quality are presented on Maps LQ-01-312b to LQ-01-314a (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: MA04 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>69</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>69</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, 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 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-002-0MA04<sup>70</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>71</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>70</sup> High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background and Information Data, Land quality baseline data*, BID LQ-002-0MA04. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

<sup>71</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 Coal Authority, Oil and Gas Authority (OGA), Network Rail, WBC, TMBC, Cheshire RIGS (Regionally Important Geological Sites) Group (CRG), Public Health England, the Environment Agency, Natural England and the APHA records, as well as online sources such as local geological trusts. Further details are given in Volume 5: Appendix LQ-001-0MA04 and BID LQ-002-0MA04 and presented on Maps LQ-01-1-312b to LQ-01-314a (Volume 5, Land quality Map Book).

### Geology

10.3.2 This section describes the underlying ground conditions within the Broomedge to Glazebrook area. Recent changes in lithostratigraphic classifications by the BGS have been incorporated where appropriate<sup>72</sup>.

10.3.3 Table 16 provides a summary of the geology (made ground, superficial and bedrock units) in the study area.

**Table 16: Summary of the geology underlying the land quality study area**

Category	Geology	Distribution	Formation description	Aquifer classification
Made ground	Made ground	BGS mapping indicates made ground associated with railway lines and the land between the Manchester Ship Canal and the A57 Manchester Road south of Hollins Green, including the area identified as historical Hollins Green Landfill.  Other sections of the study area have been previously developed as such made ground is likely to be present in all previously developed areas of the study area.	Made ground comprising variable deposits of reworked natural and man-made materials.	Not designated
Superficial	Peat	Glazebrook Moss underlies the northern end of the study area.	Partially decomposed vegetation.	Unproductive strata

<sup>72</sup> British Geological Survey (2014), *Lithostratigraphy of the Sherwood Sandstone Group of England, Wales and south-east Scotland*. Available online at: <http://pubs.bgs.ac.uk/publications.html?pubID=B07318>.

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Category	Geology	Distribution	Formation description	Aquifer classification
Superficial	Shirdley Hill Sand Formation	Most prevalent deposit identified to the south of the Manchester Ship Canal. Situated approximately 200m south of the Manchester Ship Canal and further south from Ship Lane extending south to the boundary with the Pickmere to Agden and Hulseheath area (MA03).	Sand	Secondary A aquifer
Superficial	Alluvium	Present along the course of the Glaze Brook and River Mersey (canalised as the Manchester Ship Canal), Red Brook, and River Bollin).	Organic rich clay, silt, sand and gravel.	Secondary A aquifer
Superficial	River terrace deposits	Isolated areas to the south of the River Bollin.	Sand and gravel	Secondary A aquifer
Superficial	Glaciofluvial sheet deposits	160m south of the Liverpool to Manchester Line (via Warrington Central) railway extending south to the A57 Manchester Road.  Immediately south of Coroners Wood to the south of the Manchester Ship Canal. Sub crops to the north of the alluvial deposits associated with the River Bollin and to the south extending to Spring Lane.	Sand and gravel	Secondary A aquifer
Superficial	Glaciofluvial deposits	North of the River Bollin, following the route of the Proposed Scheme from Moss Brow to Lower Carr Green Farm.	Sand and gravel	Secondary A aquifer
Superficial	Glacial till	Glacial till may be present beneath younger mapped deposits.  Mapped between the boundary with the Risley to Bamfurlong area (MA05) and the Manchester Ship Canal.  To the south of the Manchester Ship Canal glacial till is mapped in limited areas; three small areas around Jack Hey Gate Farm, north of Mossbrow, the south-west corner of the study area in two areas near Oak Villa Farm and near to Agden Lane Farm.	Sandy silty clay with gravel	Secondary (Undifferentiated) aquifer
Bedrock	Mercia Mudstone Group - Sidmouth Mudstone Formation - Northwich Halite Member	Between the southern boundary of the study area to north of the River Bollin.	Halite stone and mudstone	Unproductive strata

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Category	Geology	Distribution	Formation description	Aquifer classification
Bedrock	Mercia Mudstone Group - Sidmouth Mudstone Formation Bollin Mudstone Member	North of the River Bollin to 200m south of the Manchester Ship Canal extending northwards along the western side of the study area to the Manchester to Liverpool Line (via Warrington Central) railway.	Mudstone and siltstone	Secondary B aquifer
Bedrock	Mercia Mudstone Group - Tarporley Siltstone Formation	200m south of the Manchester Ship Canal extending north below the route of the Proposed Scheme to Church Farm at Glazebrook Moss.	Siltstone, mudstone and sandstone	Secondary B aquifer
Bedrock	Sherwood Sandstone Group - Helsby Sandstone Formation	Underlies the extreme south-west corner of the study area, just north of the A56 Higher Lane. The north east corner of the study area from Partington to Glazebrook.	Pebbly sandstone	Principal aquifer
Bedrock	Sherwood Sandstone Group - Wilmslow Sandstone Formation	In the south-west of the study area around Burford Lane and extending west outside of the study area. Also located under Little Woolden Moss.	Sandstone	Principal aquifer

10.3.4 A fault is located to the north-east of Lymm, running in a north-west to south-east orientation. The fault forms a divide between the Mercia Mudstone Group to the north and the Sherwood Sandstone Group to the south. A second fault is mapped in a similar orientation within the Tarporley Siltstone and Helsby Sandstone passing beneath historical Hollins Green landfill and the Manchester Ship Canal.

10.3.5 Based on local authority records, no farm burial or pyre sites associated with the 1967/8 and 2001/2 outbreaks of foot and mouth disease (FMD) are known to be present within the Broomedge to Glazebrook area. However, the 2001/2 FMD outbreak risk assessment map<sup>73</sup> identifies the study area to lie within an 'at risk county'. In addition, older unrecorded sites may 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.

<sup>73</sup> Animal and Plant Health Agency (2001), *Foot and Mouth Disease 2001 County Status Map 01.10.2001*.



## Radon

- 10.3.6 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>74</sup>.
- 10.3.7 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

- 10.3.8 Four aquifer designations have been identified within the study area, as defined by the Environment Agency. These are as follows:
- the Helsby Sandstone Formation and Wilmslow Sandstone Formation are designated as a Principal aquifer;
  - the river terrace deposits, alluvium, glaciofluvial sheet deposits and glaciofluvial deposits (sand and gravel), and the Shirdley Hill Sand Formation are designated as Secondary A aquifers;
  - the Bollin Mudstone Member and the Tarporley Siltstone Formation have been designated as Secondary B aquifers; and
  - the glacial till is designated as a Secondary (Undifferentiated) aquifer.
- 10.3.9 Table 17 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 Broomedge to Glazebrook area.

**Table 17: Groundwater designations and abstractions in the land quality study area**

Feature	Details
Source Protection Zone (SPZ) associated with licensed public water supplies	A SPZ 3 extends from the boundary with the Risley to Bamfurlong area (MA05), to 200m south of the Manchester to Liverpool Line (via Warrington Central) railway south west of Glazebrook railway station. The same SPZ 3 also extends into the periphery of the study area in the south-west from Spud Wood down to approximately 600m north east of Broomedge.
Private licensed groundwater abstractions	There are no public water supply abstractions directly within the study area, however one is situated <5m from the western boundary on the western bank of Heatley Flash, south-east of Oughtrington.
Registered unlicensed private groundwater abstractions	None

<sup>74</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).

10.3.10 Further information on the groundwater in the Broomedge to Glazebrook area is provided in Section 15, Water resources and flood risk.

## Surface water

10.3.11 The route of the Proposed Scheme will cross a number of canals and 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-003-0MA04.

10.3.12 Table 18 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 Broomedge to Glazebrook area.

**Table 18: Surface water designations and abstractions in the land quality study area**

Feature	Details
Surface water abstractions	Nine surface water abstractions within the study area relating to agricultural extraction or environmental improvement.
Private water supplies from surface water sources	None
Environment Agency Drinking Water Protected Area – Surface Water Safeguard Zone	None

10.3.13 Further information on surface water in the Broomedge to Glazebrook area are described in Section 15, Water resources and flood risk.

## Current and historical land use

10.3.14 Current potentially contaminative land uses within the study area include 28 industrial and commercial sites.

10.3.15 Historical land uses identified within the study area with the potential to have caused contamination include six landfill sites, three Ministry of Defence (MoD) sites and nine industrial and commercial sites. Infilled pits and ponds may have been filled with a variety of waste materials but have not been licensed.

10.3.16 Table 19 to Table 20 summarise the key current and historical contaminative land uses in the Broomedge to Glazebrook area. These are categorised into:

- landfill sites; and
- industrial, commercial and other sites identified with a high risk of potential contamination.

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**Table 19: Current and historical landfill sites located within the study area**

Name and area reference	Location	Description
Former refuse pit (MA04-43)	The historical landfill is located within land required for construction of the Proposed Scheme, north of the Manchester Ship Canal.	The Environment Agency does not hold information pertaining to the licencing of the landfill or the waste types accepted.
Historical Hollins Green landfill (MA04-45)	The historical landfill is located within land required for construction of the Proposed Scheme, north of the Manchester Ship Canal.	Environment Agency records indicate that industrial waste was accepted at the landfill between 1 November 1989 and 31 July 1991. There is no information available pertaining to the licence name/number, although a surrender date of 30 April 1993 is noted.
Historical Warburton Farm landfill (MA04-66)	Historical landfill located to the west of Warburton Park Farm south of the Manchester Ship Canal partially within land required for the construction of the Proposed Scheme.	Land is identified as potentially contaminated by TMBC but the council holds no other information as to the type of fill or licencing. The Environment Agency does not hold information pertaining to the licencing of the landfill or the waste types accepted.
Land adjacent to tar distillers (MA04-48)	The historical landfill is located approximately 30m east of the land required for construction of the Proposed Scheme, north of the Manchester Ship Canal and directly to the east of the historical Hollins Green landfill.	The Environment Agency does not hold information pertaining to the licencing of the landfill or the waste types accepted.
Historical Lock Lane landfill (MA04-67)	Historical landfill on the south side of the Manchester Ship Canal north east of Millbank Hall Farm. Situated 50m south-west of MA04-68.	Land is identified as potentially contaminated by TMBC but the council holds no other information as to the type of fill or licencing. The Environment Agency does not hold information pertaining to the licencing of the landfill or the waste types accepted.
Historical Lock Lane landfill (MA04-68)	Historical landfill on the south side of the Manchester Ship Canal north east of Millbank Hall Farm. Situated 50m north-east of MA04-67.	Land is identified as potentially contaminated by TMBC but the council holds no other information as to the type of fill or licencing. The Environment Agency does not hold information pertaining to the licencing of the landfill or the waste types accepted.

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**Table 20: 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
Former MoD land (MA04-55)	Located on land required for construction of the Proposed Scheme and extends north to the south side of Glazebrook.	Former MoD rifle range.
Former MoD land (MA04-51)	Located 80m south of land required for construction of the Proposed Scheme.	Former MoD barracks.
Former MoD land and rifle range (MA04-71)	Located within land required for the construction of the Proposed Scheme at Little Woolden Moss	Former MoD land and rifle range.
Tank (MA04-08)	At the southern end of the study area, situated between Warrington Lane and the Bridgewater Canal. Situated 175m outside of land required for construction of the Proposed Scheme.	Evidence on mapping of tank/fuel storage.
Former tank (MA04-44)	Northern end of Hollins Green, approximately 30m west of Manchester Road. Situated outside of land required for construction of the Proposed Scheme.	Evidence on mapping of tank/fuel storage. Part of location presently occupied by residential properties.

10.3.17 Contaminants commonly associated with sites in Table 19 and Table 20 could include metals, semi-metals, asbestos, organic and inorganic compounds. In addition, landfills could give rise to landfill gases such as methane or carbon dioxide and leachate.

## Other regulatory data

10.3.18 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).

10.3.19 In the Broomedge to Glazebrook area this includes:

- two significant pollution incidents to controlled waters, located at Holcroft Brook, comprising 'tip sewage';
- four discharge consents to surface water. The majority are for final/treated effluent and for emergency or storm sewer overflow, and one discharge consent to groundwater for final/treated effluent;
- one nationally significant ecological designation, Holcroft Moss, as defined in the Land Quality section of the SMR, is located within the study area but is situated entirely within the Risley to Bamfurlong community area (MA05) and, as such the potential impacts

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upon this site are assessed in the Volume 2: Community Area report MA05 Risley to Bamfurlong; and

- two Local Wildlife Sites (LWS), two Sites of Biological Interest (SBI), a Traditional Orchard Inventory site and an ancient woodland site. Three of these ecological sites are on land required for the construction of the Proposed Scheme: Fox Covert and Meadows (SBI), Coroners Wood (ancient woodland site) and Glazebrook Moss (LWS).

10.3.20 Further details of relevant regulatory data in the Broomedge to Glazebrook area is provided in Section 5 of BID LQ-002-0MA04.

10.3.21 Further information on ecological designations in the Broomedge to Glazebrook area is provided in Section 7, Ecology and biodiversity.

## Mineral resources

10.3.22 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 and gravel, peat, 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

10.3.23 WBC is responsible for the minerals and waste local plans in most of the study area. The WBC Local Plan Core Strategy<sup>75</sup> was adopted in July 2014. Policy MP9 sets out the policies aimed at encouraging the efficient and sustainable use of mineral resources in order to enable the council to plan for a steady and adequate supply of aggregates. A 'Minerals Resource Study and Policy Review'<sup>76</sup> was undertaken by Urban Vision on behalf of WBC in March 2017, the aim of which was to review the existing Local Plan to ensure a steady and adequate supply of minerals to meet future demand for minerals in the Plan area.

10.3.24 TMBC is responsible for the mineral and waste local plans for part of the study area, around Heatley and Warburton. Trafford falls within the Greater Manchester area and adopts the policies set out in the Greater Manchester Joint Minerals Plan<sup>77</sup>, which was adopted in April 2013. This outlines how the 10 administrative areas within Greater Manchester can plan for minerals in a sustainable manner.

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<sup>75</sup> Warrington Borough Council (2014), *Local Plan Core Strategy 2012-2027*. Available online at: [https://www.warrington.gov.uk/sites/default/files/2019-08/local\\_plan\\_core\\_strategy\\_adopted\\_2014.pdf](https://www.warrington.gov.uk/sites/default/files/2019-08/local_plan_core_strategy_adopted_2014.pdf).

<sup>76</sup> Urban Vision (2017), *A Minerals Resource Study and Policy Review*. Available online at: [https://www.warrington.gov.uk/sites/default/files/2019-09/warrington\\_minerals\\_study\\_mar\\_2017\\_0.pdf](https://www.warrington.gov.uk/sites/default/files/2019-09/warrington_minerals_study_mar_2017_0.pdf).

<sup>77</sup> Greater Manchester Combined Authority (2013), *Greater Manchester Joint Minerals Plan*. Available online at: [https://secure.manchester.gov.uk/downloads/download/4804/greater\\_manchester\\_joint\\_waste\\_development\\_plan\\_documents](https://secure.manchester.gov.uk/downloads/download/4804/greater_manchester_joint_waste_development_plan_documents).

## **Sand and gravel deposits**

- 10.3.25 River terrace deposits (sand and gravel) are recorded as mineral resources in the WBC Local Plan Core Strategy in the study area, although no quarries are recorded within 250m of land required for the construction of the Proposed Scheme.
- 10.3.26 There are six MSA for sand and gravel in the study area; three are crossed by the Proposed Scheme. The first is in the southern extent of the study area to the north-east of Lymm. The second is in the central part of the study area adjacent to the south bank of the Manchester Ship Canal, with a third 100m to the east of the route of the Proposed Scheme. The fourth and fifth are located to the south bank of the Manchester Ship Canal, straddling Red Brook. The last is in the northern part of the study area around Little Woolden Moss. The MSA coincide with the location of glaciofluvial sand and gravel superficial deposits.

## **Peat**

- 10.3.27 The WBC Minerals Resource Study and Policy Review<sup>78</sup> indicates that generally, current mineral activity extracting peat in the Warrington area is limited. Peat is recorded as a resource at the very north of the study area, although no extraction sites are recorded within the study area.

## **Salt**

- 10.3.28 Salt is not currently exploited in the study area, despite salt resources being located adjacent to the south of the Cheshire Ring Canal Walk in the south west of the study area and within the Northwich Halite Formation.
- 10.3.29 The study area is located in a brine compensation<sup>79</sup> area, administered by the Cheshire Brine Compensation Board.

## **Coal**

- 10.3.30 Available records from the Coal Authority show that the route of the Proposed Scheme is not located in areas of recorded historical underground coal mining activities. Deep coal (associated with the South Lancashire Coalfield and located at more than 1,200m below ground level) is recorded as a mineral resource in the central and northern eastern sections of the study area, although no mines are recorded in or under the land required for the construction of the Proposed Scheme in the study area.

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<sup>78</sup> Warrington Borough Council (2017), *Minerals Resource Study and Policy Review*. Available online at: [https://www.warrington.gov.uk/sites/default/files/2019-09/warrington\\_minerals\\_study\\_mar\\_2017\\_0.pdf](https://www.warrington.gov.uk/sites/default/files/2019-09/warrington_minerals_study_mar_2017_0.pdf).

<sup>79</sup> A brine compensation area is an area with the potential to undergo subsidence due to the pumping of brine, and where there are compensation schemes in place to compensate for damaged caused by such subsidence. This brine compensation area is relevant to study due to the potential for damage to structures and/or infrastructure from subsidence or change in ground conditions caused by brine pumping.

10.3.31 There are no areas identified as development high risk areas or coal mining reporting areas in the study area.

## Petroleum Exploration and Development Licences/Hydrocarbons

10.3.32 Data from the OGA indicate that two PEDLs cover the whole study area; PEDL 193 from approximately the Manchester Ship Canal northwards and PEDL 296 from the Manchester Ship Canal south extending out of the study area. Active wells are located within the PEDLs identified; however, none of the wells are situated within the study area and therefore no assessment has been undertaken.

10.3.33 A Shale Prospective Area (SPA) is located throughout the study area.

## Geoconservation resources

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

## Receptors

10.3.35 The sensitive receptors that have been identified within the study area are summarised in Table 21. A definition of receptor sensitivity is given in the SMR.

**Table 21: Summary of sensitive receptors**

Issue	Receptor type	Receptor description	Receptor sensitivity
Land contamination	People	Residents at existing properties, schools and study centres.	High
Land contamination	People	Employees and visitors of retail, business parks, farms and commercial properties (public and workplaces).	Moderate
Land contamination	People	Workers at and visitors of industrial properties.	Low
Land contamination	Groundwater	Principal aquifers (Helsby Sandstone Formation, Wilmslow Sandstone Formation)	High
Land contamination	Groundwater	Secondary A superficial aquifer (Shirdley Hill Sand Formation)	Moderate
Land contamination	Groundwater	Secondary (Undifferentiated) superficial aquifers (Glacial till)	Low
Land contamination	Groundwater	Secondary B bedrock aquifers (Sidmouth Mudstone Formation, Bollin Mudstone Member, Tarporley Siltstone Formation)	Low
Land contamination	Surface waters	Manchester Ship Canal, River Bollin and Old Bollin.	Moderate
Land contamination	Surface waters	Bridgewater Canal, Red Brook, Glaze Brook, and Moss Brook).	Low
Land contamination	Surface waters	Unnamed springs and ponds.	Low



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Issue	Receptor type	Receptor description	Receptor sensitivity
Land contamination	Built environment	Underground structures and buried services.	Low
Land contamination	Ecological designations	LWS, ancient woodland, traditional orchard inventory site and SBI*.	Moderate
Impacts on mineral and petroleum (gas) sites (severance and sterilisation)	Mineral sites	PEDL (discounting gas wells).	High
Impacts on mineral and petroleum (gas) sites (severance and sterilisation)	Mineral sites	Sand and gravel MSA. Sand and gravel and peat resources. SPA	Medium
Impacts on mineral and petroleum (gas) sites (severance and sterilisation)	Mineral sites	Coal (deep).	Low

\* SBI and LWS are equivalent terms.

## Future baseline

### Construction (2025)

- 10.3.36 Volume 5: Appendix CT-004-00000 provides details of the committed developments in the Broomedge to Glazebrook area that are assumed to have been implemented by 2025.
- 10.3.37 No committed developments have been identified in this study area that will materially alter the baseline conditions in 2025 for land quality.

### Operation (2038)

- 10.3.38 Volume 5: Appendix CT-004-00000 provides details of the committed developments in the Broomedge to Glazebrook area that are assumed to have been implemented by 2038.
- 10.3.39 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>80</sup>. The draft CoCP sets out the measures and

<sup>80</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

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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);
  - 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 further detailed investigations, which may include both desk-based and site-based work, to confirm the full extent of areas of contamination. Such works will be required prior to and during construction. It also requires a risk assessment to be undertaken to determine what, if any, site specific remediation measures are required. The identified measures will 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>81</sup>, based on CLR11<sup>82</sup> and British Standards BS10175<sup>83</sup> and BS8576<sup>84</sup>.

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<sup>81</sup> Environment Agency (2020), *Land Contamination Risk Management (LCRM)*. Available online at: <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>.

<sup>82</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>83</sup> British Standards Institution (2011), *BS10175+A2:2017 Investigation of Potentially Contaminated Sites*.

<sup>84</sup> British Standards Institution (2013), *BS8576:2013 Guidance on Investigations for Ground Gas*.

- 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>85</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 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: MA04 Map Book.

## 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- 312b to LQ-01- 314a (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 MA04-43 and on the related maps as 04-43.
- 10.4.8 In the Broomedge to Glazebrook area 26 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 commercial 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:

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<sup>85</sup> Sustainable Remediation Forum UK (2010), *A Framework for Assessing the Sustainability of Soil and Groundwater Remediation*.

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- 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 22. A more detailed assessment of baseline risk is provided in Volume 5: Appendix LQ-001-0MA04. The baseline risks quoted are those before any mitigation is 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 19 to Table 20 have been taken further in the assessment following the initial screening. Sites were not taken through to detailed assessment due to a predicted low risk resulting from the distance to the land required for the construction of the Proposed Scheme and the types of works to be undertaken in the vicinity of the site, for instance shallow utilities. Professional judgement or evidence of redevelopment have also been used.

**Table 22: 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	Historical landfills MA04-43, MA04-45, MA04-66	Moderate/low to low	Moderate to moderate/low	Moderate	N/A	Low
On-site	Former MoD land MA04-51, MA04-55, MA04-71	Moderate/low to low	Moderate/low to very low	Very low	N/A	Low to very low
On-site	Former and current railway land MA04-17, MA04-42,	Moderate/low to low	Moderate/low to very low	Moderate/low to very low	Very low	Low to very low

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Category	Site group/ ID	Human health risk	Groundwater risk	Surface water risk	Ecosystem risk	Buildings risk
	MA04-57, MA04-61					
Off-site	Farms MA04-21, MA04-24, MA04-30, MA04-52	Moderate/low to low	Moderate/low to very low	Very low	N/A	Low to very low
Off-site	Sewage works MA04-37, MA04-40	Moderate/low to very low	Low to very low	Moderate/low	Very low	Low to very low
Off-site	Cemetery MA04-47	Moderate to moderate/low	Low to very low	Very low	N/A	Low to very low
Off-site	Current and former smithies MA04-46, MA04-44	Moderate/low to low	Low to very low	Very low	N/A	Low to very low
Off-site	Historical landfills MA04-48, MA04-67, MA04-68	Moderate/low to low	Moderate	Moderate	N/A	Low to very low
Off-site	Former tank MA04- 39	Moderate/low to low	Low to very low	Moderate/low	N/A	Low to very low
Off-site	Former MoD land MA04-54	Moderate/low to low	Moderate/low to low	Low	N/A	Low to very low
Off-site	Former railway land MA04-64, MA04-65	Moderate/low to low	Low to very low	Low	N/A	Low to very 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).

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- 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 22 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.
- 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, and may also be used for temporary storage of potentially contaminated soils. Control and mitigation measures are contained within the draft CoCP, which will 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 There are no post-construction stage significant effects identified in the study area.

### **Mineral resources**

- 10.4.23 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.

- 10.4.24 The route of the Proposed Scheme will cross three MSA for sand and gravel which are located between Lymm and Hollins Green and two PEDL.

### Temporary effects

- 10.4.25 The following section outlines the potential temporary effects arising during the construction of the Proposed Scheme.
- 10.4.26 Temporary adverse effects may occur where construction compounds are proposed within the MSA. An example of this is Manchester Ship Canal viaduct south satellite compound, where there will be a temporary sterilisation of the resource during construction works, but this is not considered to represent a significant effect and the resource will not be lost permanently.

### Sand and gravel

- 10.4.27 The effect of construction of the Proposed Scheme on the identified sand and gravel deposits will be temporary sterilisation of the land required for construction of the Proposed Scheme, which is not significant.

### Petroleum Exploration and Development Licences/Hydrocarbons

- 10.4.28 Any effects from the construction of the Proposed Scheme on the identified PEDL 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.

### Summary of temporary effects

- 10.4.29 Table 23 sets out a summary of the temporary effects identified for mineral resources.

**Table 23: Summary of temporary effects for mineral resources**

Mineral resource	Status	Description	Sensitivity/ value	Magnitude of impact	Effect and significance (Y/N)
Three sand and gravel deposits	MSA	MSA for sand and gravel extraction	Medium	Negligible	Negligible (N)
PEDL Area 193 and 296	PEDL	Licence to search and bore for and extract petroleum	High	Negligible	Negligible (N)
Shale Gas	SPA	SPA for Shale gas	Medium	Negligible	Negligible (N)

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



## Permanent effects

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

### Sand and gravel deposits

10.4.32 The effect of construction of the Proposed Scheme on the identified sand and gravel deposits will be permanent where underlain by the land required for the Proposed Scheme, with a strip of mineral resource becoming sterilised. However, as a proportion of the total mineral site, the strip accounts for less than 5% of the total area of all three MSA and is therefore considered to be minor adverse and not significant. Mitigation measures will be discussed with the mineral planning authority in advance of commencement of the works.

### Petroleum Exploration and Development Licences/Hydrocarbons

10.4.33 The effect of construction of the Proposed Scheme on the identified PEDL 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.

### Summary of permanent effects

10.4.34 Table 24 sets out a summary of the permanent effects identified for mineral resources.

**Table 24: Summary of permanent effects for mineral resources**

Mineral resource	Status	Description	Sensitivity/value	Magnitude of impact	Effect and significance (Y/N)
Three river terrace deposits (sand and gravel)	MSA	MSA for sand and gravel extraction	Medium	Minor	Negligible (N)
PEDL Areas 193 and 296	Licensed by UK Oil and Gas Authority	Petroleum exploration and development licence areas	High	Negligible	Negligible (N)
Shale Gas	SPA	SPA for Shale gas	Medium	Negligible	Negligible (N)

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

## Geoconservation sites

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

## Other mitigation measures

10.4.37 No additional measures are considered necessary to mitigate risks from land contamination during the construction phase 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.

- 10.4.38 Mitigation of the effects on mineral resources could include extraction of the resource within the land required for the construction of the Proposed Scheme adjacent to, rather than beneath the structural footprint of the Proposed Scheme. A plan will be discussed in advance of the construction works with the landowner, the mineral planning department at WBC, TMBC and any other relevant parties to assist in achieving an effective management of minerals within the affected locations.

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

- 10.4.39 Based on the information currently available and with the application of the mitigation measures detailed above, no likely significant residual effects are anticipated with respect to land quality.
- 10.4.40 Where remediation at contaminated land sites is undertaken there may be significant beneficial residual effects.

## **Cumulative effects**

- 10.4.41 Volume 5: Appendix CT-004-00000 sets out the committed developments that have been considered in the assessment of cumulative effects.
- 10.4.42 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 the A6144 Paddock Lane auto-transformer station which 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 the 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 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 and landfill gas 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 Broomedge to Glazebrook area. It summarises the baseline conditions found within and around the route of the Proposed Scheme 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 Warrington Borough Council (WBC), Salford City Council (SaCC), Trafford Metropolitan Borough Council (TMBC) and 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-001-0MA04, 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: MA04 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) features 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>86</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 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 Lymm.
- 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>86</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>87</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 the settlement of Lymm and the Bridgewater Canal in the south to Chat Moss in the north. It comprises a corridor approximately 3km wide along the route of the Proposed Scheme.
- 11.3.2 This is a predominantly low-lying river valley landscape which rises gently towards the south. The river floodplains support species-rich meadows and rough pasture for grazing. Fields in intensive arable cultivation are medium to large-scale, with remnant hedgerows. The pattern of medium to large-scale fields results in an open landscape that allows extensive views of Winter Hill, a raised moorland plateau within the West Pennines, to the north. Smaller scale fields with intact hedgerows at settlement edges create a more enclosed landscape, on a more intimate scale. Blocks of broadleaf woodland occur throughout the area and these include Fox Covert, Gailey Wood, Spud Wood and Coroners Wood ancient woodland. There

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<sup>87</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

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are also areas of woodland associated with disused campsites west of Glazebrook. The watercourses of the River Bollin, Red Brook and Manchester Ship Canal are tree-lined.

- 11.3.3 Historic transport routes make a strong contribution to landscape character. These include the 18th century Bridgewater Canal, which forms a tranquil corridor through the landscape. Its historic character derives from the presence of traditional red brick Victorian canalside buildings, aqueducts, viaducts and bridges. There is a notable contrast between the intimate scale of the Bridgewater Canal, its associated buildings and bridges, and the industrial scale of Manchester Ship Canal, railway viaducts and former landfill sites. A dismantled railway line cuts across the study area from east to west, forming a strong linear belt of woodland, visible from much of the study area. The disused railway line and the canals and rivers are associated with recreational routes including the Cheshire Ring Canal Walk (Footpath Lymm 43), Trans Pennine Trail which is a long-distance footpath and forms part of National Cycle Route 62, Mersey Valley Timberland Trail, Glazebrook Timberland Trail and Bollin Valley Way.
- 11.3.4 Larger settlements within the study area include Lymm, Partington and Cadishead. The picturesque village of Lymm with the Lymm Dam, Lower Dam and Lymm Conservation Area at its core, has an intimate quality with noticeable historic associations. By contrast Partington and Cadishead are centred around industrial activity associated with Manchester Ship Canal with residential development on the outskirts, encroaching into the surrounding rural landscape. Smaller settlements including Warburton, Mossbrow, Broomedge, Little Heatley, Glazebrook and Hollins Green are well integrated into the landscape where woodland, trees and hedgerows at settlement edges, soften the urban-rural interface. There is street lighting in most settlements. and a perceived tranquillity in association with footpath and cycle networks, rural lanes and watercourses and in association with the nearby Dunham Massey Estate in Pickmere to Agden and Hulseheath area (MA03).
- 11.3.5 There is an extensive network of busy roads in the area including the M6, M62, the A57 Manchester Road, the A6144 Bent Lane/Paddock Lane/Warburton Lane and the A56 Lymm Road. Consequently, there are few places where traffic noise is not audible. The Liverpool to Manchester Line (via Warrington Central) railway and prominent overhead power lines are detracting linear elements in the landscape.
- 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



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National Landscape Character Areas<sup>88</sup> and the Landscape Character Assessments for the Greater Manchester Combined Authority<sup>89</sup>, Warrington<sup>90</sup>, Salford<sup>91</sup> and Trafford<sup>92</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 Broomedge to Glazebrook area has been subdivided into nine LCA. Full descriptions of these LCA is provided in Volume 5: Appendix LV-001-0MA04.
- 11.3.9 Six of the nine LCA will not be significantly affected by the Proposed Scheme due to their distance from the Proposed Scheme and the presence of intervening vegetation, which will contain landscape effects to mostly within 1.5km of the Proposed Scheme.
- 11.3.10 A summary of the three LCA that will be significantly affected within the Broomedge to Glazebrook area is shown in Figure 8, Figure 9 and Figure 10 and described below.
- 11.3.11 In addition to the nine LCA in this area, Holcroft and Glazebrook Moss Mosslands LCA will be significantly affected by the Proposed Scheme. Part of this LCA is within the Broomedge to Glazebrook area; however, as it is located for the most part within the Risley to Bamfurlong area (MA05), it is reported in Volume 2: Community Area report: Risley to Bamfurlong (MA05).

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<sup>88</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>89</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>90</sup> Agathoclis Beckmann Landscape Architects (2007), *Warrington: A Landscape Character Assessment*, Warrington Borough Council. Available online at: [https://www.warrington.gov.uk/sites/default/files/2019-08/landscape\\_character\\_assessment\\_2007.pdf](https://www.warrington.gov.uk/sites/default/files/2019-08/landscape_character_assessment_2007.pdf).

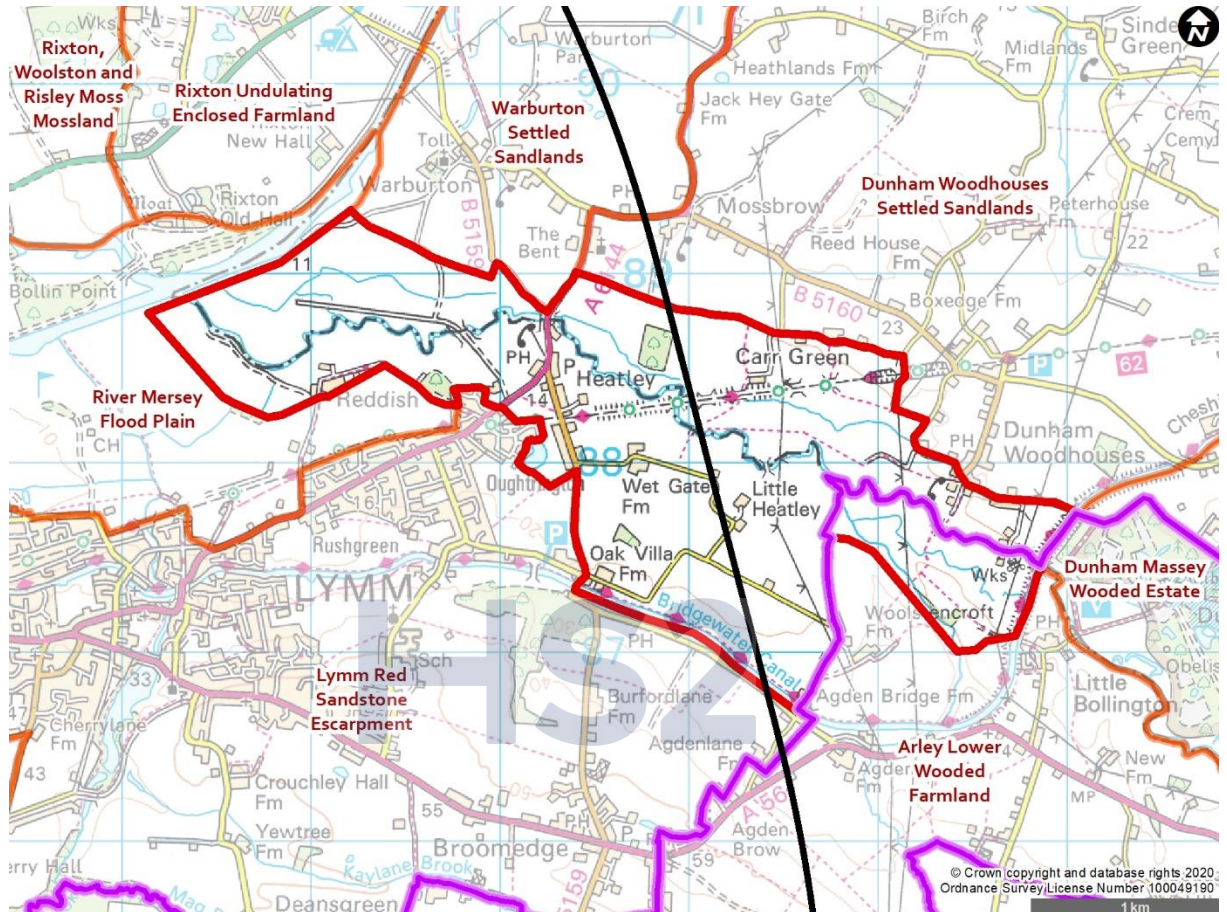
<sup>91</sup> Salford City Council (2007), *Landscape Character Assessment*. Available online at: <http://www.salford.gov.uk/planning-building-and-regeneration/salfords-natural-environment/landscape/landscape-character-assessment/>.

<sup>92</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

### River Bollin Meadowlands

Figure 8: River Bollin Meadowlands



- 11.3.12 The River Bollin Meadowlands LCA is a low-lying, rural landscape that follows the course of the River Bollin as it meanders through the landscape to join the River Mersey, north of Lymm, as shown in Figure 8.
- 11.3.13 The main land uses are mixed arable farming and pasture with permanent pasture within the River Bollin floodplain. Fields are medium size, increasing in scale to the north, at the confluence of the Rivers Bollin and Mersey, creating a more open landscape than in the south. Roadside hedges are well maintained, with remnant hedgerows and scattered trees along field boundaries. Belts of woodland, clusters of willow trees and marginal vegetation mark the courses of rivers, with scattered blocks of woodland on higher land. Land to the south-east of this LCA falls within the wider Dunham Massey historic estate owned by the National Trust. Woodland within the Dunham Massey Wooded Estate LCA in the Pickmere to Agden and Hulseheath area (MA03), forms a wooded backdrop to the south-east boundary of the River Bollin Meadowlands LCA.
- 11.3.14 The settlement pattern is one of scattered farmhouses and isolated cottages connected by a sparse network of unlit roads. Dunham Woodhouses Conservation Area, part of which lies

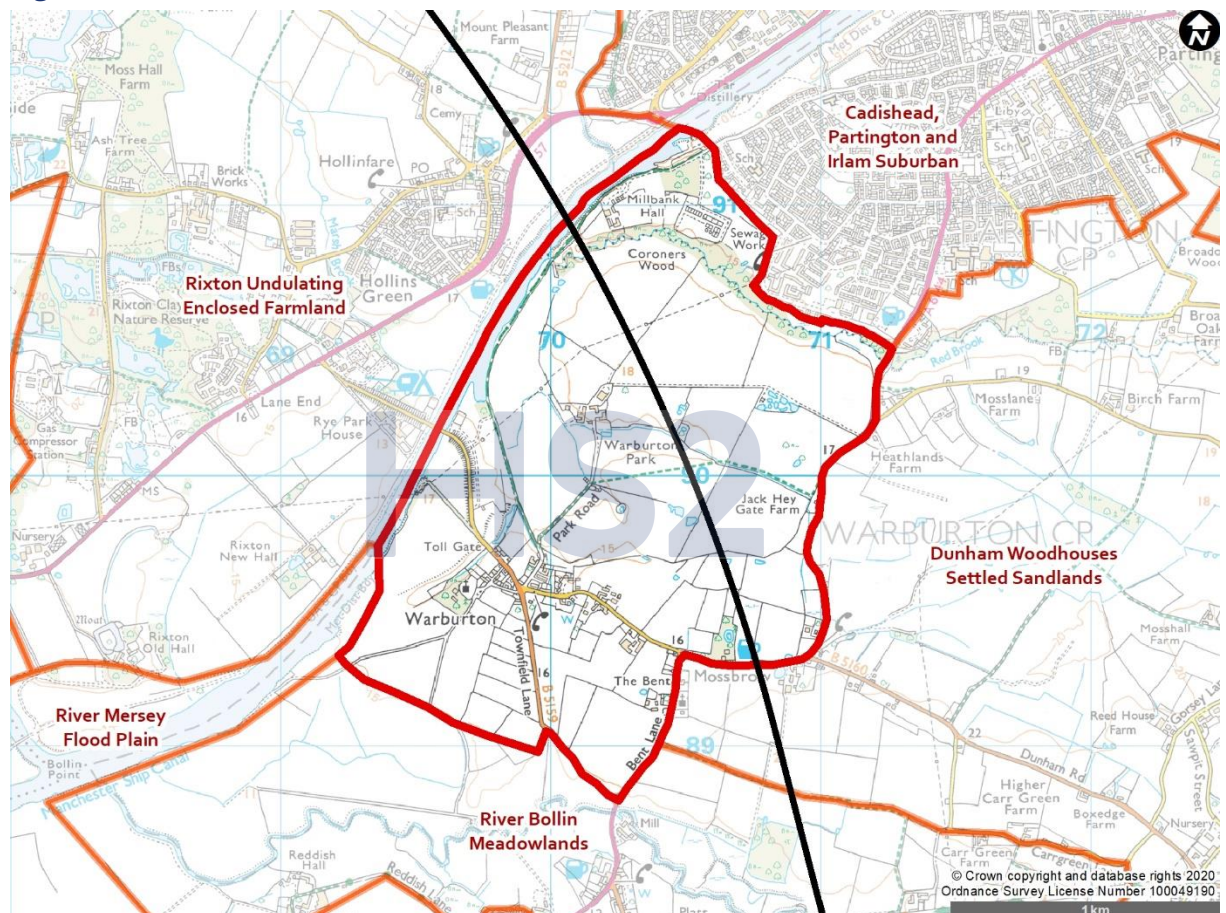


within this LCA, falls within the wider Dunham Massey Estate, listed buildings and Bridgewater Canal add to the landscape value of the LCA. In contrast, the busy and well-lit road junction at Heatley, lined with residential development, shops and restaurants has an urbanising influence on landscape character. Trans Pennine Trail (National Cycle Route 62), Cheshire Ring Canal Walk (Footpath Lymm 43) and numerous public rights of way (PRoW) contribute to the recreational value of the area. North-south connectivity for both motorised and non-motorised users, is restricted by the small number of crossings over Manchester Ship Canal and Bridgewater Canal, giving the area a sense of seclusion and containment. There is a perceived tranquillity in association with footpath and cycle networks, rural lanes and watercourses and in association with the nearby Dunham Massey Estate. Overhead power lines, the industrial chimneys at Irlam (beyond the boundary of this LCA) and noise generated by light industrial units along the Bridgewater Canal are detracting elements in the landscape.

- 11.3.15 The River Bollin Meadowlands LCA is assessed as having an overall **medium** landscape value, based on the presence of historic watercourses, the recreational value of the landscape due to the extensive footpath network combined with the detracting presence of modern, industrial and power infrastructure.

## Warburton Settled Sandlands

**Figure 9: Warburton Settled Sandlands**



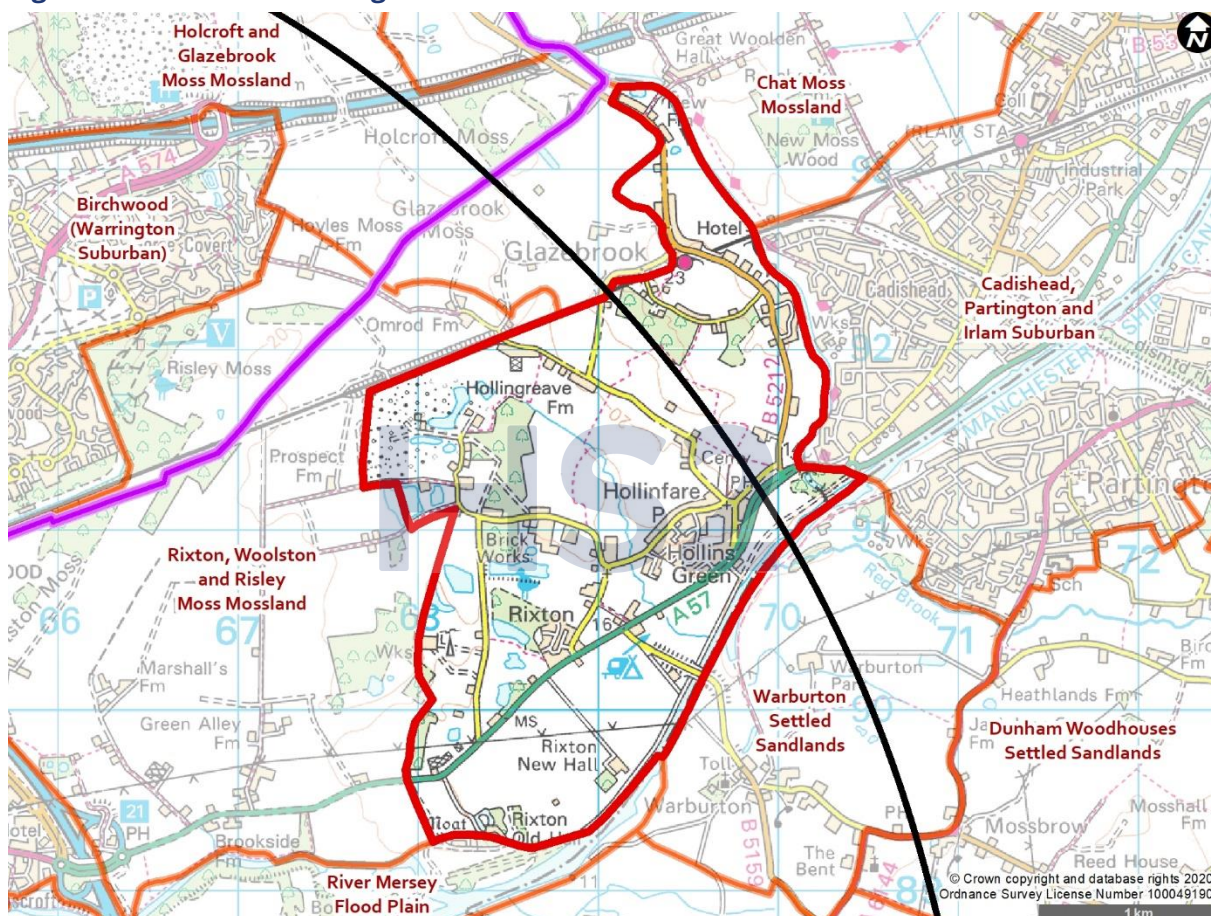
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- 11.3.16 The Warburton Settled Sandlands LCA is a low lying, rural landscape to the south-east of the River Mersey and Manchester Ship Canal, as shown in Figure 9.
- 11.3.17 Numerous ponds are indicative of the former mosslands and their subsequent draining for agriculture. Arable farming occurs on small-scale arable fields around Warburton and Mossbrow, where woodland blocks and roadside trees create a strong sense of visual containment. Field sizes increase towards the River Mersey floodplain, with remnant hedgerows along field boundaries allowing more open views across the landscape. The once meandering alignment of the River Mersey (prior to canalisation) is reflected in a distinct, sweeping field pattern to the north-west of Warburton village. The rural and agricultural character of this LCA is contained by linear belts of woodland, including Coroners Wood ancient woodland, which separate the agricultural landscape from the industrial landscape of Manchester Ship Canal and suburban area of Partington.
- 11.3.18 Settlement is concentrated in the villages of Warburton and at Mossbrow, with outlying dispersed farmsteads. The cultural history of this LCA is evident in the many listed buildings and structures within the Warburton Village Conservation Area and on the periphery of Warburton village. Remnant hedge lines of the medieval field systems and the now largely eroded boundaries of the medieval deer park at Warburton Park are indicators of historic land management.
- 11.3.19 Encroaching development at the edge of Partington, overhead power lines and traffic, detract from the tranquillity of the area, particularly during peak periods when traffic queues to use the Warburton toll bridge. The Red Brook Wildlife Trail through Coroners Wood and Bridleway Partington 6 (part of the Bollin Valley Way) contribute to the recreational value of the area. However, pedestrian links beyond this LCA are restricted by the lack of crossings over Manchester Ship Canal in the north and the busy A6144 Warburton Lane in the south.
- 11.3.20 The Warburton Settled Sandlands LCA is assessed as having an overall **medium** landscape value based on its low level of tranquillity and the presence of detracting elements, in combination with the evidence of its cultural history, its sense of enclosure and its ancient woodland.



## Rixton Undulating Enclosed Farmland

Figure 10: Rixton Undulating Enclosed Farmland



- 11.3.21 The Rixton Undulating Enclosed Farmland LCA is an open area of intensively farmed, rural landscape between Manchester Ship Canal and River Mersey in the south and the Liverpool to Manchester Line (via Warrington Central) railway in the north, as shown in Figure 10.
- 11.3.22 The land gently rises from the valleys of the River Mersey and the Glaze Brook, to the south and east respectively. Localised variations in landform are indicative of past landfill operations around Rixton Clay Pits Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI) and along the A57 Manchester Road. Glaze Brook is contained within a valley and is largely hidden from the wider LCA. Arable fields are medium to large-scale, with remnant hedgerows and a network of ditches draining the heavy clay soils. Blocks of woodland at the disused campsites on Bank Street and Glazebrook Lane, woodland near Rixton Clay Pits SSSI/SAC and at Rixton Old Hall are enclosing elements in this otherwise open landscape. Historically, glacial till was excavated for use in the brickmaking industry and the chimney of the former brickworks on Moss Side Lane is a prominent landmark.
- 11.3.23 The village of Hollins Green is the main settlement, with mixed age residential properties lining rural roads and farmhouses are scattered throughout the rural landscape. There is a comprehensive network of PRow, including local walking routes and the River Mersey Timberland Trail. 'Weint' footpath around Hollins Green Churchyard is thought to be of pre-

Roman origin. The Royal Society for the Protection of Birds (RSPB) Rixton Clay Pits Nature Reserve and Blundells Fishery at Moss Side Farm add to the recreational value of the area. However, limited crossing points over Manchester Ship Canal and the Liverpool to Manchester Line (via Warrington Central) railway reduce connectivity with the wider landscape. The A57 Manchester Road, the Liverpool to Manchester Line (via Warrington Central), former industrial elements and active landfill site at Moss Side are prominent and detracting elements in the landscape. Street lighting is present in settlements and at major road junctions but not along most rural roads. Pockets of tranquillity are found along PRoW to the north and east of Hollins Green.

- 11.3.24 The Rixton Undulating Enclosed Farmland LCA is assessed as having an overall **medium** landscape value, based on the extensive PRoW network, recreation sites including Rixton Clay Pits Nature Reserve, the intimate, gently undulating rural landscape and woodland blocks around Hollins Green. Busy roads and overall low levels of tranquillity, diminish value.

## Visual baseline

- 11.3.25 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: MA04 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>93</sup>, 4: Transport, 5: Hotels/healthcare/schools and 6: Employment.
- 11.3.26 The gently undulating landform and screening provided by existing vegetation at the edges of settlements partially enclose, frame and filter views across the rural landscape from residential properties. The low-lying floodplain of the River Bollin Meadowlands allows wide and open views across the landscape in the south of the study area. Taller industrial elements, raised landform, linear belts of vegetation and woodland blocks are landmarks within views. Further north, the landform and associated vegetation of Manchester Ship Canal and along Glaze Brook further enclose views.
- 11.3.27 The majority of PRoW are in low-lying areas. Recreational users of the Cheshire Ring Canal Walk (Footpath Lymm 43), Trans Pennine Trail (National Cycle Route 62), Bridgewater Canal, Bollin Valley Way, Mersey Valley Timberland Trail, Red Brook Trail and Glazebrook Timberland Trail have linear and sequential views along these recreational routes with views either side of the path across the adjacent rural landscape. Views experienced by footpath users from the majority of PRoW in the study area are partially filtered through hedgerows and woodland vegetation.
- 11.3.28 Roadside hedgerows and mature trees partially filter and contain views from rural roads.

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<sup>93</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.

## Future baseline

### Construction (2025)

11.3.29 Volume 5: Appendix CT-004-00000 provides details of the developments in the Broomedge to Glazebrook area that are assumed to have been implemented by 2025. The following committed development of relevance to landscape and visual during construction in this area are set out in Table 25.

**Table 25: Committed developments relevant to landscape and visual during construction**

Map book reference <sup>94</sup>	Planning reference	Description	How is this considered in the assessment
MA04/105	86160/OUT/15	Location: land south of Manchester Ship Canal and north of Lock Lane/Thirlmere Road/Inglewood Close. Application to extend the time limit for the implementation of planning permission H/OUT/68617 (outline application, including details for access, for residential development for up to 500 dwellings, associated footpath, landscaping and ecological works) on land south of Manchester Ship Canal and north of Lock Lane/Thirlmere Road/Inglewood Close.	Informing future baseline.
MA04/121	97897/FUL/19	Location: site of The Red Brook Public House, land north of Oak Road and West of Warburton Lane, Partington. Erection of 75 new affordable dwellings and ancillary infrastructure including new main site access of Oak Road.	Informing future baseline.

11.3.30 Implementation of committed developments MA04/105 and MA04/121 will introduce new housing on the edge of an existing urban area, which will lie adjacent to land required for construction, altering the future baseline the Proposed Scheme is assessed against. As such, this committed development has been included as part of the future baseline and considered within this assessment.

### Operation (2038)

11.3.31 Volume 5: Appendix CT-004-00000 provides details of the developments in the Broomedge to Glazebrook area that are assumed to have been implemented by 2038. No additional committed developments of relevance for landscape and visual 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 that works 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

<sup>94</sup> Volume 5, Planning Data/Committed Development Map Book: Maps CT-13-312b to CT-13-314a.



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 features 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;
  - 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 auto-transformer stations; removal of existing landscape elements including trees and hedgerows; and the

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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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closure and diversion of existing public highways and PRow. Other changes include the installation of overhead power lines and the demolition of buildings and structures.

11.4.7 Non-significant effects are reported in Volume 5: Appendix LV-001-0MA04.

## Landscape assessment

11.4.8 The LCA set out in Table 26 will be significantly affected during construction of the Proposed Scheme.

**Table 26: Summary description and assessment of effects on LCA**

Location	
<p><b>River Bollin Meadowlands</b></p> <p>A proportion of the rural, riparian landscape of the River Bollin Meadowlands LCA of <b>medium</b> value will be directly affected by activity including the construction of Lymm North embankment, Bridgewater Canal viaduct, Heatley South embankment, Spring Lane underbridge, River Bollin West viaduct and Heatley North embankment. The presence of Bridgewater Canal satellite compound, Wet Gate Lane satellite compound, River Bollin West viaduct satellite compound and demolition of buildings along Wet Gate Lane will alter landcover and land use within the River Bollin floodplain. Bridgewater Canal satellite compound will be an uncharacteristic element in the landscape setting of the Bridgewater Canal. The landscape setting of the south-western edge of the wider Dunham Massey Estate along Spring Lane, close to Agden Bridge, will be locally altered due to the proximity to construction works. Noise, movement and lighting associated with the works will result in disturbance and reduced levels of tranquillity across a proportion of the central part of this LCA. Trans Pennine Trail (National Cycle Route 62) and Footpath Lymm 43 (a section of the Cheshire Ring Canal Walk), Footpath Warburton 4 and Footpath Warburton 37, and Footpath Warburton 8 will be temporarily realigned. Footpath Warburton 3 will be permanently realigned. The landscape in the eastern part of the LCA, which includes part of the Dunham Woodhouses Conservation Area, will not be directly affected by the construction of the Proposed Scheme, However, there will be an increase in traffic on Woodhouse Lane due to traffic measures associated with construction.</p> <p>Due to <b>medium</b> value including the perceptual qualities of tranquillity and remoteness, together with presence of a comprehensive PRow network including long distance footpaths and cycle routes and the low-lying terrain this LCA has a <b>medium-high</b> susceptibility to change arising from the Proposed Scheme. The introduction of construction works and large-scale changes to landform across a proportion of the central part of this LCA will result in a <b>medium</b> magnitude of change to the landscape.</p> <p>The <b>medium</b> magnitude of change for the River Bollin Meadowlands LCA and its <b>medium-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><b>Warburton Settled Sandlands</b></p> <p>A substantial proportion of the rural landscape of the Warburton Settled Sandlands LCA of <b>medium</b> value will be directly affected by large-scale construction works including the construction of Warburton cutting, A6144 Paddock Lane realignment and A6144 Paddock Lane overbridge, Warburton embankment and Manchester Ship Canal viaduct.</p> <p>The loss of hedgerows, trees and woodland including parts of Coroners Wood and woodland at Mossbrow will alter the landscape pattern. Construction activity will create severance of the landscape between the village of Warburton and the hamlet of Mossbrow. Noise and vehicle movement associated with construction activity at the A6144 Paddock Lane and Manchester Ship Canal viaduct south satellite compounds, will further reduce tranquillity levels. Lighting for satellite compounds and lighting to facilitate construction of Manchester</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

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Location	
<p>Ship Canal viaduct will create newly lit areas in the rural landscape. Footpath Warburton 11 and Bridleway Partington 6 will be temporarily diverted. The landscape setting of listed assets, Warburton Village Conservation Area will be altered by the proximity of construction activity. The Proposed Scheme will bisect farmland and alter the landscape setting of Warburton Park.</p> <p>Due to the <b>medium</b> value with detracting elements that affect scenic quality including queuing traffic for the Warburton Toll Bridge together with the open character of the landscape and presence of historic elements, this LCA has a <b>medium-high</b> susceptibility to change arising from the Proposed Scheme. The introduction of construction works and large-scale changes to landform across a large proportion of this LCA will result in a high magnitude of change to the landscape.</p> <p>The <b>high</b> magnitude of change for the Warburton Settled Sandlands LCA and its <b>medium-high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	
<p><b>Rixton Undulating Enclosed Farmland</b></p> <p>The rural, farmed landscape of the Rixton Undulating Enclosed Farmland LCA of <b>medium</b> value, will be directly affected by large-scale construction works. These works will include construction of Manchester Ship Canal viaduct, Glazebrook South embankment and Glazebrook (Railway) viaduct. Construction works will occupy a wide corridor through the eastern half of the LCA with large-scale changes to local landform. Field patterns will be altered as a result of the removal of trees and hedgerows. Removal of enclosing vegetation will alter the intimate character of the landscape. Construction activity and the introduction of the construction plant at Manchester Ship Canal viaduct central satellite compound, Manchester Ship Canal viaduct north main compound and Glazebrook Railway south satellite compound will be uncharacteristic elements introduced into the rural landscape and will affect the landscape character of a substantial proportion of this LCA. The lit Manchester Ship Canal viaduct central satellite compound, Manchester Ship Canal viaduct north main compound, Glazebrook Railway south satellite compound and workers' accommodation, and lighting to facilitate construction of Manchester Ship Canal viaduct and Glazebrook (Railway) viaduct, will introduce new areas of illumination in the rural landscape. Construction activity, vehicle movements and lighting in a largely unlit landscape will lower levels of tranquillity. Footpath Rixton-with-Glazebrook 7 and Rixton-with-Glazebrook 8 will be temporarily diverted. Footpath Rixton-with-Glazebrook 9 and Rixton-with-Glazebrook 14 will be permanently diverted. The landscape setting of listed and non-listed assets including the Church of St Helen, the Black Swan public house and Hollinfare Cemetery will be altered by the proximity of construction works.</p> <p>Due to the <b>medium</b> value with pockets of tranquillity and detracting elements that affect scenic quality including queuing traffic, together with the open, rural character of the arable landscape, and recreational assets, this LCA has a <b>medium-high</b> susceptibility to change arising from the Proposed Scheme. The introduction of construction works and large-scale changes to 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 Rixton Undulating Enclosed 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>

## 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,

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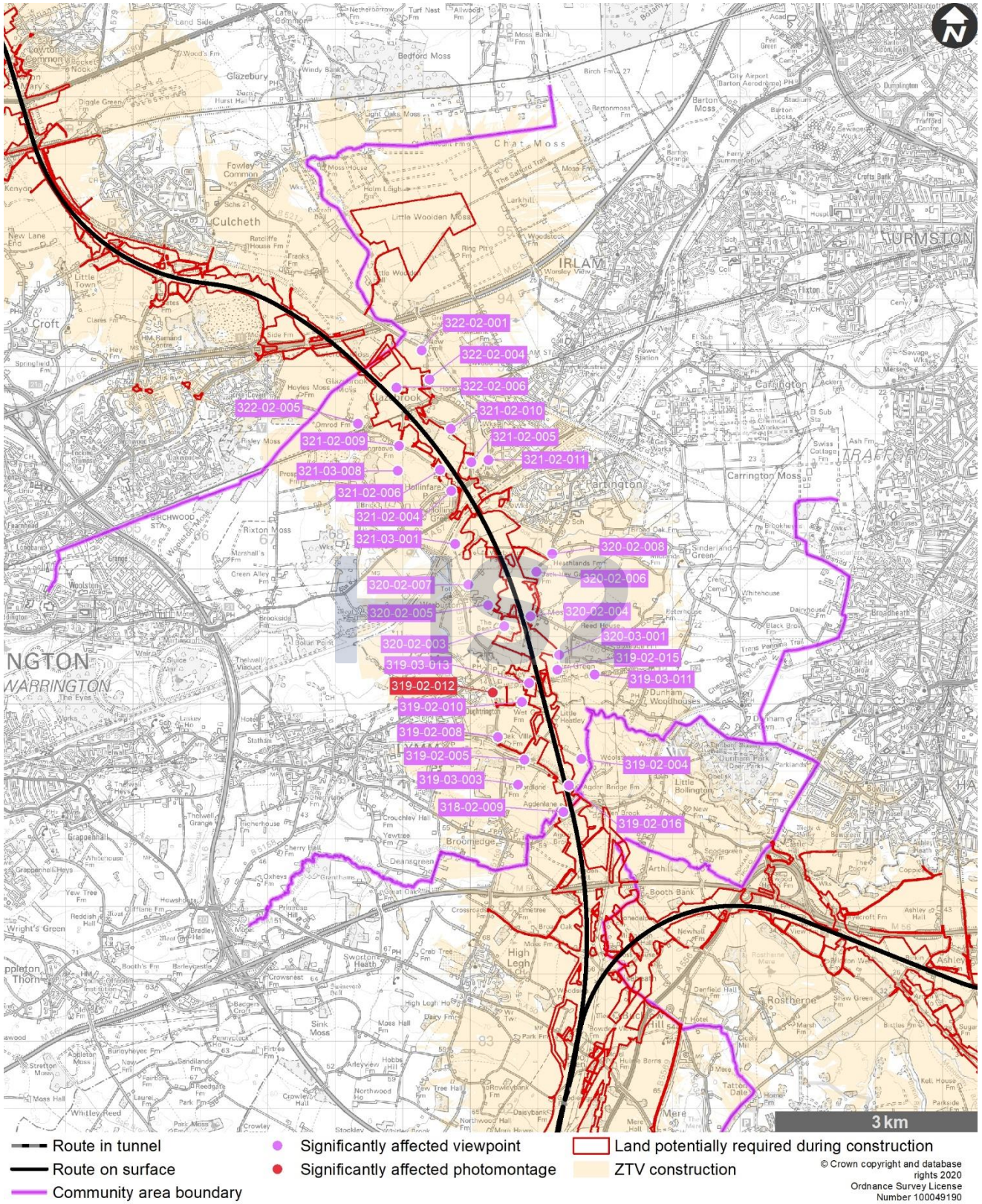
visibility of construction activities may be reduced during summer when vegetation, if present in a view, will be in leaf. Where visual receptors are predicted to experience significant effects at night-time arising from additional lighting, these are also presented in this section.

- 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 27 and described in detail in Volume 5: Appendix LV-001-0MA04, Part 3).
- 11.4.12 Table 27 describes the construction phase potentially significant visual effects. Viewpoint locations are shown in Map Series LV-03 in the Volume 2: MA04 Map Book.



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**Table 27: Construction phase significant visual effects**





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<b>View east from Agden Lane at Agden Lane Farm (High sensitivity receptors) (VP 318-02-009)</b>	
<p>Residents of Agden Lane Farm, Agden Lane Cottage, The Stables and Old Barn, and 1, 3, 7 and 11 Warrington Lane of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to near and middle-distance views due to the presence of large-scale construction works including the construction of Lymm South embankment and Lymm Road viaduct in the Pickmere to Agden and Hulseheath area (MA03) and Lymm North embankment. Construction works including earthworks, temporary material stockpiles and construction vehicles using the A56 Lymm Road and Agden Brow will be uncharacteristic, new elements in view. Construction activity will be visible across the majority of the view. The A56 Lymm Road satellite compound will foreshorten views for residents on Agden Lane. For residents on Warrington Lane, construction works will foreshorten views to the south, west and east. Demolition of Hollybank House in the Pickmere to Agden and Hulseheath area (MA03) and removal of intervening roadside hedges and field boundary hedgerows will alter the composition of views compared to the baseline and further open up views of construction works and the emerging structures. There will be views of construction activity in association with work to underground utilities.</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>At night, residents will have near-distance views of the lit A56 Lymm Road satellite compound. This will be a new light source within the view and closer than existing light sources. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider views. At night, there will be a <b>medium</b> magnitude of visual change and <b>moderate</b> adverse effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>
<b>View north-east from Footpath Lymm 33 (High sensitivity receptors) (VP 319-03-003)</b>	
<p>Footpath users and residents along the A5159 Burford Lane of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a noticeable change to near and middle-distance views due to the presence of large-scale construction works including the construction of Heatley South embankment, Heatley North embankment, Spring Lane underbridge, Spring Lane realignment, Wet Gate Lane realignment and River Bollin West viaduct. Construction activity will be visible across much of the view. Wet Gate Lane satellite compound, River Bollin West viaduct satellite compound, earthworks and temporary material stockpiles will be uncharacteristic elements in views of the otherwise rural river valley landscape. Views of construction and the emerging structures will be partially filtered through intervening trees on Warrington Lane to the north. However, the removal of hedgerows and hedgerow trees will noticeably change the composition of views and open up views of construction works and the emerging structures. There will be views of construction activity in association with work to underground utilities. Construction activity and elements will be viewed in the context of buildings along the canal and existing detracting elements including overhead power lines and the industrial chimneys at Irlam.</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>
<b>View west from Agden Bridge Farm (High sensitivity receptors) (VP 319-02-016)</b>	
<p>Residents of Agden Bridge Farm, boaters along the Bridgewater Canal and users of Cheshire Ring Canal Walk (Footpath Lymm 43) of <b>high</b> susceptibility and with</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

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<b>View west from Agden Bridge Farm (High sensitivity receptors) (VP 319-02-016)</b>	
<p><b>medium</b> value views will experience a substantial change to near and middle-distance views due to the presence of large-scale construction works including the construction of Lymm North embankment, Bridgewater Canal viaduct and Heatley South embankment. Bridgewater Canal satellite compound, large-scale earthworks and temporary material stockpiles will be uncharacteristic within views of Bridgewater Canal and arable farmland and will be visible across the majority of the view. For residents of Agden Bridge Farm, construction works will be partially filtered through intervening garden vegetation. Footpath Lymm 43 will be temporarily diverted and footpath users will have sequential views of construction activity as they travel along the footpath. Demolition of buildings at Heatley Heath Farm and the removal of canalside hedges will further alter the composition of views and will open up views to construction. There will be views of construction activity in association with work to underground utilities.</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>Night-time effects</p> <p>Residents will have views of the artificial lighting at Bridgewater Canal satellite compound in the middle distance. This will be a new area of illumination, in a largely unlit landscape. However, views will be partially filtered through intervening garden vegetation. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider views. At night, there will be a <b>medium</b> magnitude of change and a moderate adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

<b>View west from Spring Lane (High sensitivity receptors) (VP 319-02-004)</b>	
<p>Residents on Spring Lane including Rose Cottages and Spring House, and residents of Little Heatley of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to near and middle-distance views due to the presence of large-scale construction works including the construction of Heatley South embankment, Bridgewater Canal viaduct, Spring Lane underbridge, Little Heatley accommodation access and River Bollin West viaduct. Construction activity will replace views across the arable landscape in the middle distance and will be visible across the majority of the view. Views of Bridgewater Canal and Wet Gate Lane satellite compounds, earthworks and temporary material stockpiles will replace views across the arable landscape of the Bollin Valley and will be uncharacteristic new elements within the view. For residents of Rose Cottages and Little Heatley, views of construction activity and the emerging structures will be near distance and direct. Removal of intervening vegetation will noticeably change the composition of views compared to the baseline and will open up views of construction activities and the emerging structures. There will be views to construction activity in association with work to underground utilities.</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>Night-time effects:</p> <p>At night, residents will have middle-distance views of the artificial lighting at Bridgewater Canal satellite compound, Wet Gate Lane satellite compound and for construction of River Bollin West viaduct. These will be new areas of light source in a predominantly unlit landscape. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider views. At night, there will be a <b>medium</b> magnitude of visual change and <b>moderate</b> adverse effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>



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View north-east from The Barn Owl Inn, Agden Wharf, Warrington Lane (High sensitivity receptors) (VP 319-02-005)	
<p>Residents of The Bungalow, Warrington Lane of <b>high</b> susceptibility and visitors to the Barn Owl Inn of lower susceptibility both with <b>medium</b> value views, will experience a substantial change to near and middle-distance views due to the presence of large-scale construction works including the construction of Heatley South embankment, Spring Lane realignment and underbridge, Wet Gate Lane realignment and River Bollin West viaduct. Construction activity will be visible across a large proportion of the view. Some views will be partially filtered through intervening vegetation. Bridgewater Canal satellite compound, Wet Gate Lane satellite compound, earthworks and temporary material stockpiles will be uncharacteristic elements in views across this rural, river valley landscape. The removal of intervening vegetation will noticeably change the composition of views and open up views of construction activity and the emerging structures. The removal of roadside hedges and trees will open up middle-distance views of construction traffic using Bradshaw Lane and the B5159 Mill Lane. Construction activity and elements will be viewed in the context of existing detracting elements, including overhead power lines and the industrial chimneys at Irlam in the far distance, but will still represent a substantial and uncharacteristic change to views. There will be views of construction activity in association with work to underground utilities. The combination of 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 adverse</b> significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Night-time effects:            At night, residents of The Bungalow will have near distance but largely oblique views of the artificial lighting at Bridgewater Canal satellite compound. This will be a new area of light source in a predominantly unlit landscape. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider views. At night, there will be a <b>medium</b> magnitude of visual change and <b>moderate</b> adverse effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>
View north-east from the B5159 Mill Lane (High sensitivity receptors) (VP 319-02-008)	
<p>Residents of Oak Villa Farm, Spring Farm and properties on Stage Lane of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a noticeable change to middle-distance views due to the presence of large-scale construction works including the construction of Heatley South embankment, Spring Lane underbridge, Wet Gate Lane realignment and River Bollin West viaduct. Some views will be partially filtered through intervening vegetation including woodland at Gailey Wood, or screened by intervening buildings. Residential properties are generally not orientated towards the Proposed Scheme. Views of Wet Gate Lane satellite compound, earthworks and temporary material stockpiles will replace views across the rural river valley landscape. These elements will be uncharacteristic of existing views and will feature prominently on the skyline across a large proportion of the view. Construction activity will be visible across a large proportion of the view. Removal of intervening vegetation including roadside trees and hedges from Bradshaw Lane, will noticeably change the composition of views compared to the baseline and will open up views of construction works and the emerging structures. Construction traffic using Bradshaw Lane and the B5159 Mill Lane will introduce additional vehicle movements into views. Work to underground utilities will bring construction activity closer within the view.</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 Wet Gate Lane at Wet Gate Farm (High sensitivity receptors) (VP 319-02-010)	
<p>Residents of Wet Gate Farm and Wet Gate Lane Farm of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to near-distance views due to the presence of large-scale construction works, including the construction of Heatley South embankment, River Bollin West viaduct and the lowering of Trans Pennine Trail (National Cycle Route 62). Construction activity will be visible across a proportion of the view. However, views will be partially screened by intervening buildings or partially filtered through intervening vegetation. Wet Gate Lane satellite compound will be prominent in near-distance views and will foreshorten views to the east. Wet Gate Lane satellite compound, construction machinery, large-scale earthworks and temporary material stockpiles will be new and uncharacteristic elements introduced into views of the farmed, river valley landscape. Construction traffic using Wet Gate Lane will introduce uncharacteristic vehicle movements into views. A section of Wet Gate Lane will be realigned. The existing Wet Gate Lane will be closed where it crosses the route of the Proposed Scheme. There will be views of construction activity in association with work to underground utilities.</p> <p>The combination of the above and presence of intervening screening elements 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>At night, residents on Wet Gate Lane, will have near-distance views of the artificial lighting at Wet Gate Lane satellite compound to facilitate construction of River Bollin West viaduct. These new areas of light source will be seen in the context of existing light sources and will be partially screened and filtered through intervening farm buildings and garden vegetation. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider views. At night, there will be a <b>medium</b> magnitude of visual change and <b>moderate</b> adverse effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>
View east from the B5159 Mill Lane at Bollin Court (High sensitivity receptors) (VP 319-02-012)	
<p>Residents of Heatley of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a noticeable change to middle-distance views due to the presence of large-scale construction works including the construction of Heatley South embankment, River Bollin West viaduct and the lowering of the Trans Pennine Trail (National Cycle Route 62). Construction activity will be visible across a proportion of the view. Some views will be partially filtered through intervening vegetation and partially screened by intervening farm buildings. Wet Gate Lane satellite compound, construction machinery, large-scale earthworks and material stockpiles will be new and uncharacteristic elements within views of the farmed, river valley landscape. Construction activity will foreshorten views across the Bollin Valley and obscure the wooded landform at Dunham Massey Estate in the far distance of the view. Overhead power lines and telegraph lines will continue to be visible across much of the view. Construction traffic using the B5159 Mill Lane and Wet Gate Lane will introduce additional and uncharacteristic vehicle movements into views. A section of Wet Gate Lane will be realigned. The existing Wet Gate Lane will be closed where it crosses the route of the Proposed Scheme. There will be views of construction activity in association with work to underground utilities.</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>A photomontage illustrating this scenario is included Volume 5: Appendix LV-001-0MA04.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

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View east from Trans Pennine Trail (National Cycle Route 62) (High sensitivity receptors) (VP 319-03-013)	
<p>Users of Trans Pennine Trail (National Cycle Route 62) of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to near and middle-distance views due to the presence of large-scale construction works including the construction of Heatley South embankment, River Bollin West viaduct, the lowering of the Trans Pennine Trail (National Cycle Route 62) and Heatley North embankment. Some views will be partially filtered through intervening vegetation along the boundaries of Trans Pennine Trail (National Cycle Route 62) and across the adjacent farmed landscape. Wet Gate Lane and River Bollin West viaduct satellite compounds, construction plant, large-scale earthworks and temporary materials stockpiles will be new and uncharacteristic elements introduced into views of the rural, river valley landscape. Construction activity will be visible across a large proportion of the view. Removal of intervening field boundary vegetation and woodland, and demolition of properties at Little Heatley will noticeably alter the composition of views and open up views of construction works and the emerging structures. Trans Pennine Trail (National Cycle Route 62) will be temporarily diverted.</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>

View west from Trans Pennine Trail (National Cycle Route 62) (High sensitivity receptors) (VP 319-03-011)	
<p>Users of Trans Pennine Trail (National Cycle Route 62) of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a noticeable change to middle-distance views due to the presence of large-scale construction works including the construction of Heatley South embankment, River Bollin West viaduct, the lowering of the Trans Pennine Trail (National Cycle Route 62) and Heatley North embankment. Construction activity will be visible across a proportion of the view. Oblique views of construction activity within the wider Bollin Valley, will be partially filtered through vegetation along the boundaries of Trans Pennine Trail (National Cycle Route 62) and in the adjacent farmed landscape. Wet Gate Lane and River Bollin West viaduct satellite compounds, construction plant, large-scale earthworks and temporary materials stockpiles will be new and uncharacteristic elements introduced into views of the rural landscape. Removal of intervening field boundary vegetation and woodland will noticeably alter the composition of views and open up views of construction works and the emerging structures. The temporary diversion of Trans Pennine Trail (National Cycle Route 62) will alter the orientation and sequence of views for footpath users as they travel along the footpath.</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>

View west from Lower Carr Green Farm (High sensitivity receptors) (VP 319-02-015)	
<p>Residents of Lower Carr Green Farm and users of Footpath Warburton 4 of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a noticeable change to near and middle-distance views due to the presence of large-scale construction works including the construction of River Bollin West viaduct and Heatley North embankment. Views for residents will be partially filtered through intervening vegetation and screened by intervening farm buildings. Users of Footpath Warburton 4 will experience sequential and largely unfiltered views of construction activity and the emerging structures. River Bollin</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

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View west from Lower Carr Green Farm (High sensitivity receptors) (VP 319-02-015)	
<p>West viaduct satellite compound, construction plant and earthworks will be new and uncharacteristic elements introduced into views of the arable landscape and woodland and will feature prominently on the skyline. Construction activity will be visible across a large proportion of the view. Removal of intervening field boundary vegetation and woodland along Trans Pennine Trail (National Cycle Route 62) will further change the composition of views and will open up views of construction activities and the emerging structures. Footpath Warburton 4 will be temporarily diverted. There will be views of construction activity in association with work to underground utilities and the diversion of an overhead power line. 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><b>Night-time effects</b>            At night, residents will have near-distance views of the artificial lighting at River Bollin West viaduct satellite compound and to facilitate construction of River Bollin West viaduct. These will be new areas of light source in the unlit rural landscape. However, views will be partially filtered through intervening vegetation and screened by intervening farm buildings. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider views.            At night, there will be a <b>medium</b> magnitude of visual change and <b>moderate</b> adverse effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

View west from Footpath Warburton 3 (High sensitivity receptors) (VP 320-03-001)	
<p>Footpath users of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to near and middle-distance views due to the presence of large-scale construction works including the construction of River Bollin West viaduct, Heatley North embankment and Warburton cutting. River Bollin West viaduct satellite compound, construction plant, earthworks and temporary material stockpiles will be new and uncharacteristic elements introduced into views of the arable landscape. Construction activity will be visible across the majority of the view. Construction activity will feature prominently on the skyline, replacing views of the farmed landscape and woodland at Fox Covert. Removal of intervening field boundary vegetation and woodland blocks will further change the composition of views compared to the baseline and will open up views of construction activities and the emerging structures. Footpath Warburton 3 will be realigned. There will be views of construction activity in association with work to underground utilities and the diversion of an overhead power line. 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>

View north and east from St Werburgh's New Church, Bent Lane (High sensitivity receptors) (VP 320-02-003)	
<p>Residents along the A6144 Bent Lane and users of Footpath Warburton 3 of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to near and middle-distance views due to the presence of large-scale construction works including the construction of Warburton cutting and Footpath Warburton 3 accommodation overbridge. Construction machinery and large-scale earthworks will be introduced into views of arable fields. Construction activity will be visible across a large proportion of the view. For residents on the west side of the A6144 Bent Lane, views will be partially filtered through intervening vegetation and screened by intervening buildings. Views to the north from properties close to A6144 Paddock Lane will be more open due to the removal of roadside</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

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<p><b>View north and east from St Werburgh’s New Church, Bent Lane (High sensitivity receptors) (VP 320-02-003)</b></p>	
<p>vegetation during construction. Residents on the east side of the A6144 Bent Lane and footpath users will have near-distance views of construction works. Footpath Warburton 3 will be realigned. Removal of intervening field boundary vegetation will noticeably change the composition of views compared to the baseline and will open up views of construction works and the emerging structures. Construction traffic using the A6144 Paddock Lane will introduce additional vehicle movements into middle-distance views. There will be views of construction activity in association with work to underground utilities.</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>View north-west from the A6144 Warburton Lane at Mossbrow (High sensitivity receptors) (VP 320-02-004)</b></p>	
<p>Residents of Mossbrow of <b>high</b> susceptibility and visitors to the Saracens Head public house of lower susceptibility both with <b>medium</b> value views, will experience a substantial change to near and middle-distance views due to the presence of large-scale construction works including the construction of Warburton cutting and the A6144 Paddock Lane realignment and overbridge. Construction activity will be visible across a large proportion of the view. Some views will be partially filtered through intervening vegetation. This viewpoint lies within the land required for construction, but the A6144 Warburton Lane will remain open throughout the construction phase of the Proposed Scheme until the A6144 Paddock Lane realignment is completed. The presence of Warburton embankment satellite compound will foreshorten views to the north and west. Large-scale earthworks and machinery will replace views of the arable landscape to the south. Closure of a section of the A6144 Paddock Lane and the removal of woodland, field boundary and roadside vegetation from the A6144 Paddock Lane, will noticeably change the composition of views and open up direct views of construction works and the emerging structures. Construction traffic using the A6144 Paddock Lane will introduce additional vehicle movements into near-distance views. Visitors to the Saracens Head public house, will have near-distance views of construction operation and the emerging structures. Removal of vegetation from around the Saracens Head public house, will open up views of construction activity for visitors using the Saracens Head public house garden. There will be views of construction activity in association with work to underground utilities and the diversion of an overhead power line.</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:  Residents will have near-distance views of the artificial lighting at Warburton embankment satellite compound. This new area of light source will be seen in the context of existing light sources within the view. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider views.  At night, there will be a <b>medium</b> magnitude of visual change and <b>moderate</b> adverse effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>
<p><b>View east from the A6144 Paddock Lane (High sensitivity receptors) (VP 320-02-005)</b></p>	
<p>Residents along A6144 Paddock Lane of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to near and middle-distance views due to the presence of large-scale construction works including the construction of the A6144 Paddock Lane overbridge, Warburton embankment and Manchester Ship Canal viaduct. Construction</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

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View east from the A6144 Paddock Lane (High sensitivity receptors) (VP 320-02-005)	
<p>activity will be visible across a large proportion of the view. Some views will be partially screened and filtered through farm outbuildings, intervening field boundary and garden vegetation. The A6144 Paddock Lane satellite compound will be a prominent feature within the view. Large-scale earthworks and machinery will be new and uncharacteristic elements introduced into views of relatively flat, arable farmland. Construction activity and the emerging structures will obscure views of the Saracens Head public house and surrounding woodland. Removal of intervening field boundary vegetation and woodland from the boundary of the garden to the Saracens Head public house will noticeably change the composition of views compared with the baseline and will open up views of construction works and the emerging structures that will feature prominently on the skyline.</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>At night, residents will have near-distance views of the artificial lighting at A6144 Paddock Lane satellite compound and middle-distance views of lighting required for construction of Manchester Ship Canal viaduct. These new areas of light source will be seen in the context of existing light sources within the view, and views 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 views.</p> <p>At night, there will be a <b>medium</b> magnitude of visual change and <b>moderate</b> adverse effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

View east from Footpath Warburton 11 (High sensitivity receptors) (VP 320-02-007)	
<p>Residents of Park Road, in the village of Warburton and of Warburton Park Farm, and users of Footpath Warburton 11 of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to near and middle-distance views due to the presence of large-scale construction works including the construction of Warburton embankment and Manchester Ship Canal viaduct. Construction activity will be visible across a large proportion of the view. Some views will be partially filtered through intervening vegetation. Manchester Ship Canal viaduct south satellite compound, earthworks and temporary material stockpiles will be new and uncharacteristic elements introduced into views across this otherwise flat and relatively open rural landscape. For residents of Warburton Park Farm, the proximity of Manchester Ship Canal viaduct south satellite compound will foreshorten views to the east and replace views of Coroners Wood. Removal of intervening field boundary vegetation and woodland blocks will noticeably change the composition of views compared to the baseline and will open up views of construction works and the emerging structures. There will be views of construction activity in association with work to underground utilities and the diversion of an overhead power line. A section of Footpath Warburton 11 will be permanently realigned.</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>At night, residents on the edge of Warburton, will have middle-distance views of the artificial lighting at Manchester Ship Canal viaduct south satellite compound and lighting required for construction of Manchester Ship Canal viaduct. These new areas of light source will be much closer in the view than existing light sources and will be seen across the majority of the view. Residents of Warburton Park Farm will have near-distance views to these new areas of light source. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider views.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>



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View east from Footpath Warburton 11 (High sensitivity receptors) (VP 320-02-007)	
At night, there will be a <b>medium</b> magnitude of visual change and <b>moderate</b> adverse effect.	

View north-west from Footpath Warburton 11 at Jack Hey Gate Farm (High sensitivity receptors) (VP 320-02-006)	
<p>Residents of Jack Hey Gate Farm and properties along the A6144 Warburton Lane and users of Footpath Warburton 11 of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to middle-distance views due to the presence of large-scale construction works including the construction of Warburton embankment and Manchester Ship Canal viaduct. Some views will be partially filtered through intervening garden vegetation. Manchester Ship Canal viaduct south satellite compound, earthworks and temporary material stockpiles will be new and uncharacteristic elements introduced into views of the otherwise flat, rural landscape. Construction elements and operations will replace views across the farmed landscape to Warburton Park Farm. Construction activity will be visible across the majority of the view. Removal of intervening field boundary vegetation and woodland blocks will noticeably change the composition of views compared to the baseline and will open up views of construction works and the emerging structures. A section of Footpath Warburton 11 will be permanently realigned.</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>At night, residents will have middle-distance views of the artificial lighting at Manchester Ship Canal viaduct south satellite compound and for construction of Manchester Ship Canal viaduct. These new areas of light source will be much closer within the view than existing light sources. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider views.</p> <p>At night, there will be a <b>medium</b> magnitude of visual change and <b>moderate</b> adverse effect.</p>	<p>Level of effect: <b>Moderate</b> adverse (significant)</p>

View north-west from the A6144 Warburton Lane at the junction with Moss Lane (High sensitivity receptors) (VP 320-02-008)	
<p>Residents along the A6144 Warburton Lane, including residents of Heathlands Farm, Brook House and Top Park Close and residential properties on the western edge of Partington, of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to middle-distance views due to the presence of large-scale construction works including the construction of A6144 Paddock Lane realignment and overbridge, Warburton embankment and Manchester Ship Canal viaduct. Manchester Ship Canal viaduct south satellite compound, earthworks and temporary material stockpiles will be new and uncharacteristic elements introduced into views of the otherwise flat, rural landscape and will feature prominently on the skyline. Views of construction elements and activities will replace views across the farmed landscape to Warburton Park Farm, Warburton toll bridge and woodland. Construction activity will be visible across the majority of the view. Construction traffic using the A6144 Warburton Lane will introduce additional traffic movements into views. Removal of intervening field boundary vegetation will noticeably change the composition of views and will open up views of construction activity and the emerging structures. For residents of Partington, woodland at Coroners Wood and woodland along Red Brook, will continue to filter views to the west. Views for residents of Top Park Close, will be oblique and partially filtered through intervening garden vegetation and screened by intervening buildings.</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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View north-west from the A6144 Warburton Lane at the junction with Moss Lane (High sensitivity receptors) (VP 320-02-008)	
The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.	

View east from Bridleway Partington 6 part of the Bollin Valley Way along Manchester Ship Canal (High sensitivity receptors) (VP 321-03-001)	
<p>Users of Manchester Ship Canal and Bridleway Partington 6 and residents of Millbank Hall Farm of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to near and middle-distance views due to the presence of large-scale construction works including the construction of Warburton embankment and Manchester Ship Canal viaduct. Construction activity will be visible across a large proportion of the view. However, views for residents of Millbank Hall Farm will be partially filtered through intervening garden vegetation and screened by intervening farm buildings. Manchester Ship Canal viaduct south satellite compound, Manchester Ship Canal viaduct central satellite compound on the north side of Manchester Ship Canal, earthworks and temporary material stockpiles will be new and uncharacteristic elements introduced into views of Manchester Ship Canal corridor and riparian landscape. Removal of intervening vegetation, in particular from Coroners Wood and bankside vegetation from Manchester Ship Canal, will substantially change the composition of views compared to the baseline. The loss of vegetation will open up views of construction activity on the north bank of Manchester Ship Canal and construction traffic using the A57 Manchester Road. There will be views of construction activity in association with work to underground utilities and the installation of overhead power lines. Bridleway Partington 6 will be temporarily diverted to the south, bringing construction activity to the south, closer in 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>

View north-east from Dam Lane at the junction with Footpath Rixton-with-Glazebrook 7 (High sensitivity receptors) (VP 321-02-004)	
<p>Residents on the north-east edge of Hollins Green and users of Footpath Rixton-with-Glazebrook 7 of <b>high</b> susceptibility and visitors to Hollinfare Cemetery and the Black Swan public house of lower susceptibility all with <b>medium</b> value views, will experience a substantial change to near and middle-distance views due to the presence of large-scale construction works including the construction of Manchester Ship Canal viaduct. Views of construction activity and Manchester Ship Canal viaduct north main compound will replace views across the gently undulating arable landscape. Construction activity will be visible across the majority of the view. Residents of Hollins Green will have glimpsed views of construction activity and the emerging structures, between intervening buildings. Manchester Ship Canal viaduct north main compound, large-scale earthworks and machinery will be new and uncharacteristic elements within views of the arable landscape. Construction traffic using Manchester Road and Dam Lane will introduce additional vehicle movements into near-distance views for all receptors. The removal of intervening vegetation will noticeably change the composition of views and open up views of construction works and the emerging structures. A section of Footpath Rixton-with-Glazebrook 7 will be temporarily diverted.</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 the Glazebrook Timberland Trail (Footpath Irlam 60) at Cadishead (High sensitivity receptors) (VP 321-02-011)	
<p>Residents on the western edge of Cadishead and users of the Glazebrook Timberland Trail of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a noticeable change to middle-distance views due to the presence of large-scale construction works including the construction of Manchester Ship Canal viaduct and Glazebrook South embankment. The majority of views will be oblique and partially filtered through intervening vegetation. Manchester Ship Canal viaduct north main compound will be a new element in middle-distance views and will feature prominently on the skyline. Construction activity will be visible across a proportion of the view. Manchester Ship Canal viaduct north main compound, construction machinery, earthworks and temporary material stockpiles will be new and uncharacteristic elements introduced into views of the otherwise rural river valley and arable landscape. Construction traffic using the B5212 Glazebrook Lane will introduce additional vehicle movements into views. Removal of field boundary vegetation and woodland blocks will noticeably change the composition of views and open up views of construction works and the emerging structures. For residents on Essex Gardens, to the north of this viewpoint, views will be framed by woodland at the disused campsites on Bank Street and around Glazebrook House.</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>
View west from the B5212 Glazebrook Lane (High sensitivity receptors) (VP 321-02-005)	
<p>Residents of Lea Brook Farm, Mount Pleasant Farm and properties on the B5212 Glazebrook Lane and users of Footpath Rixton with Glazebrook 9 of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to near and middle-distance views due to the presence of large-scale construction works including the construction of Manchester Ship Canal viaduct and Glazebrook South embankment. Views of Manchester Ship Canal viaduct north main compound will replace views across the gently undulating arable landscape. The presence of Manchester Ship Canal viaduct north main compound, large-scale earthworks and material stockpiles will be uncharacteristic elements within views of arable farmland and woodland blocks. Construction activity will be visible across the majority of the view. Construction traffic using the B5212 Glazebrook Lane will introduce additional vehicle movements into near-distance views. Removal of intervening vegetation will noticeably change the composition of views compared to the baseline and will open up views of construction works and the emerging structures. There will be some loss of woodland from the disused campsites off Bank Street to accommodate utilities works. Footpath Rixton with Glazebrook 9 will be temporarily diverted.</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:            At night, residents will have middle-distance views of the artificial lighting at Manchester Ship Canal viaduct north main compound, for the workers' accommodation and to facilitate the construction of Manchester Ship Canal viaduct. These new areas of light source will greatly increase the level of artificial lighting in the view. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider views. At night, there will be a <b>medium</b> magnitude of visual change and <b>moderate</b> adverse effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

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View north-east from Dam Lane (High sensitivity receptors) (VP 321-02-006)	
<p>Residents on Dam Lane and Pool Road and users of Footpath Rixton-with-Glazebrook 8 of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to near and middle-distance views due to the presence of large-scale construction works including the construction of Manchester Ship Canal viaduct and Glazebrook South embankment. Views of Manchester Ship Canal viaduct north main compound will replace views across the gently undulating arable landscape. Construction activity will be visible across a large proportion of the view. Manchester Ship Canal viaduct north main compound, large-scale earthworks and material stockpiles will be new and uncharacteristic elements within views of arable farmland and woodland blocks. Construction traffic along Dam Lane will introduce additional traffic movements into near-distance views. Removal of intervening vegetation will noticeably change the composition of views and open up views of construction works and the emerging structures. There will be some loss of woodland from the disused campsites off Bank Street to accommodate utilities works. Footpath Rixton-with-Glazebrook 8 will be temporarily diverted and construction activity will become more prominent in the view as footpath users travel towards the Proposed Scheme. 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>Night-time effects: At night, residents will have middle-distance views of artificial lighting at Manchester Ship Canal viaduct north main compound, for the workers' accommodation and to facilitate the construction of Manchester Ship Canal viaduct. These new areas of light source will greatly increase the level of artificial lighting in the view. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider views. At night, there will be a <b>medium</b> magnitude of visual change and <b>moderate</b> adverse effect.</p>	<p>Level of effect: <b>Moderate</b> adverse (significant)</p>
View north-east from Footpath Rixton-with-Glazebrook 6 (High sensitivity receptors) (VP 321-03-008)	
<p>Users of Footpath Rixton-with-Glazebrook 6 of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a noticeable change to middle and far-distance views due to the presence of large-scale construction works including the construction of Manchester Ship Canal viaduct and Glazebrook South embankment. Manchester Ship Canal viaduct north main compound, earthworks and temporary material stockpiles will be new and uncharacteristic elements introduced into views across the arable landscape. Construction activity will be visible across a proportion of the view. Some views will be partially filtered through intervening vegetation and screened by intervening buildings. Construction traffic using Dam Lane will introduce additional vehicle movement into views. Removal of intervening vegetation will noticeably change the composition of views and open up views of construction works and the emerging structures. There will be some loss of woodland from the disused campsites off Bank Street to accommodate utilities works. 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>
View north-east from the junction of Dam Lane and Dam Head Lane (High sensitivity receptors) (VP 321-02-009)	
<p>Residents of Hollingreave Farm, Townley Brow Farm, Bridge Farm, Rose Cottage and residents of Dam Lane and users of Footpath Rixton-with-Glazebrook 14 of high susceptibility and with medium value views, will experience a substantial change to near and</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>

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<b>View north-east from the junction of Dam Lane and Dam Head Lane (High sensitivity receptors) (VP 321-02-009)</b>	
<p>middle-distance views due to the presence of large-scale construction works including the construction of Manchester Ship Canal viaduct and Glazebrook South embankment. Manchester Ship Canal viaduct north main compound, Glazebrook Railway south satellite compound, earthworks and temporary material stockpiles will be new large-scale elements introduced into views of the otherwise rural landscape. Construction elements and activities will replace views of arable farmland and woodland. Construction activity will be visible across the majority of the view. The removal of intervening field boundary vegetation and woodland blocks will noticeably change the composition of views compared with the baseline and will open up views of construction works and the emerging structures. There will be some loss of woodland from the disused campsites off Bank Street to accommodate utilities works. A section of Footpath Rixton-with-Glazebrook 14 will be permanently diverted.</p> <p>The combination of the above will result in a high magnitude of visual change.</p> <p>The high magnitude of visual change and high sensitivity will result in a major adverse significant effect.</p>	
<p>Night-time effects:</p> <p>Residents will have views of the artificial lighting at Manchester Ship Canal viaduct north main compound, including workers' accommodation and lighting to facilitate construction of Manchester Ship Canal viaduct in the middle distance. These will be new areas of light source within the largely unlit rural landscape. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider views.</p> <p>At night, there will be a <b>medium</b> magnitude of visual change and <b>moderate</b> adverse effect.</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>

<b>View south-west from Vetch Close (High sensitivity receptors) (VP 321-02-010)</b>	
<p>Residents on Bank Street and Vetch Close and users of Footpath Rixton-with-Glazebrook 9 of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to near and middle-distance views due to the presence of large-scale construction works including the construction of Manchester Ship Canal viaduct and Glazebrook South embankment. Some views will be partially filtered through intervening garden vegetation. Manchester Ship Canal viaduct north main compound, fencing, earthworks and temporary material stockpiles will be new large-scale elements, introduced into views of gently undulating, arable fields. Construction activity will be visible across the majority of the view. Removal of intervening vegetation will noticeably change the composition of views and open up views of construction works and the emerging structures. Footpath Rixton-with-Glazebrook 9 will be realigned. There will be some loss of woodland from the disused campsites off Bank Street to accommodate utilities works.</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:</p> <p><b>Major</b> adverse (significant)</p>
<p>Night-time effects:</p> <p>Residents will have views of the artificial lighting a Manchester Ship Canal viaduct north main compound, including workers' accommodation and lighting to facilitate construction of Manchester Ship Canal viaduct in the middle distance. Views will be largely oblique and partially filtered through garden vegetation. However, these new light sources will be introduced into a largely unlit rural landscape. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider views.</p> <p>At night, there will be a <b>medium</b> magnitude of visual change and <b>moderate</b> adverse effect.</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>

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View east from Dam Lane (High sensitivity receptors) (VP 322-02-005)	
<p>Residents of Milverton Farm, Omrod Farm and Railway Cottages of high susceptibility, and workers at Beechfield Farm of lower susceptibility, all with medium value views, will experience a noticeable change to near and middle-distance views due to the presence of large-scale construction works including the construction of Glazebrook (Railway) viaduct and Glazebrook North embankment. The majority of views will be partially filtered through intervening vegetation and screened by intervening farm buildings. Construction activity will be visible across the majority of the view. For residents of Milverton Farm and Omrod Farm, taller construction elements such as cranes will be visible above the line of intervening vegetation and buildings and will be visible across the majority of the view in the middle distance. Construction traffic using Dam Lane will introduce uncharacteristic traffic movements into near-distance views, across a small proportion of the view for these residents. For residents of Railway Cottages, views of construction activity will be oblique and partially filtered through intervening vegetation, with taller construction elements such as cranes visible above the line of trees. The removal of woodland from along the side of the Liverpool to Manchester Line (via Warrington Central) railway and dismantled railway line will change the composition of middle-distance views compared to the baseline and will open up views of construction works and the emerging structures. There will be views of construction activity in association with work to underground utilities.</p> <p>The combination of the above will result in a medium magnitude of visual change.</p> <p>The medium magnitude of visual change and high sensitivity will result in a moderate adverse significant effect</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

View west from Moss Farm and Church Farm (High sensitivity receptors) (VP 322-02-006)	
<p>Residents of Church Farm and Moss Farm of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to near-distance views due to the presence of large-scale construction works including the construction of Glazebrook (Railway) viaduct, Glazebrook North embankment and M62 West viaduct. Views of arable fields, woodland along the dismantled railway line and woodland along the Liverpool to Manchester line (via Warrington Central) railway, will be replaced by views of construction elements and activities including work to utilities. Glazebrook Railway north satellite compound, earthworks and temporary material stockpiles will be new and uncharacteristic elements introduced into views of the mossland landscape. Construction activity will be visible across the entire view. Construction traffic using a section of Dam Head Lane will introduce uncharacteristic traffic movements into views. Removal of vegetation and woodland from the dismantled railway line will noticeably change the composition of views compared to the baseline and will open up views of construction works and the emerging structures.</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:            At night, residents will have near-distance views of the artificial lighting at Glazebrook Railway north satellite compound. This new area of light source will be much closer within the view than existing light sources. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider views.</p> <p>At night, there will be a <b>medium</b> magnitude of visual change and <b>moderate</b> adverse effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

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View west from the B5212 Glazebrook Lane (High sensitivity receptors) (VP 322-02-004)	
<p>Residents along Glazebrook Lane of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to near and middle-distance views due to the presence of large-scale construction works including the construction of Glazebrook (Railway) viaduct, Glazebrook North embankment, M62 West viaduct. Construction activity will be visible across a large proportion of the view. Some views will be partially filtered through intervening garden vegetation. Views across the arable landscape towards farm buildings in the middle distance, and woodland on the horizon, will be replaced by views of construction elements and activities. Glazebrook railway north satellite compound, earthworks and temporary material stockpiles will be new and uncharacteristic elements introduced into views of the mossland landscape. Construction traffic using Dam Head Lane and part of Glazebrook Lane will introduce additional and uncharacteristic vehicle movement into views. Removal of vegetation and woodland from the dismantled railway embankment and the presence of emerging structures will noticeably change the composition of the background of the view. There will be views of construction activity in association with work to underground utilities.</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>Level of effect:  <b>Major</b> adverse (significant)</p>

View south-west from the B5212 Glazebrook Lane at New Farm (High sensitivity receptors) (VP 322-02-001)	
<p>Residents of New Farm and users of Footpath Rixton-with-Glazebrook 17 of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to near and middle-distance views due to the presence of large-scale construction works including the construction of Glazebrook (Railway) viaduct, Glazebrook North embankment and M62 West viaduct. Construction activity will be visible across a large proportion of the view. Some views will be partially filtered through intervening vegetation. Views across pastoral fields towards farm buildings in the middle distance, and woodland on the horizon, will be replaced by views of construction elements and operations. Glazebrook Railway north satellite compound, earthworks and temporary material stockpiles will be new and uncharacteristic elements introduced into views of the mossland landscape. Removal of vegetation and woodland from the dismantled railway line will noticeably change the composition of views compared to the baseline and will be replaced by views of construction works and the emerging structures. There will be views of construction activity in association with work to underground utilities.</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>

## 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 surrounding residents, and users of PRow 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 two LCA;
  - moderate adverse effects in relation to one LCA;
  - major adverse visual effects at 19 representative residential viewpoint locations;
  - moderate adverse visual effects at five representative residential viewpoint locations;
  - major adverse visual effects at three recreational viewpoint locations;
  - moderate adverse visual effects at three recreational viewpoint locations;
  - major adverse night-time effects at one representative residential viewpoint locations; and
  - moderate adverse night-time effects at 14 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 features 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 the Lymm North embankment, Warburton embankment, Glazebrook South embankment and Glazebrook North embankment) and cuttings (such as Warburton 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 (using the same species composition and planting types) to replace woodland lost to provide connectivity between habitats, green infrastructure, historic landscape features and to soften the appearance of embankments and viaduct abutments and integrate them into the landscape;
- hedgerow replacement and restoration in areas of loss to restore connectivity and landscape pattern, where reasonably practicable, using an appropriate palette of hedgerow types and species to tie the Proposed Scheme mitigation into the wider landscape character; and
- design of structures such as River Bollin West viaduct and Manchester Ship Canal viaduct to allow views under the viaduct decks and the continuity of landscape features, where reasonably practicable.

## 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:
- Bridgewater Canal viaduct, River Bollin West viaduct and Manchester Ship Canal viaduct;
  - trains, overhead line equipment and noise fence barriers;
  - earthworks, including Lymm North embankment, Heatley South embankment, Heatley North embankment, Warburton cutting, Warburton embankment, Glazebrook South embankment and Glazebrook North embankment; and
  - other design features and railway infrastructure such as Spring Lane underbridge, Wet Gate Lane telecommunications site, Footpath Warburton 3 accommodation overbridge, the A6144 Paddock Lane overbridge, A6144 Paddock Lane auto-transformer station and the A6144 Paddock Lane telecommunications site, Dam Lane telecommunications site and Glazebrook (Railway) underbridge.
- 11.5.4 Non-significant effects are reported in Volume 5: Appendix: LV-001-0MA04.

## Landscape assessment

- 11.5.5 The LCA described in Table 28 will be significantly affected during operation of the Proposed Scheme.

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**Table 28: Operational phase significant landscape effects**

Location	
<b>River Bollin Meadowlands</b>	
<p>Year 1:</p> <p>The scale of the Proposed Scheme will be at variance with the intimate scale of this LCA and will introduce uncharacteristic changes to landscape character across a proportion of this LCA. The landscape setting of the south-eastern edge of the wider Dunham Massey Estate will be locally altered by the proximity of Bridgewater Canal viaduct and Lymm North embankment in the adjacent Pickmere to Agden and Hulseheath area (MA03). The landscape setting of Bridgewater Canal will be altered by the scale of the Proposed Scheme on viaduct. Heatley South embankment and Heatley North embankment will be new large-scale earthworks that will divide this LCA and reduce permeability across this LCA. However, Bridgewater Canal viaduct, Spring Lane underbridge and River Bollin West viaduct, will afford some permeability across the landscape. Although local roads will have been diverted and Footpath Warburton 3 permanently realigned, connectivity will be retained. Trans Pennine Trail (National Cycle Route 62) will have been lowered during construction as it crosses beneath River Bollin West viaduct. Intermittent noise disturbance from train movements will alter the perceived remoteness along long-distance footpaths and PRoW. Mitigation planting will not be sufficiently mature to assist in the integration of the Proposed Scheme into its landscape setting.</p> <p>Due to the medium value with the perceptual qualities of tranquillity and remoteness together with a comprehensive PRoW network including long-distance footpaths and cycle routes, and the low-lying terrain, the landscape has a <b>medium-high</b> susceptibility to change arising from the Proposed Scheme.</p> <p>The introduction of large-scale infrastructure and landform modifications will result in a <b>medium</b> magnitude of change to the landscape.</p> <p>The <b>medium</b> magnitude of change for River Bollin Meadowlands LCA and its <b>medium-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:</p> <p>Maturing mitigation planting will partially integrate the Proposed Scheme into its landscape setting. However, the large-scale Heatley South embankment and Heatley North embankment will continue to divide and reduce permeability across a proportion of this LCA. The Heatley South embankment and Heatley North embankment remain uncharacteristic landforms within the low-lying river valley landscape. The landscape setting of Bridgewater Canal will remain altered by the Proposed Scheme on Bridgewater Canal viaduct.</p> <p>There will continue to be a <b>medium</b> magnitude of change and a <b>moderate</b> adverse significant effect will remain.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>
<p>Year 30:</p> <p>A proportion of this LCA will continue to be directly altered by the presence of the Proposed Scheme. The greater maturity of the mitigation planting will continue to integrate the Proposed Scheme into the landscape. However, the landscape setting of Bridgewater Canal will remain altered by the scale of the Proposed Scheme. The large-scale Heatley South embankment and Heatley North embankment will continue to divide this LCA and reduce permeability. The embankments will remain uncharacteristic landforms within the low-lying river valley landscape. There will continue to be a <b>medium</b> magnitude of change and a <b>moderate</b> adverse significant effect will remain.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>
<b>Warburton Settled Sandlands</b>	
<p>Year 1:</p> <p>The presence of the Proposed Scheme will result in a substantial change to key characteristics of the LCA. The introduction of large-scale elements including Warburton cutting, A6144 Paddock Lane overbridge, Warburton embankment and Manchester Ship Canal viaduct will be at variance with the scale and relatively level terrain of this LCA. Warburton cutting will create severance of the landscape between the village of Warburton and the hamlet of Mossbrow and will affect the</p>	<p>Level of effect:  <b>Major</b> adverse            (significant)</p>

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Location	
<p>landscape setting of Warburton Park. The landscape setting of Warburton Village Conservation Area and St. Werburgh's New Church will be altered by the proximity of the Proposed Scheme. Manchester Ship Canal viaduct will be a new structure in the landscape, on a far greater scale than Warburton toll bridge crossing. Footpath Warburton 11 will have been permanently diverted beneath Manchester Ship Canal viaduct. Mitigation planting will not be sufficiently mature to assist in the integration of the Proposed Scheme into its landscape setting.</p> <p>Due to the <b>medium</b> value with detracting elements that affect scenic quality including queuing traffic together with the open character of the landscape and presence of historic elements, this LCA has a <b>medium-high</b> susceptibility to change arising from the Proposed Scheme.</p> <p>The introduction of large-scale infrastructure and landform modifications will result in a <b>high</b> magnitude of change to the landscape.</p> <p>The <b>high</b> magnitude of change for the Warburton Settled Sandlands LCA and its <b>medium-high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	
<p>Year 15:</p> <p>Maturing mitigation woodland and hedgerow planting will partially integrate the Proposed Scheme into the landscape. However, the central proportion of this LCA will continue to be affected by the presence of the Proposed Scheme. Warburton cutting will continue to sever the landscape between the village of Warburton and the hamlet of Mossbrow and will affect the landscape setting of Warburton Park and listed assets. The large-scale Warburton embankment and Manchester Ship Canal viaduct will continue to be prominent and uncharacteristic elements in this low lying LCA.</p> <p>The magnitude of change will reduce to <b>medium</b> resulting in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>
<p>Year 30:</p> <p>The greater maturity of mitigation planting will further integrate the Proposed Scheme into the landscape. However, the central proportion of this LCA will continue to be affected by the presence of the Proposed Scheme, including severance of the landscape due to the presence of large-scale earthworks. Manchester Ship Canal viaduct will continue to be a prominent and uncharacteristic element in the rural landscape of this LCA.</p> <p>There will continue to be a <b>medium</b> magnitude of change and a <b>moderate</b> adverse significant effect will remain.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>
<b>Rixton Undulating Enclosed Farmland</b>	
<p>Year 1:</p> <p>The eastern section of this LCA will be directly affected by the presence of Manchester Ship Canal viaduct and Glazebrook South embankment which will be much larger and more prominent, linear elements than the existing transport infrastructure. The open character of this LCA will be altered and permeability across the landscape will be reduced by the presence of the Glazebrook South embankment and Manchester Ship Canal viaduct piers. Footpath Rixton-with-Glazebrook 9 and Footpath Rixton-with-Glazebrook 14 will have been permanently realigned to the north of this LCA, restoring connectivity. Perceived tranquillity along footpaths will be diminished due to intermittent noise disturbance from train movements. The landscape setting of listed and non-listed assets, including the Church of St Helen, the Black Swan public house and Hollinfare Cemetery, will be altered by the proximity of the Proposed Scheme. Existing vegetation will largely contain landscape effects to the central part of the character area. However, mitigation planting will not be sufficiently mature to assist in the integration of the Proposed Scheme into its landscape setting.</p> <p>Due to the medium value including pockets of tranquillity together with the open rural character of the arable landscape and recreational assets, this LCA has a <b>medium-high</b> susceptibility to change arising from the Proposed Scheme.</p> <p>The introduction of large-scale infrastructure and landform modifications will result in a <b>medium</b> magnitude of change to the landscape.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>

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The <b>medium</b> magnitude of change for the Rixton Undulating Enclosed Farmland LCA and its <b>medium-high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.	
<p>Year 15:</p> <p>Maturing mitigation planting will partially integrate Glazebrook South embankment into the landscape. However, the large-scale Manchester Ship Canal viaduct will remain an uncharacteristic structure within the landscape. Changes to the level of tranquillity and the landscape setting of listed and non-listed assets will remain.</p> <p>There will continue to be a <b>medium</b> magnitude of change and a <b>moderate</b> adverse significant effect will remain.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>
<p>Year 30:</p> <p>The greater maturity of the mitigation planting will further integrate Glazebrook South embankment into the landscape. However, the large-scale Manchester Ship Canal viaduct will remain an uncharacteristic structure in the landscape. Changes to the level of tranquillity and the landscape setting of listed and non-listed assets will remain.</p> <p>There will continue to be a <b>medium</b> magnitude of change and a <b>moderate</b> adverse significant effect will remain.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>

## Visual assessment

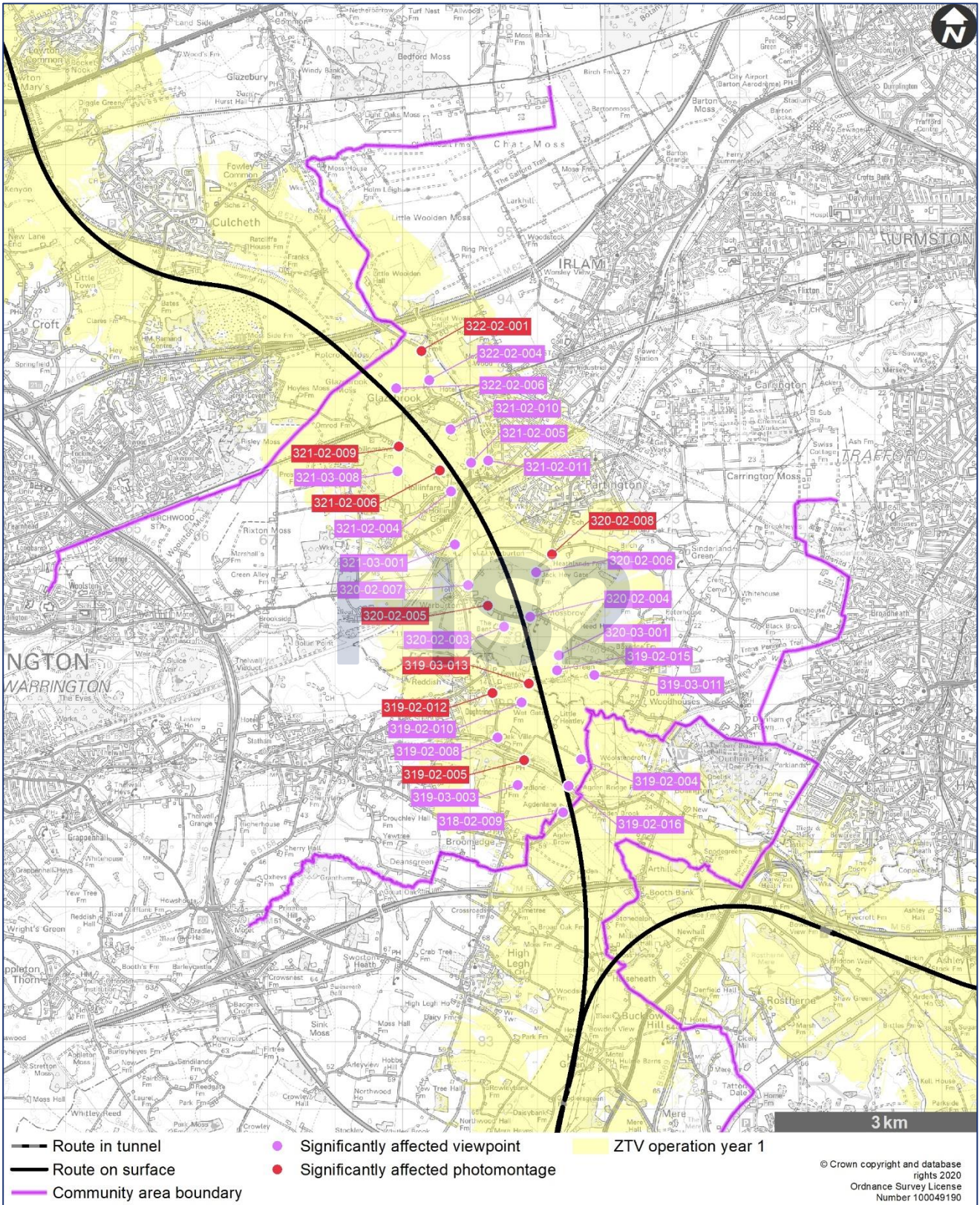
### Introduction

- 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 visual assessment has identified locations where additional lighting during operation will result in significant effects on visual receptors, see Volume 5: Appendix: LV-001-0MA04.
- 11.5.9 Table 29 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 MA04 Map Book.



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**Table 29: Operation phase significant visual effects**





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<b>View east from Agden Lane at Agden Lane Farm (High sensitivity receptors) (VP 318-02-009)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents of Agden Lane Farm, Agden Lane Cottage, The Stables and Old Barn, and 1, 3, 7 and 11 Warrington Lane of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to near and middle-distance views. Lymm South embankment, Lymm Road viaduct and the A56 Lymm Road telecommunications site, in the Pickmere to Agden and Hulseheath area (MA03), Lymm North embankment and Bridgewater Canal viaduct along with noise fence barriers and boundary fencing, will be new and uncharacteristic elements introduced into views of an otherwise rural landscape and will be visible across a large proportion of the view. The proximity of Lymm South embankment and Lymm North embankment will foreshorten views to the east for residents along Agden Lane, and to the south-west for residents on Warrington Lane, and will feature prominently on the skyline. Train movements, noise fence barriers and overhead line equipment will be visible along the top of Lymm South embankment and Lymm North embankment. The loss of Hollybank House, in the Pickmere to Agden and Hulseheath area (MA03) and associated roadside vegetation during construction will substantially change the composition of views compared to the baseline and will result in open views of the Proposed Scheme. Mitigation planting will not be sufficiently established to assist in the filtering of views or the visual integration of the Proposed Scheme into its landscape context.</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:</p> <p><b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>Views of Lymm South embankment, the A56 Lymm Road telecommunications site and Lymm Road viaduct in the Pickmere to Agden and Hulseheath area (MA03), Lymm North embankment and boundary fencing will be partially filtered through maturing woodland and hedgerow mitigation planting. However, the height of the Proposed Scheme means that Lymm Road viaduct, overhead line equipment and noise fence barriers will remain visible above the treeline and will continue to feature prominently on the skyline. Train movements will continue to be visible along the top of Lymm South embankment and Lymm North embankment, above the treeline. The magnitude of visual change will remain <b>high</b> and effects will continue to be <b>major</b> adverse and significant.</p>	<p>Level of effect:</p> <p><b>Major</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>The greater maturity of the woodland and hedgerow planting will largely screen views of Lymm South embankment, the A56 Lymm Road telecommunications site and Lymm Road viaduct in the Pickmere to Agden and Hulseheath area (MA03), and Lymm North embankment. However, the movement of trains, overhead line equipment and noise fence barriers will remain visible above this vegetation across a small proportion of the view.</p> <p>The magnitude of visual change will reduce to <b>medium</b> resulting in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>

<b>View north-east from Footpath Lymm 33 (High sensitivity receptors) (VP 319-03-003)</b>	
<p>Year 1 – winter and summer:</p> <p>Footpath users and residents along the A5159 Burford Lane of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a noticeable change to middle and far-distance views. Lymm North embankment, Bridgewater Canal viaduct, Heatley South embankment and River Bollin West viaduct will be new large-scale structures at a much larger scale and more noticeable in views than existing detracting elements including the buildings along the canal, overhead power lines and the industrial chimneys at Irlam, in the far distance. There will be distant views of Manchester Ship Canal viaduct during winter months. The Proposed Scheme will introduce new and uncharacteristic elements into views across the farmed, river valley landscape, including Wet Gate Lane telecommunications site, boundary fencing, overhead line</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>

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<b>View north-east from Footpath Lymm 33 (High sensitivity receptors) (VP 319-03-003)</b>	
<p>equipment and train movements. The Proposed Scheme will be visible across much of the view. Mitigation planting will not be sufficiently established to assist in the filtering of views or the visual integration of the Proposed Scheme into its landscape context.</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> adverse significant effect.</p>	
<p>Year 15 and year 30 – summer:</p> <p>Effects will reduce to non-significant in year 15 and remain so for year 30 due to the growth and maturity of the mitigation planting (reported in Volume 5: Appendix LV-001-0MA04).</p>	<p>Level of effect: Non-significant</p>

<b>View west from Agden Bridge Farm (High sensitivity receptors) (VP 319-02-016)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents of Agden Bridge Farm, boaters along the Bridgewater Canal, and users of Cheshire Ring Canal Walk (Footpath Lymm 43) of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to near and middle-distance views. Lymm North embankment, Bridgewater Canal viaduct and Heatley South embankment will be new, large-scale elements uncharacteristic within views of Bridgewater Canal and the surrounding arable landscape. The Proposed Scheme will be visible across a large proportion of the view and will feature prominently on the skyline. The proximity of Bridgewater Canal viaduct will interrupt linear views along the canal corridor. Lymm North and Heatley South embankments will foreshorten middle-distance views to the west. Train movements, noise fence barriers and overhead line equipment will be visible along the top of Lymm North and Heatley South embankments and Bridgewater Canal viaduct. The loss of hedges along the Bridgewater Canal and buildings at Heatley Heath Farm during construction will be a noticeable change to the composition of the view. Some views for residents of Agden Bridge Farm will be partially filtered through intervening garden vegetation. However, mitigation planting will not be sufficiently established to assist in the filtering of views or the visual integration of the Proposed Scheme into its landscape context. Users of Footpath Lymm 43 will experience sequential views of the Proposed Scheme as they travel along the footpath. There will be near-distance views of the underside of Bridgewater Canal viaduct as footpath users cross beneath the Proposed Scheme through Bridgewater Canal viaduct.</p> <p>The combination of 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>For residents of Agden Bridge Farm, the Proposed Scheme will continue to feature prominently on the skyline in views to the west, partially filtered through intervening garden vegetation. Views of Lymm North embankment and Heatley South embankment will also be partially filtered through maturing woodland mitigation planting. However, due to the height of the Proposed Scheme, train movements, overhead line equipment and noise fence barriers will remain visible above the new treeline. Bridgewater Canal viaduct will continue to interrupt linear views along the Bridgewater Canal and will be visible in near-distance views for footpath users as they cross beneath the Proposed Scheme through Bridgewater Canal viaduct.</p> <p>The magnitude of visual change will remain <b>high</b> and effects will be <b>major</b> adverse (significant).</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>The greater maturity of woodland and hedgerow planting will largely filter views of Lymm North embankment and Heatley South embankment. However, views across the arable landscape will continue to be foreshortened by the Proposed Scheme which will feature prominently on the skyline. Bridgewater Canal viaduct will continue to interrupt linear views along the Bridgewater Canal and will be visible in near-distance views for footpath users as they cross beneath the</p>	<p>Level of effect: <b>Moderate</b> adverse (significant)</p>



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<b>View west from Agden Bridge Farm (High sensitivity receptors) (VP 319-02-016)</b>	
Proposed Scheme through Bridgewater Canal viaduct. Train movements, overhead line equipment and noise fence barriers will remain visible along the top of Bridgewater Canal viaduct. The magnitude of visual change will reduce to <b>medium</b> , resulting in a <b>moderate</b> adverse significant effect.	

<b>View west from Spring Lane (High sensitivity receptors) (VP 319-02-004)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents on Spring Lane including Rose Cottages and Spring House, and residents of Little Heatley of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to near and middle-distance views. The Proposed Scheme will introduce new and uncharacteristic, large-scale structures into views of the Bollin Valley landscape. Views of the farmed landscape will be replaced with views of Heatley South embankment, Bridgewater Canal viaduct, Spring Lane underbridge and River Bollin West viaduct. The scale and proximity of the Heatley South embankment will foreshorten views to the west for residents and will feature prominently on the skyline. Boundary fencing, overhead line equipment and noise fence barriers will be prominent and uncharacteristic elements in views. Train movements will be visible along the top of Heatley South embankment, Bridgewater Canal viaduct and River Bollin West viaduct. The loss of buildings at Heatley Heath Farm and loss of vegetation during construction, will noticeably change the composition of views compared to the baseline and will open up views of the Proposed Scheme. In the summer months, views of the Proposed Scheme will be partially filtered through intervening garden vegetation, where present. However, mitigation planting will not be sufficiently established to assist in the filtering of views or the visual integration of the Proposed Scheme into its landscape context. 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>	Level of effect: <b>Major</b> adverse (significant)
<p>Year 15 – summer:</p> <p>Maturing mitigation planting will partially filter views of the lower slopes of Heatley South embankment, Bridgewater Canal viaduct, Spring Lane underbridge and River Bollin West viaduct. However, the height and proximity of the Proposed Scheme will continue to foreshorten views and will feature prominently on the skyline. Overhead line equipment, noise fence barriers and train movements will be seen along the top of Heatley South embankment, Bridgewater Canal viaduct and River Bollin West viaduct, above the treeline and will be viewed against the skyline. The magnitude of visual change will remain <b>high</b> and will result in a major adverse significant effect.</p>	Level of effect: <b>Major</b> adverse (significant)
<p>Year 30 – summer:</p> <p>The greater maturity of the mitigation planting will further filter views of Heatley South embankment, Bridgewater Canal viaduct, Spring Lane underbridge and River Bollin West viaduct. However, views will continue to be foreshortened by the height and proximity of Heatley South embankment. Overhead line equipment, noise fence barriers and the movement of trains will be visible above the treeline across part of the view and viewed against the skyline. The magnitude of visual change will reduce to <b>medium</b> resulting in a <b>moderate</b> adverse significant effect.</p>	Level of effect: <b>Moderate</b> adverse (significant)

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<b>View north-east from The Barn Owl Inn, Agden Wharf, Warrington Lane (high sensitivity receptors) (VP 319-02-005)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents of The Bungalow, Warrington Lane of <b>high</b> susceptibility and visitors to the Barn Owl Inn of lower susceptibility, both with <b>medium</b> value views, will experience a substantial change to near and middle-distance views. Bridgewater Canal viaduct, Heatley South embankment, Spring Lane underbridge and River Bollin West viaduct will be new, large-scale elements uncharacteristic within views of the otherwise rural landscape and will be visible across the majority of the view. The proximity and extent of the Proposed Scheme will change the visual horizon and foreshorten the wider view across the Bollin Valley. Train movements across the top of Bridgewater Canal viaduct, Heatley South embankment and River Bollin West viaduct, boundary fencing, overhead line equipment and noise fence barriers will be uncharacteristic elements within views of the river valley landscape. There will be a distant view of Manchester Ship Canal viaduct. In the summer months views will partially be filtered through existing hedgerows in leaf. However, mitigation planting will not be sufficiently established to assist in the filtering of views or the visual integration of the Proposed Scheme into its landscape context.</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 Volume 5: Appendix LV-001-0MA04.</p>	<p>Level of effect:</p> <p><b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>Maturing mitigation planting will assist in integrating the Proposed Scheme into the landscape and will partially filter views of the lower slopes of Heatley South embankment and River Bollin West viaduct. Train movements, boundary fencing, overhead line equipment and noise fence barriers will remain visible above the treeline. Views across the wider valley will continue to be foreshortened. Hedgerows will be established and will assist in the integration of the realigned Spring Lane and Wet Gate Lane into views.</p> <p>The magnitude of visual change will reduce to <b>medium</b> resulting in a <b>moderate</b> adverse significant effect.</p> <p>A photomontage illustrating this scenario is included Volume 5: Appendix LV-001-0MA04.</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>Effects will reduce to non-significant by year 30 due to the growth and maturity of the mitigation planting (reported in detail in Volume 5: Appendix LV-001-0MA04).</p>	<p>Level of effect:</p> <p>Non-significant</p>

<b>View north-east from the B5159 Mill Lane (High sensitivity receptors) (VP 319-02-008)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents of Oak Villa Farm, Spring Farm and properties on Stage Lane of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a noticeable change to middle-distance views. The Proposed Scheme will introduce new large-scale elements into views of the rural, river valley landscape. Heatley South embankment will foreshorten views to the east and will alter the skyline across a large proportion of the view. Wet Gate Lane telecommunications site, boundary fencing, overhead line equipment and noise fence barriers will be new and uncharacteristic elements within views. Train movements will be visible across the top of Heatley South embankment and River Bollin West viaduct. Intervening roadside vegetation and Gailey Wood will partially filter views of the Proposed Scheme. Mitigation planting will not be sufficiently established to assist in the filtering of views or the visual integration of the Proposed Scheme into its landscape context. Residential properties are generally not orientated towards the Proposed Scheme or views are partially filtered through intervening vegetation or screened by intervening buildings. In the summer months, intervening vegetation in leaf will further filter views of the Proposed Scheme.</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>

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<b>View north-east from the B5159 Mill Lane (High sensitivity receptors) (VP 319-02-008)</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>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.	
Year 15 and year 30 summer: Effects will reduce to non-significant in year 15 and remain so for year 30 due to the growth and maturity of the mitigation planting (reported in detail in Volume 5: Appendix LV-001-OMA04).	Level of effect: Non-significant

<b>View east from Wet Gate Lane at Wet Gate Farm (High sensitivity receptors) (VP 319-02-010)</b>	
Year 1 – winter and summer: Residents of Wet Gate Farm and Wet Gate Lane Farm of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a noticeable change to middle-distance views. Heatley South embankment, Wet Gate Lane telecommunications site and River Bollin West viaduct will be new large-scale elements introduced into views of the rural river valley landscape. Heatley South embankment, and River Bollin West viaduct will foreshorten views to the east and will feature prominently on the skyline across a proportion of the view. Boundary fencing, noise fence barriers, overhead line equipment and an overhead power line will be new and uncharacteristic elements within these views. Train movements will be visible along the top of Heatley South embankment and River Bollin West viaduct. However, due to the orientation of residential properties, the majority of views will be partially screened by intervening farm buildings and filtered through intervening vegetation. In the summer months, vegetation in leaf along River Bollin and woodland along Trans Pennine Trail (National Cycle Route 62) will partially filter some views of Heatley South embankment, River Bollin West viaduct and Wet Gate Lane telecommunications site. However, mitigation planting will not be sufficiently established to assist in the filtering of views or the visual integration of the Proposed Scheme into its landscape context. 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 and year 30 – summer: Effects will reduce to non-significant in year 15 and remain so for year 30 due to the growth and maturity of the mitigation planting (reported in detail in Volume 5: Appendix LV-001-OMA04).	Level of effect: Non-significant

<b>View east from the B5159 Mill Lane at Bollin Court (High sensitivity receptors) (VP 319-02-012)</b>	
Year 1 – winter and summer: Residents of Heatley of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a noticeable change to middle-distance views. Heatley South embankment, Wet Gate Lane telecommunications site and River Bollin West viaduct will be new large-scale elements introduced into views of the low-lying river valley landscape. The Proposed Scheme will be visible across a proportion of the view. Some views will be partially filtered through intervening vegetation and screened by intervening buildings on Wet Gate Lane. The raised landform of Heatley South embankment and elevated River Bollin West viaduct will foreshorten views across the Bollin Valley and obscure views of woodland at Dunham Massey Estate in the far distance of the view. The River Bollin West viaduct and Heatley South embankment will be new and uncharacteristic elements in views of the otherwise rural, low-lying landscape and will feature prominently on the skyline. Overhead line equipment, noise fence barriers and train movements will be visible along the top of Heatley South embankment and River Bollin West viaduct. The loss of vegetation during construction will	Level of effect: <b>Moderate</b> adverse (significant)

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<b>View east from the B5159 Mill Lane at Bollin Court (High sensitivity receptors) (VP 319-02-012)</b>	
<p>open up views of the Proposed Scheme. Mitigation planting will not be sufficiently established to assist in the filtering of views or the visual integration of the Proposed Scheme into its landscape context.</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 high sensitivity will result in a <b>moderate</b> adverse significant effect.</p> <p>A photomontage illustrating this scenario is included Volume 5: Appendix LV-001-0MA04.</p>	
<p>Year 15 and year 30 – summer:</p> <p>Effects will reduce to non-significant in year 15 and remain so for year 30 due to the growth and maturity of the mitigation planting (reported in detail in Volume 5: Appendix LV-001-0MA04).</p> <p>A photomontage illustrating this scenario is included Volume 5: Appendix LV-001-0MA04.</p>	<p>Level of effect: Non-significant</p>

<b>View east from Trans Pennine Trail (National Cycle Route 62) (High sensitivity receptors) (VP 319-03-013)</b>	
<p>Year 1 – winter and summer:</p> <p>Users of Trans Pennine Trail (National Cycle Route 62) of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to the rural character of near and middle-distance views. The Proposed Scheme will be visible across a large proportion of the view. However, some views will be partially filtered through intervening vegetation. River Bollin West viaduct will be a new high-level element visible across a large proportion of the view in the near distance and will feature prominently on the skyline. Views to the east will be possible beneath River Bollin West viaduct deck and between the piers. Heatley South embankment, Spring Lane underbridge, Wet Gate Lane telecommunication site and Bridgewater Canal viaduct will be new elements in oblique views to the south. Woodland at the Dunham Massey Estate in the far distance of the view, will be partially obscured by Heatley South embankment. Oblique views of Heatley North embankment will be partially filtered through intervening vegetation along Trans Pennine Trail (National Cycle Route 62) and along the River Bollin. Overhead line equipment and train movements will be uncharacteristic elements within views and will be visible along the top of Heatley South embankment, River Bollin West viaduct and Heatley North embankment. The loss of vegetation during construction will noticeably 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 assist in the filtering of views or the visual integration of the Proposed Scheme into its landscape context. Trans Pennine Trail (National Cycle Route 62) will be lowered relative to the baseline as it passes beneath River Bollin West viaduct. There will be near-distance views of the underside of River Bollin West viaduct structure and its piers as footpath users cross beneath the viaduct structure.</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 Volume 5: Appendix LV-001-0MA04.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>River Bollin West viaduct will continue to be a high-level structure, prominent in near-distance views, and will feature prominently on the skyline. Views along Trans Pennine Trail (National Cycle Route 62) will be framed by River Bollin West viaduct deck and piers. Mitigation planting will be sufficiently mature to partially integrate the lower slopes of Heatley South embankment and Heatley North embankment into oblique views of the Bollin Valley. However, Heatley South and Heatley North embankments and their associated planting will foreshorten oblique views across the wider river valley landscape and will partially obscure views of woodland at Dunham Massey Estate in the far distance of the view. Overhead line</p>	<p>Level of effect: <b>Moderate</b> adverse (significant)</p>

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<b>View east from Trans Pennine Trail (National Cycle Route 62) (High sensitivity receptors) (VP 319-03-013)</b>	
<p>equipment and train movements will continue to be visible above the line of planting on Heatley South and North embankments as well as the planting along River Bollin West viaduct. Footpath users will have near-distance views of the underside of River Bollin West viaduct as it crosses over Trans Pennine Trail (National Cycle Route 62).</p> <p>The magnitude of visual change will reduce to <b>medium</b> resulting in a <b>moderate</b> adverse significant effect.</p>	
<p>Year 30 – summer:</p> <p>River Bollin West viaduct will continue to feature prominently on the skyline in views to the east, with views along Trans Pennine Trail (National Cycle Route 62) framed by River Bollin West viaduct deck and piers. The greater maturity of mitigation planting will further integrate Heatley South and North embankments into the landscape, but long-distance views across the Bollin Valley to woodland at Dunham Massey Estate will continue to be foreshortened by Heatley South and North embankments and their associated planting. Overhead line equipment and train movements will remain visible along the top of River Bollin West viaduct.</p> <p>The magnitude of visual change will remain <b>medium</b> and result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>

<b>View west from Trans Pennine Trail (National Cycle Route 62) (High sensitivity receptors) (VP 319-03-011)</b>	
<p>Year 1 – winter and summer:</p> <p>Users of Trans Pennine Trail (National Cycle Route 62) of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a noticeable change to middle-distance views. River Bollin West viaduct will be a new raised element, visible in the middle distance and sequentially as footpath users travel along Trans Pennine Trail (National Cycle Route 62). The Proposed Scheme will be visible across a proportion of the view. Heatley South embankment and elements of the Proposed Scheme to the south of the viewpoint, will be seen in oblique views across the wider Bollin Valley landscape, partially filtered through intervening vegetation. Heatley South embankment, River Bollin West viaduct and Heatley North embankment will be new high-level elements, at a much larger scale than the disused railway line of Trans Pennine Trail (National Cycle Route 62) and the existing pedestrian bridge over the River Bollin. Overhead line equipment and train movements will be uncharacteristic elements within views. The loss of vegetation during construction will noticeably change the composition of views compared to the baseline and will open up views of the Proposed Scheme. The Trans Pennine Trail (National Cycle Route 62) will have been lowered as it passes beneath River Bollin West viaduct. Footpath users will have near-distance views of the underside of River Bollin West viaduct and piers as users cross beneath the viaduct. Mitigation planting will not be sufficiently established to assist in the filtering of views or the visual integration of the Proposed Scheme into its landscape context.</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 in year 15 and remain so for year 30 due to the growth and maturity of the mitigation planting (reported in Volume 5: Appendix LV-001-OMA04).</p>	<p>Level of effect:            Non-significant</p>

<b>View west from Lower Carr Green Farm (High sensitivity receptors) (VP 319-02-015)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents Lower Carr Green Farm and users of Footpath Warburton 4 of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to the rural character of middle-distance views. River Bollin West viaduct and Heatley North embankment will be new</p>	<p>Level of effect:</p>

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<b>View west from Lower Carr Green Farm (High sensitivity receptors) (VP 319-02-015)</b>	
<p>large-scale elements introduced into views of the farmed landscape and woodland. The elevated River Bollin West viaduct and raised Heatley North embankment will be uncharacteristic new elements within views and will be visible across a large proportion of the view in the middle distance. River Bollin West viaduct and Heatley North embankment will partially screen views of Fox Covert and woodland along the River Bollin. Overhead line equipment and train movements will be visible along the top of River Bollin West viaduct and Heatley North embankment, partially filtered through intervening vegetation. The loss of vegetation during construction will noticeably change the composition of views and will open up views of the Proposed Scheme. For residents of Lower Carr Green Farm, the majority of views will be filtered through intervening vegetation and screened by intervening farm buildings. Users of Footpath Warburton 4 will have sequential views of the Proposed Scheme as they travel along the footpath, with near-distance views of River Bollin West viaduct and piers as the footpath passes beneath the viaduct to the south of Trans Pennine Trail (National Cycle Route 62). Mitigation planting will not be sufficiently established to assist in the filtering of views or the visual integration of the Proposed Scheme into its landscape context.</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><b>Moderate</b> adverse (significant)</p>
<p>Year 15 and year 30 – summer:            Effects will reduce to non-significant in year 15 and remain so for year 30 due to the growth and maturity of the mitigation planting (reported in Volume 5: Appendix LV-001-0MA04).</p>	<p>Level of effect:            Non-significant</p>

<b>View west from Footpath Warburton 3 (High sensitivity receptors) (VP 320-03-001)</b>	
<p>Year 1 – winter and summer:            Footpath users of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to the rural character of middle-distance views. River Bollin West viaduct and Heatley North embankment will be new large-scale elements introduced into views of the farmed landscape. The elevated River Bollin West viaduct and raised Heatley North embankment, overhead line equipment and train movements will be uncharacteristic new elements within views and will be visible across the majority of the view in the middle distance. The loss of vegetation during construction will noticeably 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 assist in the filtering of views or the visual integration of the Proposed Scheme into its landscape context. Footpath Warburton 3 will have been realigned and will cross the Proposed Scheme via the Footpath Warburton 3 accommodation overbridge, substantially changing the user's sequential views of medium scale agricultural fields 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>Year 15 – summer:            Mitigation planting will be sufficiently mature to integrate the lower slopes of Heatley North embankment into the landscape and reinstate the existing hedgerow pattern for users of realigned Footpath Warburton 3. Intervening vegetation in leaf will also partially filter views of Heatley North embankment and River Bollin West viaduct. However, train movements and overhead line equipment along the top of the embankment and viaduct will remain visible in the middle distance across a large proportion of the view.</p> <p>The magnitude of visual change will reduce to <b>medium</b> resulting in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>



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**View west from Footpath Warburton 3 (High sensitivity receptors) (VP 320-03-001)**

Year 30 – summer: Effects will reduce to non-significant by year 30 due to the growth and maturity of the mitigation planting (reported in Volume 5: Appendix LV-001-0MA04).	Level of effect: Non-significant
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**View north and east from St Werburgh’s New Church, Bent Lane (High sensitivity receptors) (VP 320-02-003)**

Year 1 – winter and summer: Residents along the A6144 Bent Lane and users of Footpath Warburton 3 of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to the rural character of near and middle-distance views. The Proposed Scheme will be visible across a large proportion of the view. Warburton cutting and Footpath Warburton 3 accommodation overbridge will be new and uncharacteristic elements introduced into views of the rural landscape. Footpath Warburton 3 accommodation overbridge will be an isolated high-level structure, visible across the low-lying landscape. Warburton cutting will be partially screened by landscape earthworks, however overhead line equipment and train movements will be visible above the line of Warburton cutting and will be uncharacteristic elements in rural views. For residents on the west side of the A6144 Bent Lane, views east to the Proposed Scheme will be heavily filtered through intervening vegetation and screened by intervening buildings. Views to the north from properties closer to A6144 Paddock Lane will be more open due to the removal of roadside vegetation during construction. For residents on the east of the A6144 Bent Lane, views will be more open where property boundary vegetation is absent. The A6144 Paddock Lane overbridge will be visible in the far distance of the view and will feature prominently on the skyline in oblique views to the north beyond the Saracens Head public house. Footpath Warburton 3 will have been realigned across the Proposed Scheme on Footpath Warburton 3 accommodation overbridge, and footpath users will experience elevated views across the landscape. In the summer months, intervening vegetation in leaf will partially filter views of the Proposed Scheme. However, mitigation planting will not be sufficiently established to assist in the filtering of views or the visual integration of the Proposed Scheme into its landscape context.  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: Maturing mitigation planting will partially filter views of Warburton cutting, associated with overhead line equipment and train movements. However, the elevated Footpath Warburton 3 accommodation overbridge and the A6144 Paddock Lane overbridge will remain visible above the treeline.  The magnitude of visual change will reduce to <b>medium</b> resulting in a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)
Year 30 – summer: Effects will reduce to non-significant by year 30 as a result of maturing planting (reported in Volume 5: Appendix LV-001-0MA04).	Level of effect: Non-significant

**View north-west from the A6144 Warburton Lane at Mossbrow (High sensitivity receptors) (VP 320-02-004)**

Year 1 – winter and summer: Residents of Mossbrow of <b>high</b> susceptibility and visitors to the Saracens Head public house of lower susceptibility all with <b>medium</b> value views, will experience a substantial change to the rural character of near and middle-distance views. The A6144 Paddock Lane auto-transformer station, Warburton cutting, and A6144 Paddock Lane overbridge will be new large-scale elements, visible across a large proportion of the view in the near and middle	Level of effect: <b>Major</b> adverse (significant)
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<b>View north-west from the A6144 Warburton Lane at Mossbrow (High sensitivity receptors) (VP 320-02-004)</b>	
<p>distance. The A6144 Paddock Lane overbridge will foreshorten views to the north and feature prominently on the skyline. Warburton cutting will be partially screened by landscape earthworks, however overhead line equipment and train movements will be visible above the line of the cutting. Views for visitors to the Saracens Head public house will be partially filtered through intervening vegetation. For residents of Moss Brow Farm, views of the Proposed Scheme will be partially filtered through intervening vegetation and screened by farm buildings. The loss of vegetation during construction will noticeably change the composition of views compared to the baseline and will allow views of the Proposed Scheme. Mitigation planting will not be sufficiently established to assist in the filtering of views or the visual integration of the Proposed Scheme into its landscape context.</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>Maturing mitigation planting in association with landscape earthworks will partially filter views of Warburton cutting, overhead line equipment and train movements. The A6144 Paddock Lane overbridge will continue to foreshorten views to the north. Lighting columns and traffic using the overbridge will remain visible, but views will partially be filtered through woodland and hedgerow planting.</p> <p>The magnitude of visual change will reduce to <b>medium</b> resulting in 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 by year 30 as a result of maturing planting (reported in Volume 5: Appendix LV-001-0MA04).</p>	<p>Level of effect:            Non-significant</p>
<p>Night-time effects - year 1</p> <p>Traffic movements and roadside lighting along the A6144 Paddock Lane will be more prominent in middle-distance views at night compared to the baseline, due to the elevated position of the realigned A6144 Paddock Lane and overbridge. The new roundabouts at the junctions between the realigned A6144 Paddock Lane, the A6144 Warburton Lane and the A6144 Bent Lane will also be lit. The lights will be designed to reduce the visual impact of the lighting installation.</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>
<p>Night-time effects - year 15 and 30</p> <p>Effects will reduce to non-significant in years 15 and 30 due to the growth and maturity of mitigation planting. This will filter the majority of the lighting arising from the Proposed Scheme (reported in Volume 5: Appendix LV-001-0MA04).</p>	<p>Level of effect:            Non-significant</p>

<b>View east from the A6144 Paddock Lane (High sensitivity receptors) (VP 320-02-005)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to the rural character of middle-distance views. The A6144 Paddock Lane overbridge, Warburton embankment and Manchester Ship Canal viaduct will be new, large-scale structures introduced into views of arable farmland in the middle distance and will be visible across a large proportion of the view. The raised landform associated with A6144 Paddock Lane overbridge and Warburton embankment will be uncharacteristic elements within views of this relatively flat landscape. Manchester Ship Canal viaduct will be a new element within the view. Landscape earthworks will partially screen views of overhead line equipment and train movements along Warburton embankment. Views of train movements along Manchester Ship Canal viaduct will be partially filtered through intervening vegetation.</p>	<p>Level of effect:  <b>Major</b> adverse            (significant)</p>

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<b>View east from the A6144 Paddock Lane (High sensitivity receptors) (VP 320-02-005)</b>	
<p>Warburton embankment and A6144 Paddock Lane overbridge will obscure views of the Saracens Head public house and will feature prominently on the skyline in views to the east. Views across the landscape to Warburton Park Farm and to woodland at Coroners Wood, will be possible beneath Manchester Ship Canal viaduct deck, between the viaduct piers. Traffic movements and lighting along A6144 Paddock Lane overbridge will be elevated and closer in the view relative to the baseline. The loss of vegetation during construction will noticeably change the composition of views and will open up views of the Proposed Scheme. Mitigation planting will not be sufficiently established to assist in the filtering of views or the visual integration of the Proposed Scheme into its landscape context.</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 Volume 5: Appendix LV-001-0MA04.</p>	
<p>Year 15 – summer:</p> <p>Maturing mitigation planting in association with landscape earthworks will partially integrate the A6144 Paddock Lane overbridge and Warburton embankment into views of the farmed landscape and will partially filter views of train movements and overhead line equipment across the top of Warburton embankment. The landform associated with the A6144 Paddock Lane overbridge will continue to obscure views of the Saracens Head public house. Roadside lighting columns and traffic movements along the elevated A6144 Paddock Lane overbridge, will be partially filtered in views by maturing mitigation planting on the A6144 Paddock Lane overbridge embankments. Views of the lower sections of Manchester Ship Canal viaduct piers, will be partially filtered through maturing mitigation planting. However, due to its scale, Manchester Ship Canal viaduct will continue to be visible across a large proportion of the view, partially filtered through intervening vegetation. Overhead line equipment and train movements across Manchester Ship Canal viaduct will be seen against the skyline.</p> <p>The magnitude of visual change will reduce to <b>medium</b> resulting in a <b>moderate</b> adverse significant effect.</p> <p>A photomontage illustrating this scenario is included in Volume 5: Appendix LV-001-0MA04.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>The greater maturity of mitigation planting in association with landscape earthworks will further integrate Warburton embankment into rural views. The A6144 Paddock Lane overbridge will remain a high-level element within the view. Views of the lower sections of Manchester Ship Canal viaduct piers, will be further filtered through mature mitigation planting. However, the elevated Manchester Ship Canal viaduct, train movements and overhead line equipment across the top of the viaduct, will remain uncharacteristic elements in views of the farmed landscape, partially filtered through intervening vegetation.</p> <p>The magnitude of visual change will remain <b>medium</b> 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 Warburton 11 (High sensitivity receptors) (VP 320-02-007)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents of Park Road, in the village of Warburton and of Warburton Park Farm, and users of Footpath Warburton 11 of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to near and middle-distance views. Warburton embankment and Manchester Ship Canal viaduct will be new, large-scale structures, introduced into views of arable farmland in the middle distance and will feature prominently on the skyline across the majority of the view. Warburton embankment will be a raised element in views of this otherwise relatively flat landscape, partially screened by landscape earthworks. Manchester Ship Canal viaduct will be a new element within the view at a much larger scale than</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

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<b>View east from Footpath Warburton 11 (High sensitivity receptors) (VP 320-02-007)</b>	
<p>Warburton toll bridge. Overhead line equipment and train movements will be visible along the top of Warburton embankment and Manchester Ship Canal viaduct across a large proportion of the view, partially filtered through intervening vegetation. For residents of Warburton Park Farm the proximity and height of Manchester Ship Canal viaduct means that overhead line equipment and movement of trains will be too elevated to be visible. Warburton embankment will foreshorten views to the east. Views across the landscape will be possible beneath Manchester Ship Canal viaduct structure, however, the viaduct piers will be clearly visible within these views. Footpath Warburton 11 will have been diverted beneath Manchester Ship Canal viaduct. Users of Footpath Warburton 11 will have near-distance views of the underside of the viaduct deck and piers in sequential views passing under the viaduct. The loss of vegetation during construction will noticeably change the composition of views compared to the baseline and will open up views of the Proposed Scheme.</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>Warburton embankment will continue to be a raised element in views and will foreshorten views of the east. Views of Warburton embankment will be partially filtered through maturing mitigation planting in association with landscape earthworks. However, train movements and overhead line equipment will be visible along the top of the embankment, above the line of planting. Due to the scale of Manchester Ship Canal viaduct, mitigation planting will not result in full visual integration of Manchester Ship Canal viaduct into views of the arable landscape. Views of the lower sections of Manchester Ship Canal viaduct piers, will be partially filtered through maturing mitigation planting. Views across the landscape to Coroners Wood will be possible beneath Manchester Ship Canal viaduct deck and between the piers.</p> <p>The magnitude of visual change will reduce to <b>medium</b> resulting in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>
<p>Year 30 – summer:</p> <p>Views of Warburton embankment will continue to be partially filtered through mature mitigation planting in association with landscape earthworks. The lower sections of the Manchester Ship Canal viaduct piers will be further filtered through mature mitigation planting. However, despite maturity of mitigation planting Manchester Ship Canal viaduct, will not be fully integrated into views of the arable landscape.</p> <p>The magnitude of visual change will remain <b>medium</b> resulting in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>

<b>View north-west from Footpath Warburton 11 at Jack Hey Gate Farm (High sensitivity receptors) (VP 320-02-006)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents of Jack Hey Gate Farm and properties along the A6144 Warburton Lane and users of Footpath Warburton 11 of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to middle-distance views. Warburton embankment and Manchester Ship Canal viaduct will be new, large-scale structures, introduced into views of the farmed landscape in the middle distance, and will feature prominently on the skyline. The raised form of Warburton embankment will be an uncharacteristic element within views of this otherwise flat, rural landscape. Views of Warburton embankment and associated train movements and overhead line equipment will be partially screened by landscape earthworks. Manchester Ship Canal viaduct will be at a much larger scale than Warburton toll bridge. Overhead line equipment and train movements will be visible along the top of Manchester Ship Canal viaduct across a large proportion of the view, partially filtered through intervening vegetation. Views of Warburton Park Farm will be possible beneath Manchester Ship Canal viaduct deck,</p>	<p>Level of effect:  <b>Major</b> adverse            (significant)</p>

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<b>View north-west from Footpath Warburton 11 at Jack Hey Gate Farm (High sensitivity receptors) (VP 320-02-006)</b>	
<p>between the piers. The loss of vegetation during construction will noticeably 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 assist in the filtering of views or the visual integration of the Proposed Scheme into its landscape context. Views for footpath users will be near distance and direct, as they travel beneath Manchester Ship Canal viaduct on the realigned Footpath Warburton 11.</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>Year 15 – summer:</p> <p>Maturing mitigation planting in association with landscape earthworks will partially filter views of Warburton embankment, associated train movements and overhead line equipment. Due to the scale of Manchester Ship Canal viaduct, mitigation planting will not result in full visual integration of the viaduct into views of the arable landscape. However, views of the lower sections of Manchester Ship Canal viaduct piers, will be partially filtered through maturing mitigation planting. The elevated section of Manchester Ship Canal viaduct, associated overhead line equipment and train movements will continue to be visible across much of the view, partially filtered through intervening vegetation. Views for footpath users will be near distance and direct, as they travel beneath Manchester Ship Canal viaduct on the realigned Footpath Warburton 11.</p> <p>The magnitude of visual change will reduce to <b>medium</b> resulting in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>
<p>Year 30 – summer:</p> <p>Views of Warburton embankment will be further filtered through mature mitigation planting in association with landscape earthworks. The lower sections of the Manchester Ship Canal viaduct piers will be further filtered through mature mitigation planting. However, the elevated section of Manchester Ship Canal viaduct, associated train movements and overhead line equipment will continue to be visible across a large proportion of the view, partially filtered through intervening vegetation and mature mitigation planting. Footpath users will continue to have near-distance views of the viaduct and piers as they travel beneath Manchester Ship Canal viaduct on the realigned Footpath Warburton 11.</p> <p>The magnitude of visual change will remain <b>medium</b> resulting in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>

<b>View north-west from the A6144 Warburton Lane at the junction with Moss Lane (High sensitivity receptors) (VP 320-02-008)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents along the A6144 Warburton Lane, including residents of Heathlands Farm, Brook House and Top Park Close and residential properties on the western edge of Partington of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a noticeable change to middle and far-distance views. A6144 Paddock Lane realignment and overbridge, Warburton embankment and Manchester Ship Canal viaduct will be new, large-scale structures, introduced into views of arable farmland, and will feature prominently on the skyline across the majority of the view. The raised landform of A6144 Paddock Lane overbridge and Warburton embankment will be uncharacteristic elements within views of the otherwise flat, rural landscape, partially screened by landscape earthworks. Manchester Ship Canal viaduct will be at a much larger scale than Warburton toll bridge. Overhead line equipment and train movements will be visible along the top of Warburton embankment and Manchester Ship Canal viaduct, partially filtered through intervening vegetation. Views of Warburton Park Farm will be possible beneath Manchester Ship Canal viaduct and between the viaduct piers. Views</p>	<p>Level of effect:  <b>Major</b> adverse            (significant)</p>

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**View north-west from the A6144 Warburton Lane at the junction with Moss Lane (High sensitivity receptors) (VP 320-02-008)**

<p>of Warburton toll bridge will be obscured by Manchester Ship Canal viaduct. The loss of vegetation during construction will noticeably 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 assist in the filtering of views or the visual integration of the Proposed Scheme into its landscape context. Woodland at Coroners Wood and woodland along Red Brook, will continue to filter views to the west for residents of Partington. Views for residents of Top Park Close, will be oblique and partially filtered through intervening garden vegetation and screened by intervening buildings.</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-001-0MA04.</p>	
<p>Year 15 – summer:</p> <p>Mitigation planting in association with landscape earthworks will partially integrate the realigned A6144 Paddock Lane and overbridge and Warburton embankment into views of the farmed landscape and will partially filter views of train movements and overhead line equipment across the top of the Warburton embankment. Due to the scale of Manchester Ship Canal viaduct, mitigation planting will not result in full visual integration of the viaduct into views of the arable landscape. However, views of the lower sections of Manchester Ship Canal viaduct piers, will be partially filtered through maturing mitigation planting. The elevated sections of Manchester Ship Canal viaduct, associated overhead line equipment and train movements will continue to be visible across much of the view, partially filtered through intervening vegetation.</p> <p>The magnitude of visual change will reduce to <b>medium</b> resulting in a <b>moderate</b> adverse significant effect.</p> <p>A photomontage illustrating this scenario is included in Volume 5: Appendix LV-001-0MA04.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>
<p>Year 30 – summer:</p> <p>The greater maturity of the mitigation planting in association with landscape earthworks will further filter views of the realigned A6144 Paddock Lane and overbridge and Warburton embankment. Views of the lower sections of Manchester Ship Canal viaduct piers will be further filtered through mature mitigation planting. However, the elevated sections of Manchester Ship Canal viaduct, associated train movements and overhead line equipment will continue to be visible across a large proportion of the view, partially filtered through intervening vegetation and mature mitigation planting.</p> <p>The magnitude of visual change will remain <b>medium</b> resulting in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>

**View east from Bridleway Partington 6 part of the Bollin Valley Way along Manchester Ship Canal (High sensitivity receptors) (VP 321-03-001)**

<p>Year 1 – winter and summer:</p> <p>Users of Manchester Ship Canal and Bridleway Partington 6 and residents of Millbank Hall Farm of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to near and middle-distance views. The loss of vegetation during construction, particularly from Coroners Wood, will noticeably change the composition of views compared to the baseline and will open up views of the Proposed Scheme. Manchester Ship Canal viaduct will be an imposing, high-level, linear element elevated over the adjoining landscape and visible across a large proportion of the view. However, views for residents of Millbank Hall Farm will be partially filtered through intervening vegetation and partially screened by farm buildings, but Manchester Ship Canal viaduct will be perceived as a new elevated feature in the view.</p>	<p>Level of effect:  <b>Major</b> adverse            (significant)</p>
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<b>View east from Bridleway Partington 6 part of the Bollin Valley Way along Manchester Ship Canal (High sensitivity receptors) (VP 321-03-001)</b>	
<p>Noise fence barriers will be visible along the top of Manchester Ship Canal viaduct and will partially screen views of overhead line equipment, and fully screen train movements for users of the bridleway. There will be clear views along the bridleway and across the canal (under Manchester Ship Canal viaduct deck) between the visually prominent piers. Manchester Ship Canal viaduct will be viewed in the context of the industrial scale and character of Manchester Ship Canal corridor. During the summer months, views of the lower parts of Manchester Ship Canal viaduct piers will be partially filtered through intervening vegetation in leaf. However, due to the scale of the viaduct, mitigation planting will not contribute to any visual integration of Manchester Ship Canal viaduct into its landscape context.</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>Due to the scale and height of Manchester Ship Canal viaduct, the Proposed Scheme will remain visible across much of the view, with views of the lower sections of Manchester Ship Canal viaduct piers partially filtered through intervening vegetation.</p> <p>The magnitude of visual change will remain <b>high</b> 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>Due to the scale and height of Manchester Ship Canal viaduct, the Proposed Scheme will remain visible across much of the view, with views of the lower sections of Manchester Ship Canal viaduct piers partially filtered through intervening vegetation.</p> <p>The magnitude of visual change will remain <b>high</b> resulting in a <b>major</b> adverse significant effect.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>

<b>View north-east from Dam Lane at the junction with Footpath Rixton-with-Glazebrook 7 (High sensitivity receptors) (VP 321-02-004)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents on the north-east edge of Hollins Green and users of Footpath Rixton-with-Glazebrook 7 of high susceptibility and visitors to Hollinfare Cemetery and the Black Swan public house of lower susceptibility, all with medium value views, will experience a substantial change to near and middle-distance views. Manchester Ship Canal viaduct will be a new, large-scale, element introduced into views of the otherwise rural village landscape. The majority of residents will experience glimpsed views of Manchester Ship Canal viaduct, train movements and noise fence barriers between and above intervening vegetation associated with the Hollinfare Cemetery, individual gardens and buildings. More open views from properties to the north of Hollins Green towards Manchester Ship Canal viaduct will be framed by the cemetery trees and the Marshland properties on Dam Lane. For users of Footpath Rixton-with-Glazebrook 7, views across farmland toward properties on Glazebrook Lane will be possible beneath Manchester Ship Canal viaduct deck and between the viaduct piers. Mitigation planting will not assist in filtering or integrating the Proposed Scheme into views, due to the height of the viaduct. Manchester Ship Canal viaduct will become more prominent in views for users of Footpath Rixton-with Glazebrook 7 as they travel along the footpath towards the Proposed Scheme. There will be near-distance views of the underside of Manchester Ship Canal viaduct and piers for footpath users, as they travel north-east from Dam Lane.</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-east from Dam Lane at the junction with Footpath Rixton-with-Glazebrook 7 (High sensitivity receptors) (VP 321-02-004)**

<p>Year 15 – summer:</p> <p>Intervening vegetation will further filter views of Manchester Ship Canal viaduct for residents in Hollins Green. Mitigation planting will partially filter views of Manchester Ship Canal viaduct piers, but Manchester Ship Canal viaduct as a whole will remain prominent in views. Footpath users will experience sequential views towards and under Manchester Ship Canal viaduct as they travel along Footpath Rixton-with-Glazebrook 7.</p> <p>The magnitude of visual change will remain <b>high</b> resulting in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:</p> <p><b>Major</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>The greater maturity of the mitigation planting will further filter views of the lower section of Manchester Ship Canal viaduct piers, but Manchester Ship Canal viaduct will remain a prominent element in views.</p> <p>The magnitude of visual change will reduce to <b>medium</b> resulting in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>

**View west from the Glazebrook Timberland Trail (Footpath Irlam 60) at Cadishead (High sensitivity receptors) (VP 321-02-011)**

<p>Year 1 – winter and summer:</p> <p>Residents on the western edge of Cadishead and users of the Glazebrook Timberland Trail users of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a noticeable change to the rural character of views. For the majority of residents and footpath users, Manchester Ship Canal viaduct and Glazebrook South embankment will be new large-scale, linear elements uncharacteristic of oblique views across the valley of the Glaze Brook. Manchester Ship Canal viaduct will be viewed in the middle distance above the rooftops of residential properties and vegetation on the B5212 Glazebrook Lane and will feature prominently on the skyline across a proportion of the view. Some views will be partially filtered through intermittent bankside vegetation, and some views will be screened by intervening buildings. Properties on the western edge of Essex Gardens, to the north of this viewpoint, will have framed, but largely uninterrupted, views of Manchester Ship Canal viaduct and Glazebrook South embankment which will feature prominently on the skyline in the far distance of the view. Overhead line equipment and train movements will be uncharacteristic new elements within all views. The presence of Glazebrook South embankment, Manchester Ship Canal viaduct and train movements will represent a noticeable change in the composition of views over the river valley and arable landscape but will be partially filtered through intervening vegetation. The loss of vegetation during construction, will noticeably 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 assist in the filtering of views or the visual integration of the Proposed Scheme into its landscape context.</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:</p> <p><b>Moderate</b> adverse (significant)</p>
<p>Year 15 and year 30 – summer:</p> <p>Effects will reduce to non-significant in year 15 and remain so for year 30 due to the growth and maturity of the mitigation planting (reported in detail in Volume 5: Appendix LV-001-0MA04).</p>	<p>Level of effect:</p> <p>Non-significant</p>



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<b>View west from the B5212 Glazebrook Lane (High sensitivity receptors) (VP 321-02-005)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents of Lea Brook Farm, Mount Pleasant Farm and properties on the B5212 Glazebrook Lane and users of Footpath Rixton-with-Glazebrook 9 all of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to open views across the arable landscape. Manchester Ship Canal viaduct and Glazebrook South embankment will be new, large-scale elements, uncharacteristic within views of the otherwise rural landscape. Manchester Ship Canal viaduct and notably the piers, will be prominent and uncharacteristic elements within views of the arable fields. Long views across the landscape will be possible between Manchester Ship Canal viaduct piers. Mitigation planting will not be sufficiently established to assist in the filtering of views or the visual integration of the Proposed Scheme into its landscape context. Footpath Rixton-with-Glazebrook 9 will have been realigned. Footpath users will have near-distance views of the underside of Manchester Ship Canal viaduct and piers as they travel beneath Manchester Ship Canal viaduct.</p> <p>The combination of 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:</p> <p><b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>Intervening vegetation in leaf and maturing landscape planting along field boundaries and Glazebrook South embankment will partially filter views of the Glazebrook South embankment and lower sections of Manchester Ship Canal viaduct. Mitigation planting along Dam Lane will partially filter some views of the lower section of the Manchester Ship Canal viaduct piers to the south-east. However, due to the scale of Manchester Ship Canal viaduct, it will remain visible in the majority of views above the line of mitigation planting. Footpath users will have near-distance views of Manchester Ship Canal viaduct piers as they travel along the realigned Footpath Rixton-with-Glazebrook 9 with near-distance views of the underside of Manchester Ship Canal viaduct deck as they travel beneath the Proposed Scheme.</p> <p>The magnitude of visual change will remain <b>high</b> and effects will be <b>major</b> adverse significant effects.</p>	<p>Level of effect:</p> <p><b>Major</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>The greater maturity of the mitigation planting associated with Glazebrook South embankment, will further integrate the Proposed Scheme into the landscape and provide some filtering of views. However, Manchester Ship Canal viaduct piers will continue to be prominent elements within the view.</p> <p>The magnitude of visual change will remain <b>high</b> and effects will be <b>major</b> adverse significant effects.</p>	<p>Level of effect:</p> <p><b>Major</b> adverse (significant)</p>

<b>View north-east from Dam Lane (High sensitivity receptors) (VP 321-02-006)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents on Dam Lane and Pool Road and users of Footpath Rixton-with-Glazebrook 8 of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to open views across the arable landscape in the near, middle and far distance. Manchester Ship Canal viaduct will be an uncharacteristic element introduced into views of the otherwise rural landscape. Long views across the landscape will be possible between Manchester Ship Canal viaduct piers. The presence of the large-scale Glazebrook South embankment will substantially change the composition of the far distance of the view. Due to the scale of Manchester Ship Canal viaduct, mitigation planting will not assist in filtering views or integrating the Proposed Scheme into views. Users of Footpath Rixton-with Glazebrook 8 will have sequential views of Manchester Ship Canal viaduct as they travel along the footpath, with some views filtered through intervening vegetation. There will be near-distance views of the</p>	<p>Level of effect:</p> <p><b>Major</b> adverse (significant)</p>

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<b>View north-east from Dam Lane (High sensitivity receptors) (VP 321-02-006)</b>	
<p>underside of Manchester Ship Canal viaduct deck and piers as users of Footpath Rixton-with-Glazebrook 8 travel beneath the Proposed Scheme.</p> <p>The combination of above will result in a high 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-001-0MA04.</p>	
<p>Year 15 – summer:</p> <p>Mitigation planting along Dam Lane and Footpath Rixton-with-Glazebrook 8 will partially filter views of Manchester Ship Canal viaduct to the south-east. However, due to the scale of Manchester Ship Canal viaduct, mitigation planting will not result in full visual integration of Manchester Ship Canal viaduct into views of the arable landscape. Views of the lower sections of Manchester Ship Canal viaduct piers, will be partially filtered through maturing mitigation planting. There will be views across the landscape between the piers of Manchester Ship Canal viaduct, with near-distance views of the underside of Manchester Ship Canal viaduct deck as users of Footpath Rixton-with-Glazebrook 8 travel beneath Manchester Ship Canal viaduct.</p> <p>The magnitude of visual change will remain <b>high</b> and effects will be <b>major</b> adverse significant.</p> <p>A photomontage illustrating this scenario is included Volume 5: Appendix LV-001-0MA04.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>The greater maturity of the mitigation planting will further filter views of the Proposed Scheme for residents on Dam Lane. Views of the lower sections of Manchester Ship Canal viaduct will also be partially filtered. However, the upper section of Manchester Ship Canal viaduct will remain visible above the line of mitigation planting.</p> <p>The magnitude of visual change will remain <b>high</b> and effects will be <b>major</b> adverse significant.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<b>View north-east from Footpath Rixton-with-Glazebrook 6 (High sensitivity receptors) (VP 321-03-008)</b>	
<p>Year 1 – winter and summer:</p> <p>Users of Footpath Rixton-with-Glazebrook 6 of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a noticeable change to middle and far-distance views. The raised embankment and Manchester Ship Canal viaduct will be uncharacteristic elements introduced into views of the otherwise rural landscape. Intervening vegetation will partially filter views of Glazebrook South embankment. However, due to the height of both Glazebrook South embankment and Manchester Ship Canal viaduct, the Proposed Scheme will be visible above the treeline across a proportion of the view. Overhead line equipment, noise fence barriers and train movements will be viewed against the skyline. Intervening vegetation in leaf will partially filter views of the lower parts of Glazebrook South embankment and Manchester Ship Canal viaduct. Mitigation planting will not be sufficiently mature to assist in filtering views of the Proposed Scheme nor contribute to the visual integration of structures into their landscape context.</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> 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 in year 15 and remain so for year 30 due to the growth and maturity of the mitigation planting (reported in detail in Volume 5: Appendix LV-001-0MA04).</p>	<p>Level of effect:  Non-significant</p>

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**View north-east from the junction of Dam Lane and Dam Head Lane (High sensitivity receptors) (VP 321-02-009)**

<p>Year 1 – winter and summer:</p> <p>Residents of Hollingreave Farm, Townley Brow Farm, Bridge Farm, Rose Cottage and residents of Dam Lane and users of Footpath Rixton-with-Glazebrook 14 of <b>high</b> susceptibility and with <b>medium</b> value views, will experience changes to the rural character of near and middle-distance views. Glazebrook South embankment and Dam Lane telecommunication site will be new elements introduced into near and middle-distance views and will be visible across a large proportion of the view. These structures will be at a larger scale than the existing railway infrastructure. Glazebrook South embankment will foreshorten views to the east and will replace open views across arable fields to woodland. Manchester Ship Canal viaduct will be the new focus in the middle distance. Views across the landscape, to the south-east will be possible beneath Manchester Ship Canal viaduct deck and between Manchester Ship Canal viaduct piers. Train movements, noise fence barriers and overhead line equipment will be visible along the top of Glazebrook South embankment and Manchester Ship Canal viaduct. Footpath Rixton-with-Glazebrook 14 will have been diverted and footpath users will have near-distance views of the Manchester Ship Canal deck and piers as they travel beneath Manchester Ship Canal viaduct. Mitigation planting will not be sufficiently established to assist in the filtering of views or the visual integration of the Proposed Scheme into its landscape context.</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-001-0MA04.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>Maturing mitigation planting will partially integrate Glazebrook South embankment and Dam Lane telecommunications site into rural views. However, the embankment will continue to foreshorten views to the east. Train movements, boundary fencing and overhead line equipment will be visible above the line of trees. Views of the lower section of Manchester Ship Canal viaduct will be partially filtered through intervening mitigation woodland but due to its height, Manchester Ship Canal viaduct will remain a highly visible. The movement of trains, overhead line equipment and noise fence barriers will be visible on the skyline along the top of Manchester Ship Canal viaduct. Views for users of Footpath Rixton-with-Glazebrook 14 will be largely filtered through maturing woodland. However, there will be near distance and direct views of the Proposed Scheme as they travel beneath Manchester Ship Canal viaduct.</p> <p>The magnitude of visual change will reduce to <b>medium</b> resulting in a <b>moderate</b> adverse significant effect.</p> <p>A photomontage illustrating this scenario is included in Volume 5: Appendix LV-001-0MA04.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>Effects will reduce to non-significant by year 30 due to the growth and maturity of the mitigation planting (reported in Volume 5: Appendix LV-001-0MA04).</p>	<p>Level of effect:  Non-significant</p>

**View south-west from Vetch Close (High sensitivity receptors) (VP 321-02-010)**

<p>Year 1 – winter and summer:</p> <p>Residents on Bank Street and Vetch Close and users of Footpath Rixton-with-Glazebrook 9 of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to middle-distance views. The Proposed Scheme will be visible across a large proportion of the view. Manchester Ship Canal viaduct and raised landform of Glazebrook South embankment will be new large-scale elements that will feature prominently on the skyline in oblique views to the west. Manchester Ship Canal viaduct and Glazebrook South embankment will be large-scale, uncharacteristic elements introduced into views of the otherwise rural landscape, along</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
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<b>View south-west from Vetch Close (High sensitivity receptors) (VP 321-02-010)</b>	
<p>with overhead line equipment, noise fence barriers and train movements. Long views across the landscape will be possible between Manchester Ship Canal viaduct piers. Footpath Rixton-with-Glazebrook 9 will have been diverted and there will be close views of Glazebrook South embankment and Manchester Ship Canal viaduct as footpath users travel along the diverted footpath. The mitigation planting will not be sufficiently established to assist in the filtering of views or the visual integration of the Proposed Scheme into its landscape context.</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>Views of Glazebrook South embankment will be partially filtered through the maturing mitigation planting. However, train movements and overhead line equipment will be visible above the line of planting. Manchester Ship Canal viaduct will remain highly visible due to its large-scale.</p> <p>The magnitude of visual change will reduce to <b>medium</b> resulting in a moderate adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>
<p>Year 30 – summer:</p> <p>The greater maturity of mitigation planting will largely filter views of Glazebrook South embankment and train movements. Manchester Ship Canal viaduct will remain visible but in a narrow view, framed by woodland at the disused campsites.</p> <p>The magnitude of visual change will remain <b>medium</b> and effects will be <b>moderate</b> adverse (significant).</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>

<b>View west from Moss Farm and Church Farm (High sensitivity receptors) (VP 322-02-006)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents of Church Farm and Moss Farm of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a substantial change to near-distance views. Glazebrook North embankment, Glazebrook (Railway) viaduct and M62 West viaduct will be new large-scale structures, that will replace views of the farmed landscape and woodland associated with the dismantled railway line in the near distance of the view. The high-level Glazebrook North embankment will be an uncharacteristic element in the otherwise flat mossland landscape and will be visible across the entire view. Glazebrook (Railway) viaduct and M62 West viaduct will be visible in oblique views. Glazebrook North embankment, Glazebrook (Railway) viaduct and the M62 West viaduct will foreshorten views to the west for these residents and will create a new and prominent skyline in close views. Overhead line equipment and train movements will be visible along the top of Glazebrook North embankment, Glazebrook (Railway) viaduct and M62 West viaduct and will be viewed against the skyline. Noise fence barriers will be visible across the top of Glazebrook (Railway) viaduct. Mitigation planting will not be sufficiently established to assist in the filtering of views or the visual integration of the Proposed Scheme into its landscape context.</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>Views of Glazebrook North embankment, Glazebrook (Railway) viaduct, M62 West viaduct, overhead line equipment, train movements and noise fence barriers will partially be filtered through maturing mitigation planting along Glazebrook North embankment. The mitigation planting will partly replicate the existing vegetation associated with the disused railway line. However, the raised landform of Glazebrook North embankment will continue to be</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>

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<b>View west from Moss Farm and Church Farm (High sensitivity receptors) (VP 322-02-006)</b>	
<p>prominent, foreshortening views to the west and will form the new skyline across the entire view.</p> <p>The magnitude of visual change will reduce to <b>medium</b> resulting in a moderate adverse significant effect.</p>	
<p>Year 30 – summer:</p> <p>The greater maturity of mitigation planting will further screen views of the Proposed Scheme. However, the raised landform of Glazebrook North embankment will continue to foreshorten views to the west and form the skyline.</p> <p>The magnitude of visual change will remain <b>medium</b> resulting in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>

<b>View west from the B5212 Glazebrook Lane (High sensitivity receptors) (VP 322-02-004)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents along Glazebrook Lane of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a noticeable change to middle-distance views. Some views will be partially filtered through intervening vegetation. Glazebrook (Railway) viaduct, Glazebrook North embankment and M62 West viaduct will be new, large-scale structures introduced into views of pastoral fields and woodland and will be visible across the majority of the view. The elevated Glazebrook North embankment and Glazebrook (Railway) viaduct and M62 West viaduct will be uncharacteristic elements within views of the otherwise flat mossland landscape and will feature prominently on the skyline across much of the view. Overhead line equipment and train movements will be visible along the top of Glazebrook (Railway) viaduct, Glazebrook North embankment and M62 West viaduct and will be seen against the skyline. Noise fence barriers will be visible across the top of Glazebrook (Railway) viaduct. Loss of vegetation during construction will change the composition of views compared to the baseline and will open up views of the Proposed Scheme. Church Farm and Moss Farm will be viewed against the backdrop of the Glazebrook North embankment, in the middle distance. Mitigation planting will not be sufficiently established to assist in the filtering of views or the visual integration of the Proposed Scheme into its landscape context.</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 in year 15 and remain so for year 30 due to the growth and maturity of the mitigation planting (reported in Volume 5: Appendix LV-001-0MA04).</p>	<p>Level of effect:            Non-significant</p>

<b>View south-west from B5212 Glazebrook Lane at New Farm (High sensitivity receptors) (VP 322-02-001)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents of New Farm and users of Footpath Rixton-with-Glazebrook 17 of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a noticeable change to middle-distance views. Some views will be partially filtered through intervening vegetation. Glazebrook (Railway) viaduct, Glazebrook North embankment and M62 West viaduct will be new, large-scale structures introduced into views of pastoral fields and woodland and will be visible across the majority of the view. The elevated Glazebrook North embankment and Glazebrook (Railway) viaduct and M62 West viaduct will be uncharacteristic elements within views of the otherwise flat mossland landscape. These structures will replace views of woodland in the background of the view and will feature prominently on the skyline. Overhead line equipment and train movements will be visible along the top of Glazebrook North embankment, Glazebrook (Railway) viaduct and M62 West viaduct. Noise fence barriers will be visible across the top of</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>

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<b>View south-west from B5212 Glazebrook Lane at New Farm (High sensitivity receptors) (VP 322-02-001)</b>	
<p>Glazebrook (Railway) viaduct. Loss of vegetation during construction will change the composition of views. Church Farm and Moss Farm will be viewed against the backdrop of Glazebrook North embankment, in the middle distance. Mitigation planting will not be sufficiently established to assist in the filtering of views or the visual integration of the Proposed Scheme into its landscape context.</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>A photomontage illustrating this scenario is included in Volume 5: Appendix LV-001-0MA04.</p>	
<p>Year 15 and year 30 – summer:</p> <p>Effects will reduce to non-significant in year 15 and remain so for year 30 due to the growth and maturity of the mitigation planting (reported in detail in Volume 5: Appendix LV-001-0MA04).</p> <p>A photomontage illustrating this scenario is included in Volume 5: Appendix LV-001-0MA04.</p>	<p>Level of effect: Non-significant</p>

## 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:
- moderate adverse effects in relation to three LCA;
  - major adverse visual effects at six representative residential viewpoint locations;
  - major adverse visual effects at one recreational viewpoint location;
  - moderate adverse visual effects at ten representative residential viewpoint locations; and
  - moderate adverse visual effects at two representative recreational viewpoints.

## 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.
- 11.5.15 There are no area-specific requirements for monitoring landscape and visual mitigation during the operation of the Proposed Scheme in the Broomedge to Glazebrook 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 Broomedge to Glazebrook area. The assessment considers existing businesses, community organisations, local employment and local economies, including planned growth and development.
- 12.1.2 Engagement with Warrington Borough Council (WBC), Trafford Metropolitan Borough Council (TMBC) and Greater Manchester Combined Authority (GMCA) 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: MA04 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).
- 12.2.2 It is assumed that existing business resources can be retained within areas of land required for some utility works including the raising or lowering of pylons, the re-stringing of cables, utility decommissioning or the provision of access routes to such works. On the basis of this assumption, no direct assessment has been undertaken in relation to the following business resources:
- Rixton with Glazebrook Community Hall in Rixton; and
  - The Black Swan public house in Rixton.

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<sup>96</sup> Volume 5: Appendix CT-001-00001, *Environmental Impact Assessment Scope and Methodology Report*.

## 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 Broomedge to Glazebrook area which lies within the administrative areas of WBC and TMBC and within the North West region. The southern and northern sections of the study area fall within the Cheshire and Warrington Local Enterprise Partnership (LEP) area and the central section of the study area falls within the Greater Manchester LEP area and the GMCA area<sup>97</sup>.

#### Business and labour market

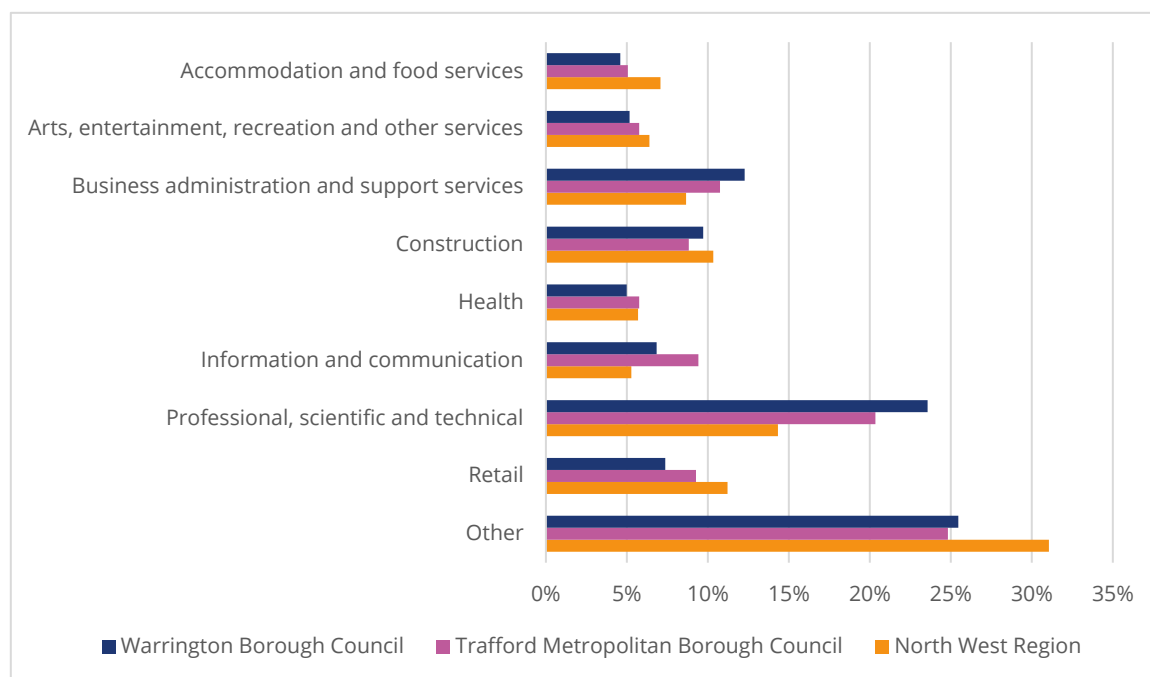
- 12.3.2 Within the WBC and TMBC administrative areas there is a wide spread of business types reflecting a diverse range of commercial activities. In the WBC area in 2020 the professional, scientific and technical sector accounted for the largest proportion of businesses (24%), with business administration and support services the second largest (12%), followed by construction (10%) and retail (7%). In the TMBC area in 2020 the professional, scientific and technical sector accounted for the largest proportion of businesses (20%), with business administration and support services the second largest (11%), followed by information and communication (9%) and retail (9%) as shown in Figure 11. 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>98</sup>.

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<sup>97</sup> A small portion of the Broomedge to Glazebrook area lies within the administrative area of Salford City Council (SaCC) but as the route of the Proposed Scheme does not directly impact the SaCC area, it is not included in the socio-economic study area.

<sup>98</sup> Office for National Statistics (2020), *UK Business Counts 2020 - local units by industry and employment size band*. Available online at: <http://www.nomisweb.co.uk/datasets/idbrlu>.

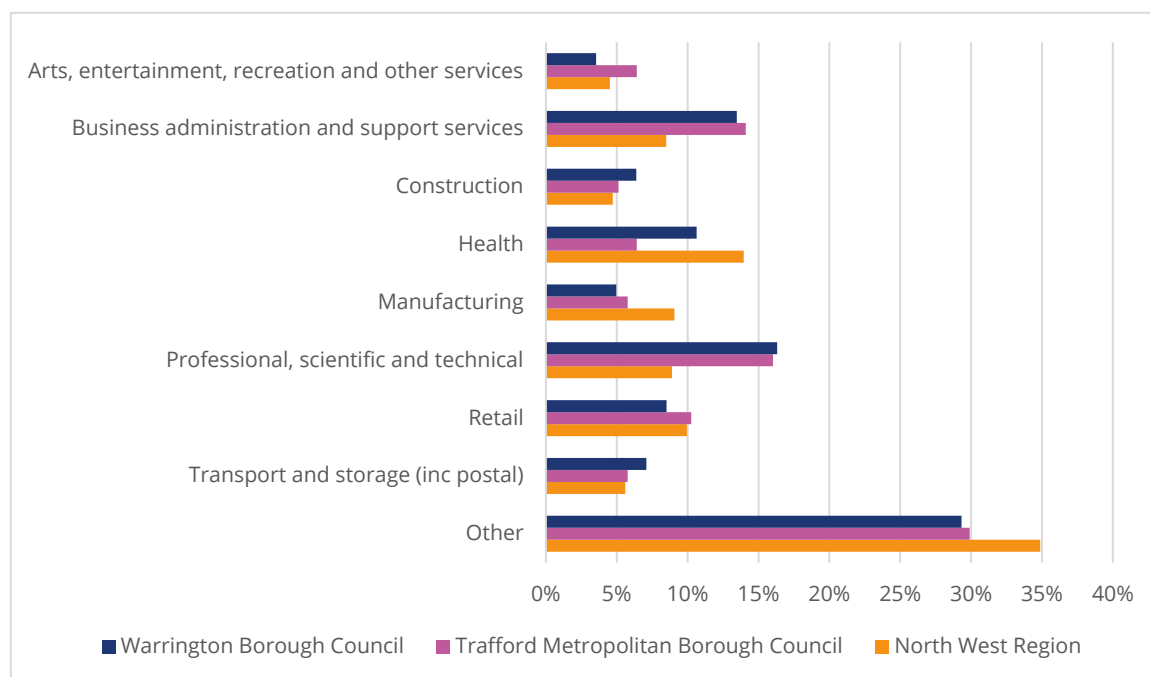
**Figure 11: Business sector composition in the Warrington Borough Council and Trafford Metropolitan Borough Council areas and the North West region**



12.3.3 In 2019<sup>99</sup>, approximately 141,000 people worked in the WBC area. According to the Office for National Statistics Business Register and Employment Survey 2019, the top four sectors in terms of share of employment in the WBC area were: professional, scientific and technical (16%); business administration and support services (13%); health (11%); and retail (9%). In 2019, approximately 156,000 people worked in the TMBC area. The top five sectors in terms of share of employment in the TMBC area were: professional, scientific and technical (16%); business administration and support services (14%); retail (10%); health (6%); and arts, entertainment, recreation and other services (6%). 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 12.

<sup>99</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 WBC and TMBC who work within their boundaries.

**Figure 12: Employment by industrial sector in the Warrington Borough Council and Trafford Metropolitan Borough Council areas and the North West region**



- 12.3.4 According to the Annual Population Survey (2020)<sup>100</sup>, the employment rate<sup>101</sup> within the WBC area was 80% (103,200 people), and 78% (114,800 people) in the TMBC area. This was higher than the employment rate of 74% recorded for the North West region and 76% for England. In 2020, unemployment in the WBC area was 3.1% and 4.5% in the TMBC area which compares with the North West region (4.3%) and England (4.8%).
- 12.3.5 The Annual Population Survey (2020) also shows that 42% of WBC residents and 51% of TMBC residents aged 16-64 were qualified to National Vocational Qualification Level 4 (NVQ4) and above, which compares with the 39% recorded in the North West region and 43% in England, while 4.7% of WBC residents and 4.3% of TMBC 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 update in 2019<sup>102</sup> within the WBC area identified a need for up to 361.7ha of land based on the strategic/local take up model, over the plan period (2017-2037). It was estimated that WBC only had 83.9ha of realistic employment land supply across the borough. The shortfall compared to realistic supply was 277.8ha, equating to an average

<sup>100</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 WBC and TMBC irrespective of where they work.

<sup>101</sup> The proportion of working age (16-64 year olds) residents that is in employment.

<sup>102</sup> BE Group and Mickledore (2019), *Economic Development Needs Assessment Update: Warrington Borough Council*.

of 13.9ha per year. The shortfall included both strategic and local sites for logistics or distribution (158.9ha), along with a sizeable office requirement (71ha).

- 12.3.7 A review of employment land in 2009<sup>103</sup> identified the need for up to 170ha of employment land in the TMBC area between 2007 and 2026, amounting to 8.5ha a year. A recent update in 2021<sup>104</sup> estimated that TMBC had only 78.4ha of realistic employment land supply across the borough, which was less than the projected need. It is important to note that the 2009 Employment Land Review is still relied upon for TMBC's employment land requirement. This highlights that there is insufficient economic land supply within Trafford (as of April 2020) up to 2037.
- 12.3.8 Based on the latest available data from the Estates Gazette (February 2021), the average vacancy rates for industrial and warehousing property in the WBC and TMBC areas have been assessed as 22% and 16%, respectively, based on marketed space against known stock<sup>105</sup>.
- 12.3.9 Based on the latest available data from the Estates Gazette (February 2021), the average vacancy rate for office space in the WBC and TMBC areas<sup>106</sup> is 20% and 14%, respectively.

## Future baseline

### Construction (2025)

- 12.3.10 Volume 5: Appendix CT-04-00000 provides details of the developments in the Broomedge to Glazebrook area that are assumed to have been implemented by 2025. No committed developments of relevance for socio-economics have been identified that would materially alter the future baseline in this area.

### Operation (2038)

- 12.3.11 Volume 5: Appendix CT-04-00000 provides details of the developments in the Broomedge to Glazebrook area that are assumed to have been implemented by 2038. No committed developments of relevance for socio-economics have been identified that would materially alter the future baseline in this area.

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<sup>103</sup> Ove Arup and Partners Ltd (2009), *Trafford Employment Land Study: Final Report*. Based on upper range.

<sup>104</sup> Trafford Metropolitan Borough Council (2021), *Employment Land Review Update – as of 1st April 2020*.

<sup>105</sup> Vacant space is based on marketed space identified from Estates Gazette data (EGi) (February 2021).

<sup>106</sup> Based on marketed space identified from Estates Gazette data (EGi) (February 2021).

## 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);
- 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 Broomedge to Glazebrook 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 The Black Swan public house, located on Manchester Road, will experience significant visual effects and effects from HGV construction traffic (traffic-related severance for non-motorised users) as a result of the construction of the Proposed Scheme. The sensitivity of this

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<sup>107</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

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 this facility. Given the duration of effects and the high level of sensitivity, the Proposed Scheme is assessed to have an adverse significant in-combination effect on this business.

- 12.4.4 The Saracens Head public house, located on the A6144 Paddock Lane, will experience significant visual effects and effects from HGV construction traffic (traffic-related severance for non-motorised users and congestion and/or delays for road users) as a result of the construction of the Proposed Scheme. The sensitivity of this establishment is assessed to be high as customers are considered to be sensitive to impacts on the local environment and setting. The construction works may discourage them from using this facility. Given the duration of effects and the high level of sensitivity, the Proposed Scheme is assessed to have an adverse significant in-combination effect on this business.
- 12.4.5 A farm shop at Moss Brow Farm, located on the A6144 Paddock Lane, will experience significant visual effects and effects from heavy goods vehicle (HGV) construction traffic (traffic-related severance for non-motorised users and congestion and/or delays for road users) as a result of the construction of the Proposed Scheme. The sensitivity of this establishment is assessed to be medium as customers are considered to be sensitive to impacts on the local environment and setting. The construction works may discourage them from using this facility. Given the duration of effects and the medium level of sensitivity, the Proposed Scheme is assessed to have an adverse significant in-combination effect on this business.

## **Isolation**

- 12.4.6 Businesses within the Broomedge to Glazebrook area may experience significant isolation effects as a result of construction of the Proposed Scheme. As a consequence, this could lead to a loss of trade for the affected businesses.
- 12.4.7 Construction works at Bridgewater Canal viaduct will require the temporary closure of the eastern end of Warrington Lane over a one year and nine month period. Traffic will be diverted via the A56 Lymm Road and Burford Lane, increasing the journey length for customers travelling from the east by up to 2.5km. Approximately 18 businesses along Warrington Lane will experience disruption as a result of construction works. Business activities include: The Barn Owl Inn public house; contracting and engineering firms; as well as specialist maintenance firms. For the reasons stated above, the disruption as a result of the Proposed Scheme is considered to represent a moderate adverse significant isolation effect on this group of businesses during construction.
- 12.4.8 The construction works required for the realignment of the existing A6144 Paddock Lane, where it crosses the route of the Proposed Scheme, will lead to traffic congestion effects due to an increase in associated HGV traffic. This traffic congestion may impair the ability of the Saracens Head public house to attract customers, since vehicle users are likely to avoid the area, especially due to a good availability of alternative public houses including the Green Dragon on the A6144 Mill Lane. The pub is not located in a population centre, so is likely to



currently rely on passing trade from vehicle occupants. For the reasons stated above, the disruption due to the construction works for the Proposed Scheme is considered to represent a temporary moderate adverse significant isolation effect on this business.

## **Construction employment**

- 12.4.9 There will be one main civil engineering compound (Manchester Ship Canal viaduct north main compound), and nine civil engineering satellite compounds in the Broomedge to Glazebrook area. Two of the satellite compounds will continue to be used as railway systems compounds following the completion of civil engineering works. Another civil engineering satellite compound straddles the boundary between the Pickmere to Agden and Hulseheath area (MA03) and the Broomedge to Glazebrook area and is included within the Volume 2: Community Area report: Pickmere to Agden and Hulseheath (MA03) for construction employment purposes.
- 12.4.10 Up to 4,400 person years of construction employment opportunities will be created at these sites<sup>108</sup>, broadly equivalent to 440 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).
- 12.4.11 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).
- 12.4.12 The resulting effects on employment are reported in aggregate at a route-wide level (see Volume 3, Route-wide effects).

## **Permanent effects**

### **Businesses**

- 12.4.13 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.
- 12.4.14 The Proposed Scheme is not expected to result in the displacement or possible loss of jobs within this area and hence no significant permanent direct effects are expected.

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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.

## Isolation

- 12.4.15 Businesses within the Broomedge to Glazebrook 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.
- 12.4.16 The permanent closure of the existing A6144 Paddock Lane where it crosses the route of the Proposed Scheme will mean that two businesses remaining in this area will no longer be on a major road.
- 12.4.17 The ability of a farm shop at Moss Brow Farm to generate income may be impaired by a loss of passing trade due to this closure. For the reason 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.
- 12.4.18 The closure and associated increased journey time from diversions may impair the ability of the Saracens Head public house to attract customers due to loss of passing trade, especially due to a good availability of alternative public houses including the Green Dragon on the A6144 Mill Lane.
- 12.4.19 For the reasons stated above, the disruption as a result of the Proposed Scheme is considered to represent a permanent major adverse significant isolation effect on this business. The effects on these two resources begin part way through the construction phase and continue whilst the Proposed Scheme is in operation.

## Other mitigation measures

- 12.4.20 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>110,111</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.
- 12.4.21 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.

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<sup>110</sup> High Speed Two Ltd (2022), *Phase 2b Western Leg Information Paper C7: Business relocation*.

<sup>111</sup> High Speed Two Ltd (2022), *Phase 2b Western Leg Information Paper C8: Compensation code for compulsory purchase*.

- 12.4.22 The nominated undertaker will seek to deliver appropriate signage to inform users of the continued operation of the Saracens Head public house and the farm shop at Moss Brow Farm, subject to securing all relevant consents.

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

- 12.4.23 Likely significant residual effects are shown in Volume 5, Socio-economics Map Book: Maps SE-01-312b to SE-01-314a. During construction, customers may be discouraged from using the Black Swan public house on Manchester Road as it is expected to be affected by construction works associated with the Proposed Scheme. This will result in a significant adverse residual in-combination effect on this resource.
- 12.4.24 During construction, businesses on Warrington Lane, including The Barn Owl Inn public house, may experience isolation as customers may be discouraged by an increased journey length and diversion associated with the construction of the Proposed Scheme. This will result in a significant adverse residual isolation effect on this resource.
- 12.4.25 Customers may be permanently discouraged from using the Saracens Head public house and a farm shop at Moss Brow Farm on the A6144 Paddock Lane as both are expected to be affected by highway changes associated with the Proposed Scheme, as well as by a combination of temporary visual effects and effects from HGV construction traffic during construction. Both resources will experience temporary significant adverse residual in-combination effects and permanent adverse residual isolation effects.

## **Cumulative effects**

- 12.4.26 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.

### **Assessment of impacts and effects**

- 12.5.2 No resources are expected to experience significant direct socio-economic, in-combination or isolation effects during the operation of the Proposed Scheme.

### **Operational employment**

- 12.5.3 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 Broomedge to Glazebrook area. Within the adjacent Hulseheath to Manchester Airport area (MA06) to the east, there will be a station at Manchester Airport creating 160 HS2-related jobs and a further 60 concourse retail jobs<sup>112</sup>. These employment opportunities will be accessible to residents in the locality.

- 12.5.4 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.
- 12.5.5 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.
- 12.5.6 The impact of operational employment creation has been assessed as part of the route-wide assessment (see Volume 3).

## Other mitigation measures

- 12.5.7 The assessment has concluded that operational effects within the area will be either negligible or beneficial and therefore mitigation is not required.

## Summary of likely residual significant effects

- 12.5.8 There are no significant effects arising during operation.

## Cumulative effects

- 12.5.9 No significant cumulative effects on socio-economic receptors have been identified in the Broomedge to Glazebrook area during operation.

## Monitoring

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

On the basis of there being no significant residual operational effects, there are no area-specific requirements for monitoring socio-economic effects during the operation of the Proposed Scheme in the Broomedge to Glazebrook area.

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<sup>112</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 Broomedge to Glazebrook 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>113</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>114</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>115,116</sup>.

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<sup>113</sup> Ministry of Housing, Communities and Local Government (MHCLG) (2019), *National Planning Practice Guidance – Noise*. Available online at: <https://www.gov.uk/guidance/noise--2>.

<sup>114</sup> Volume 5: Appendix CT-001-00001, *Environmental Impact Assessment Scope and Methodology Report*.

<sup>115</sup> *Environmental Noise (England) Regulations 2006 (SI 2006/2238)*. London, Her Majesty's Stationary Office. Available online at: <https://www.legislation.gov.uk/uksi/2006/2238>.

<sup>116</sup> *Environmental Noise (England) (Amendment) Regulations 2009 (SI 2009/1610)*. London, Her Majesty's Stationary 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>117</sup>, planning policy, planning practice guidance on noise<sup>113</sup> and EIA Regulations as described in the SMR.
- 13.1.6 Engagement has been undertaken with Trafford Metropolitan Borough Council (TMBC) and Warrington Borough Council (WBC) 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 Broomedge to Glazebrook 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-002-0MA04); and
  - Sound, noise and vibration operation assessment (Appendix SV-003-0MA04).
- 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: MA04 Map Book. Mapping to support the sound, noise and vibration assessment is presented in Map Series SV-05 (Volume 2: MA04 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 receptors and socio-economics 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-economics and Section 11, Landscape and visual of this report respectively. The Proposed Scheme is described in Section 2.

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<sup>117</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).

## 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 Broomedge to Glazebrook area are not currently subject to appreciable vibration<sup>118</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 Broomedge to Glazebrook 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 and local neighbourhood sources, with contributing 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 Broomedge to Glazebrook area: the M62 and the M56; the A56 Higher Lane/Agden Brow/Lymm Road through Lymm and Broomedge; the A57 Manchester Road/Cadishead Way through Irlam, Cadishead, Hollins Green and the eastern outskirts of Warrington; and the A6144 Rushgreen Road/Birch Brook Road/Mill Lane/Bent Lane/Paddock Lane/Warburton Lane through Lymm, Rushgreen, Heatley, Warburton and Partington. The Liverpool to Manchester Line (via Warrington Central) railway runs on an east to west alignment in the northern part of the study area with stations at Irlam and Glazebrook.

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<sup>118</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.



- 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 transportation routes.
- 13.3.4 Further information on the existing baseline, including baseline sound levels and baseline monitoring results, is provided for the Broomedge to Glazebrook area in Volume 5: Appendix SV-002-0MA04.

## 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>119</sup>, roads<sup>120</sup> or railways<sup>121</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: MA04 Map Book) shows any noise Important Areas in the Broomedge to Glazebrook area. Further information is reported for the Broomedge to Glazebrook area in Volume 5: Appendix SV-002-0MA04.
- 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 Broomedge to Glazebrook area in Volume 5: Appendix SV-002-0MA04<sup>122</sup>. Where applicable, noise or vibration significant effects on these committed developments are discussed in sections 13.4

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<sup>119</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>120</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>121</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>122</sup> Volume 5: Appendix CT-004-0000 provides details of all of the developments assumed to be implemented.

and 13.5. The committed developments reported in sections 13.4 and 13.5 are summarised in Table 30.

**Table 30: Committed developments relevant to sound, noise and vibration**

Map book reference <sup>123</sup> (SNV Assessment location ref.)	Planning reference	Description	How this is considered in the assessment
MA04/088 (617528)	2017/31103	Location: plot adjacent to 67, Mill Lane, Warrington. Outline application for the construction of one dwelling with all matters reserved excluding access	Informing future baseline (construction).

## 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-002-0MA04.

# 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>124</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

<sup>123</sup> Volume 5, Planning Data/Committed Development Map Book: Maps CT13-13-312b to CT-13-314a.

<sup>124</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

combination with the airborne noise effects also identified at these receptors. The assessment is presented in Volume 5: Appendix SV-002-0MA04.

- 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:
- 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);
  - 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 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 re-housing.

- 13.4.6 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

- 13.4.7 Taking account of the avoidance and mitigation measures set out in the previous paragraphs, the following five residential properties are forecast to experience noise above the eligibility criteria for noise insulation, but below the eligibility criteria for temporary re-housing, as defined in the HS2 noise insulation and temporary re-housing policy<sup>125</sup>. The locations of these dwellings are indicated on Map Series SV-03 (Volume 5, Sound, noise and vibration Map Book):
- Rose Cottage, Dam Head Lane, Rixton (assessment location ref.: 617626);
  - Westbank, Wingfield and The Bungalow, Bank Street, Glazebrook (assessment location ref.: 617628); and
  - 50 Paddock Lane, Warburton (assessment location ref.: 618220).
- 13.4.8 For daytime construction, the threshold for eligibility for noise insulation is 75dB measured outdoors as specified in the draft CoCP.
- 13.4.9 The mitigation measures, including noise insulation for the five residential properties, will reduce noise inside all dwellings such that it does not reach a level where it will significantly affect residents.

### Residential receptors: direct effects – communities

- 13.4.10 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.
- 13.4.11 In locations with lower existing sound levels<sup>126</sup>, construction noise effects are likely to be caused by changes to noise levels outside dwellings relative to existing sound levels. These

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<sup>125</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>126</sup> Further information is presented in Volume 5: Appendix SV-001-00000.

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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 are considered to be significant when assessed on a community basis taking account of the local context.

- 13.4.12 The temporary adverse effects on the residential areas identified in Table 31, 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 31: 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>127</sup>	Type of significant effect	Time of day	Location	Cause (construction activities) <sup>128</sup>	Assumed approximate duration of impact
MA04-C-C1 (SV-03-312b)	Construction noise and vibration	Daytime	Agden: Approximately 15 dwellings in the vicinity of Agden Lane, Agden Brow, Warrington Lane and Spring Lane, Lymm.	For noise: earthworks, general site works and culvert construction. The typical and highest monthly noise levels are approximately 60dB to 70dB and 70dB to 80dB <sup>129</sup> .  Vibratory rollers associated with site set-up within the A56 Lymm Road satellite compound are predicted to create a moderate vibration impact at properties near to the route of the Proposed Scheme.	Noise impacts up to three years and 6 months.  Vibration impacts up to three months.
MA04-C-C2 (SV-03-313)	Combined construction site noise and vibration and traffic noise	Daytime	Little Heatley: Approximately 15 dwellings in the vicinity of Spring Lane and Wet Gate Lane, Little Heatley.	For noise: earthworks and underbridge construction. The typical and highest monthly noise levels are approximately 60dB to 65dB and 70dB to 75dB <sup>15</sup> .  Vibratory rollers associated with ground stabilisation are predicted to create a moderate vibration impact at properties near to the route of the Proposed Scheme.	Noise impacts up to one year and six months.  Vibration impacts up to two months.
MA04-C-C3 (SV-03-314a)	Construction noise	Daytime	Rixton (Hollins Green): Approximately 15 dwellings in the vicinity of St Helen's Close and Manchester Road, Rixton.	Viaduct construction and highway works. The typical and highest monthly noise levels are approximately 60dB to 65dB and 70dB to 75dB <sup>129</sup> .	Up to 11 months.

<sup>127</sup> See Volume 5: Appendix SV-002-0MA04 MA04 Sound, noise and vibration report, and Volume 5, Map Book SV-03.

<sup>128</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>129</sup> Equivalent continuous sound level at the facade, L<sub>pAeq,0700-1900</sub>.

## Residential receptors: indirect effects

13.4.13 Construction traffic is likely to cause adverse noise effects on residential receptors along Wet Gate Lane between the route of the Proposed Scheme and the junction with Mill Lane. Approximately 15 dwellings<sup>130</sup> located immediately adjacent to the road are forecast to experience an increase in road traffic noise levels of around 6dB  $L_{pAeq,0700-2300}$  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. This temporary adverse effect from combined construction site noise and vibration and traffic noise denoted as MA04-C-C2 in Table 2 and Volume 5: Appendix SV-002-0MA04 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.

## Non-residential receptors: direct effects

13.4.14 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 criterion (typically a change of greater than 3dB<sup>131</sup> compared with the existing baseline sound level):

- Rixton-with-Glazebrook Community Hall, Manchester Road, Rixton (assessment location ref. 617598);
- Church of St Helen, Dam Lane, Hollinfare (assessment location ref. 617599);
- EEF Ltd (office), Glazebrook Lane, Warrington (assessment location ref. 617613);
- Glazebrook Methodist Church, Glazebrook Lane, Warrington (assessment location ref. 617638); and
- Church of St Werburgh, Bent Lane, Warburton (assessment location ref. 617964).

13.4.15 These locations are identified in the Broomedge to Glazebrook 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.

13.4.16 Rixton-with-Glazebrook Community Hall is a single storey building located off Manchester Road, Rixton and bounded to the rear by the adjacent A57 Manchester Road, approximately 30m to the west of the land required for the construction of the Proposed Scheme. The community hall building has a capacity of 150 people and is available to hire. There is a car park to the rear which is sometimes used as amenity space. The building is of brick masonry construction with a lightweight roof. There is high-level glazing to the main hall and windows

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<sup>130</sup> This includes the property associated with committed development MA04/088.

<sup>131</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-002-0MA04.



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to the ancillary spaces. The windows are assumed to be double thermal glazing. The building is naturally ventilated by opening the windows. Rixton-with-Glazebrook Community Hall has been assessed against the small auditoria or halls criteria<sup>132</sup>. Noise levels have been predicted for the façade of the building facing toward the land required for construction of the Proposed Scheme. The predicted daytime monthly construction noise level is above the screening criteria defined in the SMR for small auditoria or halls for a period of two years. The highest predicted daytime monthly construction noise level is 14dB above the screening criteria defined in the SMR. The typical predicted monthly daytime construction noise level is 9dB above the screening criteria defined in the SMR. The highest and typical monthly construction noise levels are above the screening criteria for external amenity spaces defined in the SMR<sup>132</sup>. The change in ambient noise level due to the highest predicted daytime monthly construction is 8dB. Rixton-with-Glazebrook Community Hall is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA04-C-N1 in Table 6 Volume 5: Appendix SV-002-0MA04). This temporary adverse effect from construction site noise may take the form of activity disturbance to users of the hall.

- 13.4.17 The Church of St Helen is a Grade II listed brick building with single glazed windows and slate roof situated in the centre of Hollins Green at the junction of Dam Lane and School Lane, approximately 10m west of land required for construction of the Proposed Scheme. Sunday services are held between 10:30 and 11:30 and there are weekday services between 12:00 and 13:00 on the first Thursday of each month. There are lawned areas around the church, but these are not used for amenity space. The building is naturally ventilated by opening the windows. The Church of St Helen has been assessed against the places of meeting for religious worship criteria<sup>133</sup>. Noise levels have been predicted for the façade of the building facing toward the land required for construction of the Proposed Scheme. The predicted daytime monthly construction noise level is above the screening criteria defined in the SMR for places of meeting for religious worship for a period of five months. The highest predicted daytime monthly construction noise level is 4dB above the screening criteria defined in the SMR. The typical monthly daytime construction noise level is below the screening criteria defined in the SMR. The change in ambient noise level due to the highest predicted daytime monthly construction is 4dB. The Church of St Helen is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA04-C-N2 in Table 6 Volume 5: Appendix SV-002-0MA04). This temporary adverse effect from construction site noise may take the form of activity disturbance to users of the church.
- 13.4.18 EEF Ltd (office) is a group of two storey former farm buildings located off Glazebrook Lane, Glazebrook, approximately 10m to the east of the land required for the construction of the Proposed Scheme. Now part of Make UK, EEF Ltd provides consultancy and training to the manufacturing sector. It is assumed to open during standard office hours. Building construction includes a red brick former farmhouse, outbuildings of apparent masonry

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<sup>132</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>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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construction and a large 'shed' type building which appears to have masonry walls but may have a light-weight roof (roof lights are apparent). It is anticipated that windows are generally double glazed. There are windows which face the land required for construction of the Proposed Scheme. There are external gardens and grounds. Given the potential training activities, EEF Ltd has been assessed against the education facilities criteria<sup>133</sup>. Noise levels have been predicted for the façade of the building facing toward the land required for construction of the Proposed Scheme. The predicted daytime monthly construction noise level is above the screening criteria defined in the SMR for education facilities for a period of two years and one month. The highest predicted daytime monthly construction noise level is 6dB above the screening criteria defined in the SMR. The typical predicted monthly construction noise level is equal to the screening criteria defined in the SMR. The highest and typical monthly construction noise levels are above the screening criteria for external amenity spaces defined in the SMR. The change in ambient noise level due to the highest predicted daytime monthly construction is 16dB. EEF Ltd is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA04-C-N3 in Table 6 Volume 5: Appendix SV-002-0MA04). This temporary adverse effect from construction site noise may take the form of activity disturbance to users of the office.

- 13.4.19 Glazebrook Methodist Church comprises a church and associated community room situated off Glazebrook Lane approximately 80m to the north-east of the land required for construction of the Proposed Scheme. Activities at the church include services on a Sunday between 10:00 and 11:00. The community room is available for hire for a variety of activities so is potentially used during weekdays and evening periods. The building is of brick masonry construction with a variety of windows, those into the church being of a large size. It is anticipated that there is a mixture of single and double glazing. There is a lawn to the front of the church which may be considered an external amenity space. The building is naturally ventilated by opening the windows. Glazebrook Methodist Church has been assessed against the places of meeting for religious worship criteria<sup>134</sup>. Noise levels have been predicted for the west façade of the building, which includes a window and faces toward the land required for construction of the Proposed Scheme. The predicted daytime monthly construction noise level is above the screening criteria defined in the SMR for places of meeting for religious worship for a period of three years and six months. The highest predicted daytime monthly construction noise level is 8dB above the screening criteria defined in the SMR. The typical monthly daytime construction noise level is 3dB above the screening criteria defined in the SMR. The change in ambient noise level due to the highest predicted daytime monthly construction is 9dB. Glazebrook Methodist Church is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA04-C-N4 in Table 6 Volume 5: Appendix SV-002-0MA04). This temporary adverse effect from construction site noise may take the form of activity disturbance to users of the church.

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<sup>134</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).

13.4.20 Church of St Werburgh is a Grade I listed building. The church only holds services on Sunday mornings which is outside of the anticipated construction work times for the nearby sites and therefore a likely significant construction noise effect is not identified at the Church of St Werburgh.

## **Non-residential receptors: indirect effects**

13.4.21 The assessment of construction noise and vibration indicates that significant indirect effects are unlikely to occur on non-residential receptors in the Broomedge to Glazebrook area.

## **Other mitigation measures**

13.4.22 No other mitigation measures are proposed in this area.

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

13.4.23 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>135</sup>.

13.4.24 The measures will also reduce the construction noise and vibration effects on the acoustic character in the majority of residential communities. Despite these measures, the noise and vibration effects on the acoustic character in the following local residential community areas are considered likely to be significant:

- Agden; and
- Rixton (Hollins Green) (noise only).

13.4.25 Noise and vibration from specific construction activities and from construction traffic has also been identified as resulting in a significant residual temporary effect on the local residential community area of Little Heatley.

13.4.26 Noise from specific construction activities has been identified as resulting in significant residual temporary effects on the non-residential buildings at:

- Rixton-with-Glazebrook Community Hall, Manchester Road, Rixton;
- The Church of St Helen, Dam Lane, Hollinfare;
- EEF Ltd (office), Glazebrook Lane, Glazebrook; and
- Glazebrook Methodist Church, Glazebrook Lane, Glazebrook.

13.4.27 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.

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<sup>135</sup> Refer to Volume 5: Appendix SV-001-00000.

## Cumulative effects

- 13.4.28 This assessment has considered the potential cumulative construction noise effects of the Proposed Scheme and other committed developments<sup>136</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 Broomedge to Glazebrook 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 four trains per hour in each direction on the route of the Proposed Scheme<sup>137</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 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). At the southern end of the Broomedge to Glazebrook area, trains are assumed to have an operating speed of 200mph (330kph) for 90% of services and 225mph (360kph) for 10% of services, progressively decreasing to around<sup>138</sup> 155mph (250kph) at the northern end. Further information is presented in Volume 1 (Section 8).

### 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).

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<sup>136</sup> Refer to Volume 5: Appendix CT-004-00000, Planning data.

<sup>137</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).

<sup>138</sup> Speeds are approximate given the difference in train acceleration/deceleration.

## 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>139</sup> and European standards<sup>140</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 will 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 Broomedge to Glazebrook area, noise barriers have been incorporated into the Proposed Scheme to avoid or reduce adverse effects due to airborne noise at the following communities:
- Agden;
  - Little Heatley;
  - Warburton;
  - Hollins Green; and
  - Glazebrook.
- 13.5.8 The envisaged noise barrier locations based upon the currently available information are shown on Map Series SV-05 (Volume 2: MA04 Map Book) and described in Section 2.2.
- 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: MA04 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.

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<sup>139</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>140</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>.

- 13.5.11 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>141</sup> and the Noise Insulation Regulations 1975<sup>142</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>143</sup> or the maximum noise level criteria<sup>144</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 operational railway 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 not identified any residential dwellings where noise levels are predicted to exceed the daytime trigger threshold set out in the Regulations<sup>145</sup>.
- 13.5.14 The assessment has identified six dwellings close to the Proposed Scheme where the daytime forecast noise level does not exceed the threshold set in the 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>146</sup>. It is anticipated that these buildings will also be offered noise insulation as described previously in the avoidance and mitigation measures section. These residential dwellings are indicated on Map Series SV-05 (Volume 2: MA04 Map Book):

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<sup>141</sup> *The Noise Insulation (Railways and Other Guided Transport Systems) Regulations 1996*. London, Her Majesty's Stationery Office.

<sup>142</sup> *The Noise Insulation Regulations 1975*. London, Her Majesty's Stationery Office.

<sup>143</sup> World Health Organization (2010), *Night Noise Guidelines for Europe*.

<sup>144</sup> Dependent on the number of train passes.

<sup>145</sup> Equivalent to a daytime the free-field level of 65dB  $L_{pAeq,0700-2300}$ , and a night-time free-field level of 60dB  $L_{pAeq,2300-0700}$ .

<sup>146</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).

- Agden Lane Farm, Agden Lane, Lymm (assessment location ref.: 617510);
- Agden Lane Farm Cottage, Agden Lane, Lymm (assessment location ref.: 617511);
- The Stables, Agden Lane, Lymm (assessment location ref.: 617511);
- Old Barn, Agden Lane, Lymm (assessment location ref.: 617511);
- 1 Rose Cottages, Spring Lane, Lymm (assessment location ref.: 617524); and
- Rose Cottage, Dam Head Lane, Rixton (assessment location ref.: 617626).

13.5.15 The avoidance and 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 Broomedge to Glazebrook area will avoid or reduce adverse effects due to airborne noise on the majority of receptors, and in the following communities:

- Agden;
- Little Heatley;
- Warburton;
- Hollins Green; and
- Glazebrook.

13.5.17 Taking account of the envisaged mitigation, Map Series SV-05 (Volume 2: MA04 Map Book) shows the long-term 40dB<sup>147</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: MA04 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>148</sup>, there may be a significant effect when assessed on a community basis<sup>149</sup>.

13.5.19 Approximately 20 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.

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<sup>147</sup> Defined as the equivalent continuous sound level from 23:00 to 07:00 or  $L_{pAeq,night}$ .

<sup>148</sup> Further information is provided in Volume 5: Appendices SV-001-00000 and SV-003-0MA04.

<sup>149</sup> Further information is contained in Volume 1.



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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 32 are considered to be significant on a community basis.

**Table 32: Direct adverse operational effects on residential communities and shared open areas that are considered to be significant on a community basis**

Significant effect number <sup>150</sup> and map reference	Source of significant effect	Time of day	Location and details
MA04-O-C1 (SV-05-312b)	Airborne noise increases from new train services	Daytime and night-time	Agden Lane, Warrington Lane and Spring Lane Approximately 15 dwellings in the vicinity of Agden Lane, Warrington Lane and Spring 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. The effect on the acoustic character of residential areas that are located further from the railway would be minor adverse. There are no shared open spaces identified as being affected in this community.
MA04-O-C2 (SV-05-313)	Airborne noise increases from new train services	Daytime and night-time	Little Heatley Approximately 10 dwellings in the vicinity of Wet Gate Lane. Forecast increases in sound from the railway are likely to cause a major 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.

13.5.21 In this study area, the direct beneficial effects on the acoustic character of the areas of the residential communities identified in Table 33 are considered to be significant on a community basis.

**Table 33: Direct beneficial operational effects on residential communities and shared open areas that are considered significant on a community basis**

Significant effect number <sup>150</sup> and map reference	Source of significant effect	Time of day	Location and details
MA04-O-C3 SV-02-313	Airborne noise decrease from road realignment	Daytime and night-time	Mossbrow Approximately 5 dwellings on the A6144 Warburton Lane and Paddock Lane. Forecast decreases in sound from road traffic are likely to cause a major noise decrease affecting the acoustic character of the area around the properties. There are no shared open spaces identified as being affected in this community.

<sup>150</sup> See Map Series SV-05 (Volume 2: MA04 Map Book).

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Significant effect number <sup>150</sup> and map reference	Source of significant effect	Time of day	Location and details
MA04-O-C4 SV-02-314a	Airborne noise decrease from road closure	Daytime and night-time	Dam Lane Approximately 10 dwellings on Dam Lane. Forecast decreases in sound from road traffic are likely to cause a moderate noise decrease 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

- 13.5.22 The assessment of operational noise and vibration indicates that significant indirect effects on residential receptors are unlikely to occur in this area.

## Non-residential receptors: direct effects

- 13.5.23 The assessment has identified airborne sound levels greater than the screening criteria relevant to the particular building use<sup>151</sup> and typically a change of greater than 3dB<sup>152</sup> compared to the future baseline sound level at the office at Lymm Marina in the Broomedge to Glazebrook area, as shown in Map Series SV-02 (Volume 5, Sound, noise and vibration Map Book).
- 13.5.24 The assessment has identified no ground-borne noise or vibration levels greater than the relevant screening criteria in the Broomedge to Glazebrook area.
- 13.5.25 At the non-residential receptor 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.
- 13.5.26 The office at Lymm Marina is an ancillary office building associated with Lymm Marina, a boat sales company located on Warrington Lane in Lymm. An operational noise effect has been identified at the office at Lymm Marina 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 only predicted to exceed the screening criterion for offices of 55dB  $L_{pAeq,16hr}$  by 1dB, as defined in the SMR. On this basis, a likely significant effect is not identified at the office at Lymm Marina as the predicted daytime operational noise level is only marginally above the screening criterion.

<sup>151</sup> As defined in the SMR and SV-001-00000.

<sup>152</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-002-0MA04.

13.5.27 The assessment of effects on non-residential receptors has been undertaken on a reasonable worst-case basis and no likely significant effects have been found. Further information can be found in Volume 5: Appendix SV-003-0MA04.

## **Non-residential receptors: indirect effects**

13.5.28 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**

13.5.29 No other mitigation measures are proposed in this area.

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

13.5.30 At the majority of individual residences, the proposed mitigation measures will reduce 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.

13.5.31 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: MA04 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 operational adverse airborne noise effects due to increased noise levels around the following communities have been identified:

- Agden: occupants of residential properties on Agden Lane, Warrington Lane and Spring Lane identified by MA04-O-C1 on Map SV-05-312b; and
- Little Heatley: occupants of residential properties on Wet Gate Lane identified by MA04-O-C2 on Map SV-05-313.

13.5.32 Likely residual significant operational beneficial airborne noise effects due to decreased noise levels around the following communities have been identified:

- Mossbrow: occupants of residential properties on the A6144 Warburton Lane and Paddock Lane identified by MA04-O-C3 on Map SV-02-313; and
- Dam Lane: occupants of residential properties on Dam Lane identified by MA04-O-C4 on Map SV-02-314a.

13.5.33 The assessment of operational noise and vibration indicates that significant residual direct effects on non-residential receptors are unlikely to occur in the Broomedge to Glazebrook area.

13.5.34 HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid these significant adverse operational 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

- 13.5.35 It is not anticipated that there will be any significant cumulative noise effects during operation of the Proposed Scheme.

## Monitoring

- 13.5.36 Volume 1 (Section 9) sets out the general approach to environmental monitoring during operation of the Proposed Scheme.
- 13.5.37 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.
- 13.5.38 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 Broomedge to Glazebrook 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, Warrington Borough Council (WBC), Salford City Council (SaCC), 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 Broomedge to Glazebrook 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: MA04 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>153</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>154</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>153</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>154</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 Lymm, Partington, Cadishead, Irlam, Broomedge, Heatley, Mossbrow, Warburton, Hollins Green and Glazebrook, together with Glazebrook Station and Irlam 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 junction 21), the M60 (including junctions 8-11) and the M62.
- 14.2.6 For all roads, the baseline forecast traffic flows for the future years of assessment have been derived using the Department for Transport's (DfT) traffic forecasting tool, Trip End Model Presentation Program (TEMPro). The assessment covers the average weekday morning (08:00-09:00) and evening (17:00-18:00) peak hours.
- 14.2.7 Forecast future year traffic flows, with and without the Proposed Scheme, have been based on an approach that does not take account of wider effects such as redistribution and reassignment of traffic. This is consistent with the assessment of other phases of HS2. It is not considered that that these wider changes will affect the conclusion of the assessment.
- 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, WBC, SaCC, TMBC and TfGM (including

provision of information on public transport, public rights of way (PRoW) and accident<sup>155</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 June, July and November 2017, and June and July 2018. These data have been supplemented by existing traffic data from other sources, including from Highways England, WBC, SaCC, TMBC and TfGM. Assessment of the data indicates that the weekday peak hours in the area are generally 07:30-08:30 and 16:30-17:30. However, there are only small differences (1-3%) between the observed peak hours and the periods 08:00-09:00 and 17:00-18:00, which are the periods when HS2 construction traffic movements and workforce arrivals and departures will have the greatest impact. Consequently, 08:00-09:00 and 17:00-18:00 have been used as the assessment hours representing a reasonable worst case.
- 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 route of 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 that pass through the area are the M6, the M60, and the M62. The strategic road network in and around the Broomedge to Glazebrook area is busy at peak times and delays can be experienced.
- 14.3.5 The local roads include (ordered by road class from south to north):
- A56 Lymm Road;
  - A6144 Birch Brook Road/Mill Lane/Bent Lane/Paddock Lane/Warburton Lane/Manchester Road/Carrington Lane/Carrington Spur;
  - A57 Manchester Road/Cadishead Way/Liverpool Road;
  - B5159 Mill Lane;
  - B5160 Dunham Road;
  - B5210 Woolston Grange Avenue;
  - B5212 Glazebrook Lane/Holcroft Lane;

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<sup>155</sup> The term accident in this report refers to injury related collisions reported to/recorded by the police. These 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.



- B5214 Trafford Boulevard/Barton Road;
- Agden Lane;
- Warrington Lane;
- Spring Lane;
- Bradshaw Lane;
- Wet Gate Lane;
- Paddock Lane;
- Manchester Road;
- Dam Head Lane;
- Dam Lane;
- Banky Lane;
- Salford Western Gateway; and
- Trafford Way.

- 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>156</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 No accident clusters were identified within the Broomedge to Glazebrook area.
- 14.3.9 The route of the Proposed Scheme will cross two roads with roadside footways within the Broomedge to Glazebrook area. These are the A6144 Paddock Lane and Manchester Road.

## **Parking and loading**

- 14.3.10 There is off-street parking within the Broomedge to Glazebrook area that may be impacted by the Proposed Scheme. This includes a private off-street car park comprising 35 parking spaces associated with The Black Swan public house, located at the junction of Dam Lane and Manchester Road in Hollins Green.

## **Public transport network**

- 14.3.11 Ten bus services operate on five roads that will be crossed or could be affected by the route of the Proposed Scheme in the Broomedge to Glazebrook 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:

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<sup>156</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>.

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- A6144 Mill Lane/Bent Lane/Paddock Lane: route Cat5 (Warrington - Lymm - Warburton - Altrincham);
- A6144 Mill Lane/Bent Lane/Paddock Lane/Warburton Lane/Manchester Road: route Cat5a (Warrington - Lymm - Warburton - Altrincham);
- A6144 Warburton Lane/Manchester Road: route 247 (Altrincham - Sinderland - Partington - Flixton - Trafford Centre); route 248 (Partington - Trafford Park); route 253 (Partington - Flixton - Urmston - Stretford - Hulme - Manchester); route 255 (Partington - Flixton - Urmston - Stretford - Old Trafford - Manchester); and route 260 (Sale - Carrington - Partington);
- A57 Manchester Road: route 100 (Warrington - Irlam - Trafford Centre - Eccles - Salford - Manchester); route P5 (Irlam - Cadishead - Priestley College); and route 40b (Martinscroft - Hollins Green - Latchford Locks - Lymm, Oughtrington Lane); and
- Manchester Road: route 100 (Warrington - Irlam - Trafford Centre - Eccles - Salford - Manchester); route P5 (Irlam - Cadishead - Priestley College); and route 40b (Martinscroft - Hollins Green - Latchford Locks - Lymm, Oughtrington Lane).

14.3.12 Local rail services are accessible via Glazebrook and Irlam stations within the Broomedge to Glazebrook area. Both stations provide access to local services on the Liverpool to Manchester Line (via Warrington Central).

## Non-motorised users

- 14.3.13 There are pedestrian footways adjacent to many of the roads in the built-up areas of Lymm, Partington, Cadishead, Irlam, Broomedge, Heatley, Mossbrow, Warburton, Hollins Green and Glazebrook. 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.
- 14.3.14 In the Broomedge to Glazebrook area, National Route 62 of the National Cycle Network (part of the Trans Pennine Trail) passes through the area from Warrington in the west to Altrincham in the east.
- 14.3.15 In the Broomedge to Glazebrook area, there is a network of advisory cycle routes linking Hollins Green, Cadishead, Irlam and Higher Irlam. A shared use pedestrian/cycleway extends parallel to the A57 Manchester Road/Cadishead Way between Cadishead and Irlam. A parallel advisory on-road route (signposted but no facilities) also extends between Cadishead and Irlam along the B5320 Liverpool Road. To the south of the Manchester Ship Canal, advisory cycle lanes extend along a 1km section of the A6144 Warburton Lane on both sides of the road through the built-up area of Partington.
- 14.3.16 Bridleway Partington 6 (part of the Bollin Valley Way) is the only bridleway in the vicinity of the Proposed Scheme in the Broomedge to Glazebrook area. Some sections of the Trans Pennine Trail within the Broomedge to Glazebrook area are also open to horse riders, including the section between Mill Lane and the B5160 Dunham Road.
- 14.3.17 The route of the Proposed Scheme will cross the route of 10 PRow and one informal footpath within the Broomedge to Glazebrook area. Further PRow and roadside footways in

the Broomedge to Glazebrook area could be affected by the Proposed Scheme and have been included in the assessment.

- 14.3.18 The surveys undertaken to inform the assessment showed that the routes with the greatest daily usage during the survey day were: National Route 62, which was used by 93 pedestrians and 181 cyclists; and Footpath Lymm 43 (Cheshire Ring Canal Walk), which was used by 164 pedestrians and 49 cyclists.

## Waterways and canals

- 14.3.19 There are two navigable waterways in the Broomedge to Glazebrook area. The Bridgewater Canal passes through the study area on a south-west to north-east alignment between Runcorn and Manchester. The Manchester Ship Canal is located in the centre of the study area, running broadly east-west and is actively used for transporting freight.

## Air transport

- 14.3.20 There is no relevant air transport in the Broomedge to Glazebrook area. Consequently, this topic is not considered further in this assessment.

## Future baseline

- 14.3.21 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, WBC, SaCC, TMBC and TfGM and are considered to be appropriately reflected in the traffic forecasts.
- 14.3.22 At the time of the assessment, major committed changes to the transport network that have been taken into account in the future baseline include the:
- The entirety of the Western Gateway Infrastructure Scheme (WGIS);
  - M62 junction 10 to 12 smart motorway; and
  - M6 junction 21A to 26 smart motorway.
- 14.3.23 Phase 1 of the WGIS provided a new link, known as the Salford Western Gateway, which connects from a new signalised junction with the A57 to the west of the M60 before passing under the M60 south of the M60 junction 11, over the Manchester Ship Canal and connecting with Trafford Way on the eastern side of the M60 junction 10. The new link opened in December 2018.
- 14.3.24 As part of a later phase of the WGIS, there are proposals to provide a new link from Salford Western Gateway alongside the M60 to the M60 junction 11, with the subsequent removal of the current M60 junction 11 northbound off-slip and southbound on-slip. Traffic which

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currently uses these slip roads to egress/access the M60 at junction 11 will instead travel via the Salford Western Gateway to the M60 junction 10. This will also lead to downgrading of the A57 between the M60 junction 11 and the Salford Western Gateway as traffic will no longer use the A57 to access the M60 junction 11.

- 14.3.25 The M62 junction 10 to 12 smart motorway is promoted by Highways England. Work on the M62 junction 10 to 12 was completed in January 2021 to provide an all-lane running smart motorway.
- 14.3.26 The M6 junction 21A to 26 smart motorway scheme is promoted by Highways England. Work at M6 junction 21A to 26 is in progress to provide an all-lane running smart motorway. This is expected to complete in 2023.
- 14.3.27 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 Broomedge to Glazebrook area, there are no known substantial committed changes to the public transport network, parking and pedestrian and cycling facilities.

## **Construction**

- 14.3.28 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.
- 14.3.29 The year 2030 is the common future baseline year and the impact of individual or overlapping activities are considered against this single year.
- 14.3.30 Future baseline traffic volumes in the peak hours are forecast to grow by an average of 10% by 2030 compared to a baseline year of 2018.

## **Operation**

- 14.3.31 Future baseline traffic volumes in the peak hours are forecast to grow by an average of 16% by 2038 compared to the baseline year of 2018.
- 14.3.32 Future baseline traffic volumes in the peak hours are forecast to grow by an average of 23% 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 crossed by the route of 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 route of 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;
- 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 route of 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>157</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

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<sup>157</sup> Volume 5: Appendix CT-002-00000, draft Code of Construction Practice (CoCP).

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 operators; promotion of car sharing; and the appointment of a travel plan coordinator to ensure suitable measures are in place and are effective.
- 14.4.7 Where works potentially affect Network Rail assets, disruption to travelling passengers and freight movements will be reduced as far as reasonably practicable. This includes measures such as:
- programming the construction works to coincide with the possessions that are required and planned by Network Rail for the general maintenance of their railway;
  - planning the required construction works so that they can be undertaken in short overnight stages so that passenger services are not disrupted; and
  - programming longer closures at the weekend and on bank holidays to reduce as far as reasonably practicable the number of passengers affected.

## **Assessment of impacts and effects**

### **Temporary effects**

- 14.4.8 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**

- 14.4.9 The assessment takes account of all of the impacts of the Proposed Scheme in the Broomedge to Glazebrook 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;
  - alternative routes for PRow and roadside footways; and
  - possessions on the conventional rail network.
- 14.4.10 The construction assessment has also considered any impacts in the Broomedge to Glazebrook area that arise from construction of the Proposed Scheme in the adjoining community areas.
- 14.4.11 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, viaduct, bridge and highway construction.
- 14.4.12 Details of the construction compounds are provided in Section 2.3. Table 34 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.
- 14.4.13 Table 34 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 34 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 34: Typical vehicle trip generation for construction compounds in the Broomedge to Glazebrook 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	A56 Lymm Road satellite compound <sup>158</sup>	2027 Q2	4 years and 6 months	237-362	69-80	6
Satellite	Bridgewater Canal satellite compound	2027 Q4	4 years	168-216	73-94	7
Satellite	Wet Gate Lane satellite compound	2027 Q2	4 years and 9 months	202-216	74-84	6
Satellite	River Bollin West viaduct satellite compound	2027 Q3	3 years and 6 months	181-218	87-98	6
Satellite	Warburton embankment satellite compound	2027 Q2	5 years and 3 months	284-428	197-274	4
Satellite	A6144 Paddock Lane satellite compound	2027 Q4	3 years and 6 months	158-218	81-96	8
Satellite	Manchester Ship Canal viaduct south satellite compound	2027 Q2	4 years and 3 months	196-262	119-126	3
Satellite	Manchester Ship Canal viaduct central satellite compound	2027 Q2	4 years and 3 months	123-148	37-50	10
Main	Manchester Ship Canal viaduct north main compound	2027 Q2	4 years and 3 months	219-296	101-126	11
Satellite	Glazebrook Railway south satellite compound	2027 Q2	3 years	188-212	46-58	5
Satellite	Glazebrook Railway north satellite compound	2027 Q2	3 years and 6 months	163-184	69-84	6

14.4.14 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 35 summarises the construction HGV routes to and from each compound to the main road network. For some compounds, Table 35 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

<sup>158</sup> Also reported in Volume 2: Community Area report: Pickmere to Agden and Hulseheath (MA03), Section 14, Traffic and transport.

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construction HGV route varies over time to account for changes to the highway network through the construction period.

- 14.4.15 The average daily combined two-way HGV trips reported in Table 34 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 35, 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 35: Construction HGV routes for construction compounds in the Broomedge to Glazebrook area**

Compound name(s)	Access routes to/from compound(s) to main road network
Bridgewater Canal satellite compound	<ul style="list-style-type: none"> <li>Spring Lane, Bradshaw Lane, B5159 Mill Lane and A6144 Mill Lane</li> </ul>
Wet Gate Lane satellite compound	<ul style="list-style-type: none"> <li>Wet Gate Lane, B5159 Mill Lane and A6144 Mill Lane</li> </ul>
River Bollin West viaduct satellite compound	<ul style="list-style-type: none"> <li>A6144 Paddock Lane (to be used before opening of the A6144 Paddock Lane realignment)</li> <li>A6144 Paddock Lane realignment (to be used after opening of the A6144 Paddock Lane realignment)</li> </ul>
Warburton embankment satellite compound	<ul style="list-style-type: none"> <li>On-site construction traffic route, A6144 Paddock Lane (to be used before opening of the A6144 Paddock Lane realignment)</li> <li>On-site construction traffic route, A6144 Paddock Lane realignment (to be used after opening of the A6144 Paddock Lane realignment)</li> </ul>
A6144 Paddock Lane satellite compound	<ul style="list-style-type: none"> <li>Paddock Lane and A6144 Paddock Lane (to be used before opening of the A6144 Paddock Lane realignment)</li> <li>Paddock Lane and A6144 Paddock Lane realignment (to be used after opening of the A6144 Paddock Lane realignment)</li> </ul>
Manchester Ship Canal viaduct south satellite compound	<ul style="list-style-type: none"> <li>On-site construction traffic route, A6144 Warburton Lane (to be used before opening of the A6144 Warburton Lane realignment)</li> <li>On-site construction traffic route, A6144 Warburton Lane realignment (to be used after opening of the A6144 Warburton Lane realignment)</li> </ul>
Manchester Ship Canal viaduct central satellite compound	<ul style="list-style-type: none"> <li>A57 Manchester Road</li> </ul>
Manchester Ship Canal viaduct north main compound	<ul style="list-style-type: none"> <li>On-site construction traffic route, Manchester Road, B5212 Glazebrook Lane and A57 Manchester Road</li> </ul>
Glazebrook Railway south satellite compound	<ul style="list-style-type: none"> <li>Dam Head Lane, Dam Lane, Manchester Road, B5212 Glazebrook Lane and A57 Manchester Road</li> </ul>
Glazebrook Railway north satellite compound	<ul style="list-style-type: none"> <li>Dam Head Lane, Dam Lane, Manchester Road, B5212 Glazebrook Lane and A57 Manchester Road (to be used before closure of Dam Head Lane)</li> <li>Dam Head Lane, B5212 Glazebrook Lane and A57 Manchester Road (to be used after closure of Dam Head Lane)</li> </ul>

- 14.4.16 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 34.

- 14.4.17 The assessment of the effects of construction of the Proposed Scheme on the highway network in the Broomedge to Glazebrook area is based on the highest volume of construction traffic on each construction HGV route during the construction period. 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 during the construction period.

## Highway network

### Strategic and local highway network

- 14.4.18 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 route of 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):

- A6144 Birch Brook Road/Mill Lane/Bent Lane/Paddock Lane/Warburton Lane/Manchester Road/Carrington Lane/Carrington Spur (between B5159 Mill Lane and M60 junction 8);
- A57 Manchester Road/Cadishead Way/Liverpool Road (between M6 junction 21 and M60 junction 11);
- B5159 Mill Lane (between Bradshaw Lane and A6144 Mill Lane);
- B5212 Glazebrook Lane/Holcroft Lane (between A57 Manchester Road and Hole Mill Farm);
- B5214 Trafford Boulevard (between Trafford Way and M60 junction 10);
- Agden Lane (between A56 Lymm Road and Warrington Lane);
- Warrington Lane (between A56 Lymm Road and Lymm Marina);
- Spring Lane (between Bradshaw Lane and Rose Cottages);
- Bradshaw Lane (between B5159 Burford Lane and Wet Gate Lane);
- Wet Gate Lane (between Spring Lane and B5159 Mill Lane);
- Paddock Lane (between A6144 Paddock Lane and B5159 Townfield Lane);
- Manchester Road (between A57 Manchester Road and B5212 Glazebrook Lane);
- Dam Head Lane (between Dam Lane and B5212 Glazebrook Lane);
- Dam Lane (between Manchester Road and School Lane);
- Salford Western Gateway between A57 Liverpool Road and Trafford Way); and
- Trafford Way (between Salford Western Gateway and B5124 Trafford Boulevard).

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- 14.4.19 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:
- Warrington Lane – temporary closure of a section of Warrington Lane between Spring Lane and Lymm Marina. The temporary closure will enable the permanent realignment of a 214m section of Warrington Lane, 9m south of its existing alignment, to accommodate the construction of Bridgewater Canal viaduct. A diversion route for vehicular traffic will be provided via the A56 Lymm Road and Burford Lane for one year and nine months, increasing journey length by up to 2.5km;
  - Spring Lane – temporary realignment of a 250m section of Spring Lane to the east of Wet Gate Lane. The temporary realignment will enable the construction of Heatley South embankment and Spring Lane underbridge. Traffic will be diverted via the southern part of Little Heatley accommodation access and a temporary section of new road. The temporary realignment will be in use for two years, resulting in a negligible change in journey length;
  - Wet Gate Lane – temporary closure of Wet Gate Lane to the east of Wet Gate Farm during the construction of highway tie-ins with the Wet Gate Lane realignment. Traffic will be diverted via Bradshaw Lane, the B5159 Mill Lane and Wet Gate Lane for three months, resulting in a negligible change in journey length;
  - A57 Manchester Road – temporary realignment of a 300m section of the A57 Manchester Road to the west of the junction with the B5212 Glazebrook Lane during the construction of Manchester Ship Canal viaduct. The A57 Manchester Road will be temporarily realigned approximately 40m south of its existing alignment for three months, resulting in a negligible change in journey length. Following completion of Manchester Ship Canal viaduct, the A57 Manchester Road will be reinstated along its existing alignment; and
  - Manchester Road – temporary closure of a section of Manchester Road between the B5212 Glazebrook Lane and Dam Lane during the construction of Manchester Ship Canal viaduct. Traffic will be diverted via the A57 Manchester Road and Manchester Road to the south of Dam Lane for a period of three months. A temporary right-turn facility at the junction of the A57 Manchester Road and Manchester Road, to the south of the village of Hollins Green, will accommodate users travelling from the A57 Manchester Road (westbound) and the B5212 Glazebrook Lane. The temporary diversion will increase journey length by up to 649m.
- 14.4.20 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 to journey times for vehicle occupants. The temporary closure of Warrington Lane will result in an increase in journey length of more than 1km for vehicle occupants. However, because vehicle flows are less than 100 vehicles/day, this change in journey length is not predicted to result in any significant effects

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with regard to changes to delays for vehicle occupants or traffic-related severance for non-motorised users. The temporary diversions or realignments may also affect non-motorised users, which is considered separately below.

- 14.4.21 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.
- 14.4.22 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 (ordered by road class from south to north):
- M6 junction 21/A57 Manchester Road/B5210 Woolston Grange Avenue - major adverse effect;
  - M60 junction 10/B5214 Trafford Boulevard/B5214 Barton Road - major adverse effect;
  - A56 Higher Lane/B5159 Burford Lane/B5159 High Legh Road - major adverse effect;
  - A6144 Warburton Lane/A6144 Paddock Lane/B5160 Dunham Road - major adverse effect;
  - A6144 Bent Lane/A6144 Paddock Lane/Paddock Lane - major adverse effect;
  - A57 Manchester Road/Manchester Road - major adverse effect;
  - A57 Manchester Road/B5212 Glazebrook Lane/Manchester Road - major adverse effect;
  - A6144 Manchester New Road/A6144 Manchester Road/Manchester Road/Moss Lane - major adverse effect;
  - A6144 Carrington Lane/A6144 Carrington Spur/Banky Lane - moderate adverse effect;
  - A6144 Carrington Road/B5158 Flixton Road - major adverse effect;
  - A57 Liverpool Road/Salford Western Gateway - major adverse effect;
  - A57 Liverpool Road/Hardy Street/Peel Green Road - minor adverse effect; and
  - B5230 Barton Lane/B5211 Barton Road/B5211 Redclyffe Road/Peel Green Road - major adverse effect.
- 14.4.23 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 for non-motorised users, which are significant. The significant effects with the highest magnitude in each location will be:
- A6144 Mill Lane (between B5159 Mill Lane and B5159 Townfield Lane) - major adverse effect due to an increase in HGVs;
  - A6144 Bent Lane (between A6144 Paddock Lane and B5159 Townfield Lane) - moderate adverse effect due to an increase in HGVs;
  - A6144 Paddock Lane (between B5160 Dunham Road and A6144 Bent Lane) - major adverse effect due to an increase in HGVs;
  - A6144 Warburton Lane (between B5160 Dunham Road and Paddock Lane realignment) - major adverse effect due to an increase in HGVs;

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- A6144 Warburton Lane (between Paddock Lane realignment and Moss Lane) - major adverse effect due to an increase in HGVs;
- A6144 Warburton Lane (between Moss Lane and Chapel Lane) - major adverse effect due to an increase in HGVs;
- A6144 Warburton Lane (between Chapel Lane and Moss Lane) - major adverse effect due to an increase in HGVs;
- A6144 Manchester Road (between B5158 Flixton Road and Moss Lane) - major adverse effect due to an increase in HGVs;
- B5159 Burford Lane (between A56 Higher Lane and Stage Lane) – minor beneficial effect due to a decrease in all vehicles;
- B5159 Mill Lane (between Bradshaw Lane and Wet Gate Lane) - major adverse effect due to an increase in HGVs;
- B5160 Station Road (between Barns Lane and B5160 Paddock Lane) - major adverse effect due to an increase in HGVs;
- B5159 Mill Lane (between Wet Gate Lane and A6144 Birch Brook Road) - major adverse effect due to an increase in HGVs;
- B5160 Paddock Lane (between Barns Lane and B5160 Station Road) - major adverse effect due to an increase in HGVs;
- B5160 Dunham Road (between B5160 Paddock Lane and Barns Lane) - major adverse effect due to an increase in HGVs;
- B5160 Dunham Road (between Barns Lane and Gorse Lane) - major adverse effect due to an increase in HGVs;
- B5160 Dunham Road (between Gorse Lane and A6144 Warburton Lane) - major adverse effect due to an increase in HGVs;
- B5212 Glazebrook Lane (between Manchester Road and A57 Manchester Road) - moderate adverse effect due to an increase in HGVs;
- Crouchley Lane (between Mag Lane and A56 Higher Lane) – minor adverse effect due to an increase in all vehicles;
- Bradshaw Lane (between B5159 Burford Lane and Wet Gate Lane) - major adverse effect due to an increase in HGVs;
- Stage Lane (between B5159 Burford Lane and Sandy Lane) – minor adverse effect due to an increase in all vehicles;
- Wet Gate Lane (between B5159 Mill Lane and Bradshaw Lane) - major adverse effect due to an increase in HGVs;
- Dam Lane (between School Lane and Manchester Road) - major adverse effect due to an increase in HGVs;
- Manchester Road (between Dam Lane and B5212 Glazebrook Lane) - major adverse effect due to an increase in HGVs;
- Dam Lane (between School Lane and Dam Head Lane) - moderate adverse effect due to an increase in HGVs;

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- Dam Head Lane (between B5212 Glazebrook Lane and Bank Street) - moderate adverse effect due to an increase in HGVs;
- Trafford Way (between B5214 Trafford Boulevard and Old Park Lane) – moderate adverse effect due to an increase in HGVs;
- Salford Western Gateway (between Trafford Way and B5214 Trafford Boulevard) - moderate adverse effect due to an increase in HGVs; and
- Salford Western Gateway (between Trafford Way and A57 Liverpool Road) - major adverse effect due to an increase in HGVs.

14.4.24 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**

14.4.25 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**

14.4.26 No significant effects on parking and loading have been identified during construction in the Broomedge to Glazebrook area.

### **Public transport network**

14.4.27 Construction of the Proposed Scheme will not result in any significant effects upon the operation of existing bus services or stops.

14.4.28 There are interfaces with the existing rail network in this area, in particular on the operation of the Liverpool to Manchester Line (via Warrington Central) and its passengers.

14.4.29 The construction of the Proposed Scheme is expected to require a number of rail possessions over a period of up to three years in this area. Overall, there will be four possessions comprising one possession up to 27 hours and three possessions up to 54 hours. The possessions will be required to enable the construction of scheme elements including Glazebrook (Railway) viaduct.

14.4.30 Disruption to rail users will be reduced by limiting possessions, where reasonably practicable, to existing maintenance periods. Possessions will affect users of the Liverpool to Manchester Line (via Warrington Central) and will be managed through a combination of measures, which could include diversions or replacement bus services, which will reduce the disruption to the travelling public. As the possessions will be short term in nature, the effect on delay to rail passengers and freight services will not be significant.



14.4.31 HS2 Ltd will work with Network Rail and the train and freight operating companies to ensure that any need for additional possessions can be reduced with good planning and communication (including appropriate advance notice).

### **Non-motorised users**

14.4.32 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.

14.4.33 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:

- Warrington Lane – moderate adverse effect from increase in journey length of up to 1.7km;
- Footpath Lymm 43 (Cheshire Ring Canal Walk) – minor adverse effect from increase in journey length of up to 102m;
- Wet Gate Lane – minor adverse effect from increase in journey length of up to 1.4km;
- Footpath Warburton 8 – minor adverse effect from increase in journey length of up to 430m;
- Footpath Warburton 4 and Footpath Warburton 37– minor adverse effect from increase in journey length of up to 392m;
- National Route 62 – minor adverse effect from increase in journey length of up to 101m;
- Footpath Warburton 11 – moderate adverse effect from increase in journey length of up to 964m;
- Bridleway Partington 6 (Bollin Valley Way) – minor adverse effect from increase in journey length of up to 136m;
- Manchester Ship Canal informal footpath – minor adverse effect from increase in journey length of up to 369m;
- Footpath Rixton-with-Glazebrook 7– minor adverse effect from increase in journey length of up to 219m;
- Footpath Rixton-with-Glazebrook 8 – moderate adverse effect from increase in journey length of up to 574m;
- Footpath Rixton-with-Glazebrook 9 – minor adverse effect from increase in journey length of up to 161m; and
- Footpath Rixton-with-Glazebrook 14 – minor adverse effect from increase in journey length of up to 384m.

14.4.34 Permanent diversions to PRoW and roads are reported under the operational assessment.

## Waterways and canals

- 14.4.35 The construction of the Proposed Scheme will require temporary closures of the Bridgewater Canal and the Manchester Ship Canal. However, closures will be short in duration and consequently will not have a significant effect upon navigable waterways or canals in the Broomedge to Glazebrook area.

## Permanent effects

- 14.4.36 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

- 14.4.37 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.
- 14.4.38 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

- 14.4.39 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.
- 14.4.40 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 11 junctions;
  - moderate adverse effects at one junction; and
  - minor adverse effects at one junction.
- 14.4.41 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 19 roads;
  - moderate adverse effects on six roads;
  - minor adverse effects on two roads; and
  - minor beneficial effects on one road.
- 14.4.42 Changes to 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 two PRow and one roads; and
- minor adverse effects on users of 10 PRow and one road.

## Cumulative effects

- 14.4.43 The assessment includes the cumulative effects of planned and committed development during construction by taking this into account within the background traffic growth.
- 14.4.44 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;
  - replacement, diversion or realignment of PRow; and
  - provision of structures to maintain clearance requirements over navigable waterways.

### 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 Broomedge to Glazebrook area. The operation and 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):
- A6144 Warburton Lane/A6144 Paddock Lane/B5160 Dunham Road – formation of a new three-arm roundabout at the junction of A6144 Warburton Lane/A6144 Paddock Lane/B5160 Dunham Road to replace three existing closely spaced priority controlled (give-way) junctions, resulting in a negligible change in journey length;
  - A6144 Paddock Lane – realignment of the A6144 Paddock Lane, up to 242m north of its current alignment for 535m, crossing the route of the Proposed Scheme on A6144 Paddock Lane overbridge. The A6144 Paddock Lane realignment comprises the formation of a new roundabout junction at each end. At the southern end of the realignment, a new four-arm roundabout junction will be formed comprising the existing A6144 Paddock Lane/A6144 Bent Lane/A6144 Paddock Lane realignment/Paddock Lane. At the north of the realignment, a new four-arm roundabout junction will be formed comprising A6144 Warburton Lane/A6144 Paddock Lane Realignment/HS2 maintenance access. The greatest increase in journey length will be for users travelling between Warburton and Mossbrow, increasing journey length by up to 844m. For the majority of highway users, travelling between Partington and Heatley, the journey length will decrease by up to 254m;
  - Agden Lane – closure of Agden Lane where it is crossed by the route of the Proposed Scheme, with access to properties retained on both sides of the route, increasing journey length by up to 282m;
  - Warrington Lane – realignment of a section of Warrington Lane, up to 9m south of its existing alignment for 214m, to accommodate Bridgewater Canal viaduct, resulting in a negligible change in journey length;
  - Spring Lane – realignment of a section of Spring Lane, up to 5m north of its existing alignment for 211m, crossed by the route of the Proposed Scheme via Spring Lane underbridge, resulting in a negligible change in journey length;
  - Wet Gate Lane – realignment of Wet Gate Lane, up to 116m to the west of its existing alignment for 509m, decreasing journey length by up to 166m. The existing Wet Gate Lane will be closed where it is crossed by the route of the Proposed Scheme; and
  - Dam Head Lane – closure of Dam Head Lane where it is crossed by the route of the Proposed Scheme with access to properties retained on both sides of the route, increasing journey length by up to 2km.
- 14.5.7 The permanent diversions or realignments will increase journey length for vehicle occupants. Most of the diversions or realignments are less than 1km in length and will not result in any significant effects with regard to increased journey times for vehicle occupants. However, the closure of Dam Head Lane results in a diversion greater than 1km and will lead to changes to journey length for highway users. The diversion will increase journey length

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for highway users by 2km resulting in a minor adverse effect, which is significant. The temporary diversions or realignments may also affect non-motorised users, which is considered separately below.

- 14.5.8 The diversion of traffic associated with highway changes, including the realignment of the A6144 Paddock Lane and the closure of Dam Head Lane will lead to flow changes on the highway network. This will not, however, result in any significant effect on congestion or delays in either 2038 or 2046.
- 14.5.9 The junctions with changes in delay in 2046, which are significant, will be:
- A56 Higher Lane/B5159 Burford Lane/B5159 High Legh Road - major adverse effect.
- 14.5.10 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 36. Where there is no significant effect on a road during a particular time period it is represented by a dash.

**Table 36: 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
B5159 High Legh Road (between Kay Lane and A56 Higher Lane)	-	Moderate adverse	-	-
A56 Higher Lane (between B5159 Burford Lane and Agden Park Lane)	-	Moderate beneficial	-	Moderate beneficial
Crouchley Lane (between Mag Lane and A56 Higher Lane)	-	-	-	Moderate adverse
A56 Higher Lane (between Crouchley Lane and Oughtrington Lane)	-	Moderate beneficial	-	Moderate beneficial
B5159 Burford Lane (between A56 Higher Lane and Stage Lane)	Moderate beneficial	-	Moderate beneficial	Moderate beneficial
A6144 Warburton Lane (between B5160 Dunham Road and Paddock Lane realignment)	Major adverse	Major adverse	Major adverse	Major adverse
Red House Lane (between Sinderland Lane and Henshall Lane)	-	-	Moderate beneficial	-
Dam Lane (between School Lane and Manchester Road)	Major adverse	Major adverse	Major adverse	Major adverse
Manchester Road (between Dam Lane and B5212 Glazebrook Lane)	Major adverse	Major adverse	Major adverse	Major adverse

## Accidents and safety

- 14.5.11 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**

- 14.5.12 No significant effects on parking and loading have been identified during operation in the Broomedge to Glazebrook area.

## **Public transport network**

- 14.5.13 The Proposed Scheme is not expected to have a significant effect on public transport operations in the Broomedge to Glazebrook area.

## **Non-motorised users**

- 14.5.14 There will be permanent widening, realignment, diversion or extension of five PRow and six roads in the Broomedge to Glazebrook area that will have an impact on journey lengths or introduce hindrances such as substantial changes in levels for non-motorised users.
- 14.5.15 There will be severance effects, which are significant, on non-motorised users of three of these PRow and three of these roads as a result of changes in journey length and/or hindrances. These are:
- Agden Lane – moderate adverse effect from increase in journey length of up to 282m;
  - Footpath Warburton 3 (Bollin Valley Way)– minor adverse effect from increase in journey length of up to 184m;
  - A6144 Paddock Lane – moderate adverse effect from increase in journey length of up to 832m;
  - Footpath Warburton 11 – minor adverse effect from increase in journey length of up to 196m;
  - Footpath Rixton-with-Glazebrook 14 – minor adverse effect from increase in journey length of up to 210m; and
  - Dam Head Lane – minor adverse effect from increase in journey length of up to 2km.

## **Waterways and canals**

- 14.5.16 The Proposed Scheme will require the introduction of retaining walls to define the extent of the Manchester Ship Canal and protect Manchester Ship Canal viaduct against ship impact, reducing the width of the Manchester Ship Canal by up to 30m along the length of the retaining walls. However, the operation of the Proposed Scheme will have no significant effect upon the operation of the Bridgewater Canal or the Manchester Ship Canal in the Broomedge to Glazebrook area.

## **Other mitigation measures**

- 14.5.17 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

- 13.5.39 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.
- 14.5.18 The operation of the Proposed Scheme in 2038 and 2046 will result in a minor adverse effect, which is significant, on one road due to changes in journey lengths for vehicle occupants.
- 14.5.19 The residual significant effects of changes in congestion and/or delays for road users in 2046 will result in major adverse effects at one junction.
- 14.5.20 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 three roads;
  - moderate adverse effects on one road; and
  - moderate beneficial effects on three roads.
- 14.5.21 The residual significant effects on traffic-related severance for non-motorised users in 2046 will be:
- major adverse effects on three roads;
  - moderate adverse effects on one road; and
  - moderate beneficial effects on four roads.
- 14.5.22 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 the users of two roads; and
  - minor adverse effects on the users of three PRoW and one road.

## Cumulative effects

- 14.5.23 The assessment includes cumulative effects of planned and committed development during operation, by taking into account background traffic growth in the future baseline.

## Monitoring

- 14.5.24 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.
- 14.5.25 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 Broomedge to Glazebrook 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;
  - Warrington Borough Council (WBC) and Trafford Metropolitan Borough Council (TMBC), which are the Lead Local Flood Authorities (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 engagement with Natural England on Rixton Clay Pits Special Area of Conservation (SAC), Site of Special Scientific Interest (SSSI), Local Nature Reserve (LNR) and Local Wildlife Site (LWS).
- 15.1.4 Maps showing the location of the key environmental features (Map Series CT-10), 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: MA04 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 Broomedge to Glazebrook area are contained in the Volume 5 appendices. These comprise:
- Appendix WR-003-0MA04 – Water resources assessment;
  - Appendix WR-005-0MA04 – Flood risk assessment; and
  - Appendix WR-006-00002 – Hydraulic modelling report – Manchester Ship Canal.
- 15.1.7 Volume 5 also includes a detailed route-wide, stand-alone Water Framework Directive (WFD) compliance assessment (WR-001-00000) 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>159</sup>:
- BID WR-004-0MA04 – 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 alignment of the Proposed Scheme with the Sequential Test and Exception Test policies in the National Planning Policy Framework (NPPF)<sup>160</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>161</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 route of the Proposed Scheme, as described in Section 2.2 of this report. In the Broomedge to Glazebrook area, the study area has been extended to include the Rixton Clay Pits SAC, SSSI, LNR, and LWS.
- 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 access constraints, a precautionary approach has been adopted in the assessments of receptor value and impact magnitude. Where this precautionary approach indicates the

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<sup>159</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>160</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>161</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

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 analysis of flood risk impacts on the River Bollin, Manchester Ship Canal, Tributary of Manchester Ship Canal 2, Red Brook, and Tributary of Agden Brook 1. Interpretation of the hydraulic modelling and details of the analysis carried out are provided in Volume 5: Appendix WR-005-0MA04.
- 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-003-0MA04 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 other 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. Impacts from the historical Hollins Green landfill on groundwater quality are presented in Volume 5: Appendix LQ-001-0MA04.

## 15.3 Environmental baseline

### Existing baseline - Water resources

#### Surface water

- 15.3.1 All surface water bodies in the study area fall within the Mersey Lower or Mersey Upper management catchments of the North West river basin district (RBD).
- 15.3.2 The current river basin management plan<sup>162</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>163</sup> is to achieve 'good status' for all designated water bodies. The purpose of the WFD compliance assessment<sup>164</sup> is to demonstrate that the

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<sup>162</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>163</sup> *The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (SI 2017 No. 407)*. London, Her Majesty's Stationary Office.

<sup>164</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 37. 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 37: Surface water body receptors**

Water body name and location	Type (at point closest to the Proposed Scheme <sup>165</sup> )	Q95 value (m <sup>3</sup> /s) <sup>166</sup>	Receptor value	Parent WFD water body name and identification number	Current WFD status/ Objective	Crossed by the Proposed Scheme?
Agden Lane Road Drain 1 WR-01-305b - D7	Minor ditch	<0.002	Low	Bollin (Ashley Mill to Manchester Ship Canal) GB112069061382	Moderate/moderate by 2015	Yes
Tributary of Agden Brook 1 WR-01-305b - D7	Ordinary watercourse	<0.002	Low	Bollin (Ashley Mill to Manchester Ship Canal) GB112069061382	Moderate/moderate by 2015	Yes
Agden Lane Road Drain 2 WR-01-305b - E8	Minor ditch	<0.002	Low	Bollin (Ashley Mill to Manchester Ship Canal) GB112069061382	Moderate/moderate by 2015	No
Bridgewater Canal WR-01-305b - E7	Canal	N/A	Very high	Bridgewater Canal GB71210001	Moderate/good by 2027	Yes

<sup>165</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>166</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 SMR Volume 5: Appendix CT-001-00001.

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Water body name and location	Type (at point closest to the Proposed Scheme <sup>165</sup> )	Q95 value (m <sup>3</sup> /s) <sup>166</sup>	Receptor value	Parent WFD water body name and identification number	Current WFD status/ Objective	Crossed by the Proposed Scheme?
Helsdale Brook WR-01-305b - F6	Ordinary watercourse	0.006	Moderate	Bollin (Ashley Mill to Manchester Ship Canal) GB112069061382	Moderate/ moderate by 2015	No
River Bollin WR-01-305b - F7	Main river	1.2	Very high	Bollin (Ashley Mill to Manchester Ship Canal) GB112069061382	Moderate/ moderate by 2015	Yes
Wet Gate Lane Drain WR-01-305b - F7	Minor ditch	<0.002	Low	Bollin (Ashley Mill to Manchester Ship Canal) GB112069061382	Moderate/ moderate by 2015	No
Old Bollin WR-01-305b - F7	Main river	0.003	Low	Bollin (Ashley Mill to Manchester Ship Canal) GB112069061382	Moderate/ moderate by 2015	Yes
Tributary of Old Bollin WR-01-305b - G7	Ordinary watercourse	<0.002	Low	Bollin (Ashley Mill to Manchester Ship Canal) GB112069061382	Moderate/ moderate by 2015	Yes
Carrgreen Lane Drain WR-01-305b - G8	Minor ditch	<0.002	Low	Bollin (Ashley Mill to Manchester Ship Canal) GB112069061382	Moderate/ moderate by 2015	No
Tributary of Manchester Ship Canal 2 (locally known as Warburton Park Brook) WR-01-305b - H7	Main river	0.003	Low	Mersey/ Manchester Ship Canal (Irwell/ Manchester Ship Canal to Bollin) GB112069061011	Moderate/ moderate by 2015	Yes
Field Drains A6144 WR-01-305b - H8	Minor ditch	<0.002	Low	Mersey/ Manchester Ship Canal (Irwell/ Manchester Ship Canal to Bollin) GB112069061011	Moderate/ moderate by 2015	No
Manchester Ship Canal <sup>167</sup> WR-01-305b - I7	Canal	N/A	Very high	Mersey/ Manchester Ship Canal (Irwell/	Moderate/ moderate by 2015	Yes

<sup>167</sup> The Manchester Ship Canal is a canalised section of the River Mersey in the study area. It is referred to as the Manchester Ship Canal throughout this report.

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Water body name and location	Type (at point closest to the Proposed Scheme <sup>165</sup> )	Q95 value (m3/s) <sup>166</sup>	Receptor value	Parent WFD water body name and identification number	Current WFD status/ Objective	Crossed by the Proposed Scheme?
				Manchester Ship Canal to Bollin) GB112069061011		
Red Brook WR-01-305b - I7	Main river	0.1	High	Sinderland Brook GB112069060980	Poor/ moderate by 2015	Yes
Tributary of Manchester Ship Canal 1 WR-01-305b - I6	Ordinary watercourse	<0.002	Moderate	Mersey/ Manchester Ship Canal (Irwell/ Manchester Ship Canal to Bollin) GB112069061011	Moderate/ moderate by 2015	No
Marsh Brook WR-01-306a - B6	Ordinary watercourse	<0.002	Moderate	Mersey/ Manchester Ship Canal (Irwell/ Manchester Ship Canal to Bollin) GB112069061011	Moderate/ moderate by 2015	No
Glaze Brook WR-01- 306a - B7	Main river	0.8	High	Glaze GB112069061420	Poor/poor by 2015	No
Tributary of Glaze Brook 1 (locally known as Hollins Green Brook) WR-01-306a - B7	Main river	<0.002	Low	Glaze GB112069061420	Poor/poor by 2015	Yes
Glazebrook Lane Drains WR-01-306a - C8	Minor ditch	<0.002	Low	Glaze GB112069061420	Poor/poor by 2015	No
Dam Head Lane Drains WR-01-306a - C7	Minor ditch	<0.002	Low	Glaze GB112069061420	Poor/poor by 2015	No
Tributary of Glaze Brook 2 WR-01-306a - D7	Ordinary watercourse	<0.002	Low	Glaze GB112069061420	Poor/poor by 2015	Yes
Tributary of Glaze Brook 3 WR-01-306a - D8	Ordinary watercourse	<0.002	Moderate	Glaze GB112069061420	Poor/poor by 2015	No

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Water body name and location	Type (at point closest to the Proposed Scheme <sup>165</sup> )	Q95 value (m <sup>3</sup> /s) <sup>166</sup>	Receptor value	Parent WFD water body name and identification number	Current WFD status/ Objective	Crossed by the Proposed Scheme?
Boundary Drain WR-01-306a - E10	Minor ditch	<0.002	Low	Glaze GB112069061420	Poor/poor by 2015	No
Birch Covert Drains WR-01-306a - E10	Minor ditch	<0.002	Low	Glaze GB112069061420	Poor/poor by 2015	No
Little Woolden Moss Drain WR-01-306a - F10	Minor ditch	<0.002	Low	Glaze GB112069061420	Poor/poor by 2015	No

### Abstractions and permitted discharges (surface water)

15.3.6 Table 38 sets out the surface water abstractions and permitted discharges located within 1km from the route of the Proposed Scheme in the Broomedge to Glazebrook area.

**Table 38: Surface water abstraction and permitted discharges in study area**

Feature	Details	Value
Licensed surface water abstractions	Two licences for spray irrigation from the Bridgewater Canal with annual abstraction of up to 6,810m <sup>3</sup> and 13,650m <sup>3</sup> .	High
Licensed surface water abstractions	Four licences for spray irrigation from the River Bollin, with annual abstractions of up to 13,000m <sup>3</sup> , 16,300m <sup>3</sup> , 17,048m <sup>3</sup> and 13,650m <sup>3</sup> .	High
Licensed surface water abstractions	One transfer licence on the River Bollin at Heatley Weir for fish pass/canoe pass.	High
Licensed surface water abstractions	One licence for spray irrigation from Heatley Flash with annual abstraction of up to 13,640m <sup>3</sup> .	High
Licensed surface water abstractions	One licence for spray irrigation from Old Bollin with annual abstraction of up to 10,638m <sup>3</sup> .	High
Licensed surface water abstractions	One licence for spray irrigation from Red Brook with annual abstraction of up to 13,640m <sup>3</sup> .	High
Registered private unlicensed surface water abstractions	None	None
Consented discharges to surface water	Eighteen, of which one is within the land required for the construction of 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 discharge 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 route of the Proposed Scheme, whereas the default Land quality study area comprises all land within 250m from the land required for the construction 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.

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 39 (for superficial deposits) and Table 40 (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 39: Summary of geology and hydrogeology in the study area – superficial deposits**

Geology	Aquifer classification	WFD body (ID) and current overall status	WFD status objective	Receptor value
Peat	Unproductive	Weaver and Dane Quaternary Sand and Gravel Aquifer (GB40401G300500) Poor	Good by 2027	Low
Alluvium	Secondary A	Weaver and Dane Quaternary Sand and Gravel Aquifer (GB40401G300500) Poor	Good by 2027	Moderate
River terrace deposits Not crossed by the route of the Proposed Scheme	Secondary A	Weaver and Dane Quaternary Sand and Gravel Aquifer (GB40401G300500) Poor	Good by 2027	Moderate
Shirdley Hill Sand Formation	Secondary A	Weaver and Dane Quaternary Sand and Gravel Aquifer (GB40401G300500) Poor	Good by 2027	Moderate

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Geology	Aquifer classification	WFD body (ID) and current overall status	WFD status objective	Receptor value
Glaciofluvial deposits	Secondary A	Weaver and Dane Quaternary Sand and Gravel Aquifer (GB40401G300500) Poor	Good by 2027	Moderate
Glaciofluvial sheet deposits	Secondary A	Weaver and Dane Quaternary Sand and Gravel Aquifer (GB40401G300500) Poor	Good by 2027	Moderate
Glacial till	Secondary (Undifferentiated)	Weaver and Dane Quaternary Sand and Gravel Aquifer (GB40401G300500) Poor	Good by 2027	Moderate

**Table 40: Summary of geology and hydrogeology in the study area - bedrock**

Geology	Aquifer classification	WFD body (ID) and current overall status	WFD status objective	Receptor value
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
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 Merseyside North Permo-Triassic Sandstone Aquifers (GB41201G101700) Poor	Good by 2027	High
Sherwood Sandstone Group – Wilmslow Sandstone Formation Not crossed by the route of the Proposed Scheme	Principal	Lower Mersey Basin and Merseyside North 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 39, 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. They have, therefore, been classified as moderate value receptors;
- glacial till is classified as a Secondary (Undifferentiated) aquifer and this aquifer 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. Therefore, it has been classified as a moderate value receptor; and
- peat is classified as unproductive strata and is unlikely to provide anything other than a very minor component of baseflow to watercourses, or to yield significant quantities of groundwater. It has, therefore, been classified as a low value receptor.

## Bedrock aquifers

15.3.12 The basis of the receptor value attributed to the bedrock aquifers present within the study area, as shown in Table 40, is outlined briefly as follows:

- the Sherwood Sandstone Group (locally comprising sandstone of the Helsby Sandstone Formation and the Wilmslow Sandstone Formation) has been classified as a Principal aquifer by the Environment Agency. This aquifer can also provide an important component of baseflow to rivers. It has, therefore, been assessed as a high value receptor;
- the Mercia Mudstone Group (locally comprising of the Bollin Mudstone Member of the Sidmouth Mudstone Formation and the Tarporley Siltstone Formation) are classified as Secondary B aquifers. This aquifer has traditionally been regarded as predominantly impermeable, or at best a poor aquifer. Limited quantities of groundwater suitable for domestic or agricultural use are, however, occasionally obtainable within this bedrock formation. It has, therefore, been classified as a moderate value receptor; and
- the Northwich Halite Member of the Sidmouth Mudstone Formation within the Mercia Mudstone Group is classified as unproductive. It is unlikely to provide baseflow to rivers or support groundwater abstraction and has, therefore, been classified 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 40. 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 designated overlying WFD superficial and adjacent WFD bedrock groundwater bodies.

### **Abstraction and permitted discharges (groundwater)**

15.3.15 Table 41 sets out the groundwater abstraction and permitted discharges within 1km from the route of the Proposed Scheme in the Broomedge to Glazebrook area.

**Table 41: Groundwater abstraction and permitted discharges in study area**

<b>Feature</b>	<b>Details</b>	<b>Value</b>
Source Protection Zones (SPZ) associated with licensed public water supplies	One SPZ3 located near Lymm.	Very high
SPZ associated with licensed public water supplies	SPZ3 for a group of abstractions located near Glazebrook. These abstractions are located within the Risley to Bamfurlong area (MA05) and are discussed in detail within Volume 2: Community Area report MA05, Risley to Bamfurlong, Section 15.	Very high
Private licensed groundwater abstractions	None	None
Registered unlicensed private groundwater abstractions	None	None
Consented discharges to groundwater	One domestic soakaway to underground strata.	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 22 features within the study area that had the potential to be springs or sinks. Access was possible to inspect all 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-004-0MA04<sup>159</sup>. Of the 22 features inspected:

- one feature was identified as a groundwater collect discharging into Glaze Brook. The collect is supporting an undesignated habitat and has, therefore, been assessed as a moderate value receptor;
- one feature was confirmed as a spring supporting a low value stream but is not supporting any notable habitat. It has, therefore, been assessed as a low value receptor;
- during a field survey of one potential feature, no feature was identified at this location. The site has, therefore, been discounted as a groundwater feature and excluded from the groundwater assessment;
- eight potential features were verified as land drainage features and are included in the surface water assessment;
- one feature was identified as a constructed drain and not a groundwater feature; and

- ten features were identified to be culverts and not groundwater features.

15.3.17 There are 23 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

- 15.3.18 The following nature conservation sites within the study area are potentially groundwater dependent:
- Rixton Clay Pits SAC, SSSI, LNR and LWS (Rixton Brickworks) is located 961m west of land required for the construction of the Proposed Scheme towards the northern end of the Broomedge to Glazebrook area. The habitat is on the opposite side of Marsh Brook to the Proposed Scheme. Engagement has been undertaken with Natural England and it has been confirmed that there is no hydrological pathway for impact to this receptor; and
  - Holcroft Moss SSSI (part of the Manchester Mosses SAC) is located in the Risley to Bamfurlong area (MA05) adjacent to the northern boundary of the Broomedge to Glazebrook area. Assessment of the impact on Holcroft Moss SSSI is reported in Volume 2: Community Area report MA05, Risley to Bamfurlong.
- 15.3.19 No designated nature conservation sites within the study area that are dependent on surface water flows have the potential to be affected by the Proposed Scheme.
- 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>168</sup> has been used to scope the baseline flood risk for fluvial flooding from main rivers. These maps 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>169</sup> has been used to scope surface water flood risks and potential fluvial flood risk associated with 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.

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<sup>168</sup> Environment Agency (2021), *Flood map for planning*. Available online at: <https://flood-map-for-planning.service.gov.uk>.

<sup>169</sup> Environment Agency (2021), *Long term flood risk information*. Available online at: <https://flood-warning-information.service.gov.uk/long-term-flood-risk/>.

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- 15.3.22 Infrastructure failure flood risks have been scoped using the Environment Agency Risks of flooding from reservoirs national dataset<sup>170</sup>. The British Geological Survey (BGS) Susceptibility to groundwater flooding dataset<sup>171</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:
- WBC Preliminary Flood Risk Assessment (PFRA) (2017)<sup>172</sup>;
  - WBC Strategic Flood Risk Assessment (SFRA) (2011)<sup>173</sup>;
  - Manchester City, Salford City and Trafford Council Hybrid SFRA (2011)<sup>174</sup>;
  - WBC Local Flood Risk Management Strategy (LFRMS) (2017)<sup>175</sup>; and
  - TMBC LFRMS (2014)<sup>176</sup>.
- 15.3.24 Historical flood investigation reports published by the Lead Local Flood Authority (LLFA), under Section 19 of the Flood and Water Management Act<sup>177</sup>, relevant to this area have been reviewed (see Volume 5: Appendix WR-005-0MA04 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 areas of floodplain (Flood Zone 2 and 3) associated with the River Bollin, Manchester Ship Canal, Tributary of Manchester Ship Canal 2 and Red Brook. Other floodplains that will be crossed by the alignment of the Proposed Scheme include: those associated with Tributary of Agden Brook 1, north-west of Broomedge; Tributary of Glaze

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<sup>170</sup> Her Majesty's Government (2021), *Risk of Flooding from Reservoirs – Maximum Flood Extent (Web Mapping Service)*. Available online at: <https://data.gov.uk/dataset/44b9df6e-c1d4-40e9-98eb-bb3698ecb076/risk-of-flooding-from-reservoirs-maximum-flood-extent-web-mapping-service>.

<sup>171</sup> British Geological Survey (2021), *Susceptibility to groundwater flooding dataset*. Available online at: <http://www.bgs.ac.uk/products/hydrogeology/groundwaterFlooding.html>.

<sup>172</sup> Warrington Borough Council (2017), *Warrington Preliminary Flood Risk Assessment (PFRA)*. Available online at: [https://www.warrington.gov.uk/sites/default/files/2019-10/preliminary\\_flood\\_risk\\_assessment\\_pfra\\_2017\\_-\\_2023.pdf](https://www.warrington.gov.uk/sites/default/files/2019-10/preliminary_flood_risk_assessment_pfra_2017_-_2023.pdf).

<sup>173</sup> JBA Consulting (2011), *Warrington Borough Council Strategic Flood Risk Assessment (SFRA)*. Available online at: [https://www.warrington.gov.uk/sites/default/files/2019-08/warrington\\_strategic\\_flood\\_risk\\_assessment\\_ii\\_vol\\_1\\_2011.pdf](https://www.warrington.gov.uk/sites/default/files/2019-08/warrington_strategic_flood_risk_assessment_ii_vol_1_2011.pdf).

<sup>174</sup> JBA Consulting (2011), *Manchester City, Salford City and Trafford Council Hybrid Strategic Flood Risk Assessment (SFRA)*. Available online at: [https://secure.manchester.gov.uk/downloads/download/3871/strategic\\_flood\\_risk\\_assessment-manchester\\_salford\\_trafford](https://secure.manchester.gov.uk/downloads/download/3871/strategic_flood_risk_assessment-manchester_salford_trafford).

<sup>175</sup> Warrington Borough Council (2017), *Local Flood Risk Management Strategy (LFRMS)*. Available online at: [https://www.warrington.gov.uk/sites/default/files/2019-10/local\\_flood\\_risk\\_management\\_strategy\\_2017\\_v7\\_af\\_approved.pdf](https://www.warrington.gov.uk/sites/default/files/2019-10/local_flood_risk_management_strategy_2017_v7_af_approved.pdf).

<sup>176</sup> Trafford Council (2014), *Trafford Local Flood Risk Management Strategy (LFRMS)*. Available online at: <https://www.trafford.gov.uk/planning/strategic-planning/docs/lfrms-trafford-final-2014.pdf>.

<sup>177</sup> *Flood and Water Management Act 2010* (c.19). London, Her Majesty's Stationary Office. Available online at: <http://www.legislation.gov.uk/ukpga/2010/29/contents>.

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Brook 1, north of Hollinfare; and Tributary of Glaze Brook 2, on the boundary between the Broomedge to Glazebrook area and the Risley to Bamfurlong area (MA05). Table 42 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 42: River flood risk sources and receptors**

Source	Location description and figure/coordinate	Receptor potentially affected	Receptor value/sensitivity to flooding
River Bollin	River Bollin WR-01-305b - F7	Footpaths (Bollin Valley Way and Footpath Lymm 37)	Moderate
River Bollin	River Bollin WR-01-305b - F7	Trans Pennine Trail (National Cycle Route 62)	Moderate
River Bollin	River Bollin WR-01-305b - F7	Agricultural land	Moderate
Tributary of the Manchester Ship Canal 2	Manchester Ship Canal WR-01-305b - H7	Residential properties on Park Road, Warburton	High
Tributary of the Manchester Ship Canal 2	Manchester Ship Canal WR-01-305b - H7	Agricultural land	Moderate
Red Brook	Red Brook WR-01-305b - I7	Footpath (Bollin Valley Way)	Moderate
Manchester Ship Canal	Manchester Ship Canal WR-01-305b - I7	Telecommunications mast	Very high
Manchester Ship Canal	Manchester Ship Canal WR-01-305b - J8	Water works pumping station	Low
Manchester Ship Canal	Manchester Ship Canal WR-01-305b - I7	Footpath (BW2 Bollin Valley Way)	Moderate
Manchester Ship Canal	Manchester Ship Canal WR-01-305b - I7	A57 Manchester Road	Very high
Manchester Ship Canal	Manchester Ship Canal WR-01-305b - I8	Mythholme Avenue, Cadishead	Moderate
Manchester Ship Canal	Manchester Ship Canal WR-01-305b - I8	Residential properties along Mythholme Avenue, Cadishead	High
Manchester Ship Canal	Manchester Ship Canal WR-01-305b - I8	Liverpool Road, Cadishead	Moderate
Manchester Ship Canal	Manchester Ship Canal WR-01-305B - I8 and J8	Rosebank Road, Cadishead	Moderate
Manchester Ship Canal	Manchester Ship Canal WR-01-305b - I8 and J8	Residential properties along Rosebank Road, Cadishead	High
Manchester Ship Canal	Manchester Ship Canal WR-01-305b - I8	Industrial property on Cadishead Way, Irlam	High



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Source	Location description and figure/coordinate	Receptor potentially affected	Receptor value/sensitivity to flooding
Tributary of Glaze Brook 1	Tributary of Glaze Brook 1 WR-01-306a - B7 and B8	Dam Head Lane, near Hollingreave Farm	Moderate
Tributary of Glaze Brook 1	Tributary of Glaze Brook 1 WR-01-306a - B7	Agricultural land	Moderate
Tributary of Glaze Brook 2	Tributary of Glaze Brook 2 WR-01-306a - D7	Agricultural land	Moderate
Tributary of Agden Brook 1	Tributary of Agden Brook 1 WR-01-305b - E7	Residential properties along Warrington Lane, Agden Bridge	High
Tributary of Agden Brook 1	Tributary of Agden Brook 1 WR-01-305b - E7	Warrington Lane, Agden Bridge	Moderate
Tributary of Agden Brook 1	Tributary of Agden Brook 1 WR-01-305b - E7	Residential property along Agden Lane, near Agden Brow	High
Tributary of Agden Brook 1	Tributary of Agden Brook 1 WR-01-305b - E7	Agden Lane, near Agden Brow	Moderate

## Surface water flooding

15.3.26 There are no areas that are susceptible to surface water flooding within the study area.

## 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. Artificial water bodies with potential implications for flood risk within the study area include:

- Tatton Park Mere, Lamaload Reservoir, Dunham Park Reservoir, Melchett Mere, Radnor Mere and Trentabank Reservoir. These are large raised reservoirs or impounded water bodies and are shown on the Environment Agency's Flood risk from reservoir mapping<sup>178</sup>; and
- Bridgewater Canal and Manchester Ship Canal, which pass through the Broomedge to Glazebrook area.

15.3.28 The large reservoirs are subject to the requirements of the Reservoirs Act 1975<sup>179</sup> and as such are inspected annually. This increases the likelihood that any degradation in the operational performance of a reservoir will be identified and addressed before there is an increased risk of failure. Whilst the consequences of failure are potentially very high, this

<sup>178</sup> Environment Agency (2021), *Long term flood risk information*. Available online at: <https://flood-warning-information.service.gov.uk/long-term-flood-risk/>.

<sup>179</sup> Department for Communities and Local Government (2016), *Reservoirs: owner and operator requirements*. Available online at: <https://www.gov.uk/guidance/reservoirs-owner-and-operator-requirements>.

inspection and maintenance regime means that the overall risk of flooding from this source is considered low and very unlikely to change as a result of the Proposed Scheme.

- 15.3.29 The Proposed Scheme will not encroach into the Bridgewater Canal channel or embankment and will therefore not change the canal flood risk. In the event of embankment failure, flood risk posed to the Proposed Scheme will be unaffected as the Proposed Scheme is elevated on a viaduct over the Bridgewater Canal (minimum viaduct clearance defined by HS2 Ltd technical standards and agreed with the Canal & River Trust).
- 15.3.30 The assessment does not identify any changes in flood risk posed by failure of artificial water sources.

## Groundwater flooding

- 15.3.31 Information related to historical incidents of groundwater flooding in the Broomedge to Glazebrook area is provided within the SFRAs<sup>173,174</sup> and LFRMS<sup>175,176</sup>. The SFRA and LFRMS state that there is no history of groundwater flooding within the study area.
- 15.3.32 The BGS Susceptibility to groundwater flooding dataset indicates that there is some potential for groundwater flooding to occur in the River Bollin and Manchester Ship Canal floodplains, and where the Proposed Scheme is underlain by susceptible superficial deposits (glacial till) in Little Heatley and Warburton.

## Land drainage

- 15.3.33 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)

- 15.3.34 Volume 5: Appendix CT-004-00000 provides details of the developments in the Broomedge to Glazebrook area that are assumed to have been implemented by 2025. The committed developments relevant to water resources and flood risk during construction in this area are presented in Table 43.

**Table 43: Committed developments of relevance to water resources and flood risk during construction**

Map book reference <sup>180</sup>	Planning reference	Description	How this is considered in the assessment
MA04/105	86160/OUT/15	Location: land at Lock Lane, adjoining the Manchester Ship Canal Partington. Application to extend the time limit for the implementation of planning permission H/OUT/68617 (outline application for residential development of up to 550 dwellings; associated footpath, landscaping and ecological works).	Informing future baseline.
MA04/026	Saved Policies of the City of Salford Unitary Development Plan 2004-2016	Location: Liverpool Road/Mytholme Avenue, Cadishead. New and improved recreation land and facilities, Liverpool Road/Mytholme Avenue, Cadishead.	Informing future baseline.
MA04/126	2020/36673	Location: land off Hall Lane, Partington. Full planning permission for 156 dwellings, together with associated access, parking, landscaping, substation, drainage, the layout of the road and footways and other associated works.	Informing future baseline.

15.3.35 Implementation of these committed developments will result in an increase of the number of flood risk receptors around the Manchester Ship Canal. As such, these committed developments have been included as part of the future baseline and have been considered within this assessment.

## Operation (2038)

15.3.36 Volume 5: Appendix CT-004-00000 also provides details of the developments in the Broomedge to Glazebrook area that are assumed to have been implemented by 2038. No additional 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

15.3.37 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.

15.3.38 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.

<sup>180</sup> Volume 5, Planning Data/Committed Development Map Book: Maps CT-13-312b to CT-13-314a.

## 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 that 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 the River Bollin, Tributary of Manchester Ship Canal 2, Red Brook, Tributary of Glaze Brook 1 and Tributary of Glaze Brook 2 and their associated floodplains. Instead it will pass over these larger watercourses on viaducts spanning the floodplain, with piers set back from the channel;
- 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: MA04 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 Agden Brook 1 (160m realignment including 70m of culvert);
- Tributary of Manchester Ship Canal 2 known locally as Warburton Park Brook (140m realignment);

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<sup>181</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

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- Field Drains A6144 (90m realignment including 70m of culvert); and
- Tributary of Glaze Brook 1 known locally as Hollins Green Brook (45m realignment of existing culverted watercourse).

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 design 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 no diversions proposed within this study area.

15.4.8 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.

15.4.9 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.

15.4.10 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.

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- 15.4.11 Permanent culverts proposed on the smaller watercourse crossings within the Broomedge to Glazebrook area include those on:
- Surface water flow path associated with Tributary of River Weaver 2 (Park Hall culvert 110m in length);
  - Tributary of Agden Brook 1 (Agden Lane culvert 70m in length); and
  - field drains A6144 (70m of culvert).
- 15.4.12 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:
- 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.
- 15.4.13 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: Appendix WR-001-00000 WFD compliance assessment. Any mitigation required in response to significant ecological effects of these culverts is set out in Section 7, Ecology and biodiversity.
- 15.4.14 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.
- 15.4.15 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.

- 15.4.16 The exact requirements will be refined and method of mitigation will be designed following ground investigation at foundations and cutting locations, where appropriate.
- 15.4.17 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.
- 15.4.18 No borrow pits are proposed in the Broomedge to Glazebrook area.

## **Flood risk and land drainage**

- 15.4.19 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 the viaducts, which will be located in the floodplains of the River Bollin, Manchester Ship Canal, Tributary of Manchester Ship Canal 2, Red Brook, Tributary of Glaze Brook 1 and Tributary of Glaze Brook 2. 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: MA04 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;



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- 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;
- where the Proposed Scheme will pass in cutting, drainage measures will be provided to limit 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.

15.4.20 The nominated undertaker will, as far as reasonably practicable, ensure that flood risk is managed throughout the construction period and will consider flooding issues 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.

15.4.21 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.

15.4.22 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

- 15.4.23 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

- 15.4.24 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.
- 15.4.25 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 Broomedge to Glazebrook area, the current Environment Agency Abstraction Licensing Strategy (ALS)<sup>182</sup> information suggests that there may be restrictions on obtaining water supplies, particularly around the Manchester Ship Canal which is assessed as ‘no water available’ for licensed abstraction.
- 15.4.26 Where highway drainage on construction traffic routes 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 (2013), *Lower Mersey and Alt abstraction licensing strategy*. Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/300490/LIT\\_7881\\_35d3ed.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/300490/LIT_7881_35d3ed.pdf).

<sup>183</sup> Highways England (2019), *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/dmrb/search/d6388f5f-2694-4986-ac46-b17b62c21727>.

## **Groundwater**

### **Aquifers**

- 15.4.27 Warburton cutting will intersect the Shirdley Hill Sand Formation, glaciofluvial deposits and glaciofluvial sheet deposits Secondary A aquifers, and a small area of glacial till Secondary (Undifferentiated) aquifer. The Mercia Mudstone Group (Sidmouth Mudstone Formation – Bollin Mudstone Member) Secondary B aquifer will also underlie Warburton cutting, although it is separated from the cutting by a significant thickness of superficial deposits. Whilst there may be minor localised impacts, the implementation of the measures outlined in the draft CoCP is likely to mean that any effects on the overall status of these aquifers will not be significant.
- 15.4.28 Where Warburton cutting could affect local receptors, such as groundwater abstractions or springs, this is reported in the sections below.
- 15.4.29 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 most of this area, there are generally 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. GWMU are present at the southern and northern parts of the study area, where Sherwood Sandstone is present. There may be restrictions on obtaining approvals for dewatering activities relating to the Sherwood Sandstone Group, with the groundwater management unit classed as 'restricted water available' due to water balance and saline intrusion. 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**

- 15.4.30 The assessment has not identified any temporary significant effects on groundwater abstractions.

### **Groundwater – surface water interactions**

- 15.4.31 The assessment has not identified any temporary significant effects on groundwater – surface water interactions.

### **Water dependent habitats**

- 15.4.32 The assessment has not identified any temporary significant effects on water dependent habitats.

## Temporary effects – Flood risk and land drainage

- 13.5.40 Construction of River Bollin West and Manchester Ship Canal viaducts, which cross the River Bollin, Manchester Ship Canal, Tributary of Manchester Ship Canal 2, Red Brook and Tributary of Glaze Brook 1 floodplains, will require temporary working within areas at risk of flooding. This will include the site haul route spanning the main channels of the River Bollin, Tributary of Manchester Ship Canal 2, Red Brook, Tributary of Glaze Brook 1 and Tributary of Glaze Brook 2. Construction sequencing and temporary works will be designed to reduce potential flood risk effects 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

- 15.4.33 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

- 15.4.34 Where new/modified 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 HEWRAT<sup>27</sup>. The assessment has not identified any significant effects on surface water quality in this area.
- 15.4.35 The assessment has not identified any permanent significant effects on surface water.

### Groundwater

#### Aquifers

- 15.4.36 It is anticipated that implementation of the avoidance and mitigation measures will ensure that there will be no permanent significant effects related to the impact of Warburton cutting on water levels and quality in the aquifers intercepted by the Proposed Scheme. Where the impacts of Warburton cutting on the aquifers could affect additional local receptors that rely on the groundwater resource, for example springs and abstractions, the impacts have been assessed and where effects are significant, they are described below.
- 15.4.37 Field drains A6144 has a low dry weather flow and may be dry under some conditions. During these dry conditions, highways drainage discharges to this watercourse have the potential to be discharging into the underlying glacial till Secondary (Undifferentiated) aquifer. Therefore, the HEWRAT<sup>27</sup> groundwater assessment has been undertaken for discharges relating to the A6144 Paddock Lane realignment. The assessment reports a

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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*.

moderate adverse impact, on the moderate value aquifer, resulting in a moderate adverse effect, which is significant.

- 15.4.38 Manchester Ship Canal viaduct will be constructed over the Hollins Green historical landfill site. The works could create a preferential flow path for existing contamination within the landfill to migrate into the underlying Tarporley Siltstone Secondary B aquifer via piling for the viaduct. There is currently little information available on the waste material within this historical landfill site. The potential impact of piling associated with the construction of the Proposed Scheme on water quality in the underlying aquifer is set out in Volume 5: Appendix LQ-001-0MA04 and BID LQ-002-0MA04.

### **Abstractions**

- 15.4.39 The assessment has not identified any permanent significant effects on groundwater abstractions.

### **Groundwater – surface water interactions**

- 15.4.40 The assessment has not identified any permanent significant effects on groundwater – surface water interactions.

### **Water dependent habitats**

- 15.4.41 The assessment has not identified any permanent hydrological impacts on water dependent habitats.
- 15.4.42 The assessment of local ecological effects is provided in Volume 5: Appendix EC-015-0MA04, 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**

- 15.4.43 Hydraulic modelling indicates a potential for major adverse impacts on peak flood levels in Glaze Brook, upstream of the confluence with the Manchester Ship Canal, affecting up to 32 high value residential receptors along Glazebrook Lane, Mythholme Avenue, Rosebank Road, Haig Avenue, Victory Road and Essex Gardens in Cadishead and part of a moderate value wastewater treatment works (see Volume 5: Appendix WR-006-00002). This is due to the new retaining walls associated with the Proposed Scheme which will be constructed on the north and south bank of the Manchester Ship Canal to protect Manchester Ship Canal viaduct piers against ship impact. These retaining walls will constrict the flow in the canal in this area, causing the backing-up of flow in Glaze Brook. This will result in major adverse effects, which will be significant.

### **Summary of significant effects**

- 15.4.44 On a precautionary basis the Proposed Scheme is anticipated to result in the following significant effects which require other mitigation:

- a permanent moderate adverse effect on water quality in the glacial till Secondary (Undifferentiated) aquifer relating to highway discharges to Field Drains A6144; and
- a permanent major adverse effect on up to 32 high value residential flood risk receptors along Glazebrook Lane, Mythholme Avenue, Rosebank Road, Haig Avenue, Victory Road and Essex Gardens in Cadishead and part of a moderate value wastewater treatment works due to the construction of retaining walls, which will constrict the flow in the Manchester Ship Canal, causing the backing-up of flow in Glaze Brook.

## Other mitigation measures

- 15.4.45 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

- 15.4.46 No requirement for additional mitigation has been identified in this assessment for surface water features.

### Groundwater

- 15.4.47 Mitigation measures are required to address the impacts of changes to highways drainage on water quality in the glacial till Secondary (Undifferentiated) aquifer relating to the realignment of the A6144 Paddock Lane and the discharge to field drains A6144. Mitigation may include the change of existing balancing ponds to basins for retention and settlement before discharge. Following further investigation, the mitigation measures will be designed in consultation with the Environment Agency and other stakeholders to ensure no significant adverse effect on water quality.

### Groundwater – surface water interactions

- 15.4.48 No requirement for additional mitigation has been identified in this assessment for groundwater – surface water interactions.

### Flood risk and land drainage

- 15.4.49 Additional mitigation is required to reduce the significant effects from the construction of Manchester Ship Canal viaduct. These measures may include provision of additional floodplain storage to accommodate the backing up of flow along Glaze Brook without increasing peak flood levels or consideration of measures to preserve the conveyance of flow through the Manchester Ship Canal channel in order to reduce the impacts. Additional surveys, hydraulic analysis and refinement of the hydraulic modelling will be undertaken during design development. Analysis will be carried out, in collaboration with Environment Agency, in order to identify and agree an appropriate mitigation strategy to ensure no

adverse effect on flood risk, where reasonably practicable. Until such time as these mitigation measures have been defined, a residual significant effect will remain.

## Summary of likely residual significant effects

- 15.4.50 Implementation of the other mitigation measures described above will reduce one of the identified effects to a level that is not significant. However, on a precautionary basis, it is anticipated that significant residual effects will remain on flood risk at properties along Glazebrook Lane, Mythholme Avenue, Rosebank Road, Haig Avenue, Victory Road and Essex Gardens and part of a wastewater treatment works in Cadishead (permanent major adverse effect). This is due to the construction of Manchester Ship Canal retaining walls which will constrict the flow in the canal, causing the backing-up of flow in Glaze Brook. Additional mitigation will be required to ensure no increase in flood risk in this area.

## Cumulative effects

- 15.4.51 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, Appendix WR-005-0MA04. 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-001-000. 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.

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