In Parliament – Session 2021 - 2022

HS2

High Speed Rail (Crewe – Manchester) Environmental Statement

Volume 2: Community Area reports

MA08: Manchester Piccadilly Station

M23

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Department for Transport

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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.

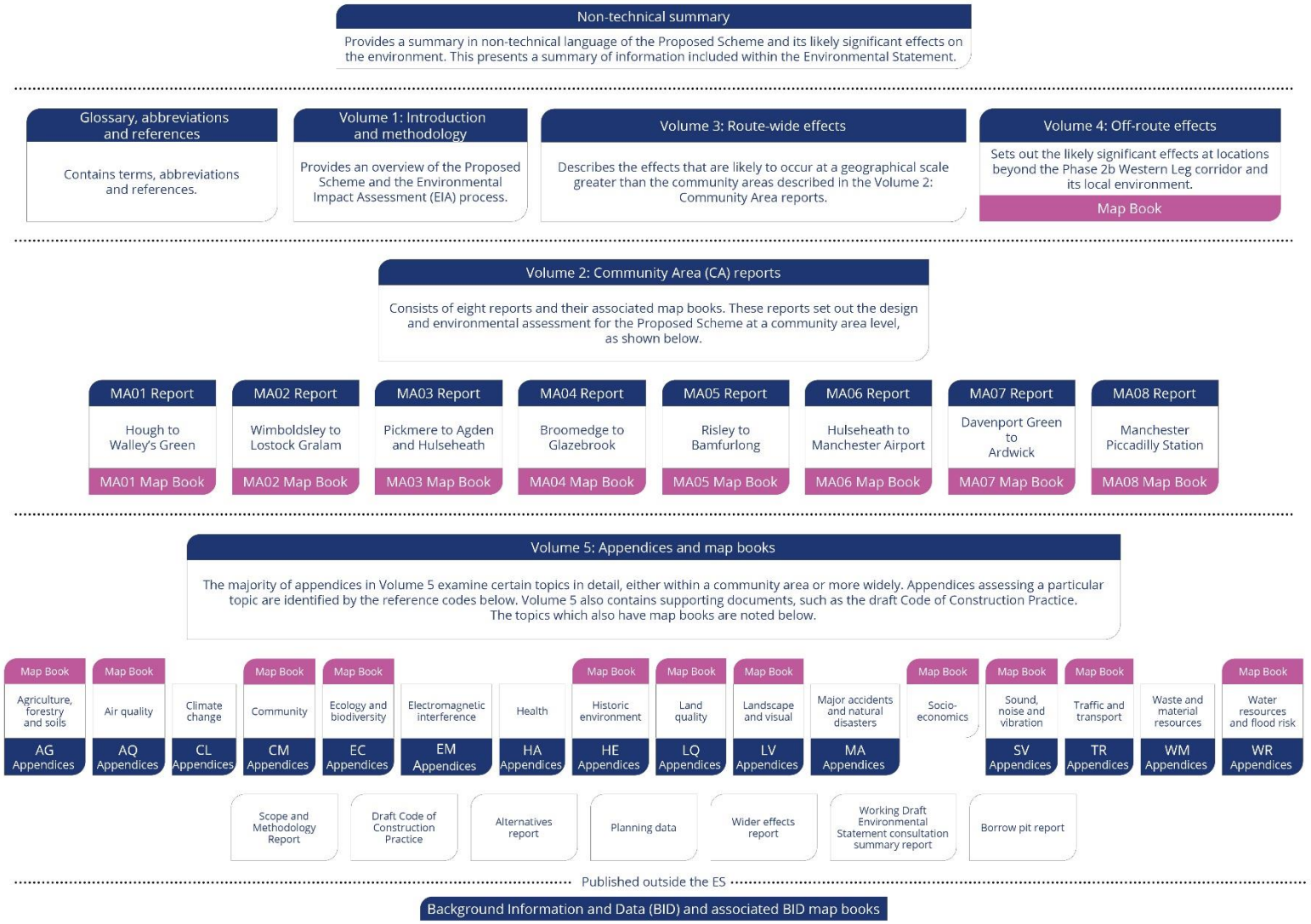
Consultation on the Environmental Statement

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.

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.

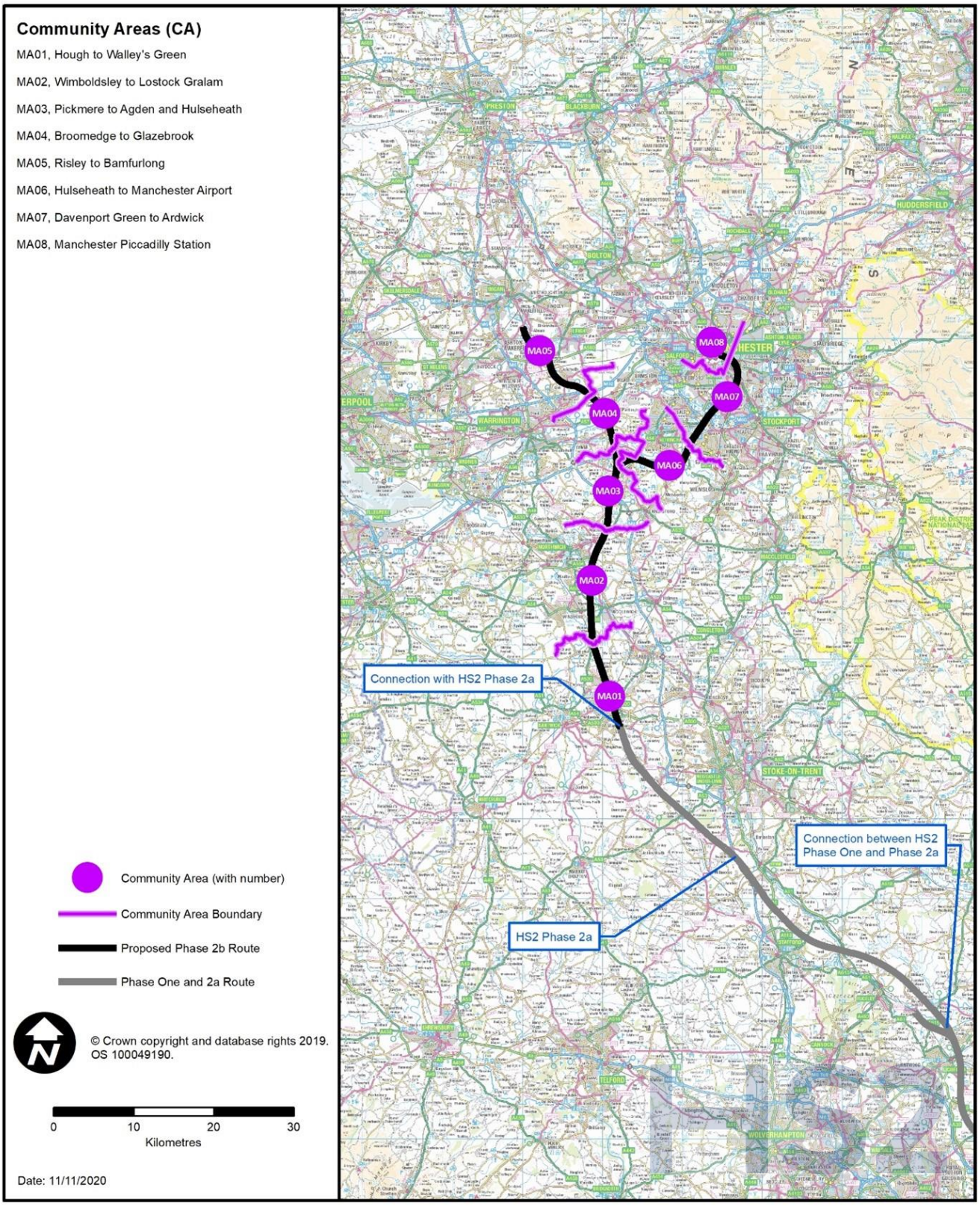
1.1.5 The environmental effects of the Proposed Scheme have been assessed. The findings of the assessment are reported in the ES, of which this Volume 2 report forms a part. The ES has been deposited alongside the Bill, in accordance with the requirements of Parliamentary

Standing Order 27A (SO27A)[1]. 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 Manchester Piccadilly Station area (MA08).

[1] 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/.

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



1.2 Purpose of this report

1.2.1 This report presents the likely significant effects of the construction and operation of the Proposed Scheme on the environment within the Manchester Piccadilly Station 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.

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)[2]. 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 Manchester Piccadilly Station area are provided in a separate corresponding document entitled Volume 2: MA08 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: MA08 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). 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.

[2] Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

2 Overview of the area and description of the Proposed Scheme

2.1 Overview of the area

General

2.1.1 The Proposed Scheme in the Manchester Piccadilly Station area will comprise five main components:

- a section of the HS2 Manchester spur (referred to in this report as the route of the Proposed Scheme), which will be 1km in length in this area;
- provision for a connection between HS2 and a future Northern Powerhouse Rail (NPR) route between Manchester and Leeds, referred to as the NPR Manchester to Leeds junction;
- Manchester Piccadilly High Speed station;
- modifications to the existing Metrolink; and
- modifications to the existing Manchester Piccadilly Station.

2.1.2 The route of the Proposed Scheme is orientated east to west from the Davenport Green to Ardwick area (MA07) to the terminus at the Manchester Piccadilly High Speed station.

2.1.3 The Proposed Scheme in the Manchester Piccadilly Station area will be located within the local authority area of Manchester City Council (MCC) and strategic authority area of Greater Manchester Combined Authority (GMCA).

2.1.4 The southern boundary of the Manchester Piccadilly Station area is located approximately 40m west of the A665 Midland Street. The area extends to the north and west of the existing Manchester Piccadilly Station. The Davenport Green to Ardwick area (MA07) lies to the south of the Manchester Piccadilly Station area, as shown in Figure 3.

Settlement, land use and topography

2.1.5 The Manchester Piccadilly Station area is entirely urban, with land use comprising mainly industrial, commercial, road and rail infrastructure throughout. A number of watercourses, notably the River Medlock, run through the area.

2.1.6 Piccadilly and the city centre are also residential areas, with the University of Manchester's Sackville Street area campus 270m south-west of the existing Manchester Piccadilly Station. There are a number of residential areas within Brunswick, Ardwick[3] and Ancoats, which are

[3] Ardwick is also partially situated in the Davenport Green to Ardwick area (MA07); however, many of Ardwick's residential areas are found in the Manchester Piccadilly Station area (MA08).

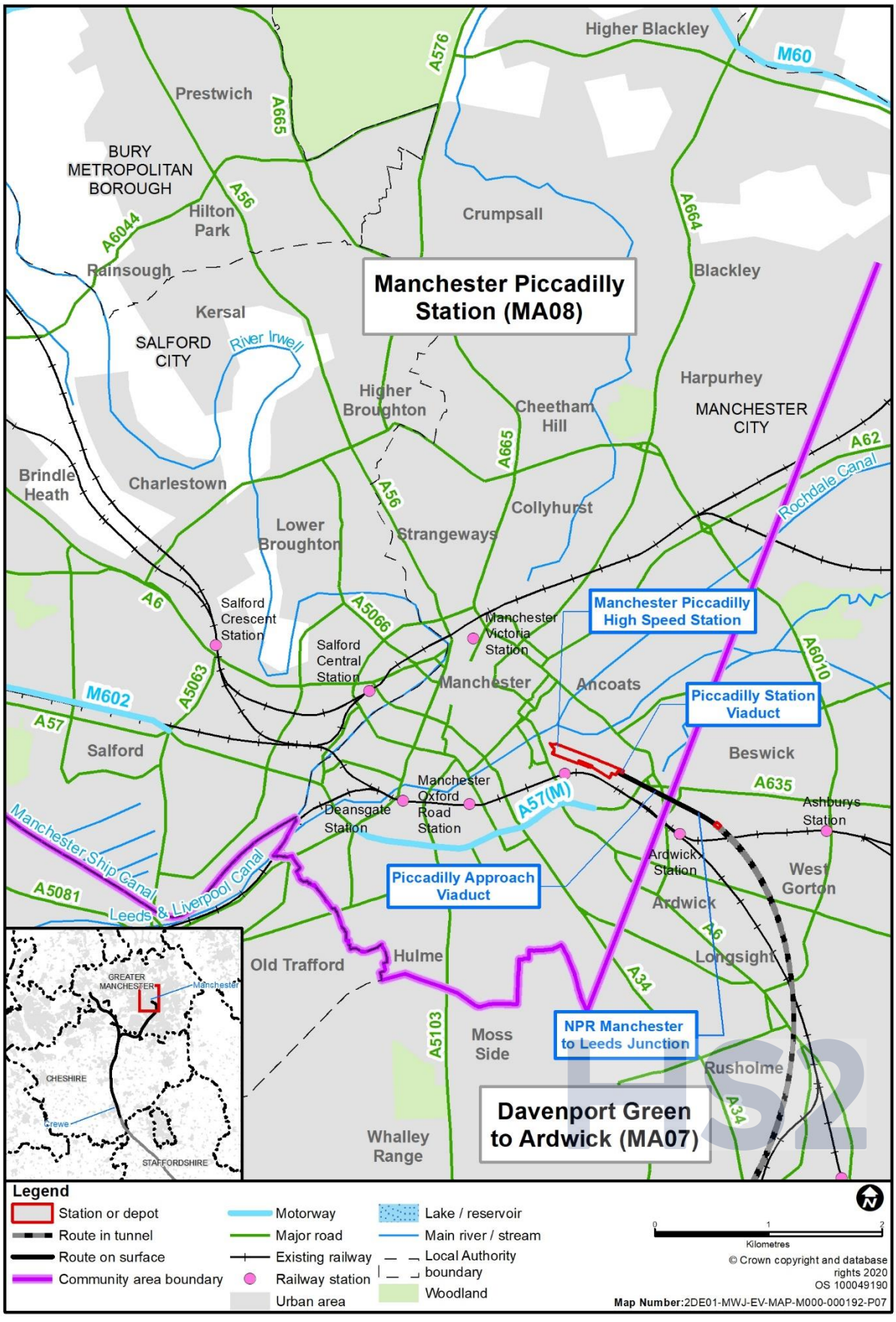
located 750m south, 480m south-east and 650m north of the existing Manchester Piccadilly Station, respectively.

2.1.7 The existing Manchester Piccadilly Station railway and associated operational and maintenance facilities are key elements of the urban environment in the area.

2.1.8 The B6469 Fairfield Street bounds the southern side of the existing Manchester Piccadilly Station. The A6 London Road bounds the existing Manchester Piccadilly Station to the west and has local shops, restaurants and public houses. To the west of the existing Manchester Piccadilly Station is Manchester city centre, where there is a mixture of commercial and residential land use.

2.1.9 The Manchester Piccadilly Station area has its highest points to the northern and south-eastern ends, at approximately 50m above Ordnance Datum (AOD). The topography slopes gently down towards the River Medlock, before slightly rising at the existing Manchester Piccadilly Station. Beyond the existing Manchester Piccadilly Station, the topography continues to gradually slope downwards towards sea level.

Figure 3: Community area context map



Key transport infrastructure

2.1.10 Key transport infrastructure elements in the Manchester Piccadilly Station area are the roads, railways and a light rail tram network that lead to and from Manchester city centre.

2.1.11 There are a number of key public highways in the Manchester Piccadilly Station area. Mancunian Way, which forms part of the Manchester inner ring road, is composed of two sections: the A57(M) section, running south of the city centre and 260m from the existing Manchester Piccadilly Station; and the A635 section, which extends from the eastern part of the city centre to the M60. Other key highways include the A6 London Road, the A665 Chancellor Lane/Pin Mill Brow/Great Ancoats Street and the B6469 Fairfield Street, which connect south-east Manchester with the city centre and intercity routes.

2.1.12 The existing Manchester Piccadilly Station is a major transport interchange and a terminus for both intercity and local train services. There are 12 terminating platforms and two through-platforms. A number of railways pass through the Manchester Piccadilly Station area, including: the Crewe to Manchester Line, Glossop Line, Hope Valley Line and the Liverpool to Manchester Line.

2.1.13 The Metrolink tram network also runs through the Manchester Piccadilly Station area, connecting the existing Manchester Piccadilly Station to the city centre and areas of Greater Manchester. The Station Access ramp, off the A6 London Road, at the north-western side of the existing Manchester Piccadilly Station, is served by three city centre bus routes. A taxi rank and public short stay/drop off is located at the southern side of the existing Manchester Piccadilly Station, which is accessible from the B6469 Fairfield Street.

2.1.14 The navigable waterways of the Manchester Ship, Rochdale, Ashton and Bridgewater canals are present in the area. There are also pedestrian footways adjacent to many of the roads throughout the area.

2.1.15 There are several promoted public rights of way (PRoW)[4] in the Manchester Piccadilly Station area, including the Medlock Valley Way, the Cheshire Ring Canal Walk and the Irwell Sculpture Trail. There is also a pedestrian footbridge linking the existing Manchester Piccadilly Station with Piccadilly Place to the north-west of the station.

2.1.16 National Cycle Route 66 runs along the A6 London Road and the Rochdale Canal. Other routes in the area include: National Cycle Route 6 which runs along the A5103 Princess Road; National Cycle Route 55 which runs from the River Irwell towards Eccles; National Cycle Route 60, which runs past the Etihad Stadium towards Collyhurst; and Regional Cycle Route 86, which follows the River Medlock.

[4] Local, regional or national trails that have been devised by local authorities and walking organisations to help promote the PRoW network.

Socio-economic profile

2.1.17 The Manchester Piccadilly Station area lies within the administrative area of MCC. It also falls within the Greater Manchester Local Enterprise Partnership and the GMCA area.

2.1.18 The retail and the professional, scientific and technical sectors account for the largest proportions of businesses within the MCC area (each 18%), followed by the business administration and support services (9%)[5] sector.

2.1.19 According to the Annual Population Survey of 2020[6], the employment rate (the proportion of residents aged 16-64 in employment) within the MCC area was 66% (257,800 people). The unemployment rate was 9% in the MCC area in 2020.

2.1.20 The same survey indicates that 48% of residents aged 16-64 in the MCC area were qualified to National Vocational Qualification Level 4 (NVQ4) or above, while 8% of residents had no qualifications.

Notable community facilities

2.1.21 Located within Manchester city centre, the Manchester Piccadilly Station area is wholly urban. The smaller residential settlements of Brunswick, Ardwick and Ancoats, as well as the city centre itself, provide the main community facilities in the area, including places of worship, community centres, libraries, medical facilities, care homes and public houses. Nursery, primary and secondary schools, and further and higher education facilities are located throughout the area. The University of Manchester and Manchester College have campuses on Sackville Street and the B6469 Whitworth Street, respectively. The University of Salford and Manchester Metropolitan University campuses are also located in this area. There is a range of associated student accommodation.

2.1.22 Other notable community facilities include Brydon Court Homeless Centre, on Union Street; Greater Manchester Youth Network, on Ardwick Green; Manchester Town Hall, on Albert Square; Manchester Cathedral, on Victoria Street; Manchester Royal Infirmary, on Oxford Road and Saint Mary's Hospital, Oxford Road.

Recreation, leisure and open space

2.1.23 The Manchester Piccadilly Station area features small open spaces, typical of an urban area, including Ardwick Green Park, Vimto Park, Grosvenor Street Park, Sackville Gardens and Piccadilly Gardens.

[5] Office for National Statistics, 2020. *UK Business Counts - local units by industry and employment size band 2020*. Available online at: https://www.nomisweb.co.uk/datasets/idbrlu.

[6] Office for National Statistics (2020). *Annual Population Survey 2020.* Available online at: http://www.nomisweb.co.uk/datasets/apsnew. This number includes the jobs held by residents of MCC irrespective of where they work.

2.1.24 There are a number of waterways in the area, including: the Ashton, Bridgewater and Rochdale canals (and moorings); and the River Irwell. All of these provide recreational routes for boating and have recreational paths alongside.

2.1.25 Manchester city centre contains many cultural and sports facilities, including museums, galleries, theatres, concert halls, sporting venues and stadia.

Policy and planning context

2.1.26 Volume 1 provides an overview of the case for HS2.

Planning framework

2.1.27 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 Manchester Piccadilly Station area are listed in Volume 5: Appendix CT-004-00000, Planning data. These have been considered and referred to where appropriate to the assessment described in Sections 4 to 15 of this Volume 2 report.

Committed development

2.1.28 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 Manchester Piccadilly Station area are listed in Volume 5: Appendix CT-004-00000, Planning data and are shown in Volume 5 Planning Data/Committed Development Map Book: maps CT-13-327 to CT-13-328.

2.1.29 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 Manchester Piccadilly Station area are reported in the relevant topic sections of this report.

Changes to the design since the working draft ES

2.1.30 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 due to ongoing design development, which include amendments to the:
  - length of the Ardwick North cutting, which has been reduced by 72m in this area (see Volume 2: MA08 Map Book, map CT-06-365b, C5 to D5);

  - depth of the Ardwick North cutting, which has increased by 3.5m as it enters the Manchester Piccadilly Station area (see Volume 2: MA08 Map Book, map CT-06-365b, C5 to D5);
  - introduction of the Ardwick embankment, which will be partially supported by a retaining wall (see Volume 2: MA08 Map Book, map CT-06-365b, D5); and
  - realignment of the Piccadilly approach viaduct 55m south of the location proposed in the working draft ES, as it enters the Manchester Piccadilly Station area (see Volume 2: MA08 Map Book, map CT-06-365b, D5 to F5).
- introduction of provisions to enable future connections between HS2 and NPR, consisting of:
  - Manchester to Leeds embankment, continuing from the Davenport Green to Ardwick area (MA07), which forms part of the NPR Manchester to Leeds junction (see Volume 2: MA08 Map Book, CT-06-356b, C5 to D5); and
  - reconfiguration of the Manchester Piccadilly High Speed station from four platforms to six platforms, increasing the width of the station footprint by 10m and number of viaducts from two to three. The two additional platforms will provide capacity for use of the station by NPR services at a future time, without disruption to HS2 services (see Volume 2: MA08 Map Book, map CT-06-365b, F5 to I6).
- works to the Metrolink to provide an interchange with the Manchester Piccadilly High Speed station, including:
  - introduction of a box structure, which will contain the relocated Piccadilly Metrolink stop, extended from two to four platforms, positioned beneath Manchester Piccadilly High Speed station (see Volume 2: MA08 Map Book, map CT-06-365b, F6 to I5);
  - decommissioning of the existing Piccadilly Metrolink stop underneath the existing Manchester Piccadilly Station and the existing section that runs along the A6 London Road (see Volume 2: MA08 Map Book, map CT-06-365b, H5 to I4);
  - realignment of the existing Metrolink line at the junction with the A6 London Road, to a position north-east of its current alignment, from where it will descend beneath Gateway House and the Manchester Piccadilly High Speed station (see Volume 2: MA08 Map Book, map CT-06-365b, I5 to J5);
  - provision for a second, two-platform Metrolink stop known as Piccadilly Central (immediately south-east of the Manchester Piccadilly High Speed station, on its northern boundary) (see Volume 2: MA08 Map Book, map CT-06-365b, F6);
  - connection of the relocated Piccadilly Metrolink stop north to the Ashton-under-Lyne to Eccles Metrolink Line (see Volume 2: MA08 Map Book, map CT-06-365b, G8 to H6);
  - introduction of the New Islington turnback facility at the existing New Islington Metrolink stop to replace the existing turnback facility on Sheffield Street (see Volume 2: MA08 Map Book, map CT-05-365b-R1, F9); and
  - introduction of the Metrolink New Islington turnback satellite compound to manage the construction associated with the Metrolink works (see Volume 2: MA08 Map Book, map CT-05-365b-R1, H2).

- introduction of the A635/A665 Pin Mill Brow gyratory between the A635 Mancunian Way, the A635 Fairfield Street, the A665 Pin Mill Brow and the A665 Chancellor Lane (see Volume 2: MA08 Map Book, map CT-06-365b, D4 to E6);
- New Sheffield Street will be extended further north-east from Store Street to Ducie Street, as the southern section of Store Street will be intersected by the relocated Metrolink Line (see Volume 2: MA08 Map Book, map CT-06-365b, I6 to J6);
- introduction of a multi-modal transport hub located between Manchester Piccadilly High Speed station and the existing Manchester Piccadilly Station, which will be accessed from Travis Street (see Volume 2: MA08 Book, map CT-06-365b, F5 to G5);
- removal of the Manchester approach viaduct satellite compound A. Works that were proposed to be undertaken from Manchester approach viaduct satellite compound A will instead be undertaken from Manchester tunnel north portal main compound located in the Davenport Green to Ardwick area (MA07); and
- introduction of utilities works including the diversion of United Utilities, Electricity North West and Cadent Gas assets and relocation of EE/3 Mobile and Vodafone/O2 assets throughout the Manchester Piccadilly Station area, as described in Section 2.2.

2.1.31 In addition, the location and layout of construction compounds and site haul routes have been considered as part of the development of the design. Mitigation such as landscape mitigation planting, grassland habitat creation and replacement floodplain storage have also been included throughout the Manchester Piccadilly Station 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 Manchester Piccadilly Station area, including the proposed environmental mitigation measures that have been identified. Further general information on typical permanent features is provided in Volume 1, Section 5. Similarly, a general description of the approach to mitigation is explained in Volume 1, Section 9. Some of the ecological mitigation described in this section has been provided on a precautionary basis. This is described in Section 7, Ecology and biodiversity.

2.2.2 Land required for operation of the Proposed Scheme is described in this section and is shown on Volume 2: Map Series CT-06. Land required for construction is described in Section 2.3 and shown on Volume 2: Map Series CT-05.

Overview

2.2.3 The Proposed Scheme within the Manchester Piccadilly Station area has five main components:

- the route of the Proposed Scheme;
- provision for future connection to NPR;
- Manchester Piccadilly High Speed station: a new six-platform terminus station, including provision for NPR and adjoining the existing Manchester Piccadilly Station to the north;
- Metrolink realignment and extension; and
- modifications to the existing Manchester Piccadilly Station to allow interchange between HS2 services at Manchester Piccadilly High Speed station and neighbouring services from Network Rail, Metrolink, future NPR connections and buses serving the Manchester Piccadilly Station area.

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

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

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

The route of the Proposed Scheme

2.2.7 The route of the Proposed Scheme through the Manchester Piccadilly Station area extends from Ardwick in the south and travels north-west towards Manchester city centre.

2.2.8 This section of the Proposed Scheme is illustrated on maps CT-06-365b in the Volume 2: MA08 Map Book.

2.2.9 All dimensions in the sections below are approximate.

2.2.10 The route of the Proposed Scheme will consist of 58m of cutting, 104m of embankment and 882m of viaduct in the Manchester Piccadilly Station area.

2.2.11 In general, the Proposed Scheme is described from east to west.

Ardwick North cutting to Piccadilly station viaduct

2.2.12 The route of the Proposed Scheme in the Manchester Piccadilly Station area will be carried in Ardwick North cutting and continue onto Piccadilly station viaduct. Key features of this section will include:

- continuation of Ardwick North cutting, comprising retaining walls on both sides, 58m in length, 4m below ground level and 29m in width in this section, with associated landscape mitigation planting to the north to integrate the Proposed Scheme into the surrounding landscape (see Volume 2: MA08 Map Book, map CT-06-365b, C5 to D5);
- diversion of the A665 Chancellor Lane, 70m north-west of its current alignment for 210m, increasing journey length by up to 436m (see Volume 2: MA08 Map Book, map CT-06-365b, C4 to D4);
- an area of land south of the A665 Chancellor Lane, to be levelled and protected by hoarding, which will be available for return to suitable development use following construction of the Proposed Scheme (see Volume 2: MA08 Map Book, map CT-06-365b, C4 to E4);
- permanent diversion and decommissioning of minor utilities along the A665 Chancellor Lane, including: United Utilities wastewater sewers and potable water mains; Electricity North West electricity cables; Cadent Gas mains; and Virgin telecommunication cables (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- diversion of an underground United Utilities 1500mm combined sewer, for 344m in length from the A635 Mancunian Way and will be diverted along the A635/A665 Pin Mill Brow gyratory (see Volume 2: MA08 Map Book, map CT-06-365b, E5 to E6);
- realignment of a 150m section of the A635 Ashton Old Road at its western extent to accommodate the closure of the A665 Chancellor Lane and diverted A635 Fairfield Street, increasing journey length by up to 392m (see Volume 2: MA08 Map Book, map CT-06-365b, D6);
- permanent diversion and decommissioning of minor utilities along the A635 Ashton Old Road, including: Openreach and Virgin telecommunication cables; a United Utilities potable water main; and a wastewater sewer (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- realignment of a 300m section of the A665 Pin Mill Brow at its southern extent to accommodate the closure of the A665 Chancellor Lane and diverted A635 Fairfield Street, increasing journey length by up to 394m (see Volume 2: MA08 Map Book, map CT-06-365b, D6 to E7);
- permanent diversion and decommissioning of minor utilities along the A665 Pin Mill Brow, including: Openreach, Virgin and Vodafone telecommunications cables; and a Cadent Gas main (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- Ardwick embankment retaining wall, 46m in length and up to 3m above ground level (see Volume 2: MA08 Map Book, map CT-06-365b, D5);
- Ardwick embankment, 58m in length and up to 5m in height, with associated landscape mitigation planting to the north and south to integrate the Proposed Scheme into the surrounding landscape (see Volume 2: MA08 Map Book, map CT-06-365b, D5);
- an area of land bound by the A635 Ashton Old Road to the north and route of the Proposed Scheme to the south, to be levelled and protected by hoarding, which will be

available for return to suitable development use following construction of the Proposed Scheme (see Volume 2: MA08 Map Book, map CT-06-365b, D5 to D6);

- an area of land bound by the A665 Chancellor Lane to the south, Ardwick embankment to the north and the A635 Fairfield Street to the west, to be levelled and protected by hoarding, which will be available for return to suitable development use following construction of the Proposed Scheme (see Volume 2: MA08 Map Book, map CT-06-365b, D4 to D5);
- closure of Dark Lane, William Street, Cresbury Street, Mill Green Street and Adlington Street, which currently provide access to industrial units between the A635 Ashton Old Road, the A635 Fairfield Street and the A665 Chancellor Lane (see Volume 2: MA08 Map Book, map CT-06-365b, D5);
- decommissioning of minor utilities along Dark Lane, including a United Utilities wastewater sewer and Electricity North West electricity cables (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- decommissioning of minor utilities along William Street, including: Electricity North West electricity cables; Openreach telecommunications cables; and a United Utilities wastewater sewer (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- Piccadilly approach viaduct, 470m in length and up to 15m in height above existing ground level (see Volume 2: MA08 Map Book, map CT-06-365b, D5 to F5);
- diversion of an underground United Utilities 450mm potable water main, for 504m in length, from the B6469 Fairfield Street and will be diverted along the A635/A665 Pin Mill Brow gyratory (see Volume 2: MA08 Map Book, map CT-06-365b, F5 to H4);
- diversion of the A635 section of Fairfield Street, 200m south of its current alignment for 590m, crossing the route of the Proposed Scheme under the Piccadilly approach viaduct, increasing journey length by up to 151m (see Volume 2: MA08 Map Book, map CT-06-365b, D5 to D6);
- underground diversion of a United Utilities 1200mm combined sewer, for 395m in length, from the A635 Fairfield Street and will be diverted along the A635/A665 Pin Mill Brow gyratory (see Volume 2: MA08 Map Book, CT-06-365b, E5 to E6);
- an underground attenuation tank for railway drainage, 20m by 61m, 62m north of the A665 Chancellor Lane diversion (located within the area shown on Volume 2: MA08 Map Book, map CT-06-365b, E5);
- diversion of the B6469 section of Fairfield Street, 85m south-east of its current alignment for 245m, increasing journey length by up to 121m (see Volume 2: MA08 Map Book, map CT-06-365b, E5 to F5);
- permanent diversion or decommissioning of minor utilities along Fairfield Street, including: Electricity North West electricity cables; Openreach and Virgin telecommunications cables; United Utilities potable water mains and wastewater sewers; and a Cadent Gas main (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);

- Fairfield Street offline overbridge 23m in length and at ground level for the diverted B6469 Fairfield Street, which will provide a crossing over the River Medlock (see Volume 2: MA08 Map Book, map CT-06-365b, E5);
- diversion of an underground United Utilities 1500mm combined sewer, for 223m in length, from Helmet Street into the new highway alignment linking Helmet Street to New Sheffield Street and the B6469 Fairfield Street (see Volume 2: MA08 Map Book, map CT-06-365b, F5 to F6);
- a substation, 5m by 5m in area, on the northern side of the route of the Proposed Scheme, 56m north of the Piccadilly approach viaduct (located within the area shown on Volume 2: MA08 Map Book, map CT-06-365b, D6);
- a substation, 5m by 5m in area, on the southern side of the route of the Proposed Scheme, 26m south of the Piccadilly approach viaduct (located within the area shown on Volume 2: MA08 Map Book, map CT-06-365b, E5);
- realignment of the A635 Mancunian Way southbound, 100m north-west of its current alignment for 200m to form the western side of the A635/A665 Pin Mill Brow gyratory, crossing the route of the Proposed Scheme under the Piccadilly approach viaduct, increasing journey length by up to 88m (see Volume 2: MA08 Map Book, map CT-06-365b, E5 to E6);
- A635 Mancunian Way southbound retaining wall, 168m in length and up to 6m above ground level (see Volume 2: MA08 Map Book, map CT-06-365b, E5 to E6);
- realignment of the A635 Mancunian Way northbound, within the footprint of the existing road for 307m crossing the route of the Proposed Scheme under the Piccadilly approach viaduct, increasing journey length by up to 73m (see Volume 2: MA08 Map Book, map CT-06-365b, E5 to E6);
- permanent diversion and decommissioning of minor utilities along the A635 Mancunian Way, including: Electricity North West electricity cables; Openreach telecommunications cables; and United Utilities potable water main (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- an area of land in the centre of the A635/A665 Pin Mill Brow gyratory, to be levelled and protected by hoarding, which will be available for return to suitable development use following construction of the Proposed Scheme (see Volume 2: MA08 Map Book, map CT-06-365b, E5 to D6);
- a substation, 5m by 5m in area, on the northern side of the route of the Proposed Scheme, immediately north of the realigned A635 Mancunian Way (located within the area shown on Volume 2: MA08 Map Book, map CT-06-365b, E6);
- closure of Blackett Street, which currently provides access to commercial units adjacent to the A635 Mancunian Way (see Volume 2: MA08 Map Book, map CT-06-365b, E6);
- permanent diversion and decommissioning of minor utilities along Blackett Street, including: an Openreach telecommunications cables; United Utilities potable water mains and wastewater sewer; Electricity North West electricity cables; and Cadent Gas mains (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);

- a substation, 5m by 5m in area, on the southern side of the route of the Proposed Scheme, 47m east of the Fairfield Street offline overbridge (located within the area shown on Volume 2: MA08 Map Book, map CT-06-365b, E5);
- closure of Raven Street and Elbe Street, which currently provide access to industrial units between the A635 Mancunian Way and the B6469 Fairfield Street (see Volume 2: MA08 Map Book, map CT-06-365b, E5 to E6);
- Piccadilly offline access ramp, 93m in length, to enable vehicular access to the platform level (see Volume 2: MA08 Map Book, map CT-06-365b, E4 to F5);
- decommissioning of minor utilities along Raven Street, including: Cadent Gas mains; Openreach telecommunications cables; Electricity North West electricity cables; and United Utilities wastewater sewers and potable water main (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- decommissioning of minor utilities along Elbe Street including, a Cadent Gas main and a United Utilities wastewater sewer (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- relocation of a mobile telephone mast owned by EE/3 Mobile. The mobile telephone mast is located off Raven Street, within the land required for the operation of the Proposed Scheme. The mobile telephone mast will be relocated onto the roof of the proposed Manchester Piccadilly High Speed station car park (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- closure of Crane Street, Mellor Street, Coronation Square and North Western Street which currently provide access to commercial units between the B6469 Fairfield Street and the Station Access ramp (see Volume 2: MA08 Map Book, map CT-06-365b, D4 to E5);
- closure of a 10m section of Union Street at its northern end (see Volume 2: MA08 Map Book, map CT-06-365b, E4);
- decommissioning of minor utilities along Crane Street, including Electricity North West electricity cables and a United Utilities potable water main (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- decommissioning of minor utilities along North Western Street, including Electricity North West electricity cables and a Cadent Gas main (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- decommissioning of minor utilities along Coronation Square, including Electricity North West electricity cables (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- closure of a 160m section of Hoyle Street between Temperance Street and North Western Street (see Volume 2: MA08 Map Book, map CT-06-365b, F4 to F5);
- decommissioning of minor utilities along Temperance Street, including a Cadent Gas main (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- an area of land between the A635/A665 Pin Mill Brow gyratory and the River Medlock, to be levelled and protected by hoarding, which will be available for return to suitable

development use following construction of the Proposed Scheme (see Volume 2: MA08 Map Book, map CT-06-365b, E5 to E6);

- replacement floodplain storage area underneath Piccadilly approach viaduct, immediately east of the River Medlock (see Volume 2: MA08 Map Book, map CT-06-365b, E6 to F5);
- removal of an existing culvert of the River Medlock upstream north of the Proposed Scheme between the Aldow Enterprise Park and Helmet Street (located within the area shown on Volume 2: MA08 Map Book, map CT-06-65b, E6 to F6);
- an area of grassland habitat creation underneath Piccadilly approach viaduct, immediately east and west of a section of the River Medlock that is bound by Helmet Street to the north and the diverted B6469 Fairfield Street to the south, to provide replacement habitat (see Volume 2: MA08 Map Book, map CT-06-365b, E5 to F6);
- closure of a 100m section of Helmet Street at the southern extent between New Sheffield Street and the existing St Andrew's Street. A short section of Helmet Street will be realigned to form a new junction with New Sheffield Street, resulting in a negligible change in journey length (see Volume 2: MA08 Map Book, map CT-06-365b, F6);
- decommissioning of minor utilities along Helmet Street, including: Virgin and Openreach telecommunications cables; a United Utilities potable water main and wastewater sewer; and a Cadent Gas main (located within the section of route shown on Volume 2: MA08, Map Book, map CT-06-365b);
- diversion of St Andrew's Street, 100m east of its current alignment for 260m, resulting in a negligible change in journey length (see Volume 2: MA08 Map Book, map CT-06-365b, F5);
- permanent diversion or decommissioning of minor utilities along St Andrew's Street, including: Electricity North West electricity cables; Cityfibre, Openreach and Virgin telecommunications cables; a United Utilities wastewater sewer and potable water main; and a Cadent Gas main (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b); and
- St Andrew's Street retaining wall 228m in length and up to 6m above ground level (see Volume 2: MA08 Map Book, map CT-06-365b, F6 to G6).

NPR Manchester to Leeds junction

2.2.13 The Manchester to Leeds embankment will continue from the Davenport Green to Ardwick area (MA07) into the Manchester Piccadilly Station area. The embankment forms part of the provision referred to as the NPR Manchester to Leeds junction and will enable provision for a future NPR route between Manchester and Leeds and HS2.

2.2.14 The Manchester to Leeds embankment will be 105m in length and up to 5m in height in this section. There will be associated landscape mitigation planting to the south, to integrate the Proposed Scheme into the surrounding landscape (see Volume 2: MA08 Map Book, map CT-06-365b, C5 to D5).

Manchester Piccadilly High Speed station and approach

2.2.15 The route of the Proposed Scheme will continue from Piccadilly approach viaduct, passing onto Piccadilly station viaduct towards Manchester Piccadilly High Speed station. The Manchester Piccadilly High Speed station will mark the terminus of the Proposed Scheme in the Manchester Piccadilly Station area.

2.2.16 Key features of this section will include:

- Piccadilly station viaduct, 412m in length and up to 11m in height, extending from the Piccadilly approach viaduct inside the Manchester Piccadilly High Speed station to support the upper level concourse (see Volume 2: MA08 Map Book, map CT-06-365b, F5 to I6);
- a substation, 5m by 5m in area, on the northern side of the route of the Proposed Scheme, 42m west of the realigned Helmet Street (located within the area shown on Volume 2: MA08 Map Book, map CT-06-365b, F6);
- a substation, 5m by 5m in area, on the northern side of the route of the Proposed Scheme, 42m west of the realigned Adair Street (located within the area shown on Volume 2: MA08 Map Book, map CT-06-365b, G7);
- Sparkle Street retaining wall, 95m in length and up to 2m above ground level (see Volume 2: MA08 Map Book, map CT-06-365b, I6);
- Baird Street retaining wall, 64m in length and up to 4m above ground level (see Volume 2: MA08 Map Book, map CT-06-365b, H6);
- Store Street retaining wall, 160m in length and up to 4m above ground level (see Volume 2: MA08 Map Book, map CT-06-365b, I6);
- a group of five substations, each 5m by 5m in area, on the northern side of the route of the Proposed Scheme, adjacent to the junction between New Sheffield Street and Store Street (located within the area shown on Volume 2: MA08 Map Book, map CT-06-365b, I6);
- a group of two substations, each 5m by 5m in area, on the northern side of the route of the Proposed Scheme, immediately east of Store Street (located within the area shown on Volume 2: MA08 Map Book, map CT-06-365b, I6); and
- realignment of Shooters Brook Downstream watercourse, which is culverted along its entire length, around the Manchester Piccadilly High Speed station and associated basements.

2.2.17 The southern edge of Manchester Piccadilly High Speed station will adjoin the northern boundary of the existing Manchester Piccadilly Station, broadly occupying 5.5ha of land extending from St Andrew's Street to Gateway House (see Volume 2: MA08 Map Book, map CT-06-365b, F5 to I6).

2.2.18 The Manchester Piccadilly High Speed station will be 445m in length and 60m in width, located above ground on the Piccadilly station viaduct (see Volume 2: MA08 Map Book, map CT-06-365b, F5 to I6).

2.2.19 An aerial visualisation of the Manchester Piccadilly High Speed station is presented in Figure 4.

2.2.20 The Manchester Piccadilly High Speed station will include two concourses and six platforms serving both HS2 and future NPR services, and four platforms at the Piccadilly Metrolink stop (Figure 5). The station will comprise three main levels (with an additional mezzanine on the third level):

- platforms and upper concourse level, located above ground on the Piccadilly station viaduct;
- concourse level, located below the platforms and upper concourse at ground level; and
- Metrolink level, located underground, below the concourse.

2.2.21 The Manchester Piccadilly High Speed station will provide an interchange between high speed and local rail services, as well as Metrolink trams, and buses for onward travel (Figure 6). Manchester Piccadilly High Speed station will also have provision for future NPR services.

2.2.22 The Manchester Piccadilly High Speed station will include:

- a roof structure, up to 30m in height, 396m in length above the new station platforms and concourse areas to the west of the platforms, allowing light into the station;
- a canopy structure, up to 15m in height above ground, extending 160m beyond the station roof over the eastern end of the station platforms;
- six platforms, each 415m in length with an additional 40m buffer zone[7] at the western end and up to 11m in height above ground level, arranged into three island platforms which will be 13m wide (see Figure 4);
- a shared concourse connecting Manchester Piccadilly High Speed station to the existing Manchester Piccadilly Station;
- a ground-level concourse providing access to the high speed platforms. Each platform island will have four customer lifts and two banks of three escalators and ticket gates at each end;
- two mezzanine areas which will be accessible via the high speed platform level;
- introduction of Metrolink infrastructure underneath Manchester Piccadilly High Speed station, described later in this section;
- electric shuttle bus stops, relocated from Gateway House ramp, will be provided along New Sheffield Street. In addition, a pick-up/drop-off area for taxis, private hire vehicles and private vehicle drop-off and pick-up facilities at both the New Sheffield Street to the north and the multi-modal transport hub to the east, comprising eight taxi/private hire

[7] The buffer zone acts as a safety zone for stopping overrunning trains.

pick-up bays, 13 taxi/private hire drop-off bays, 84 taxi/private hire waiting bays, 121 private vehicle pick-up bays and 18 private vehicle drop-off bays;

- two multi-storey car parks, comprising 2,029 parking spaces over 11 levels; two basement levels and nine above ground levels, adjacent to Manchester Piccadilly High Speed station on Adair Street. Vehicles will access the new car parks from Adair Street;
- re-provision of displaced Network Rail retail units and provision of new units within Manchester Piccadilly High Speed station on the ground level concourse and upper level concourse;
- two public cycle parking areas comprising 523 spaces: one located on New Sheffield Street opposite Store Street; and one located in the eastern pedestrian and cycle thoroughfare, which will be accessible from New Sheffield Street and the B6469 Fairfield Street. Additional cycle stands will be positioned within the public realm areas along New Sheffield Street and next to the eastern entrance to Manchester Piccadilly High Speed station;
- two loading bays for the delivery of goods and disposal of waste from trains, retail and station facilities. The western loading bay will be an expansion of the existing rail station loading bay displaced by the construction of Manchester Piccadilly High Speed station, and will be accessed from the A6 London Road. The eastern loading bay will be accessed from the New Sheffield Street;
- utility diversions (including water mains, sewers, high voltage cables, telecommunications and gas mains);
- an underground attenuation tank for railway drainage, 30m by 25m, 76m west of St Andrew's Street diversion;
- two underground attenuation tanks for railway drainage, 6m by 167m and 6m by 115m respectively, beneath New Sheffield Street;
- an underground attenuation tank for railway drainage, 5m by 100m, beneath Manchester Piccadilly High Speed station; and
- areas of public realm, comprising hard and soft landscaping, green walls, tree and ornamental planting around the multi-modal transport hub at the eastern extent of Manchester Piccadilly High Speed station and along the length of New Sheffield Street between Store Street and Manchester Piccadilly High Speed station car parks.

Figure 4: Manchester Piccadilly High Speed station visualisation looking south

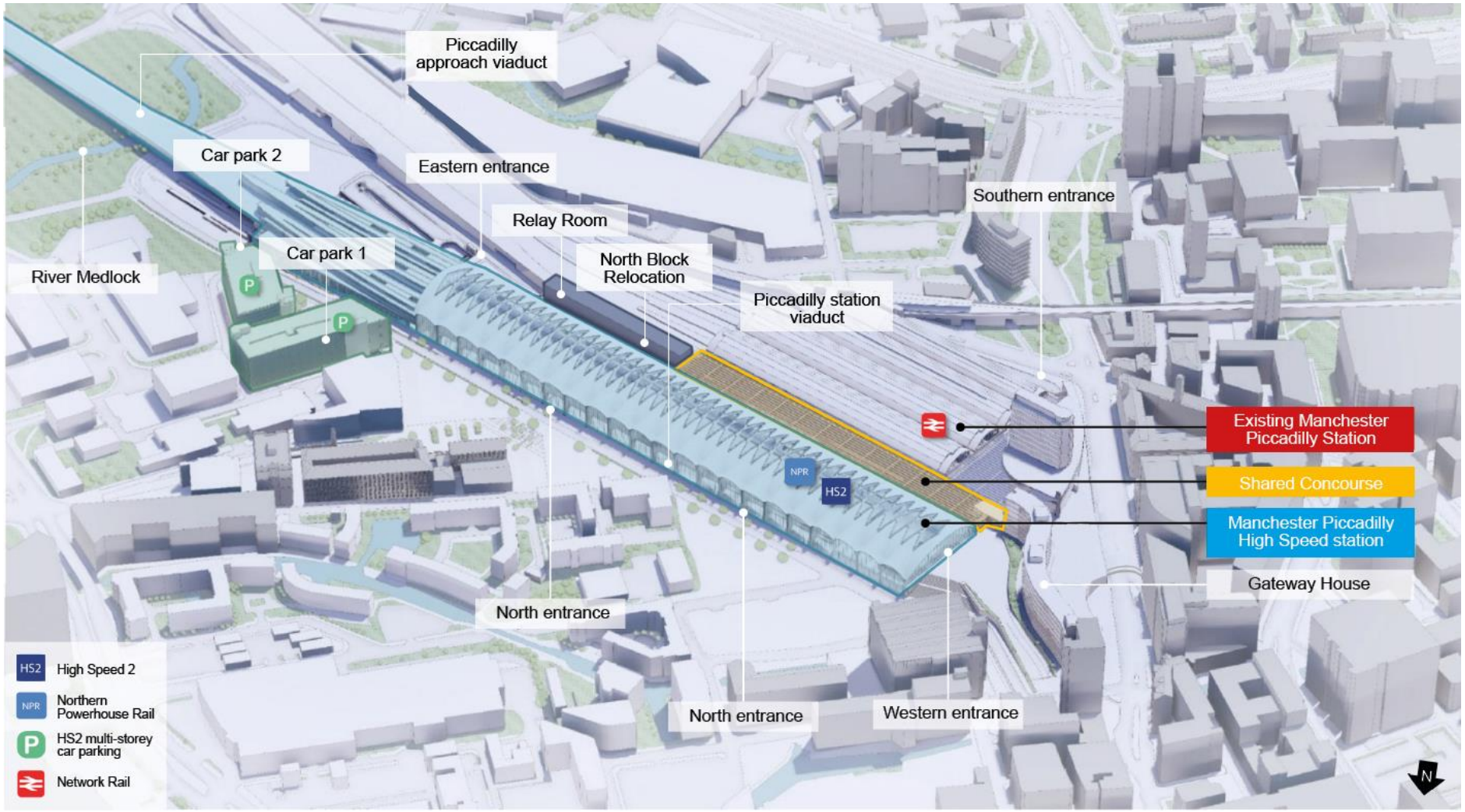


Figure 5: Manchester Piccadilly High Speed station levels

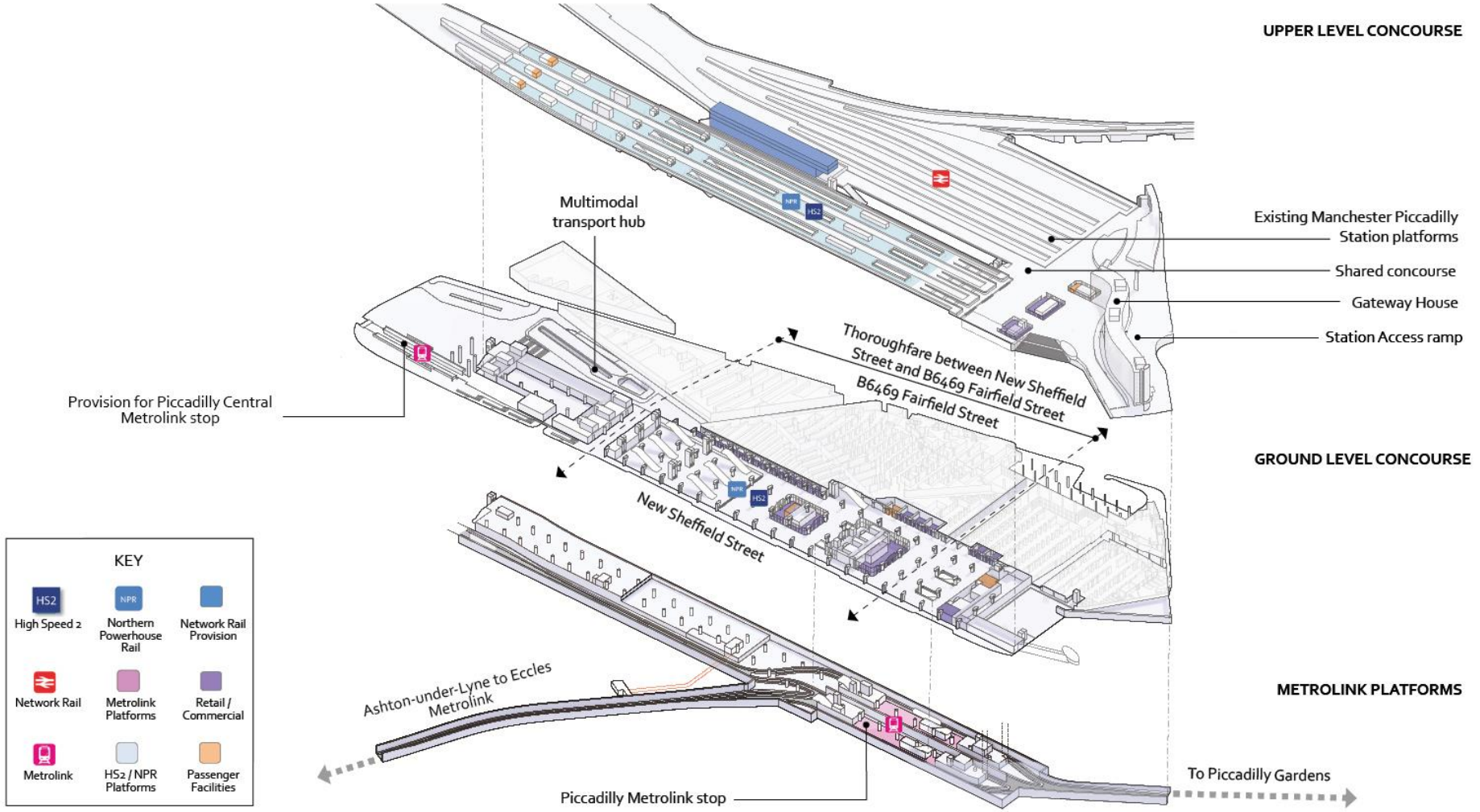
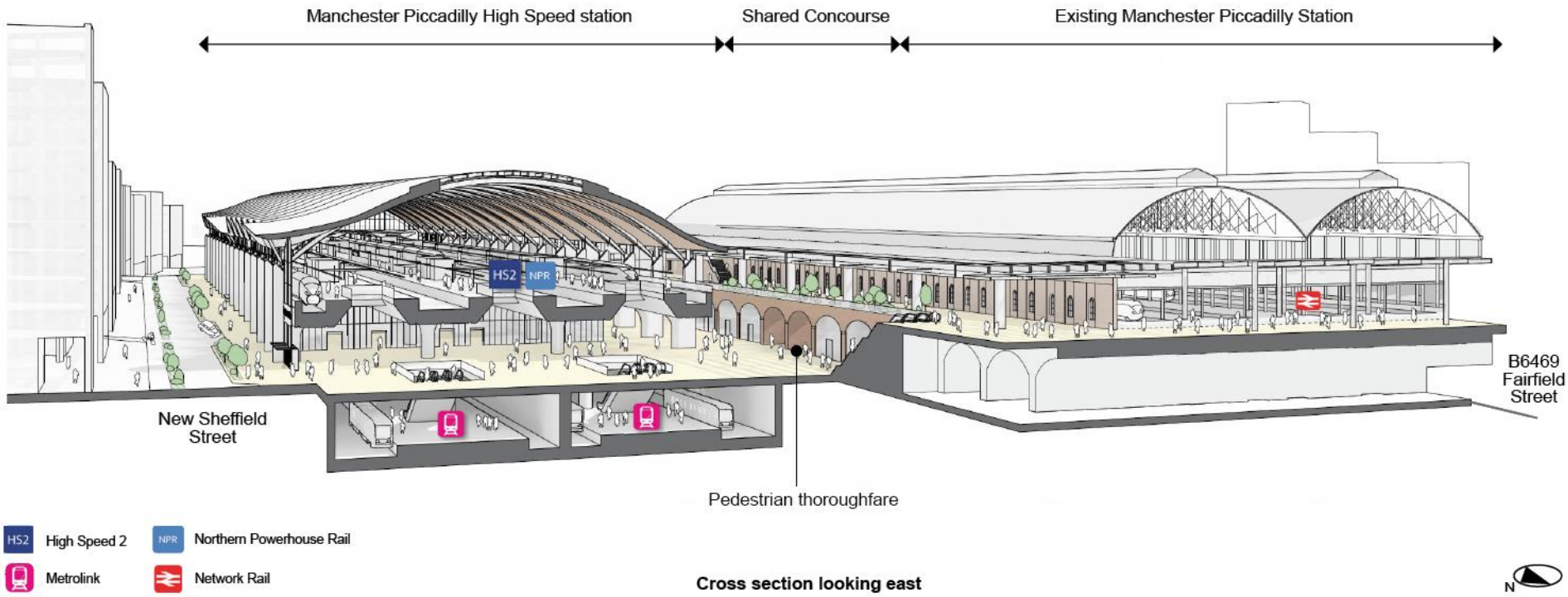


Figure 6: Manchester Piccadilly High Speed station cross-section



2.2.23 The ground level concourse of Manchester Piccadilly High Speed station will be accessible from two entrances to the north, from New Sheffield Street. The ground level concourse will include waiting areas and lounges, provision of retail units, public facilities, passenger information and ticketing facilities. Station operational facilities and offices will be provided for railway and station staff on the ground level concourse. There will also be maintenance facilities and plant rooms for heating and ventilation equipment, electricity substations, information technology and telecommunications equipment. Emergency access to and from the concourses and platforms will be provided.

2.2.24 The upper level concourse of Manchester Piccadilly High Speed station will be accessible from one entrance to the west, from the Station Access ramp. The upper level concourse will include waiting areas and lounges, provision for retail units, public facilities, passenger information and ticketing facilities. Station operational facilities and offices will be provided for railway and station staff on the upper concourse level. There will be maintenance facilities and plant rooms for heating and ventilation equipment, electricity substations, information technology and telecommunications equipment.

2.2.25 A new multi-modal transport hub, accessed via Travis Street, will be provided at the eastern extent of Manchester Piccadilly High Speed station. An eastern entrance will provide access to the ground level concourse as well as the pedestrian thoroughfare.

2.2.26 In addition to the eastern thoroughfare, a second, segregated pedestrian and cycle way thoroughfare will provide a direct route from the western entrance on New Sheffield Street, to the existing taxi rank on the B6469 Fairfield Street on the eastern side.

2.2.27 There will be three main areas of public realm around Manchester Piccadilly High Speed station:

- New Sheffield Street, along the northern face of Manchester Piccadilly High Speed station, which will include tree planting, green walls, soft landscaping, footways, a single carriageway public road, a cycle way and pedestrian priority crossings;
- Station Access ramp at the western extent of Manchester Piccadilly High Speed station, which will include green walls, tree and ornamental planting, soft landscaping, seating and cycle storage; and
- multi-modal transport hub to the east, which will include green walls and areas of hard and soft landscaping.

2.2.28 The following works to and within the existing road network will be required to accommodate Manchester Piccadilly High Speed station:

- permanent closure of a 26m section of St Andrew's Square, where it would otherwise cross the route of the Proposed Scheme. St Andrew's Square will join onto a new section of road known as New Sheffield Street, resulting in a negligible change in journey length (see Volume 2: MA08 Map Book, map CT-06-365b, F6);
- permanent works to Adair Street at its junction with New Sheffield Street to form a new junction. Adair Street will become one-way southbound between St Andrew's Square and

New Sheffield Street, resulting in a negligible change in journey length (see Volume 2: MA08 Map Book, map CT-06-365b, G6);

- diversion or decommissioning of minor utilities along Adair Street, including: Vodafone, Colt, Cityfibre, Instalcom and Virgin telecommunications cables; and Electricity North West electricity cables (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- decommissioning of minor utilities along Betley Street, including a United Utilities potable water main (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- realignment of the A665 Great Ancoats Street at its junction with Adair Street to facilitate junction improvements, resulting in no change in journey length (see Volume 2: MA08 Map Book, map CT-06-365b, F8);
- closure of a 215m section of Travis Street at the northern end between the diverted B6469 Fairfield Street and New Sheffield Street, where it would otherwise cross the route of the Proposed Scheme, increasing journey length by up to 457m. The southern end of Travis Street will remain open to provide access to the proposed multi-modal transport hub, which will be located between the existing Manchester Piccadilly Station and Manchester Piccadilly High Speed station (see Volume 2: MA08 Map Book, map CT-06-365b, G5);
- permanent diversion or decommissioning of minor utilities along Travis Street, including: United Utilities wastewater sewers and potable water mains; Openreach and Virgin telecommunications cables; Electricity North West electricity cables; and Cadent Gas mains (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- decommissioning of minor utilities along Heyrod Street, including: United Utilities potable water mains and wastewater sewers; Cadent Gas mains; and Virgin telecommunications cables (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- decommissioning of minor utilities along Churchgate Buildings, including a United Utilities potable water main (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- decommissioning of minor utilities along Portugal Street East, including a United Utilities potable water main (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- diversion of Sheffield Street, 70m north of its current alignment for 886m onto New Sheffield Street, which will connect to Ducie Street, Helmet Street, Travis Street, Chapeltown Street and Store Street, immediately north of Manchester Piccadilly High Speed station, resulting in a negligible change in journey length (see Volume 2: MA08 Map Book, map CT-06-365b, F6 to I6);
- permanent diversion or decommissioning of minor utilities along Sheffield Street, including: Level 3, Virgin, Verizon, Openreach, Vodafone, Cityfibre, Instalcom and EU Networks telecommunications cables; Electricity North West electricity cables; United

Utilities potable water mains and a wastewater sewer; and a Cadent Gas main (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);

- permanent diversion or decommissioning of minor utilities along Longacre Street, including: a United Utilities potable water main; a Cadent Gas main; and Electricity North West electricity cables (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- closure of a 105m section of Baird Street at its southern end. Access to Baird Street will be retained via Congou Street, increasing journey length by up to 89m (see Volume 2: MA08 Map Book, map CT-06-365b, I6);
- permanent diversion or decommissioning of minor utilities along Baird Street, including: Openreach, Vodafone, Level 3 and Virgin telecommunications cables; Electricity North West electricity cables; a United Utilities potable water main; and a Cadent Gas main (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- decommissioning of minor utilities along Congou Street, including Virgin and Openreach telecommunications cables (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- realignment of an 85m section of Chapeltown Street at the south-western end and junction improvements to enable access between Chapeltown Street and with New Sheffield Street, increasing journey length by up to 101m. Chapeltown Street will become one-way southbound at its southern end, traffic will be diverted via New Sheffield Street and the diverted Store Street (see Volume 2: MA08 Map Book, map CT-06-365b, H6);
- permanent diversion or decommissioning of minor utilities along Chapeltown Street, including: Virgin telecommunications cables; United Utilities potable water mains and a wastewater sewer; and a Cadent Gas main (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- closure of Sparkle Street and Leycroft Street, where they cross the route of the Proposed Scheme (see Volume 2: MA08 Map Book, map CT-06-365b, H6);
- permanent diversion or decommissioning of minor utilities along Sparkle Street, including: Cadent Gas mains; Openreach telecommunications cables; and a United Utilities potable water main and wastewater sewer (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- permanent diversion of Boad Street, 60m to the north-east, to accommodate Manchester Piccadilly High Speed station. Users will be diverted along New Sheffield Street, resulting in a negligible increasing in journey length (see Volume 2: MA08 Map Book, map CT-06-365b, I6);
- permanent diversion or decommissioning of minor utilities along Boad Street, including: Vodafone telecommunications cables; Electricity North West electricity cables; and a Cadent Gas main (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- closure of an 85m section of Store Street at the southern end between the A6 London Road and Boad Street. Store Street will be diverted to facilitate connection to New

Sheffield Street, and will be retained as a one-way exit from New Sheffield Street, providing access to the A665 Great Ancoats Street, increasing journey length by up to 217m (see Volume 2: MA08 Map Book, map CT-06-365b, I6);

- permanent diversion or decommissioning of minor utilities along Store Street, including: Electricity North West electricity cables; Vodafone, Openreach, Instalcoms, Sky, Level 3 and Virgin telecommunications cables; United Utilities wastewater sewers and potable water main; and a Cadent Gas main (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- realignment of a 100m section of Ducie Street at the western extent, between Dale Street and the junction with the A6 London Road to enable connection to New Sheffield Street and to accommodate junction improvements on the A6 London Road, resulting in no change in journey length (see Volume 2: MA08 Map Book, map CT-06-365b, I6 to J6);
- realignment of the A6 London Road at the junction with Ducie Street to facilitate junction improvements and the realigned Ducie Street, resulting in no change in journey length (see Volume 2: MA08 Map Book, map CT-06-365b, J6);
- decommissioning of minor utilities along the A6 London Road, including Electricity North West electricity cables (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b); and
- decommissioning of minor utilities along Piccadilly Gate, including Openreach telecommunications cables (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b).

2.2.29 The following changes to the existing utilities networks will also be required to accommodate the Manchester Piccadilly High Speed station:

- underground diversion of a United Utilities 90mm potable water main for 795m in length, from the B6469 Fairfield Street, along New Sheffield Street before re-joining the existing route on Adair Street (see Volume 2: MA08 Map Book, map CT-06-365b, F5 to G6);
- relocation of a mobile telephone mast owned by Vodafone/O2. The mobile telephone mast is located off Travis Street, within the land required for the operation of the Proposed Scheme. The mobile telephone mast will be relocated onto the roof of the proposed Manchester Piccadilly High Speed station car park (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- underground diversion of a United Utilities 3650mm combined sewer for 1.3km. The diversion will start next to the Ducie Street and the A665 Great Ancoats Street junction and continue south-west along the entire length of Ducie Street and will partially run beneath Piccadilly Station approach. The diversion continues along the A6 London Road and onto Downing Street before terminating 40m east of the Grosvenor Street and Downing Street junction (see Volume 2: MA08 Map Book, map CT-06-365b, H9 to I4);
- underground diversion of a United Utilities 1900mm combined sewer for 802m, along the A6 London Road and Ducie Street (see Volume 2: MA08 Map Book, map CT-06-365b, H9 to I4);

- underground diversion of a United Utilities 12-inch trunk water main owned by United Utilities for 800m along Ducie Street (see Volume 2: MA08 Map Book, map CT-06-365b, I5 to I6);
- diversion of three underground Electricity North West 33kV electricity cables for 1.3km. The diversion will start at the Travis Street, Wyre Street and Berry Street junction and continue south-west beneath the MacDonald Manchester Hotel before turning north onto the A6 London Road. The diversion will continue along the A6 London Road before turning east onto Ducie Street. The cables will run the entire length of Ducie Street before terminating within the junction between the A665 Great Ancoats Street and Portland Street (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b);
- installation of a new underground Electricity North West 33kV electricity cable for 3km. The new cable will start from an existing Electricity North West distribution point off Stuart Street and will be routed south across Ashton Canal before continuing in a westerly direction into Gibbon Street and then south onto the A6010 Alan Turing Way. The new cable will be routed along The A662 Ashton New Road, Councillor Street, Palmerston Street and the A665 Pin Mill Brown before terminating off the public highway immediately west of the A665 Ashton Old Road and A665 Midland Street junction. (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b); and
- installation of a new underground Transport for Greater Manchester telecommunications cable for 1.5km. The new cable originates within No. 9 Portland Street and continues in a north-easterly direction along Portland Street before turning south-east into the A665 Great Ancoats Street. The cable continues along the A665 Great Ancoats Street before turning north-east onto the A662 Pollard Street before terminating at the New Islington Metrolink stop. (located within the section of route shown on Volume 2: MA08 Map Book, map CT-06-365b).

2.2.30 Stormwater from the Manchester Piccadilly High Speed station building roofs and facades will be collected and channelled via a series of gutters and rainwater pipes to the below-ground drainage network. Storm water will be channelled through a number of attenuation tanks. This will enable the reuse of storm water in the station and will help manage outflow rates. Drainage collected from the internal road network and car parking areas will be passed through pollution control systems and then discharged into the public sewer. Foul water drainage will be provided throughout the station building and flows will be channelled to the existing foul outfall sewer.

Metrolink realignment and extension

2.2.31 The Proposed Scheme in the Manchester Piccadilly Station area will require a change to the existing Metrolink track alignment, position of the existing Piccadilly Metrolink stop and provision for a new stop.

2.2.32 The relocated Piccadilly Metrolink stop will be situated at basement level, underneath the Manchester Piccadilly High Speed station (see Figure 5). Access to the Metrolink platforms will be via lifts and escalators from the ground-level concourse.

2.2.33 To provide for the relocation of the existing Piccadilly Metrolink stop underneath Manchester Piccadilly High Speed station, the Proposed Scheme will include a box structure 400m in length, 40m in width and 10m in depth. The relocated Piccadilly Metrolink stop will be positioned within this box structure and the capacity of the stop will be increased. The number of platforms will increase from the two provided at the existing stop, to four. Each platform will be 80m in length and positioned at the western end of the box structure. Two sets of lifts and escalators will provide access to the Piccadilly Metrolink stop from Manchester Piccadilly High Speed station.

2.2.34 The Proposed Scheme will provide a new Metrolink turnback facility (a section of track where trains can come in and reverse along the same section of track). This will be located immediately east of the existing New Islington Metrolink stop. The New Islington turnback will replace the existing turnback facility on Sheffield Street.

2.2.35 The Proposed Scheme will require the realignment of the existing Metrolink line along the A6 London Road. The Metrolink will be realigned north-east of its current route and will cross the A6 London Road before passing beneath Gateway House, under the closed section of Store Street and under Manchester Piccadilly High Speed station at the western extent.

2.2.36 The realignment of the existing Metrolink line along the A6 London Road will require the replacement of the existing pedestrian footbridge which passes over the A6 London Road and connects Piccadilly Place to the Station Access ramp. The replaced pedestrian footbridge will start from the same location on the western side of the A6 London Road and will join the Station Access ramp 15m north-west of its current alignment. The footbridge will be curved to provide clearance from the Metrolink entrance and will maintain its current width of 3.6m.

2.2.37 From the relocated Piccadilly Metrolink stop, two out of four tracks will head north-east from the centre of the box structure. These tracks are referred to as the Ashton Line connection. The Ashton Line connection will leave the box structure within a 11m wide and 100m-long cut-and-cover tunnel, that will pass beneath New Sheffield Street before emerging into a retained cutting and rising back up to ground level, which will reconnect to the existing track immediately east of Fair Street. The remaining two tracks will head south-east along the northern wall of the box structure before rising at the eastern extent for approximately 110m to ground level, where provisions for a future two-platform stop, referred to as the Piccadilly Central Metrolink stop, will be made. The Piccadilly Central Metrolink stop will be accessible from New Sheffield Street and will provide connection for a future tram extension to the east and will service future developments around Mayfield and Pin Mill Brow.

2.2.38 A Metrolink fire escape from the box structure will be provided 110m east of the Piccadilly Metrolink stop platforms. The corridor will run parallel to the existing Ashton-under-Lyne to Eccles Metrolink Line for 80m, where a fire escape containing stairs and a lift will be provided to ground level approximately 50m north of Manchester Piccadilly High Speed station. Additional fire escapes will be provided from the Piccadilly Metrolink stop platforms to the

ground level concourse as well as walkways along the tracks leading south-east out of the box structure to ground level.

2.2.39 There will be utilities works within this section, which may include works to underground lines, gas pipes, sewers and telecommunication cables.

Modifications to the existing Manchester Piccadilly Station

2.2.40 The Proposed Scheme in the Manchester Piccadilly Station area will require modification to the existing Manchester Piccadilly Station. These modification works will include:

- removal of some of the existing car parking bays below the existing Manchester Piccadilly Station to facilitate the construction of a pedestrian thoroughfare between New Sheffield Street and the B6469 Fairfield Street;
- relocation of the short stay car parking spaces at the southern entrance of the existing Manchester Piccadilly Station to the new Manchester Piccadilly High Speed station car parks. The existing short stay car park will be converted to blue badge parking comprising 38 bays, including the three existing spaces at this location;
- provision of a new vehicular entrance into the existing car park below the existing Manchester Piccadilly Station. The access to the car park will be from A6 London Road. The alignment of the access will make use of the existing route of the section of Metrolink that will be decommissioned;
- provision of a new services yard accessed from A6 London Road via the closed section of Store Street;
- integration of the existing station concourse to form the shared concourse with the Manchester Piccadilly High Speed station (see Figure 5);
- minor works within the existing Manchester Piccadilly Station including the provision of new signage and information systems; and
- relocation of the existing North Block comprising Network Rail facilities north-west of the existing Manchester Piccadilly Station to above the existing Network Rail relay room (see Figure 5).

Demolitions

2.2.41 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.

2.2.42 The following have been identified for demolition: 48 commercial/business properties and 26 other structures and buildings (including buildings providing community facilities/services). 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 Manchester Piccadilly Station area. It includes:

- an overview of the construction process;
- a description of the advance works;
- a description of the engineering works to build the Proposed Scheme;
- information on construction waste and material resources;
- a description of how the Proposed Scheme will be commissioned;
- an indicative construction programme; and
- monitoring arrangements during the construction period.

2.3.2 The construction arrangements described in this section provide the basis for the assessment presented in this ES.

2.3.3 Land used only for construction purposes will be restored as agreed with the owner of the land and the relevant planning authority once construction works on that land are complete.

2.3.4 Land will be required permanently for the key features of the Proposed Scheme described in Section 2.2.

2.3.5 During the construction phase, public roads and PRoW routes will remain open for public use wherever reasonably practicable. Where such routes cross the Proposed Scheme and require diversion, the alternative road or PRoW crossing the Proposed Scheme will be constructed prior to any closure of existing roads or PRoW, wherever reasonably practicable. Where they cross the Proposed Scheme in proximity to their existing alignment, a temporary alternative alignment may be required. In some instances, diverted or realigned roads or PRoW may need to pass through areas required for construction of the Proposed Scheme. Routes through these areas will be identified by the nominated undertaker and provided where it is safe and reasonably practicable to do so. The routes through these areas may change over the duration of the construction period.

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

Code of Construction Practice

2.3.7 All contractors will be required to comply with a Code of Construction Practice (CoCP)[8]. 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[9] which sets out how HS2 Ltd and its contractors, as well as their sub-contractors, will undertake community engagement during the construction of the HS2 project. The framework is being implemented on Phase One of HS2 and will apply to all phases of HS2.

2.3.9 The objectives of the framework include:

- to set out how HS2 Ltd and its contractors will undertake community engagement during the construction of the project;
- to provide clarity and reassurance to HS2 Ltd's stakeholders about how community engagement activity will be managed; and
- to help HS2 Ltd be a good neighbour to local communities, including by providing accurate and timely information about construction works and offering opportunities to influence them, where appropriate.

2.3.10 A draft CoCP has been prepared (see Volume 5, Appendix CT-002-00000). It will remain a draft document through the parliamentary process and the CoCP will be finalised at Royal Assent. The CoCP sets out measures to be implemented by the nominated undertaker.

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;

[8] Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

[9] 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.

foundations for and construction of depots/stations buildings; 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 Manchester Piccadilly Station, and within land adjacent to the route:

- civil engineering works, including earthworks such as embankments and cuttings, construction of bridges and viaducts, a station, works to public roads, piling works and

excavation to create the box structure for the Metrolink and structural modifications (including the existing Manchester Piccadilly Station and Gateway House[10]);

- works to the conventional railway;
- works to Metrolink; and
- works to install, test and commission railway systems, including track, overhead line equipment, communications and signalling equipment and traction power supply.

2.3.15 The construction of track and railway systems works will include the installation of track form, rails, infill material, minor drainage works, and installation of electrification, signalling and communication equipment.

2.3.16 The construction of the Proposed Scheme will be divided into sections, each of which will be managed from compounds. The compounds will act as the main interface between the construction work sites and the public highway, as well as performing other functions as described below. Compounds will either be main compounds or satellite compounds. Satellite compounds are generally smaller than main compounds. Compounds will either be used for civil engineering works, for railway installation works, or for both.

General overview of construction compounds

2.3.17 Main compounds will be used for core project management staff (i.e. engineering, planning and construction delivery) and commercial and administrative staff. These teams will directly manage some works and coordinate the works at the satellite compounds. In general, a main compound will include:

- space for the storage of bulk materials;
- space for the receipt, storage and loading and unloading of excavated material;
- an area for the fabrication of temporary works equipment and finished goods;
- fuel storage;
- plant and equipment storage including plant maintenance facilities; and
- office space for management staff, limited car parking for staff and site operatives, and welfare facilities.

2.3.18 Satellite compounds will be used to manage specific works along a section of the route. Depending on the nature and extent of the works to be managed, these satellite compounds could include office accommodation for staff, local storage for plant and materials, car parking for staff and site operatives, and welfare facilities.

2.3.19 One main civil engineering compound, Manchester Piccadilly High Speed station main compound, will be located in the Manchester Piccadilly Station area. This will manage four civil engineering satellite compounds in the Manchester Piccadilly Station area. The

[10] Based on information currently available, it is considered that these works will not require the demolition of Gateway House. However, as the design develops, the situation will be kept under review given the potential impacts of the Proposed Scheme upon this building.

Manchester Piccadilly High Speed station main compound will also be used to install railway systems after the civil engineering has been completed.

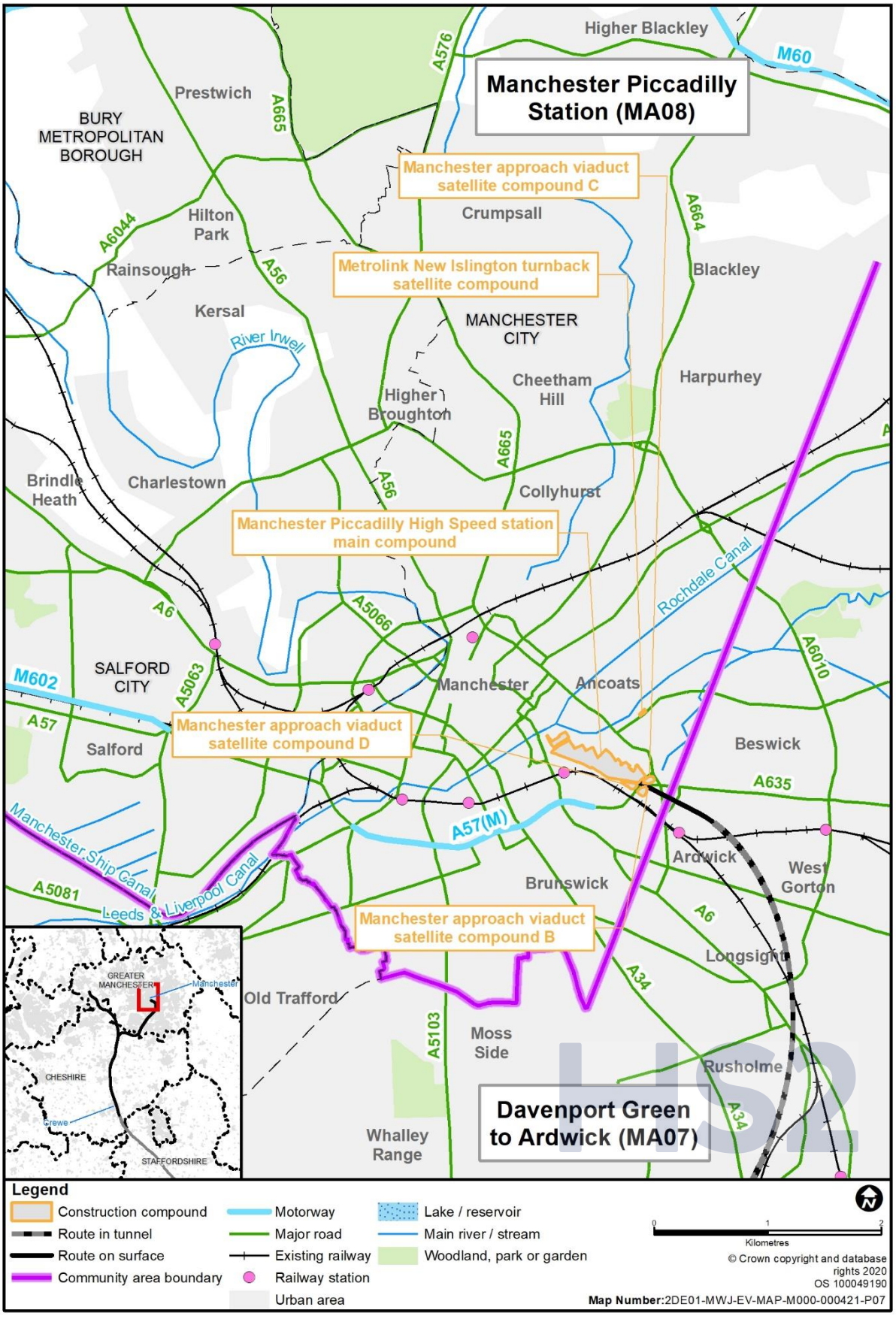
2.3.20 Four civil engineering satellite compounds, Manchester approach viaduct compound B, Manchester approach viaduct compound C, Manchester approach viaduct compound D and Metrolink New Islington turnback satellite compound, will be located in the Manchester Piccadilly Station area.

2.3.21 One main civil engineering compound, Manchester tunnel north portal main compound, will be primarily located in the Davenport Green to Ardwick area (MA07) and will partially extend into the Manchester Piccadilly Station area. Only works within the Manchester Piccadilly Station area that are managed from Manchester tunnel north portal main compound are described in this report. Works within the Davenport Green to Ardwick area that are managed from this compound are reported in the Volume 2: MA07, Community Area report, Davenport Green to Ardwick.

2.3.22 The location of construction compounds in the Manchester Piccadilly Station area is shown on Figure 7. Map Series CT-05 (in the Volume 2: MA08 Map Book) show in detail the locations of the construction compounds described below.

2.3.23 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 7: Location of construction compounds in the Manchester Piccadilly Station area



2.3.24 Figure 8 shows the management relationship for civil engineering works compounds and for the railway installation works. Details of the works associated with individual compounds are provided in subsequent sections of this report.

2.3.25 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

2.3.26 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 between the compounds and working areas. Where reasonably practicable, movements between the construction compounds 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.

2.3.27 The construction compounds will provide the interface between the construction works and the public road or railway network. The likely road routes to access compounds in the Manchester Piccadilly Station area are described in subsequent sections of this report.

Use of borrow pits

2.3.28 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.

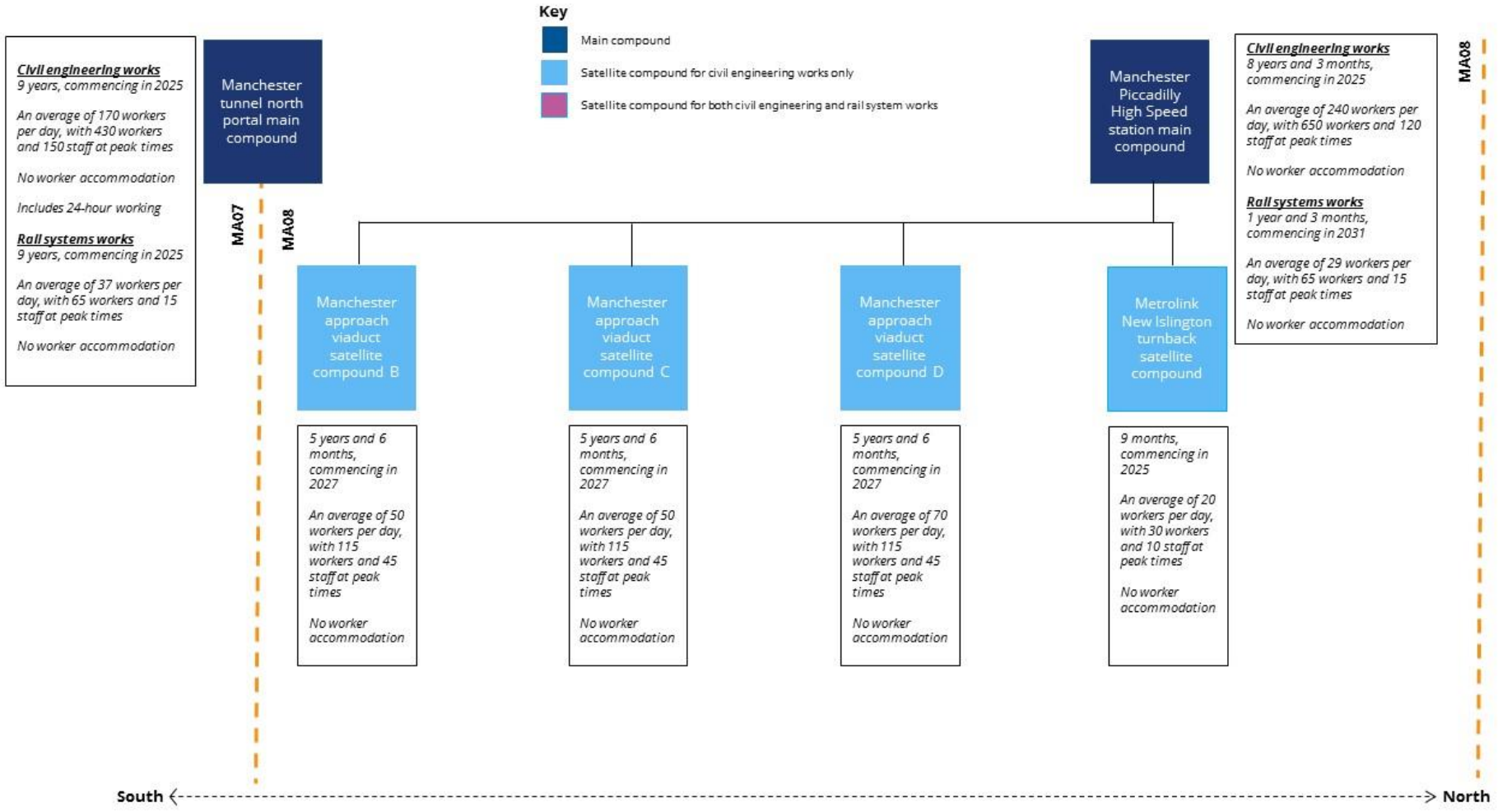
2.3.29 Volume 5, Appendix CT-008-00000 Borrow Pit report sets out the need for and approach to identifying suitable borrow pit locations, as well as the use and restoration strategy for the proposed borrow pits. General information on borrow pits is also provided in Volume 1, Section 6.

2.3.30 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

2.3.31 This section provides a summary of the works to be managed from the construction compounds in the Manchester Piccadilly Station, as illustrated in Figure 8. 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).

Figure 8: Construction compounds for civil engineering and railway systems works



Manchester tunnel north portal main compound

2.3.32 The Manchester tunnel north portal main compound will be located primarily in the Davenport Green to Ardwick area (MA07), partially extending into the Manchester Piccadilly Station area (see Volume 2: MA08 Map Book, map CT-05-365b, D4 to D6). This compound will be used to manage civil engineering and railway systems works. It will:

- be used to manage civil engineering and rail systems works for a period of nine years, commencing in 2025. Within this period, civil engineering works will take seven years and three months to complete and installation of railway system works will take four years to complete; and
- be accessed via Rondin Road (see Volume 2: MA08 Map Book, map CT-05-364, J5 and map CT-05-365b, A5).

2.3.33 The establishment of this compound and the works to be managed from it will require demolition of the buildings and structures located within the Manchester Piccadilly Station area identified in Table 1.

Table 1: Demolitions required in the Manchester Piccadilly Station area as a result of the works to be managed from the Manchester tunnel north portal main compound

Type	Description	Location	Feature resulting in demolition
Commercial	One commercial property and a canopy structure (comprising eight units)	1 and 5 Midland Street, Manchester	Ardwick North cutting
Commercial	One commercial property	A665 Chancellor Lane, Manchester	Manchester tunnel north portal main compound
Commercial	One commercial property	Junction between Dark Lane and the A665 Chancellor Lane, Manchester	Manchester tunnel north portal main compound
Commercial	One commercial property	William Street, Manchester	Ardwick embankment retaining wall
Commercial	One commercial property	1 Dark Lane, Manchester	Ardwick embankment retaining wall
Commercial	One commercial property	24 Dark Lane, Manchester	Ardwick embankment retaining wall
Commercial	One commercial property	Cresbury Street, Manchester	Ardwick embankment retaining wall
Commercial	One portacabin	4 Dark Lane, Manchester	Ardwick North cutting
Other	Four advertising hoardings	A665 Ashton Old Road, Manchester	Ardwick embankment retaining wall
Other	One advertising hoarding	Between Dark Lane, William Street and the A665 Chancellor Lane, Manchester	Ardwick embankment retaining wall
Other	One advertising hoarding	Junction between the A635 Fairfield Street and the A665 Chancellor Lane, Manchester	Ardwick embankment retaining wall

2.3.34 This compound will be used to manage the construction of the following elements in the Manchester Piccadilly Station area:

- Ardwick North cutting and retaining walls, which will take two years to complete;
- Ardwick embankment retaining wall, which will take two years to complete;
- Ardwick embankment, which will take one year and six months to complete; and
- Manchester to Leeds embankment, which will take one year and six months to complete.

2.3.35 The works to be managed from this compound will require the following works to public roads:

- Cresbury Street, Mill Green Street, Dark Lane, Adlington Street, William Street, North Western Street, Crane Street and Coronation Square will be closed to enable demolition of buildings within the land required for the construction of the Proposed Scheme. These roads will remain permanently closed on completion of construction;
- Mellor Street will be closed to enable the demolition of buildings. Upon completion of construction, Mellor Street will be permanently closed as a public highway, but will be retained as an access to the Network Rail maintenance compound on the existing railway viaduct; and
- permanent closure of a 10m section of Union Street at the northern extent to enable construction of the new link road between the A635 Mancunian way and A665 Chancellor Lane.

2.3.36 Further details of works managed from this compound are provided in the Davenport Green to Ardwick area (MA07) (see Volume 2: MA07, Davenport Green to Ardwick, Section 2.3).

2.3.37 The compound will be used to manage the routing of a new Electricity North West 33kV underground electricity cable, which will take one year to complete.

Manchester approach viaduct satellite compounds B, C and D

2.3.38 The Manchester approach viaduct satellite compounds B, C and D (see Volume 2: MA08 Map Book, map CT-05-365b, E5, D6 to E6 and E5 to F5) will be accessed from the A57(M) Mancunian Way, the A665 Pin Mill Brow or the A635 Ashton Old Road.

2.3.39 The works to be managed from the Manchester approach viaduct satellite compound B will require demolition of the buildings and structures identified in Table 2.

Table 2: Demolitions required as a result of the works to be managed from the Manchester approach viaduct satellite compound B

Type	Description	Location	Feature resulting in demolition
Commercial	One commercial property	12 Pin Mill Brow, Manchester	Piccadilly approach viaduct
Commercial	One commercial property (including miscellaneous steel containers)	Junction of Mill Green Street and Dark Lane, Manchester	Piccadilly approach viaduct
Commercial	Two commercial properties	Junction of Dark Lane and North Western Street, Manchester	Piccadilly approach viaduct
Commercial	Two commercial properties	1 Dark Lane, Manchester	Piccadilly approach viaduct
Commercial	One commercial property	5–7 Blackett Street, Manchester	Piccadilly approach viaduct
Commercial	One commercial property	1 Crane Street, Manchester	Piccadilly station viaduct

2.3.40 The works to be managed from the Manchester approach viaduct satellite compound C will require demolition of the buildings and structures identified in Table 3.

Table 3: Demolitions required as a result of the works to be managed from the Manchester approach viaduct satellite compound C

Type	Description	Location	Feature resulting in demolition
Commercial	One commercial property	128 Fairfield Street, Manchester	Piccadilly approach viaduct
Commercial	One commercial property	137 Fairfield Street, Manchester	Piccadilly approach viaduct
Commercial	One commercial property	Aldow Enterprise Park, Blackett Street, Manchester	Piccadilly approach viaduct
Commercial	One commercial property	127–129 Fairfield Street, Manchester	Piccadilly approach viaduct
Other	One telecommunications mast	Raven Street, Manchester	Piccadilly approach viaduct
Other	One advertising hoarding	127–129 Fairfield Street, Manchester	Piccadilly approach viaduct

2.3.41 The works to be managed from the Manchester approach viaduct satellite compound D will require demolition of the buildings and structures identified in Table 4.

Table 4: Demolitions required as a result of the works to be managed from the Manchester approach viaduct satellite compound D

Type	Description	Location	Feature resulting in demolition
Commercial	One commercial property	2 Raven Street, Manchester	Piccadilly approach viaduct
Commercial	One commercial property (above community facility)	115 Fairfield Street, Manchester	Piccadilly approach viaduct
Commercial	One commercial property (below community facility)	113 Fairfield Street, Manchester	Piccadilly approach viaduct
Commercial	One commercial property (above community facility)	104-108 Fairfield Street, Manchester	Piccadilly approach viaduct
Commercial	One commercial property	Helmet Street, Manchester	Piccadilly approach viaduct
Commercial	One commercial property and steel canopy structure	100 – 102 Fairfield Street, Manchester	Piccadilly approach viaduct

Type	Description	Location	Feature resulting in demolition
Commercial	One commercial property	107 Fairfield Street, Manchester	Piccadilly approach viaduct
Other	One community facility (The Men's Room) (above commercial premises)	113 Fairfield Street, Manchester	Piccadilly approach viaduct
Other	One community facility (MO:DEL) (below commercial premises)	104 Fairfield Street, Manchester	Piccadilly approach viaduct
Other	One community facility (MASH)	94 – 98 Fairfield Street, Manchester	Piccadilly approach viaduct
Other	One community facility (SOL Christian Academy) (below commercial premises)	115 Fairfield Street, Manchester	Piccadilly approach viaduct
Other	One advertising hoarding (mounted on the SOL Christian Academy building)	115 Fairfield Street, Manchester	Piccadilly approach viaduct
Other	One advertising hoarding	Adjacent 127-129 Fairfield Street, Manchester	Piccadilly approach viaduct
Other	One advertising hoarding	Adjacent 98 and 104 Fairfield Street, Manchester	Piccadilly approach viaduct
Other	One advertising hoarding	Corner of Fairfield Street and St Andrew's Street, Manchester	Piccadilly approach viaduct

2.3.42 These compounds will be used to manage the construction of the following elements in the Manchester Piccadilly Station area:

- A635 Mancunian Way southbound retaining wall, which will take six months to complete;
- Fairfield Street offline overbridge, which will take one year to complete; and
- Piccadilly approach viaduct, which will take two years and six months to complete.

2.3.43 The works to be managed from all three compounds will require the following works to public roads:

- permanent diversion of the A665 Chancellor Lane, for a period of one year and six months, which will be constructed offline. During this time, a partial closure at the A665 Chancellor Lane and the A665 Midland Street junction, with traffic restricted to one lane under traffic signal control, will be required. On completion of construction, the A665 Chancellor Lane will be permanently diverted into the A635/A665 Pin Mill Brow gyratory and the existing A665 Chancellor Lane will be closed;
- periodic, partial, temporary closure of the A635 Mancunian Way northbound carriageway of up to one week intervals over a period of three years and six months, to enable the realignment of the carriageway within its existing footprint. During this time, traffic flow along the carriageway will be maintained, resulting in no change in journey length;
- periodic, partial, temporary closure of the A635 Mancunian Way southbound carriageway of up to one week intervals over a period of three years and six months, to enable the realignment of the carriageway. During this time, traffic will be diverted via the A665 Pin

Mill Brow, the A665 Chancellor Lane and the diverted A665 Chancellor Lane, increasing journey length by up to 422m. During this period, the diverted A635 Fairfield Street will be constructed, which will take one year to complete. During this time a temporary diversion will be in place, westbound traffic will be diverted via the A665 Chancellor Lane and the A665 Chancellor Lane diversion, increasing journey length by 337m. Following the construction period, the A635 Mancunian Way southbound will be permanently realigned to form the western side of the A635/A665 Pin Mill Brow gyratory;

- the western extent of the A635 Ashton Old Road will be permanently realigned north to tie into the realigned A665 Pin Mill Brow, which will take six months to complete. The A635 Ashton Old Road will remain open during the realignment, which will be constructed online, with temporary lane restrictions;
- the A665 Pin Mill Brow will be permanently realigned at the southern extent to accommodate the closure of the A665 Chancellor Lane and realigned A635/A665 Pin Mill Brow gyratory, which will take six months to complete. The A665 Pin Mill Brown will remain open during the realignment with temporary lane restrictions;
- temporary closure of Chapelfield Road for a period of two years to enable improvement works. During this time, traffic will be diverted via Hoyle Street and Temperance Street, increasing journey length by up to 88m. On completion of construction, Chapelfield Road will be reopened;
- temporary closure of River Street for a period of one year, to enable amendments to its junction with Chapelfield Road and Temperance Street. During this time, traffic will be diverted via Rachel Street, Hoyle Street and Chapelfield Road, increasing journey length by up to 139m. On completion of construction, River Street will be reopened;
- temporary closure of a 200m section of Temperance Street for a period of two years to enable amendments to the Hoyle Street and Temperance Street junction. During this time, traffic will be diverted via Hoyle Street, increasing journey length by up to 39m. On completion of construction works, Temperance Street will be reopened;
- permanent closure of a 160m section of Hoyle Street between Temperance Street and North Western Street. A temporary closure of Hoyle Street at the southern section between Chapelfield Road and the A635 Mancunian Way will be required for a period of up to six years, to enable carriageway improvements for access to the Piccadilly offline access ramp. During this time, traffic will be diverted via the A635 Mancunian Way, Crane Street and Chapelfield Road or Temperance Street, the B6469 Fairfield Street, the A6 London Road and the A635 Mancunian Way, increasing journey length by up to 895m; and
- temporary closure of a 400m section of the B6469 Fairfield Street at its junction with St Andrew's Street, for a period of one year, to allow construction of a new junction. A temporary widening at the junction is required to allow traffic to continue through the junction while work is undertaken, resulting in no change in journey length. Following completion of construction, this section will be permanently diverted into the A635/A665 Pin Mill Brow gyratory.

2.3.44 The works to be managed from this compound will require the following works to utilities:

- diversion of an underground United Utilities 1200mm combined sewer, which will take nine months to complete;
- diversion of an underground United Utilities 1500mm combined sewer, which will take three years and three months to complete; and
- diversion of an underground United Utilities 450mm water main, which will take three months to complete.

2.3.45 In addition, the following utility works will be carried out during the construction period:

- decommissioning of 23 Electricity North West electricity cables and diversion of an additional three;
- decommissioning of 14 underground Openreach telecommunication cables and diversion of an additional four;
- diversion of 11 underground United Utilities potable water mains and diversion of an additional four;
- decommissioning of 10 underground Cadent Gas mains and diversion of an additional three;
- decommissioning of 10 United Utilities wastewater sewers and diversion of an additional two;
- diversion of four underground Vodafone telecommunications cables;
- diversion of three underground Virgin telecommunications cables and diversion of an additional three; and
- diversion of two underground Level 3 telecommunications cables.

Manchester Piccadilly High Speed station main compound

2.3.46 This compound (shown on Volume 2: MA08 Map Book, map CT-05-365b, E6 to I6) will be used to manage civil engineering and rail systems works. It will:

- be used to manage civil engineering works for a period of eight years and three months, commencing in 2025. Within this period railway systems works will be required for a period of one year and three months, commencing in 2031;
- provide main compound support to four civil engineering satellite compounds in the Manchester Piccadilly Station area, as discussed above and as illustrated on Figure 8; and
- be accessed from seven points, including: the B6469 Fairfield Street junction with St Andrew's Street; Helmet Street; new access roads from the A635 Mancunian Way, Store Street and Adair Street; the existing access from Ducie Street and the A662 Pollard Street.

2.3.47 The works to be managed from this compound will require demolition of the buildings and structures identified in Table 5.

Table 5: Demolitions required as a result of the works to be managed from the Manchester Piccadilly High Speed station main compound

Type	Description	Location	Feature resulting in demolition
Commercial	Four commercial properties	Aldow Enterprise Park, Blackett Street, Manchester	Manchester Piccadilly High Speed station main compound
Commercial	One commercial property	2 Helmet Street, Manchester	Piccadilly approach viaduct
Commercial	One commercial property (comprising five units)	101 Fairfield Street, Manchester	Piccadilly approach viaduct
Commercial	One commercial property	St Andrew's Square, Manchester	Piccadilly approach viaduct
Commercial	One commercial property	St Andrew's Street, Manchester	Piccadilly approach viaduct
Commercial	One commercial property	7 Adair Street, Manchester	Piccadilly station viaduct
Commercial	One commercial property	4 Travis Street, Manchester	Piccadilly station viaduct
Commercial	One commercial property	52 Heyrod Street, Manchester	Manchester Piccadilly High Speed station main compound
Commercial	One commercial property	7 Heyrod Street, Manchester	Piccadilly station viaduct
Commercial	Three commercial properties	Travis Street, Manchester	Piccadilly station viaduct
Commercial	One commercial property (comprising two portacabins on top of the elevated car park deck)	Sheffield Street, Manchester	Piccadilly station viaduct
Commercial	One commercial property	18 Sparkle Street, Manchester	Piccadilly station viaduct
Commercial	One commercial property	26-32 Store Street, Manchester	Manchester Piccadilly High Speed station main compound
Commercial	One commercial property	Piccadilly Gate, Store Street, Manchester	Piccadilly station viaduct
Commercial	One commercial property	Store Street, Manchester	Piccadilly station viaduct
Commercial	One commercial property	1 Portugal Street East, Manchester	Metrolink realignment and extension
Other	One electricity substation	13m from 2 Raven Street, Manchester	Manchester Piccadilly High Speed station main compound
Other	One advertising hoarding	94 Fairfield Street, Manchester	Piccadilly approach viaduct
Other	One community facility (True Jesus Church)	31 St Andrew's Street, Manchester	Piccadilly approach viaduct
Other	One advertising hoarding	Adjacent to 101 Fairfield Street, Manchester	Manchester Piccadilly High Speed station main compound
Other	One steel container	6 St Andrew's Square, Manchester	Manchester Piccadilly High Speed station main compound
Other	Brick arches	Sheffield Street, Manchester	Piccadilly station viaduct
Other	One prefabricated building, including four portacabins (above railway arches 15 and 16)	Sheffield Street, Manchester	Piccadilly station viaduct
Other	One elevated car park	Sheffield Street, Manchester	Piccadilly station viaduct

Type	Description	Location	Feature resulting in demolition
Other	One multi-storey car park and one link bridge	Boad Street, Manchester	Piccadilly station viaduct
Other	One electricity substation	Boad Street, Manchester	Piccadilly station viaduct

2.3.48 The compound will be used to manage the construction of the Metrolink realignment and extension, which will take five years and six months to complete.

2.3.49 The compound will be used to manage the construction of the following viaducts:

- Piccadilly approach viaduct, which will take two years and six months to complete; and
- Piccadilly station viaduct, which will take two years to complete.

2.3.50 The compound will be used to manage the construction of the following retaining walls:

- St Andrew's Street retaining wall, which will take six months to complete;
- Baird Street retaining wall, which will take six months to complete;
- Sparkle Street retaining wall, which will take three months to complete; and
- Store Street retaining wall, which will take three months to complete.

2.3.51 The works to be managed from this compound will require the following works to public roads:

- permanent closure of Raven Street and Blackett Street;
- permanent diversion of St Andrew's Street, to enable the construction of Manchester Piccadilly High Speed station. The diversion will be constructed over a period of three months, the diversion works will be finalised later in the construction programme and will take three months to complete. On completion of construction it will be permanently diverted 100m east from its existing alignment;
- permanent closure of the southern section of Helmet Street. The remaining section will be temporarily closed for a period of five years, to enable widening of the highway. During this time, traffic will be diverted via the St Andrew's Street diversion and the new gyratory system, increasing journey length by up to 758m. On completion of construction, this section of Helmet Street will be re-opened;
- permanent closure of a 26m section of St Andrew's Square at the southern end. The remaining section will be temporarily closed for a period of five years and nine months to facilitate alterations to the vertical realignment required for the new car parks. On completion of construction this section of St Andrew's Square will be re-opened;
- temporary closure of the southern extent of Adair Street for a period of six years, to facilitate alterations to the vertical realignment for the construction of the new car parks. An additional temporary closure at the northern extent for a period of six months will be required to improve the junction with the A665 Great Ancoats Street. During this time, vehicles will be diverted via the A665 Great Ancoats Street/Pin Mill Brow/Chancellor Lane, the diverted A665 Chancellor Lane and the diverted B6469 Fairfield Street, increasing

journey length by up to 1.2km. On completion of construction Adair Street will be re-opened;

- temporary closure of the southern end of Heyrod Street, for a period of three months, to facilitate changes to the junction with Portugal Street East. On completion of construction Heyrod Street will be reopened;
- temporary closure of Portugal Street East, for a period of three months, to enable works to facilitate connection to Heyrod Street. On completion of construction, Portugal Street East will be reopened;
- permanent diversion of Sheffield Street, for a period of one year, to enable construction of Manchester Piccadilly High Speed station. On completion of construction it will be permanently diverted 70m north onto a new road known as New Sheffield Street;
- temporary lane restrictions along the A665 Great Ancoats Street will be required to complete the junction alterations between the A665 Great Ancoats Street and Adair Street, for a period of six months. On completion of construction, the A665 Great Ancoats Street will be re-opened;
- temporary closure of Travis Street between the New Sheffield Street and Adair Street, for a period of six years, to facilitate the construction of the Manchester Piccadilly High Speed station and alterations to the vertical realignment required for the new car parks. During this time, traffic will be diverted via Adair Street, the A665 Great Ancoats Street/Pin Mill Brow/Chancellor Lane, the diverted A665 Chancellor Lane and the diverted B6469 Fairfield Street, increasing journey length by up to 1.5km. On completion of construction, the section of Travis Street beneath the existing Manchester Piccadilly Station will be reinstated to provide access to the multi-modal transport hub located between the existing and proposed stations. A 215m section at the northern end of Travis Street will remain permanently closed and no access provision will be retained;
- permanent closure of a 105m section of Baird Street;
- temporary closure of Betley Street for a period of six years, to enable the realignment of Adair Street and alterations to the Betley Street and Adair Street junction. During this time, traffic will be diverted via Norton Street and Heyrod Street, increasing journey length by up to 173m. On completion of construction, Betley Street will be reopened;
- temporary closure of an 85m section of Chapeltown Street at the south-western end, for a period of nine months, to enable construction of a new junction with New Sheffield Street. During this time, traffic travelling from Store Street to Chapeltown Street will be diverted via Jutland Street, Peak Street, Laystall Street and the A665 Great Ancoats Street, increasing journey length by up to 736m;
- permanent closure of Sparkle Street and Leycroft Street;
- permanent closure of an 85m section of Store Street at the southern end between the A6 London Road and Boad Street, to facilitate the connection to New Sheffield Street and Manchester Piccadilly High Speed station. A 260m section will be temporarily closed for a period of one year to facilitate a significant change in level along Store Street. During this time, traffic will be diverted via Jutland Street, Ducie Street and the A6 London Road, increasing journey length by up to 1.3km. Finishing works will be carried out later in the

programme and will take three months to complete. On completion of construction this section of Store Street will be reopened;

- temporary measures such as traffic management and intermittent passing places will be implemented for a period of one year and nine months on the A6 London Road at its junction with Ducie Street to enable junction improvements, resulting in no changes to journey length. On completion of construction, the A6 London Road will be permanently realigned within the footprint of the existing road. Additional closures over a period of up to seven months will be required to enable the replacement of the pedestrian footbridge, realignment of the Metrolink and alterations to the existing loading bay access;
- temporary closure of Jutland Street at its junction with Store Street, for a period of three months, to facilitate alterations to the vertical realignment at the junction. During this time, traffic will be diverted via Ducie Street, increasing journey length by up to 829m. On completion of construction, Jutland Street will be re-opened;
- permanent diversion of Boad Street, for a period of one year, to enable construction of the Manchester Piccadilly High Speed station. Finishing works will be carried out later in the construction programme and will take three months to complete. On completion of construction it will be permanently diverted 60m north-east onto New Sheffield Street;
- a temporary closure of Ducie Street at the south-western end for a period of three months to facilitate the construction of a new junction and realignment. Traffic will be diverted via Peak Street, Laystall Street, the A665 Great Ancoats Street, Newton Street and the A6 London Road, increasing journey length by up to 858m. In addition, temporary measures such as traffic management and intermittent passing places will be implemented for a period of one year and nine months along Ducie Street to enable junction improvements with the A6 London Road. On completion of construction, Ducie Street will be permanently realigned within the footprint of the existing road; and
- temporary closure of Dale Street at the southern end for a period of three months, to facilitate changes to the junction with Ducie Street. During this time, traffic will be diverted via Newton Street, Lena Street and the A6 London Road, increasing journey length by up to 265m. On completion of construction Dale Street will be reopened.

2.3.52 The compound will be used to manage the construction of the Manchester Piccadilly High Speed station which will take four years and six months to complete (including advance works), and will comprise six main phases:

- Phase 1: enabling and site preparation works including mobilisation, site investigation, demolition and clearance (including the Manchester Piccadilly Station Car Park which will be demolished when proposed car park one is fully operational, Piccadilly Gate Building and the North Block Building), utility and road diversions (including a 3650mm United Utilities combined sewer), and protection of existing assets and advance works, including provision of car parking, new Network Rail facility building and Piccadilly offline access ramp;
- Phase 2: establishment of main compound and satellite compounds post-demolition;

- Phase 3: installation of piled foundations, pile caps and ground beams, the phased construction of Metrolink box structure and Ashton Line connection works requiring the tram links through this section to operate as a single line running for a period, including below-ground drainage and utilities;
- Phase 4: completion of Metrolink box structure and Ashton Line connection, which requires use of a tram turnback by the existing Piccadilly Metrolink stop; construction of the viaduct piers and decks, concourse building envelopes, superstructures and roof canopy supports, internal structures and slabs on top of the Metrolink baseline structure, completion of the Piccadilly Metrolink stop platforms fit out, trackwork and tramways systems;
- Phase 5: station roof structure works, including installation of the roof canopy and associated glazing, cladding, drainage, lighting and internal finishes, station building services, ventilation, security/public address/fire systems, substations, railway system and finishing works, and completion of the connection to the existing Manchester Piccadilly Station via a new pedestrian overbridge; and
- Phase 6: external works/public realm, soft and hard landscaping, final highway layouts, new taxi drop off/pick up facilities at the eastern end of station including new taxi structure, completion of New Sheffield Street and other highways work, road and pavement surfacing, facilitation of the new bus/coach interchange at the junction of Travis Street and the B6469 Fairfield Street and final integration of the existing Manchester Piccadilly Station.

2.3.53 The construction staging will maintain single-line operation of the Metrolink between Piccadilly and New Islington (to the north-east of Piccadilly) for a nine-month period in Phase 3. To reduce disruption, a temporary track crossing and turnback will be put in place during this time by the existing Piccadilly Metrolink stop. For the completion of the Metrolink box structure, western entrance and Ashton Line connection in Phase 4, trams from the west will use this temporary track and turn back at Piccadilly for a period of two years, until the new Piccadilly Metrolink stop becomes fully functional. The section of line from Piccadilly to Ashton-under-Lyne will be supported by replacement buses. Once operational, the Metrolink line between Piccadilly and New Islington (on the Ashton-under-Lyne to Eccles Metrolink line) will be opened and the temporary turnback and track will be decommissioned. This will allow for completion of the station concourse and fit-out works.

2.3.54 The works to be managed from this compound will require the following works to utilities:

- underground diversion of a United Utilities 1500mm combined sewer, which will take three months to complete;
- permanent removal of an EE/3 mobile telecommunications mast, which will take six months to complete;
- underground diversion of a United Utilities 90mm water main, which will take nine months to complete;
- permanent removal of a Vodafone/O2 mobile telecommunications mast, which will take six months to complete;

- underground diversion of a United Utilities 3650mm combined sewer, which will take two years to complete;
- underground diversion of a United Utilities 1900mm combined sewer, which will take nine months to complete;
- underground diversion of a United Utilities 12-inch trunk water main, which will take nine months to complete;
- underground diversion of three Electricity North West 33kV electricity cables, which will take six months to complete; and
- installation of a new Transport for Greater Manchester 1,500mm telecommunications cable, which will take six months to complete.

2.3.55 In addition, the following utility works will be carried out during the construction period:

- decommissioning of 32 Electricity North West electricity cables and diversion of an additional 12;
- decommissioning of 11 underground Cadent Gas mains and diversion of an additional four;
- diversion of 10 underground United Utilities potable water mains and diversion of an additional four;
- decommissioning of seven United Utilities wastewater sewers and diversion of an additional four;
- decommissioning of seven underground Openreach telecommunication cables and diversion of an additional three;
- diversion of seven underground Virgin telecommunications cables and diversion of an additional three;
- decommissioning of three underground Instalcom telecommunications cables and diversion of an additional three;
- decommissioning of two underground Vodafone telecommunications cables and diversion of an additional four;
- diversion of three Cityfibre telecommunications cables;
- diversion of one underground EU Networks telecommunications cable;
- diversion of one underground Sky communications cable;
- diversion of one underground Colt communications cable;
- diversion of one underground Verizon telecommunications cable; and
- diversion of one underground Level 3 telecommunications cable.

Metrolink New Islington turnback satellite compound

2.3.56 The Metrolink New Islington Turnback satellite compound (see Volume 2: MA08 Map Book, map CT-05-365b-R1, H2) will be accessed from the A662 Pollard Street. It will be used to manage civil engineering works for a period of nine months, commencing in 2025.

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

2.3.58 The compound will be used to manage the construction of the New Islington turnback facility, which will take six months to complete.

Construction waste and material resources

2.3.59 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.

2.3.60 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.

2.3.61 Local excess or shortfall of excavated material within the Manchester Piccadilly Station 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.

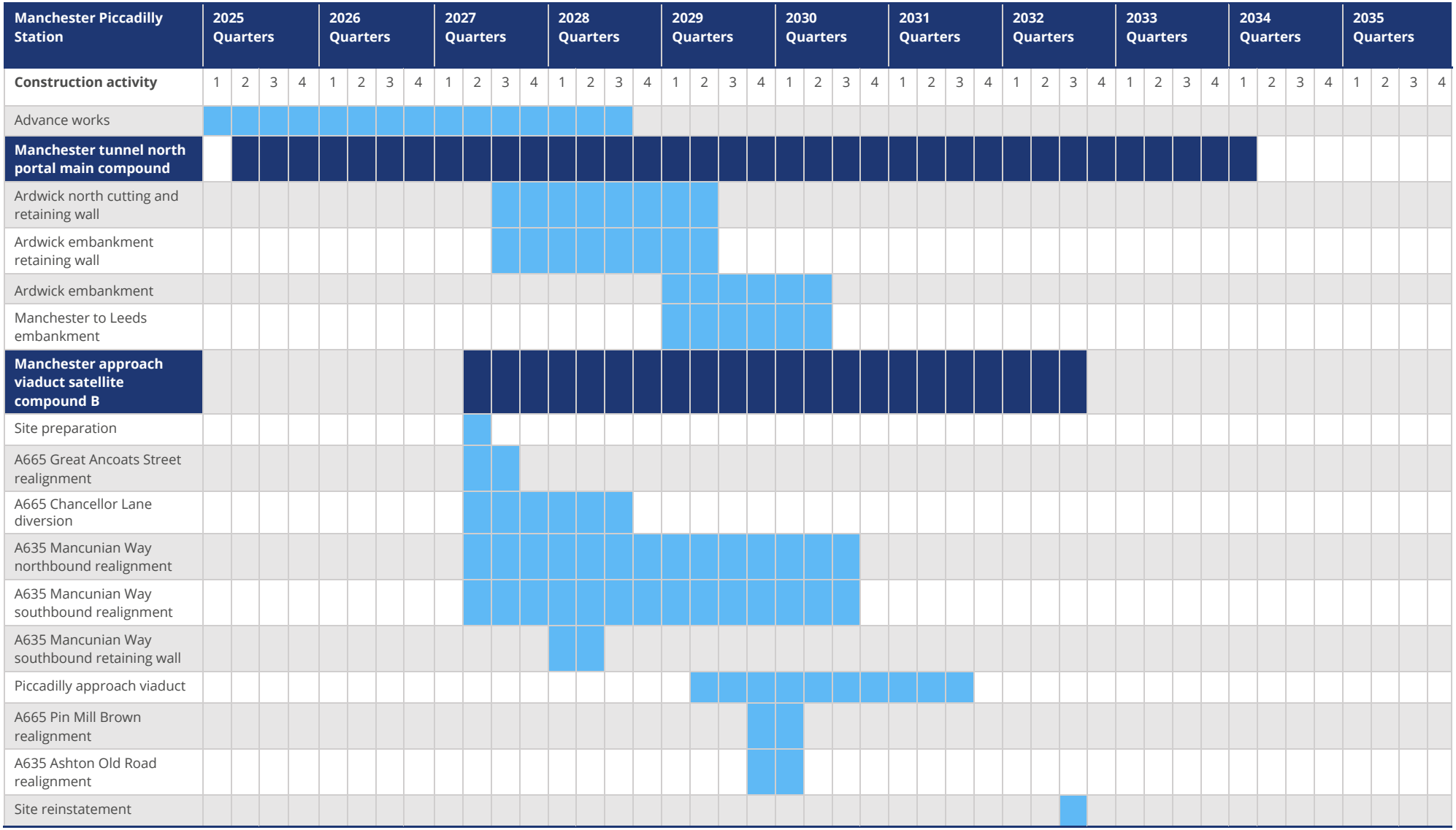
Commissioning of the railway

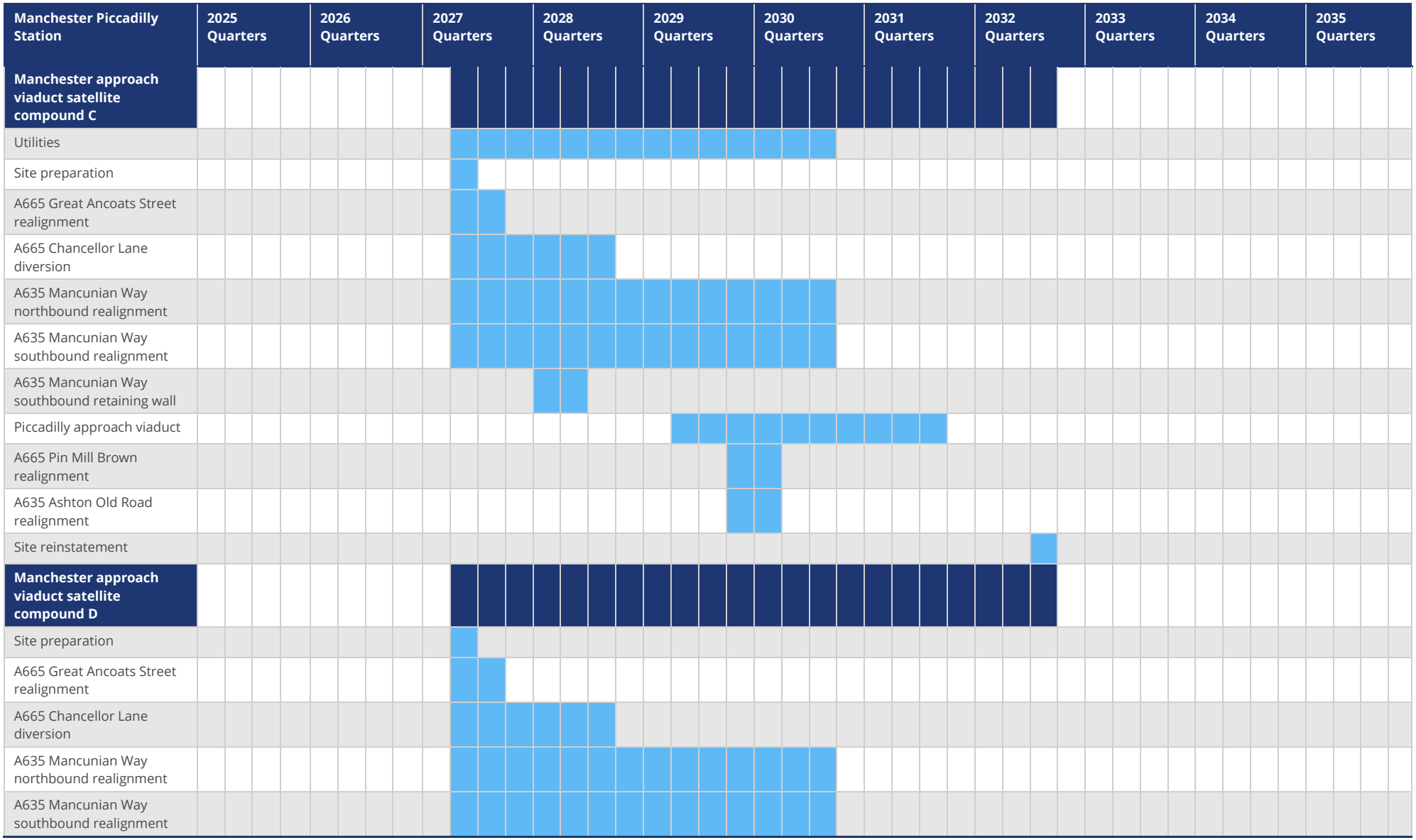
2.3.62 Commissioning is the process of testing the infrastructure to ensure that it operates as expected. It will be carried out in the period prior to opening. Further details are provided in Volume 1, Section 6.

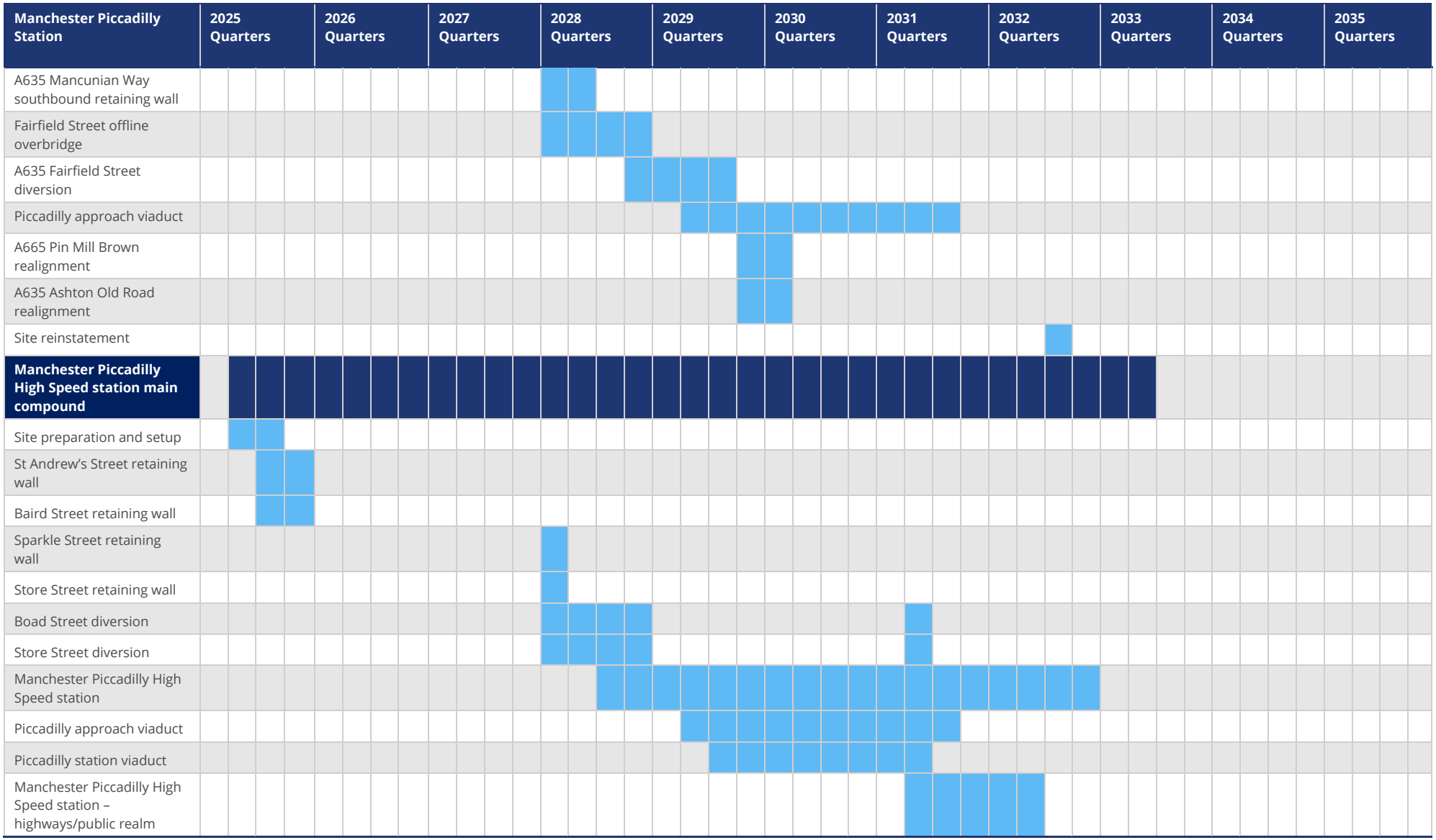
Construction programme

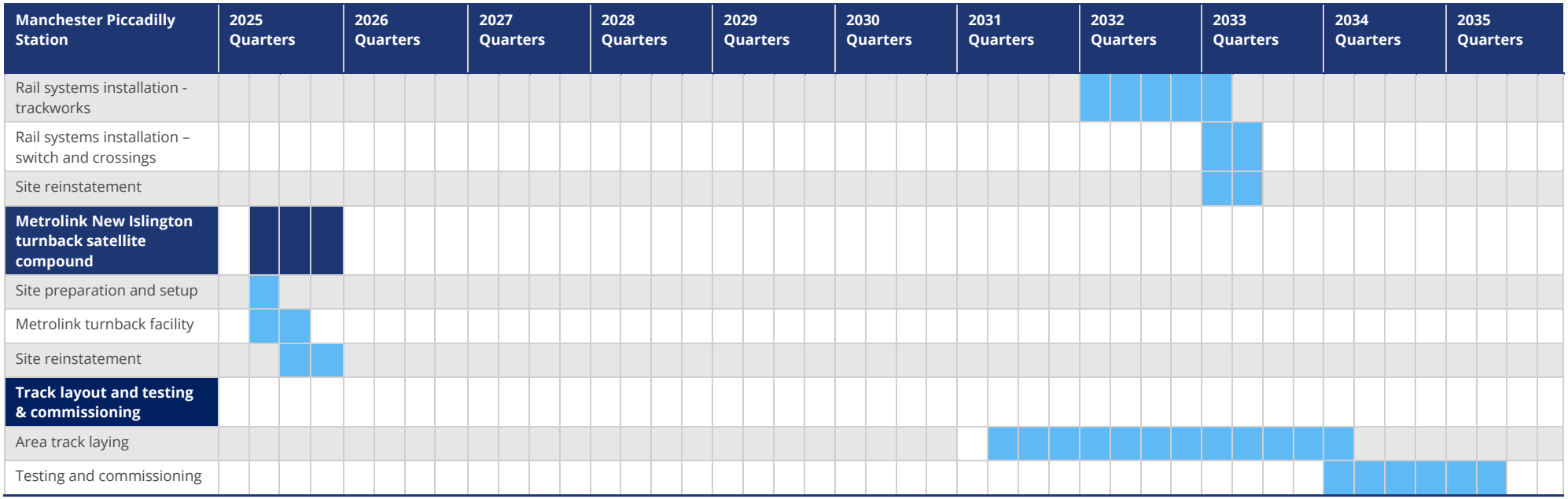
2.3.63 A construction programme illustrating indicative periods for each of the core construction activities described above is provided in Figure 9.

Figure 9: Indicative construction programme between 2025 and 2035




Manchester Piccadilly Station
2025 Quarters
2026 Quarters
2027 Quarters
2028 Quarters
2029 Quarters
2030 Quarters
2031 Quarters
2032 Quarters
2033 Quarters
2034 Quarters
2035 Quarters
Manchester approach viaduct satellite compound C
Utilities
Site preparation
A665 Great Ancoats Street realignment
A665 Chancellor Lane diversion
A635 Mancunian Way northbound realignment
A635 Mancunian Way southbound realignment
A635 Mancunian Way southbound retaining wall
Piccadilly approach viaduct
A665 Pin Mill Brown realignment
A635 Ashton Old Road realignment
Site reinstatement
Manchester approach viaduct satellite compound D
Site preparation
A665 Great Ancoats Street realignment
A665 Chancellor Lane diversion
A635 Mancunian Way northbound realignment
A635 Mancunian Way southbound realignment


Manchester Piccadilly Station
2025 Quarters
2026 Quarters
2027 Quarters
2028 Quarters
2029 Quarters
2030 Quarters
2031 Quarters
2032 Quarters
2033 Quarters
2034 Quarters
2035 Quarters
A635 Mancunian Way southbound retaining wall
Fairfield Street offline overbridge
A635 Fairfield Street diversion
Piccadilly approach viaduct
A665 Pin Mill Brown realignment
A635 Ashton Old Road realignment
Site reinstatement
Manchester Piccadilly High Speed station main compound
Site preparation and setup
St Andrew's Street retaining wall
Baird Street retaining wall
Sparkle Street retaining wall
Store Street retaining wall
Boad Street diversion
Store Street diversion
Manchester Piccadilly High Speed station
Piccadilly approach viaduct
Piccadilly station viaduct
Manchester Piccadilly High Speed station – highways/public realm


Manchester Piccadilly Station
2025 Quarters
2026 Quarters
2027 Quarters
2028 Quarters
2029 Quarters
2030 Quarters
2031 Quarters
2032 Quarters
2033 Quarters
2034 Quarters
2035 Quarters
Rail systems installation - trackworks
Rail systems installation – switch and crossings
Site reinstatement
Metrolink New Islington turnback satellite compound
Site preparation and setup
Metrolink turnback facility
Site reinstatement
Track layout and testing & commissioning
Area track laying
Testing and commissioning

Monitoring during construction

2.3.64 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.

2.3.65 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 Manchester Piccadilly Station 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 six trains per hour each way entering the Manchester Piccadilly High Speed station. 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 The trains will be a single 200m-long train, a single 400m-long train or two 200m-long trains coupled together, depending on demand and time of day. HS2 trains will accelerate as they leave and decelerate as they approach the station, with highest speeds away from the station at 62mph (100kph) in this area.

2.4.4 All passengers will alight at Manchester Piccadilly High Speed station on arrival to either transfer to other transport services or exit to Manchester city centre.

2.4.5 The Manchester Piccadilly High Speed station will include public facilities, such as waiting areas, ticket machines, information, public toilets and retail, food and beverage outlets. There will also be three station control rooms, on-board staff facilities, management mess rooms and on-board staff mess rooms, as well as staff toilets and changing room facilities.

Maintenance

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

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

Operational waste and material resources

2.4.8 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.

2.4.9 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

2.4.10 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.

2.4.11 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 Manchester Piccadilly Station area are reported in Volume 5:

- Manchester Piccadilly Station layout;
- Manchester Piccadilly High Speed station layout;
- Manchester Piccadilly approach including Ardwick; and
- track alignment from the Manchester tunnel to Manchester Piccadilly High Speed station.

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 Manchester Piccadilly Station 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 website, allowing comment by local interest groups and the public. A total of 107 responses to the 2017 SMR were received, as a result of which changes were made. A revised EIA SMR was published in October 2018 (the 2018 SMR) as part of the working draft ES (described in the following section).

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[11] also published in October 2018. The assessment set out in this ES follows the scope and methodology in the EIA SMR[12] in Volume 5 of this ES.

Consultation on the working draft ES

3.2.4 As set out in Volume 1 Section 3, two parallel consultations were undertaken by HS2 Ltd in 2018: a consultation on the working draft ES and a consultation on the working draft EQIA. These consultations related 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 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 Manchester Piccadilly Station area, events were held in Manchester city centre (December 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 Manchester Piccadilly Station area included commentary on:

- integration of Manchester Piccadilly High Speed station with the existing Manchester Piccadilly Station;
- potential for construction traffic impacts at multiple locations and the construction traffic routes;
- relocation of the existing Piccadilly Metrolink stop to below Manchester Piccadilly High Speed station;
- integration of the Proposed Scheme into local authority development plans for the wider Greater Manchester area, including links for non-motorised forms of transport;
- opportunities for businesses to join the supply chain;
- timescales, construction programme and compensation process; and
- concern regarding property compensation.

3.2.7 A working draft ES Consultation Summary Report[13] has been published as part the ES detailing how consultation responses have been taken into consideration in the development of the Proposed Scheme design and its assessment.

[11] 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.*

[12] Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

[13] Volume 5: Appendix CT-007-00001, Working Draft Environmental Statement: Consultation Summary Report.

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 Manchester Piccadilly Station area.

Consultation on design refinements

3.2.9 Design refinements to the Proposed Scheme in the Manchester Piccadilly Station area were consulted upon between October and December 2020. These design refinements were relating to changes to the design around Manchester Piccadilly High Speed station. They included provision of two additional platforms to allow future use of HS2 infrastructure as part of Northern Powerhouse Rail (NPR) services; the proposal to relocate the Piccadilly Metrolink stop beneath the proposed Manchester Piccadilly High Speed station and make provision for the Piccadilly Central Metrolink stop to accommodate future expansion; and to avoid disruption to road users and re-provide highways around HS2 works.

3.2.10 Documents containing information about the proposed design refinements, along with supporting information such as visualisations and construction and operational plans, were made available at on the gov.uk webpage. Information was also made available on the hs2.org.uk webpage, where an interactive map and a virtual exhibition room provided alternative ways for people to access the information. Printed copies of the consultation materials were sent free of charge following requests to the HS2 Helpdesk.

3.2.11 Stakeholders were invited to comment on the proposed design refinements either by using an online response form or submitting comments by post.

3.2.12 A total of 326 responses were received through the consultation on design refinements. These responses were analysed and the themes and issues relevant to the Manchester Piccadilly Station area included:

- the proposed inclusion in the design of passive provision for a future Manchester to Leeds junction would future-proof the rail network to enable growth, facilitate integration with NPR, and would help to alleviate overcrowding on the rail network;
- bringing benefits to the local economy and businesses, including increased employment opportunities for local residents;
- welcomed design of an integrated solution to provide future rail services in the north of England and provide an interchange between HS2 and Metrolink;
- the integration between NPR and HS2 in Manchester should be more ambitious and recommendations for a review of alternative solutions, including requests for an underground station to allow NPR and HS2 through trains to continue on through (east and west);
- potential impact on aspirations of place-making and economic growth agenda as set out in the Manchester City Council's Piccadilly Strategic Regeneration Framework (Manchester Piccadilly SRF);
- concerns as to whether the proposed changes will be sufficient to meet the aspiration for the regeneration and economic growth across the north of England;

- need for the Piccadilly Metrolink stop to align with proposals set out in the Manchester Piccadilly SRF and the Greater Manchester Growth Strategy to enable transformative growth and regeneration of the area;
- the number of and the locations of the Metrolink stops as part of the interface with the Proposed Scheme;
- impacts on Ducie Basin part of the Ashton Canal and concerns regarding a potential increase in flood risk;
- impacts on heritage assets in the area;
- impacts on existing public transport services;
- need for further consideration of provision for including pedestrians and cyclists (non-motorised users) connectivity and experience; and
- impacts on local communities, businesses and residents during the construction phase

3.2.13 A summary of the comments received is available at the gov.uk website.

3.3 Engagement and consultation with stakeholder groups

Communities

3.3.1 Community stakeholders in the Manchester Piccadilly Station area include a range of local interest groups, local facility and service providers, places of worship, schools and educational establishments, cultural, leisure and sports stakeholders.

3.3.2 The purpose of this engagement has been to provide affected communities with information on the development of the Proposed Scheme and to give the opportunity to raise issues in relation to the design and assessment of the Proposed Scheme. Feedback from communities has helped inform the baseline information and evolving assessment of impacts in this ES and concurrent EQIA, as well as identify opportunities for mitigation within the design.

3.3.3 Programmes of public information events were held to share new information with communities and engage them on it. HS2 Ltd notified people of these by sending leaflets to addresses along the route, advertising in local media and via social media. Public information events were held in September 2017, between June and July 2018, October and December 2018, June and July 2019. In October and November 2020, information events were held using online channels including webinars and a virtual exhibition room. Information events were held in June and July 2021 using a combination of in-person information events and online webinars. Members of local communities and other interested parties were invited to engage on issues pertinent to the development of the Proposed Scheme design and its assessment.

3.3.4 Engagement has been, and will continue to be, undertaken with community stakeholders, particularly those close to the Proposed Scheme. These stakeholders include educational

establishments, 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 6 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 6: Engagement to date with community stakeholders

Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Manchester Action on Street Health (MASH)	Meeting to discuss the Proposed Scheme, provide an update on consultation activities and understand any impacts relating to the EQIA.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
Manchester Cathedral - Dean of Manchester	Meeting to discuss timescales and construction programme.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
Manchester Offenders: Diversion Engagement Liaison (MO:DEL)	Meeting to discuss the Proposed Scheme, provide an update on consultation activities and understand any impacts relating to the EQIA.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
SOL Christian Academy	Meeting to discuss the Proposed Scheme, provide an update on consultation activities and understand any impacts relating to the EQIA and provide direct support for compensation process.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
The Men's Room	Meeting to discuss the Proposed Scheme, provide an update on consultation activities and understand any potential impacts. The Men's Room are short-term tenants. They plan to relocate and vacate the impacted property.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
True Jesus Church	Meetings held in March 2018 and April 2019 to discuss timescales, construction programme and compensation process. This also provided opportunity to inform the EQIA.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation opportunities 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 metropolitan and city councils within the Manchester Piccadilly Station 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 7 summarises key engagement undertaken 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 7: 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
Manchester City Council (MCC)	Series of meeting to discuss Manchester Piccadilly High Speed station, the surrounding area, road network and transport matters. Key discussion points included: • Manchester Piccadilly High Speed station and surrounds design; • traffic impacts; • potential flood storage mitigation; • MCC's desire for the compulsory purchase and demolition of Gateway House to provide improved public realm; • existing and proposed car parking in the Manchester Piccadilly Station area; and • relocation of the Piccadilly Metrolink stop at the existing Manchester Piccadilly Station. Meetings with technical leads to collate data and discuss key assessment topics including air quality; land quality; sound, noise and vibration; traffic and transport; and waste.	Feedback used to improve understanding of the impacts of the Proposed Scheme in and around the Manchester Piccadilly Station area, to consider local issues and longer-term aspirations in the assessment and design development process.
Transport for Greater Manchester (TfGM)	Series of meetings to discuss the Proposed Scheme, with key issues including: • Manchester Piccadilly High Speed station and surrounds design; • traffic impacts and construction haulage routes; • baseline pedestrian flows at the existing Manchester Piccadilly Station; • access to public transport; and • the relocation of the Piccadilly Metrolink stop at the existing Manchester Piccadilly Station.	Information used to improve understanding of baseline conditions, inform the assessment of the Proposed Scheme, provide an opportunity to consider mitigation that may be required and to inform the proposed design.

Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Greater Manchester Stakeholders which included representation from MCC, Greater Manchester Combined Authority (GMCA), TfGM, Transport for the North, Highways England, Network Rail, Manchester Airports Group	Regular project update meetings, often weekly, regarding a number of discussion points relating to the Manchester Piccadilly High Speed station including: • Metrolink; • connectivity between Manchester Piccadilly High Speed station and the existing Manchester Piccadilly Station; • integration with the Strategic Regeneration Frameworks; • integration with Northern Powerhouse Rail; • relocation of Network Rail infrastructure; • station location studies; • connectivity to the strategic road network and local road network; • connectivity for non-motorised users; and • surrounding planned and potential developments and car parking. Discussions focussed on Manchester Piccadilly High Speed station, and provision sought by MCC and GMCA to integrate within their Strategic Regeneration Frameworks and the Greater Manchester Growth Strategy. This included the: • connectivity between Manchester Piccadilly High Speed station and the surrounding areas and future development sites for non-motorised users; • ensuring space is maintained for future provision of public realm along the northern boundary of Manchester Piccadilly High Speed station that encourages commercial development and connectivity of non-motorised users to the surrounding areas; • managing of capacity of the highway network and car parking provision to encourage alternative forms of transport for those using Manchester Piccadilly High Speed station; • potential to integrate NPR services with the Proposed Scheme and Manchester Piccadilly High Speed station; • planned and potential developments (including improved highway/public transport links; and • appropriate car parking provision to serve Manchester Piccadilly High Speed station.	Information used to improve understanding of baseline conditions, inform the assessment of the Proposed Scheme and provide an opportunity to consider the mitigation that may be required and the interface with wider development aspirations of the stakeholders in and around Manchester Piccadilly. The Greater Manchester Stakeholders have also informed the design options.

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)[14].

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 Manchester Piccadilly Station area.

3.3.11 Engagement with statutory bodies, local authorities and utility companies within the Manchester Piccadilly Station area has been undertaken in order to:

- collate local baseline information;
- identify and understand issues and concerns; and
- provide a mechanism for ongoing dialogue and discussion on the assessment and design development.

3.3.12 Engagement has focused on the technical areas that inform the assessment, including air quality, landscape and visual, sound, noise and vibration and traffic and transport. Briefings were offered to specialist and technical stakeholders across the Proposed Scheme during the period of consultation on the working draft ES to provide information on the evolving design and assessment of the Proposed Scheme in their respective areas.

3.3.13 Engagement has been offered to blue light emergency service stakeholders including fire and rescue, police force and ambulance service providers, with meetings undertaken to share information on the Proposed Scheme. This has included design review meetings to present design detail on fire engineering and safety design aspects of the Proposed Scheme.

3.3.14 Engagement will continue with these stakeholders as the project progresses, including consultation to support the development of local traffic management plans prior to construction starting.

3.3.15 Table 8 includes engagement undertaken with technical and specialist groups and how this has informed the design and assessment of the Proposed Scheme in the Manchester Piccadilly Station area.

[14] Volume 5: Appendix CT-002-00000, draft Code of Construction Practice (CoCP).

Table 8: Engagement to-date with expert, technical and specialist groups

Type	Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Statutory and national	British Geological Survey	Geological conditions	Information has been used to improve understanding of baseline geological issues route-wide and provided an opportunity to inform the assessment and consider any proposed mitigation.
Statutory and national	Canal & River Trust	Waterways	Information has been used to inform the historic environment, landscape and visual assessment and improve understanding of baseline conditions for route-wide application, including the water resources and flood risk assessment.
Statutory and national	Coal Authority	Coal mining	Information has been used to improve understanding of baseline conditions for coal mining route-wide, informing the assessment and proposed mitigation.
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, including at the crossing of the River Medlock as part of the assessment and proposed mitigation.
Statutory and national	Animal and Plant Health Agency (APHA)	Land quality issues	Information on the location of farm burial and pyre sites associated with the 1967/8 and 2001 outbreaks of foot and mouth disease as well as anthrax infected cattle burial sites has been obtained from APHA. This has been used to improve understanding of land contamination baseline conditions along the route of the Proposed Scheme and to inform the assessment and proposed mitigation.
Statutory and national	Forestry Commission	Forestry, ecology and landscape issues	Informed the ecological and landscape assessment methodology, improved understanding of baseline conditions and the assessment and proposed mitigation.
Statutory and national	Highways England	Strategic road network, traffic and transport issues	Informed the assessment of road network capacity and identification of proposed future Highways England works that informed the design, including A57(M) Mancunian Way and the A635 Mancunian Way.
Statutory and national	Historic England	Nationally designated heritage assets and the heritage assessment methodology	Informed methodology for assessing setting and impacts on historic landscape at national and regional level. Identification and assessment methodology of designated and non-designated heritage assets including the Grade II listed Manchester Piccadilly Station.

Type	Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Statutory and national	National Farmers Union	Farming issues	Information was used to improve understanding of route-wide issues for farmers and growers.
Statutory and national	Country Land and Business Association	Farming issues	Information was used to improve understanding of route-wide issues for farmers and growers.
Statutory and national	National Trust	Owned assets and related impacts	Informed considerations around National Trust owned assets and factors to be considered in the design and assessment of the Proposed Scheme route-wide.
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.
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, including the integration of Manchester Piccadilly High Speed station with the existing Manchester Piccadilly Station, pedestrian flows, the provision of car parking for Network Rail staff, and the relocation of railway associated infrastructure.
Statutory and national	Public Health England	Public health issues	Informed methodology and factors to be taken into consideration in the health assessment.
Statutory and national	The Woodland Trust	Woodland and ancient woodland issues	Information was used to confirm that there are currently no sites within the Ancient Woodland Inventory in this area.
Statutory sub-national	Transport for the North	Connectivity to Northern Powerhouse Rail	Informed assessment around integration of NPR including at Manchester Airport High Speed station and Manchester Piccadilly High Speed station.
Local Authority technical meetings	Greater Manchester Combined Authority	Meeting to discuss the ecology and biodiversity assessment including the mitigation strategy	Information used to improve understanding of baseline conditions, support the identification of sensitive ecological sites, and consider appropriate mitigation and compensation for habitat loss associated with the Proposed Scheme.
Local Authority technical meetings	Greater Manchester Combined Authority	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	Greater Manchester Combined Authority/ Transport for Greater Manchester	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	Information used to improve understanding of local traffic flows, highways operations and future proposals, and inform the emerging design and assessment of the Proposed Scheme.

Type	Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Local Authority technical meetings	Manchester City Council	Meetings to discuss the sound, noise and vibration and air quality assessment including proposed mitigation	Information used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
Local Authority technical meetings	Manchester City Council	Meeting to discuss the ecology and biodiversity assessment including the mitigation strategy	Information used to improve understanding of baseline conditions, support the identification of sensitive ecological sites, and consider appropriate mitigation and compensation for habitat loss associated with the Proposed Scheme.
Local Authority technical meetings	Manchester City Council	Meeting to discuss known and potential contaminated land, the proposed assessment and mitigation measures for land quality	Identified local areas of land contamination, potential impacts and proposed mitigation.
Local Authority technical meetings	Manchester 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	Manchester City 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	Manchester 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	Information used to improve understanding of local traffic flows, highways operations and future proposals, and inform the emerging design and assessment of the Proposed Scheme.
Local Authority technical meetings	Manchester City 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 Authority technical meetings	Salford City Council	Meeting to provide information on the Proposed Scheme with a focus on wider impacts relating to air quality	Information used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.

Type	Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Local Authority technical meetings	Transport for Greater Manchester	Meeting to provide information on the Proposed Scheme with a focus on wider impacts relating to air quality	Information used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
Local technical specialist group	Greater Manchester Archaeological Advisory Service	Meetings with technical leads to collate data and discuss the historic environment assessment	Information on local conditions and factors used to refine the Proposed Scheme design and assessment.
Local technical specialist group	Greater Manchester Ecology Unit	Meeting to collate data related to the ecological assessment	Information on local conditions and factors used to refine the Proposed Scheme design and assessment.
Local technical specialist group	Greater Manchester Wildlife Trust	Meeting to discuss the Proposed Scheme, provide an update on consultation activities and to understand key areas of concern relating to impacts on local wildlife sites	Identified sensitive ecological sites and appropriate mitigation and compensation for habitat loss associated with 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 on existing Cadent Gas assets at sites including the Piccadilly approach viaduct, the A635 Mancunian Way northbound realignment, North Western Street and the A6 London Road realignment, as well as associated mitigation requirements.
Utilities	Cityfibre	Network provision of telecommunications services	Identified telecommunication services and informed understanding of potential impacts of the Proposed Scheme and mitigation requirements including assets at the proposed diversions at New Sheffield Street and Store Street.
Utilities	Colt	Network provision of telecommunications services	Identified telecommunication services and informed understanding of potential impacts of the Proposed Scheme and mitigation requirements including assets at the proposed diversions at New Sheffield Street and Store Street.
Utilities	EE and 3 Mobile Masts	Network provision of telecommunications services	Identified telecommunication services and informed understanding of potential impacts of the Proposed Scheme and mitigation requirements including mobile mast assets located close to St Andrew's Square and at Adair Street.

Type	Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Utilities	Electric 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 the new proposed substations off the A665 Midland Street, Sparkle Street and Store Street and any required mitigation.
Utilities	EU Networks	Network provision of telecommunications services	Identified telecommunication services and informed understanding of potential impacts of the Proposed Scheme and mitigation requirements including assets at the proposed diversions at New Sheffield Street and Store Street.
Utilities	Instalcom	Network provision of telecommunications services	Identified telecommunication services and informed understanding of potential impacts of the Proposed Scheme and mitigation requirements including assets at the proposed diversions at New Sheffield Street and Store Street.
Utilities	Level 3	Network provision of telecommunications services	Identified telecommunication services and informed understanding of potential impacts of the Proposed Scheme and mitigation requirements including assets at the proposed diversions at New Sheffield Street and Store Street.
Utilities	National Grid	Network provision of electricity and gas	Informed route-wide considerations around utilities network and factors to be considered in 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 including on existing assets along the A635/B6469 Fairfield Street, the A6 London Road, Store Street, Ducie Street, the A665 Chancellor Lane, Helmet Street and the A635 Ashton Old Road. Discussions were held around proposed diversion of Openreach assets and mitigation required as a result of the Proposed Scheme.
Utilities	Sky Telecoms	Network provision of telecommunications services	Identified telecommunication services and informed understanding of potential impacts of the Proposed Scheme and mitigation requirements including assets at the proposed diversions at New Sheffield Street and Store Street.
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 sewer and potable water assets at the B6469 Fairfield Street, Travis Street and Store Street. Discussions were also held regarding the proposed diversion of all other United Utilities assets and mitigation requirements with specific consideration given to the proposed sewer diversions at New Sheffield Street and Store Street.

Type	Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Utilities	Verizon	Network provision of telecommunications services	Identified telecommunication services and informed understanding of potential impacts of the Proposed Scheme and mitigation requirements including assets at the proposed diversions at New Sheffield Street and Store Street.
Utilities	Virgin Media	Network provision of telecommunications services	Identified telecommunication services and informed understanding of potential impacts of the Proposed Scheme and mitigation requirements including existing Virgin Media assets impacted by the realignment of St Andrew's Square and the Store Street diversion.
Utilities	Vodafone and O2 Mobile Masts	Network provision of telecommunications services	Identified telecommunication services and informed understanding of potential impacts of the Proposed Scheme and mitigation requirements including existing mobile masts impacted by the realignment of St Andrew's Square and the realignment Adair Street.

3.3.16 HS2 Ltd has pursued engagement with all affected utility and technical stakeholders across the Proposed Scheme. Where possible HS2 Ltd has obtained information and designs from these stakeholders to inform and promote the collaborative development of the scheme.

3.3.17 Further information about topic-specific engagement is provided in Sections 4 to 15, where relevant.

Directly affected individuals

3.3.18 This group includes those with land and property potentially affected by the Proposed Scheme, including individuals within the Manchester Piccadilly Station 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 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 Engagement with directly affected individuals will continue as the project develops.

Major asset owners and businesses

3.3.22 This group includes those with property potentially affected by the Proposed Scheme, including major asset holders and businesses within the Manchester Piccadilly Station area.

3.3.23 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.

3.3.24 Engagement has been undertaken with major asset owners and businesses within the Manchester Piccadilly Station area including Royal Mail, Greater Manchester Chamber of Commerce, Network Rail, Mayfield Partnership, Capital & Centric, Olympian, Stocktons Furniture, The Ballymore Group and Central Manchester Holdings Ltd. Opportunities to meet were also specifically offered to local businesses in the Manchester Piccadilly Station area by direct invitation. 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.

3.3.25 Key issues raised during this engagement have included:

- the project timescales and the practical next steps for businesses displaced by the Proposed Scheme;
- land requirements and impacts on access, property and business viability during both the construction and operational phases of the Proposed Scheme; and
- disruption to the operation of the existing Manchester Piccadilly Station and surrounding area and the interface with Network Rail.

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

4 Agriculture, forestry and soils

4.1.1 This environmental topic has been scoped out of the assessment for the Manchester Piccadilly Station area, as there are no undisturbed natural soils, agricultural activities or forestry activities affected by the Proposed Scheme.

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 Manchester Piccadilly Station area. Oxides of nitrogen (NOx) including nitrogen dioxide (NO_2), fine particulate matter (particles of size less than 2.5µm and 10µm in diameter, referred to as $PM_{2.5}$ and PM_{10}, 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, and from the operation of any combustion plant.

5.1.2 Engagement with Manchester City Council (MCC), Salford City Council (SCC) and Transport for Greater Manchester (TfGM) has been undertaken. The purpose of this engagement has been to obtain relevant baseline information, which includes monitoring data in this area.

5.1.3 Detailed reports on the air quality data and assessments for this area are contained within Volume 5: Appendix AQ-001-0MA08. Additional information on air quality monitoring and traffic data used in the assessment is set out in Background Information and Data (BID), BID AQ-002-0MA08[15].

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: MA08 Map Book. Air quality mapping is presented in the Volume 5: Air quality Map Book, map AQ-01-308.

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)[16] and Volume 5: Appendix AQ-001-0MA08.

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:

- from construction activities;

[15] High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background Information and Data, Air quality,* BID AQ-002-0MA08. Available online at: https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement.

[16] Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

- 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;
- from changes to road alignment; or
- from the operation of combustion plant at buildings.

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[17]. These include the use of Euro VI heavy goods vehicles (HGV), Euro 4 petrol and Euro 6 diesel cars and light goods vehicles (LGV) during construction of the Proposed Scheme.

5.2.5 The assessment of construction traffic impacts has used traffic data based on an estimate of the average daily flows in the peak year during the construction period (2025-2037). Several construction scenarios have been assessed for air quality to capture peak construction traffic activity at different times in the construction period. It has been assumed that the changes in construction traffic will occur for the whole year. In some cases, this is a conservative approach, as the duration of the peak traffic flows may well be much shorter. These scenarios have been assessed against the relevant future baseline case without the Proposed Scheme. The assessment also assumes vehicle emission rates and background pollutant concentrations from year 2025. As both pollutant emissions from vehicle exhausts and 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-001-0MA08. Predicted concentrations and significant effects are presented for the worst-case construction traffic scenario assessed.

5.2.7 The Government has proposed that clean air zones (CAZ) will be implemented in various cities in the country for reducing NO_2 concentrations and improving local air quality. The future baseline traffic models have assumed no improvements in the vehicle fleet due to the implementation of the CAZ. HS2 Ltd's policies on vehicle emissions comply with the requirements of all CAZ.

[17] High Speed Two Ltd (2022), *Phase 2b Western Leg Information Paper E14: Air quality.*

5.3 Environmental baseline

Existing baseline

Background air quality

5.3.1 The main sources of air pollution in the Manchester Piccadilly Station area are emissions from road vehicles and domestic activities. The main roads within the area are the M602, the A57(M) Ring Road/Mancunian Way, the A635(M) Mancunian Way, the A635 Mancunian Way, the A665 Pin Mill Brow/Ring Road/Great Ancoats Street/Swan Street/Miller Street/Cheetham Hill Road/Bury Old Road, the A6 London Road/Whitworth Street/Chapel Street/Broad Street/Downing Street, the A34 Upper Brook Street, the A56 Chester Road/Deansgate/Victoria Street/Great Ducie Street/Bury New Road, the A57 Hyde Road, the A62 Oldham Road, the A576 Middleton Road/Leicester Road/Great Cheetham Street, the A664 Rochdale Road, the A538 Altrincham Road/Wilmslow Road/Hale Road, the A556 Chester Road and the A560 Shaftesbury Avenue/Stockport Road/Woodlands Road.

5.3.2 There is one industrial installation (regulated by the Environment Agency) with a permit for emissions to air for NOx and/or PM_{10}, namely Heineken UK Limited. Details are presented in BID AQ-002-0MA08. The contribution of 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)[18] for the baseline year of 2018. The data are estimated for 1km grid squares for NOx, NO_2, PM_{10} and $PM_{2.5}$. Background concentrations were within the air quality standards for all pollutants within the Manchester Piccadilly Station area.

Local monitoring data

5.3.4 There are currently 27 local authority diffusion tube sites located within the Manchester Piccadilly Station area for monitoring NO_2 concentrations. These are located in and around Manchester city centre as well as adjacent to the M60.

5.3.5 There are also two continuous air quality monitoring sites within the Manchester Piccadilly Station area. One is located approximately 500m north-east of Manchester Piccadilly Station (monitoring NO_2, PM_{10} and $PM_{2.5}$) and the other is adjacent to A34 Oxford Road (monitoring NO_2 and PM_{10}).

5.3.6 HS2 Ltd has undertaken additional monitoring for the purpose of verifying the air quality assessment at four locations in this area.

5.3.7 Measurements of NO_2 were within the air quality standard at 20 locations in 2018. At 13 locations, annual mean NO_2 concentrations were above the air quality standard in 2018.

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

Measurements of PM_{10} were within the air quality standard in 2018 at both continuous monitoring sites. Measurements of $PM_{2.5}$ were within the air quality standard in 2018 at the Manchester Piccadilly site.

5.3.8 Details of the location of all monitoring sites are presented in Map AQ-01-308 and the monitoring data are presented in Volume 5: Appendix AQ-001-0MA08 and BID AQ-002-0MA08.

Air quality management areas

5.3.9 There is one air quality management area (AQMA) within the Manchester Piccadilly Station area, the Greater Manchester Combined Authority AQMA. This AQMA covers a number of areas in Greater Manchester, including some arterial routes, and was designated in May 2016 for exceedances in the annual mean NO_2 standard. Details of its location are presented in Map AQ-01-308 and Volume 5: Appendix AQ-001-0MA08.

Clean air zones

5.3.10 A Class C CAZ is proposed to be implemented in Manchester by 2022. This will cover the Greater Manchester area. It will be a charging CAZ with the following vehicle emission standards:

- bus/coach Euro VI;
- minibus, taxi and private hire vehicle Euro 4 petrol and Euro 6 diesel;
- HGV Euro VI; and
- LGV Euro 4 petrol and Euro 6 diesel.

Receptors

5.3.11 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.

5.3.12 Most of the receptors which may be affected by the Proposed Scheme are residential. Other receptors include Abbott Community School, Medlock Primary School, St Anne's Roman Catholic (RC) Primary School, St Anne's Catholic Primary School, St Chad's Catholic Primary School, Clifton Primary School, Our Lady of Grace RC Primary School, St Margaret's Church of England (CoE) Primary School, St Mark's Church of England Primary School, Walkden High School, City College Manchester, Cloughside College, Central Manchester University Hospital, Prestwick Hospital, Little Learning Ladder Nursery, Tazbiyah Nursery and Tiddlywinks Day Nursery.

5.3.13 The air quality assessment has also included receptors in ecological sites sensitive to nitrogen deposition and dust. There are two international/national ecological site designations of relevance to the air quality assessment identified in the Manchester

Piccadilly Station area, namely Rochdale Canal Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI). There are no other relevant local sensitive ecological sites identified close to the Proposed Scheme.

Future baseline

5.3.14 Volume 5: Appendix CT-004-00000 provides details of the developments in the Manchester Piccadilly 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)

5.3.15 Future background pollutant concentrations have been sourced from the Defra background maps for the first year of construction in 2025, which predict NO_2, PM_{10} and $PM_{2.5}$ levels in 2025 to be lower than in the 2018 baseline and within the relevant air quality standards.

5.3.16 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-001-0MA08. 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)

5.3.17 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_2, PM_{10} and $PM_{2.5}$ 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.

5.3.18 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-001-0MA08. 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[19] includes a range of mitigation measures that are accepted by the Institute of Air Quality Management (IAQM) as being suitable to reduce impacts to as low a level as is reasonably practicable. These measures are generally sufficient to avoid any significant effects from dust during construction.

5.4.2 The assessment has assumed that the general measures detailed in Section 7 of the draft CoCP will be implemented. These include:

- contractors being required to manage dust, air pollution, odour and exhaust emissions during construction works;
- inspection and visual monitoring, undertaken in consultation with the local authorities, to assess the effectiveness of the measures taken to control dust and air pollutant emissions;
- cleaning (including watering) of vehicle routes and designated vehicle waiting areas to suppress dust;
- the use of water spray systems on demolition sites to dampen down fugitive dust;
- keeping soil stockpiles away from sensitive receptors where reasonably practicable, also taking into account the prevailing wind direction relative to sensitive receptors;
- the use of enclosures to contain dust emitted from construction activities; and
- soil spreading, seeding and planting of completed earthworks as soon as reasonably practicable following completion of earthworks.

5.4.3 The draft CoCP includes the requirement for site-specific traffic management measures, such as the use of site haul routes for construction vehicles to minimise the need to use public roads.

5.4.4 Prior to commencement of activities, there will be further detailed assessment for each worksite to determine site specific dust mitigation.

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_2, PM_{10} and $PM_{2.5}$ 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

[19] Volume 5: Appendix CT-002-00000, draft Code of Construction Practice (CoCP).

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_{10}.

5.4.7 The identified risks potentially arising from construction dust within the Manchester Piccadilly Station area are shown in Table 9. 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.

5.4.8 There are no ecological sites located within 50m of dust generating activities or within 50m of a route used by construction traffic that is within 500m of the construction site boundary.

Table 9: Summary of risks for construction dust assessment

Activity	Dust soiling	Human health	Ecological effects
Demolition	High	High	Not applicable
Earthworks	High	Medium	Not applicable
Construction	High	Medium	Not applicable
Trackout	High	Medium	Not applicable

5.4.9 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-001-0MA08 where the scale of dust emissions and the sensitivity of the area and receptors are fully described.

Construction traffic effects

5.4.10 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.

5.4.11 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 include the additional traffic from future committed developments.

5.4.12 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 three construction traffic scenarios assessed in this area.

5.4.13 Receptors expected to experience the greatest change in concentrations have been included in the air quality model. Two modelled residential receptors are predicted to experience significant adverse effects for NO_2 concentrations in the Manchester Piccadilly Station area. These receptors are located on Chapeltown Street, Manchester and Farm Lane, Worsley. The Chapeltown Street receptor is located close to Manchester Piccadilly Station with NO_2 concentrations in this area predicted to be below the air quality standard with or without the Proposed Scheme. However, NO_2 concentrations at the Farm Lane, Worsley receptor are

predicted to exceed the air quality standard without the Proposed Scheme. One modelled residential receptor on Chester Street, Manchester, to the north of the A57(M) Mancunian Way, is predicted to experience a significant beneficial effect for NO_2. No significant effects are predicted in relation to annual mean PM_{10} and $PM_{2.5}$ concentrations.

5.4.14 No significant air quality effects are anticipated at any of the ecological receptors in this area.

Permanent effects

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

Other mitigation measures

5.4.16 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

5.4.17 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_2 concentrations at two residential receptors at Chapeltown Street, Manchester and Farm Lane, Worsley. There will also be a residual significant beneficial effect in relation to NO_2 concentrations at one residential receptor on Chester Street, Manchester.

Cumulative effects

5.4.18 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 and emissions from the operation of combustion plant at buildings.

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 168 roads screened in for further assessment in the Manchester Piccadilly Station area, including the A57(M) Mancunian Way, the A665 Great Ancoats Street and the A6042 Trinity Way.

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_2, PM_{10} and $PM_{2.5}$ are within the relevant air quality standards both with and without the Proposed Scheme.

Combustion plant emissions

5.5.8 The assessment of combustion plant emissions has predicted negligible increases in NO_2 concentrations. The assessment has shown that the flues of the proposed boilers will be of sufficient height to ensure effective dispersion. Therefore, no significant effects are anticipated from the operation of combustion plants in the Manchester Piccadilly Station area.

Other mitigation measures

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

Summary of likely residual significant effects

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

Cumulative effects

5.5.11 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

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

5.5.13 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 Manchester Piccadilly Station 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 Manchester Piccadilly Station 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 Manchester Piccadilly Station area are contained in Volume 5: Appendix CM-001-0MA08.

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: MA08 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)[20].

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)[21] 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.

[20] Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

[21] 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 Due to the large number and relatively high density of public houses, cafes, restaurants and other food outlets in the study area, impacts on these resources are only assessed where the nearest alternative resources are over 1km away, unless they have been identified as highly valued by the local community.

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 route of the Proposed Scheme through the Manchester Piccadilly Station area will be 1km in length and lie within the city of Manchester. The area of Ancoats lies to the north of the Proposed Scheme, and Brunswick and Ardwick lie to the south the Proposed Scheme. The route of the Proposed Scheme will run from Ardwick in the south-east and terminate at the Manchester Piccadilly High Speed station, immediately north of the existing Manchester Piccadilly Station in Manchester city centre.

6.3.2 The area is urban in character and comprises a mix of industrial units, retail units, transport infrastructure and residential flats. The area contains many community and recreational

facilities. These include places of worship, community centres, libraries, medical facilities, care homes, public houses, museums, theatres and sporting venues. Rochdale Canal, Ashton Canal, Bridgewater Canal and the River Medlock run through the area. Towpaths and moorings are associated with recreational use of the canals.

6.3.3 The area immediately north-east of the existing Manchester Piccadilly Station is mostly industrial in character, with warehouses, workshops and showrooms. Several recreational facilities are located in this area: Totem Gymnastics, Cloud Aerial Arts and CrossFit Ancoats are located in Aldow Enterprise Park in Ancoats. While primarily retaining this industrial character, the B6469 Fairfield Street, which runs directly to the south and west of Manchester Piccadilly Station, contains a small number of community resources: the SOL Christian Academy, an independent nursery, primary and secondary school; The Men's Room, an arts and social care agency that works with young men who are ex-offenders, or who may have experienced homelessness, sexual exploitation, or been involved in sex work; Manchester Action on Street Health (MASH), an outreach service for women working in the sex industry in Manchester; and Manchester Offenders Diversion Liaison Service (MO:DEL), a mental health and substance abuse service for mentally ill offenders. True Jesus Church, with a predominantly Chinese congregation, is located on St Andrew's Street; SBG Manchester, a mixed martial arts and Brazilian Jiu Jitsu gym, is located directly behind Manchester Piccadilly Station on Sheffield Street; Frontline Fit Performance Centre, a personal training gym, and the Mancunian Boxing Club, a not-for-profit community boxing club, are located on North Western Street.

6.3.4 To the south and west of Manchester Piccadilly Station there are several other community resources within the study area. There are buildings for the University of Manchester, City College Manchester and Manchester Metropolitan University. Other community facilities include: Echoes Day Nursery, a sports ground, Projekts MCR skate park, Brydon Court Homeless Centre on Union Street, and Greater Manchester Youth Network on Ardwick Green.

6.3.5 The area includes a number of open spaces, including Piccadilly Gardens to the north-west, and Sackville Gardens and Vimto Park to the west of the Proposed Scheme. Medlock Valley Way runs adjacent to the River Medlock, to the south of the Proposed Scheme, along with Cheshire Ring Canal Walk to the north-west of the Proposed Scheme.

Future baseline

Construction (2025)

6.3.6 Volume 5: Appendix CT-004-00000 provides details of the developments in the Manchester Piccadilly Station 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 10.

Table 10: Committed developments of relevance to community during construction

Map book reference[22]	Planning reference	Description	How this is considered in the assessment
MA08/222	111998/FO/2016	Location: Cheetwood House Newton Street Manchester M1 1FZ Change of use and internal/external works to the building, including the installation of four air conditioning units on the roof, to create 16 apartments (use class C3) on the first, second, third and fourth floors, with commercial uses including retail (use class A1), cafe (use class A3) and mixed use restaurant/takeaway (sui generis) provided at ground floor and basement level.	Informing future baseline
MA08/251	116793/P3OPA/2017	Location: 12 Minshull Street Manchester M1 3FR Prior notification of change of use from offices (Class B1) to apartments (use class C3) comprising 39 no. studios.	Informing future baseline
MA08/098	115178/FO/2017	Location: Part Site Of Existing Car Park Bounded By Ducie Street, The Rochdale Canal, Peak Street, Tariff Street (Multi-Storey Car Park) And Remainder Of Surface Car Park Manchester M1 2JL Erection of two linked buildings ranging in height from 8 to 10-storeys (plus roof top plant room) to provide residential accommodation (Use Class C3) comprising 128 units in total. Works to create provision for access and servicing, hard and soft landscaping (to include a secure external area and public realm linking Ducie Street to the Rochdale Canal) and associated works following the demolition of existing buildings. Development to include 128 cycle parking spaces.	Informing future baseline
MA08/092	119364/P3OPA/2018	Location: Outram House Piccadilly Village Great Ancoats Street Manchester M4 7AA Prior notification of change of use from offices (Class B1) for change of use to apartments (use class C3) comprising 43 no. studios.	Informing future baseline
MA08/212	120149/FO/2018	Location: Car Park Between 57 And 59 Ducie Street Manchester M1 2JQ Erection of 7 to 8 storey residential building (Class C3) to provide 41 apartments (7 x 1-bedroom 1-person apartments, 6 x 1-bedroom 2-person apartments, 6 x 2-bedroom 3-person apartments, 22 x 2-bedroom 4-person apartments) with associated landscaping and other works.	Informing future baseline
MA08/180	122296/FO/2019	Location: Units 3A / 3B Ground Floor 3 Piccadilly Place Manchester M1 3BN Change of use of ground floor to higher education institution (class D1), together with insertion of a new mezzanine floor amounting to 365 sqm and the installation of two external louvres.	Informing future baseline

[22] Volume 5: Planning Data/Committed Development Map Book: Map CT-13-327 to CT-12-328.

Map book reference[22]	Planning reference	Description	How this is considered in the assessment
MA08/253	125038/FU/2019	Location: 92 Temperance Street, Manchester, M12 6HU Change of use from a warehouse to a dance studio (Use Class D2).	Informing future baseline
MA08/255	122000/FO/2018	Location: Victoria House, Great Ancoats Street, Manchester, M4 7AB Erection of a part 25 part 3 storey residential tower (Use Class C3) for 177 apartments comprising 59 x 1 bed (34 x 1 bed 1 person and 25 1 bed 2 person), 113 x 2 bed (44 x 2 bed 3 person and 69 x 2 bed 4 person) and 5 x 3 bed (3 bed 5 person) with ground floor commercial space (Use Class A1, A2, A3, A4 and D1) above partial basement level associated shared amenity spaces at 3rd floor level, realm enhancements following demolition of existing buildings.	Informing future baseline
MA08/342	119374/FO/2018	Location: Mindel House (10 Minshull Street) And 11 Bloom Street Manchester M1 3EF Change of use and alterations to Mindel House and 11 Bloom Street to accommodate 80 apartments (Use class C3) including single storey roof top extension to 11 Bloom Street.	Informing future baseline
MA08/361	126608/FO/2020	Location: Land to the South of Store Street Manchester M1 2NE Erection of part 4, part 11 storey residential (Class C3) development (with roof top plant room) comprising 66 (Class C3) residential units (3 x 2 bed town houses, 46 x two bed apartments and 17 x one bed apartments) together with associated car parking (10 spaces including 5 EVC spaces), cycle parking (66 spaces) communal roof terrace (level 6), landscaping and ancillary infrastructure including rooftop PV panels, alterations to access onto Store Street.	Informing future baseline
MA08/402	128191/FO/2020	Location: Land Bounded by Ashton Canal, Great Ancoats Street, Munday Street and Pollard Street Manchester M4 7DS Erection of five office buildings and new public realm comprising: 3 no. 8 storey mixed use buildings (Buildings A, D and E) comprising workspaces (Use Class E) together with flexible uses at ground floor (Use Class E) and/or theatre/bar (Sui Generis) together with a multi use rooftop amenity area to Building A; and 2 no. 5 storey mixed use buildings (Buildings B and C) comprising workspaces (Use Class E) together with flexible uses at ground floor (Use Class E) and/or theatre/bar (Sui Generis); together with cycle parking, creation of pedestrian and cycle routes, external amenity spaces, new public realm and other associated engineering and infrastructure works.	Informing future baseline

6.3.7 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:

- MA08/222 will result in a residential development located immediately north-west of the land required for the construction of the Proposed Scheme;
- MA08/247 will result in a residential development located immediately west of the land required for the construction of the Proposed Scheme;
- MA08/098 will result in a residential development located immediately north of, and partially within, the land required for the construction of the Proposed Scheme;
- MA08/092 will result in a residential development located immediately south of the land required for the construction of the Proposed Scheme;
- MA08/212 will result in a residential development located immediately north of the land required for the construction of the Proposed Scheme;
- MA08/180 will result in a new higher education facility located immediately west of the land required for the construction of the Proposed Scheme;
- MA08/253 will result in a new dance studio located immediately south of the land required for the construction of the Proposed Scheme;
- MA08/255 will result in a residential development located immediately south of the land required for the construction of the Proposed Scheme;
- MA08/342 will result in a residential development located 100m to the west of the land required for the construction of the Proposed Scheme;
- MA08/361 will result in a residential development located immediately south of the land required for the construction of the Proposed Scheme; and
- the implementation of committed development MA08/402 will result in a mixed-use development partially within the land required for the construction of the Proposed Scheme.

Operation (2038)

6.3.8 Volume 5: Appendix CT-004-00000 also provides details of the developments in the Manchester Piccadilly Station area that are assumed to have been implemented by 2038. No 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 draft Code of Construction Practice (CoCP)[23] 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).

Assessment of impacts and effects

Temporary effects

Residential properties

6.4.2 Construction of the Proposed Scheme will be in proximity to approximately 390 residential properties in the vicinity of Chapeltown Street. The construction of Manchester Piccadilly High Speed station, Piccadilly station viaduct and highways works will result in significant noise, vibration and visual effects. Significant noise effects will occur for approximately seven years and nine months and significant vibration effects will occur for approximately five months. Chapeltown Street is expected to experience a significant increase in HGV traffic movements between Sparkle Street and the A665 Great Ancoats Street. In addition, 150 of the 390 properties will also be affected by significant noise effects from traffic. Together

[23] Volume 5: Appendix CT-002-00000, draft Code of Construction Practice (CoCP).

these noise, vibration, visual and HGV traffic effects will result in a major adverse in-combination effect on amenity for residents at these properties, which is significant.

6.4.3 Construction of the Proposed Scheme will be in proximity to approximately 360 residential properties in the vicinity of Pollard Street. The construction of New Islington turnback facility and highways works will result significant noise and visual effects. Significant noise effects will occur for approximately two years and 11 months. The A662 Pollard Street and the A665 Great Ancoats Street are designated routes for construction traffic to enable access to construction compounds around the existing Manchester Piccadilly Station. A significant increase in HGV traffic movements is expected along the A662 Pollard Street and the A665 Great Ancoats Street (between Helmet Street and Adair Street). 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.

6.4.4 Construction of the Proposed Scheme will be in proximity to approximately 800 residential properties in the vicinity of New Islington (in the vicinity of Old Mill Street). The construction of New Islington turnback facility will result significant noise and visual effects. Significant noise effects will occur for approximately one year 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 approximately 215 residential properties in the vicinity of Ducie Street. The construction of Manchester Piccadilly High Speed station, utility and highways works will result in significant noise, vibration and visual effects. Significant noise effects will occur for approximately 11 months and significant vibration effects will occur for approximately five months. Ducie Street is a designated route for construction traffic to enable access to construction compounds around the existing Manchester Piccadilly Station, and is expected to experience a significant increase HGV traffic movements. Together these noise, vibration, 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

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

Recreational facilities

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

Public open space and recreational routes

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

Permanent effects

Residential properties

6.4.9 No permanent construction effects on residential properties are anticipated in this area.

Community facilities

6.4.10 Construction of Piccadilly approach viaduct will require the demolition of SOL Christian Academy on the B6469 Fairfield Street. This is an independent, co-educational faith (Pentecostal) school with nursery, primary, secondary and sixth-form provision. The school is registered to take up to 50 pupils aged between two and 18 years. It is contained in an industrial building and is set out across four floors, with five classrooms, a design and technology room, an information technology/language room, a media studio, a recording studio, a playing area, a multi-purpose hall and a common space. The building is also used by Source of Life, a community church, by SOL station TV, a broadcasting station and by pupils from the wider community. In addition, the hall in the building is available for weddings and community events. The school also hosts H Pan International, a charitable arm of the organisation that focuses on youth and community work, and hosts events every month. There are no resources in the local area which offer the same curriculum and wider facilities. Therefore, the loss of this facility in this location will result in a major adverse effect, which is significant.

6.4.11 Construction of Piccadilly approach viaduct will require the demolition of MO:DEL on the B6469 Fairfield Street. MO:DEL is an NHS mental health and substance abuse service for ex-offenders. MO:DEL works with adults with a history of offending, substance misuse and mental health conditions to seek treatment and reduce re-offending. It offers mental health assessment, risk assessment and case management for up to 150 patients for a period of up to six months. Services are available for all residents of Manchester covering the whole criminal justice pathway, and users who are not from the area but consider themselves Manchester residents. The Fairfield Street site acts as a central hub for the service. Greater Manchester Mental Health NHS Foundation Trust operates similar services in Bolton, Salford and Trafford. However, these services are smaller than MO:DEL and do not cover Manchester city centre. Therefore, the loss of this service in this location will result in a major adverse effect, which is significant.

6.4.12 Construction of Piccadilly approach viaduct will require the demolition of a property occupied by MASH on the B6469 Fairfield Street. MASH is a charity outreach service for women working in the sex industry in Manchester, offering sexual health services, needle exchanges, life skills support, counselling and advice. The drop-in centre is open for both afternoon and evening sessions, offering a venue for women to access a variety of resources. MASH also runs outreach programmes across Manchester and Bury and a telephone advice line. In 2017/2018, MASH engaged with more than 700 women, many of whom spoke English as a second language. There are no comparable service providers in Manchester, and the service provided by MASH is unique in the North West region.

Therefore, the loss of this service in this location will result in a major adverse effect, which is significant.

6.4.13 Construction of Piccadilly approach viaduct will require the demolition of the True Jesus Church on St Andrew's Street. The church has approximately 40 regular congregants, the majority of whom are Chinese. The church is run by volunteers and worship takes place on Saturdays. It offers education classes for children, Bible study courses and gospel choir classes as well as informal social events. Due to its specific links with Manchester's Chinese community, comparable alternative resources are not available nearby. Therefore, the loss of this facility in this location will result in a major adverse effect, which is significant.

Recreational facilities

6.4.14 Construction of Piccadilly approach viaduct will require the demolition of Totem Gymnastics in Aldow Enterprise Park on Blackett Street. Totem Gymnastics runs gymnastics classes for children after school during the week and during the day on Saturdays. It also offers soft play sessions for toddlers and gymnastics classes for children with autism. There are no alternatives in Manchester city centre. The nearest alternatives are in Salford and Droylesden. Therefore, the loss of this facility in this location will result in a major adverse effect, which is significant.

6.4.15 Construction of Piccadilly approach viaduct will require the demolition of Cloud Aerial Arts in Aldow Enterprise Park on Blackett Street. Cloud Aerial Arts offers aerial, circus, acrobatic and dance classes for adults. There are no alternatives that offer the same mixture and number of classes in Manchester city centre. Therefore, the loss of this facility in this location will result in a major adverse effect, which is significant.

6.4.16 The construction of Piccadilly approach viaduct will require the demolition of CrossFit Ancoats in Aldow Enterprise Park on Blackett Street. CrossFit Ancoats provides cross fit classes and training seven days a week. There are two alternatives to the north and to the south-west of Manchester city centre. However, CrossFit Ancoats is the only CrossFit gym in the southern and eastern part of the city. Therefore, the loss of this facility in this location will result in a moderate adverse effect, which is significant.

6.4.17 The B6469 Fairfield Street diversion and the construction of a new station access ramp will require the permanent closure of North Western Street, between Chapelfield Road and Hoyle Street. Frontline Fit Performance Centre is located on this section of North Western Street. Frontline Fit Performance Centre is a gym providing a range of individual and group personal training packages, as well as online workout programmes, nutritional health assessments and infrared sauna therapy. The permanent closure of North Western Street will mean that the gym will become physically isolated, with no vehicular or pedestrian access. The road closure will affect the ability of staff and customers to access the premises, therefore affecting its ability to operate. There are several alternative gyms in the vicinity of Frontline Fit Performance Centre. However, these do not offer the same services. Therefore, as the gym will no longer be able to operate from these premises and will close, this will result in a moderate adverse effect which is significant.

6.4.18 Construction of Piccadilly Station viaduct will require the permanent closure of Sheffield Street. Sheffield Street provides the only pedestrian and vehicular access to SBG Manchester, a gym that offers drop-in classes in mixed martial arts, Brazilian ju jitsu, boxing, kickboxing, fitness and self-defence. The permanent closure of Sheffield Street will mean that the gym will become physically isolated, with no vehicular or pedestrian access. The road closure will affect the ability of staff and customers to access the premises, therefore affecting its ability to operate. There are several alternative gyms and exercise centres in the vicinity of SBG Manchester. However, these do not offer the same mix of specialist classes. Therefore, as the gym will no longer be able to operate from these premises and will close, this will result in a moderate adverse effect, which is significant.

Public open space and recreational routes

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

Other mitigation measures

6.4.20 HS2 Ltd is continuing to engage with owners and operators of a number of facilities, including SOL Christian Academy, MO:DEL, MASH, True Jesus Church, Frontline Fit Performance Centre and SBG Manchester to identify reasonably practicable measures to help mitigate the likely significant effects identified in this assessment.

6.4.21 HS2 Ltd will engage with owners and operators of a number of facilities, including Totem Gymnastics, Cloud Aerial Arts and CrossFit Ancoats, 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 390 residential properties in the vicinity of Chapeltown Street, due to the combination of noise, vibration, visual and HGV traffic effects;
- approximately 360 residential properties in the vicinity of Pollard Street, due to the combination of noise, visual and HGV traffic effects;
- approximately 800 residential properties in the vicinity of New Islington, due to the combination of noise and visual effects; and
- approximately 215 residential properties in the vicinity of Ducie Street, due to the combination of noise, vibration, 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 SOL Christian Academy;
- loss of MO:DEL;

- loss of MASH;
- loss of True Jesus Church;
- loss of Totem Gymnastics;
- loss of Cloud Aerial Arts;
- loss of CrossFit Ancoats;
- loss of Frontline Fit Performance Centre; and
- loss of SBG Manchester.

Cumulative effects

6.4.24 No temporary or permanent cumulative effects have been identified in the Manchester Piccadilly Station area.

6.5 Effects arising from operation

Avoidance and mitigation measures

6.5.1 Measures have been incorporated into the Proposed Scheme design as part of the design development process to avoid or reduce environmental impacts during operation, this includes landscape mitigation planting to the north of Ardwick embankment, along Manchester to Leeds embankment and Ardwick cutting to integrate the Proposed Scheme into the surrounding landscape.

Assessment of impacts and effects

6.5.2 No operational effects are anticipated in the Manchester Piccadilly Station area.

Other mitigation measures

6.5.3 The above assessment has concluded there are no significant adverse effects arising during operation, therefore no further mitigation is proposed.

Summary of likely residual significant effects

6.5.4 There will be no significant residual effects in the Manchester Piccadilly Station area.

Cumulative effects

6.5.5 Community-wide effects occur where a combination of effects on individual resources come together within a location and have a wider impact on the community, such that they change the experience of a considerable proportion of people within that community.

6.5.6 Land immediately to the north to Manchester Piccadilly Station will be the north-eastern terminus of the Proposed Scheme. It is considered that the development of Manchester

Piccadilly High Speed station will provide a community-wide benefit in regard to improvements to the public realm, accessibility and the contribution it will make to the regeneration of the Manchester Piccadilly Station area.

Monitoring

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

6.5.8 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 Manchester Piccadilly Station 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 Wildlife Trust for Lancashire, Manchester & North Merseyside and Greater Manchester Ecology Unit. 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-015-0MA08) and
- documents to support the Habitat Regulations Assessment (HRA) Screening Report and Appropriate Assessment for the Rochdale Canal Special Area of Conservation (SAC) (Volume 5: Appendix EC-016-00004).

7.1.4 Map Series EC-01 showing statutory and non-statutory designated sites of relevance to the assessment in the Manchester Piccadilly Station 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: MA08 Map Book.

7.1.6 In addition, ecological baseline information relating to habitats and species recorded in the Manchester Piccadilly Station area is set out in Background Information and Data (BID)[24] (BID EC-002-00001 to BID EC-014-00001[25]) and accompanying Map Series EC-02 and EC-04 to EC-12 (BID Ecology Map Books).

7.1.7 The Proposed Scheme is described in Section 2.

[24] 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.

[25] Note that BID EC-014-00001 contains data on badgers and is not published.

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)[26] 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-003-0MA08 – Water resource assessment and WR-005-0MA08 – Flood assessment.

7.2.3 Surveys for species potentially present in central Manchester have been carried out where access was obtained. However, access could not be gained in time for seasonally constrained surveys for bats within a number of structures at Manchester Piccadilly Station. Further details are provided in BID EC-002-00001 to BID EC-014-00001.

7.2.4 Where data are limited, such as due to the absence of field surveys, a precautionary baseline has been built up according to the guidance reported in the SMR. This constitutes a 'reasonable worst case' basis for the subsequent assessment and development of mitigation.

7.2.5 BID EC-002-00001 to BID EC-014-00001 identifies these survey locations. Where the assessment has been based upon limited data, the ecological receptor is described as 'of up to' a specific value to indicate that a precautionary approach has been applied.

7.2.6 The precautionary approach to the assessment that has been adopted identifies the likely significant ecological effects of the Proposed Scheme. Use of the precautionary approach ensures that any limitations arising from the age of datasets are taken into account. Unless otherwise stated, the description of effects assumes that land within Bill limits will be subject to habitat loss resulting from development of the Proposed Scheme, with the land required for construction purposes only being reinstated following completion of construction. This includes areas identified specifically for habitat creation.

7.2.7 With respect to utility works, it is normally assumed that all habitat is lost from the land required for the Proposed Scheme. This is assumed to be temporary except for mature woodland and areas of high-quality habitat.

[26] 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-002-00000 to BID EC-015-00000, 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-01-326b 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 Manchester Piccadilly Station area consists of urban habitats, largely comprising buildings and hardstanding with small and fragmented areas of amenity grassland, planted trees and shrubs, and a small area of brownfield land. The River Medlock will be crossed by the route of the Proposed Scheme and is culverted in places. The Ashton Canal is located immediately to the north and west of the land required for the Proposed Scheme.

Designated sites

7.3.3 There is one statutory designated site of international importance of potential relevance to the assessment in the Manchester Piccadilly Station area. This is the Rochdale Canal Special Area of Conservation (SAC), which covers an area of 24.9ha. This SAC is designated for extensive colonies of floating water-plantain, which is an Annex II species (a species for which sites can be designated, as listed in Annex II of the EU Habitats Directive). The SAC is close to a number of roads on which there will be an increase traffic volume as a result of the Proposed Scheme. It is located 4.2km north-east of the land required for the construction of the Proposed Scheme in the Manchester Piccadilly Station area. This site is also relevant to the Davenport Green to Ardwick area (MA07), where it is 2.7km north-east of works to an underground high voltage power line.

7.3.4 There are two nationally important Site of Special Scientific Interest (SSSI) that are of potential relevance to the assessment in the Manchester Piccadilly Station area. They are:

- Rochdale Canal SSSI, covering an area of 25.6ha, with a boundary largely similar to Rochdale Canal SAC. The Rochdale Canal SSSI is designated for important habitats for submerged aquatic plants and emergent vegetation. The canal supports a rich assemblage of mainly common invertebrates, with over 112 recorded species, of which 13 species are of local importance. A number of waterside bird species, including grey wagtail and kingfisher, are also present. The SSSI is close to a number of roads on which

there will be an increase traffic volume as a result of the Proposed Scheme. It is located 4.2km north-east of the land required for the construction of the Proposed Scheme in the Manchester Piccadilly Station area. This site is also relevant to the Davenport Green to Ardwick area (MA07) assessment, where it is 2.7km north-east from an underground high voltage power line; and

- Hollinwood Branch Canal SSSI, covering an area of 3.3ha, is designated for mesotrophic standing water system. The main habitats are open water, swamp and tall fen. Damp unimproved neutral grassland occurs on the eastern bank and unimproved neutral grassland, scattered trees and shrubs and a hedge to the west. As a consequence of the high water quality and profile of the canal, the open water plant communities are diverse and contain several regionally and nationally rare species. It is of relevance due to changes in traffic flows on the M60 as a result of the Proposed Scheme, which is situated 26m to the west of the SSSI in the Davenport Green to Ardwick area (MA07). It is 5.5km north-east of the land required for the construction of the Proposed Scheme in the Manchester Piccadilly Station area.

7.3.5 There are two Sites of Biological Interest (SBI) that are of potential relevance to the assessment in the Manchester Piccadilly Station area, each of which is of county/metropolitan value. They are:

- Ashton Canal (West) SBI, covering an area of 8.5ha and comprising part of the Ashton Canal. It is designated for its submerged aquatic flora, bank-side vegetation, invertebrate assemblage, breeding bird species and its value as a wildlife corridor. The SBI is located adjacent to the land required for the construction of the Proposed Scheme and Ducie Street, Store Street and Gibson Street, all of which cross the SBI and are all identified for use as construction traffic routes; and
- Rochdale Canal, Stott's Lane-Ducie Street Basin SBI, covering an area of 8.9ha, is connected to Rochdale Canal - Lock at Scowcroft Farm to Stott's Lane SBI, both measuring a total of 12km in length. This latter SBI comprises part of the Rochdale Canal SSSI and SAC. Rochdale Canal, Stott's Lane-Ducie Street Basin SBI is designated for its aquatic habitats and flora, including populations of floating water-plantain. Other species noted include water vole, five species of coarse fish and breeding birds. The SBI is located adjacent to the land required for the construction of the Proposed Scheme and the A665 Great Ancoats Street, which crosses the SBI and is identified as a construction traffic route.

7.3.6 There are no Ancient Woodland Inventory sites of potential relevance to the assessment in the Manchester Piccadilly Station area.

Habitats

7.3.7 The following habitat types that occur in this area are relevant to the assessment.

Woodland

7.3.8 Semi-natural broadleaved woodland covering an area of over 7ha is located adjacent to the land required for the construction of the Proposed Scheme north and west of the A665 Pin Mill Brow and adjacent to the River Medlock. This woodland contains abundant poplar hybrids, with occasional goat willow, ash, silver birch and sycamore. Also present within this woodland are areas where oak is dominant over a hawthorn understorey, with a sparse ground flora layer of ivy and bare soil. Himalayan balsam is also present within the woodland ground flora. This woodland habitat is of up to local/parish value.

Grassland

7.3.9 Semi-improved grassland, covering an area of 200m^2, occurs within a park south of Palmerston Street and east of the A665 Pin Mill Brow, adjacent to the land required for the construction of the Proposed Scheme. This grassland comprises abundant bent grass species and red fescue with frequent cock's foot and Yorkshire fog. A relatively diverse range of broadleaved herbs is present, including lesser trefoil, white clover, red clover, ragwort, common mouse-ear, ribwort plantain, ox-eye daisy and meadow vetchling. Areas of semi-improved grassland are of local/parish value.

Watercourses

7.3.10 Piccadilly approach viaduct, as part of the route of the Proposed Scheme, will cross over the River Medlock. The section of the river in the vicinity of the land required for the construction of the Proposed Scheme is considered unlikely to qualify as a habitat of principal importance and is of local/parish value. This is due to the largely canalised nature of the section of the river within and immediately downstream of the land required for the Proposed Scheme, which supports limited aquatic vegetation.

7.3.11 The Ashton Canal (West) SBI and Rochdale Canal, Stott's Lane-Ducie Street Basin SBI are adjacent to the land required for the construction of the Proposed Scheme. Ducie Street, Store Street and Gibson Street, all of which cross the SBI where the canals flow beneath existing bridges and an aqueduct are identified for use as construction traffic routes. The canals are of county/metropolitan value.

Scrub

7.3.12 Several small areas of scrub located between industrial and commercial buildings totalling 300m^2 are within the land required for the construction of the Proposed Scheme. These areas of scrub habitat are considered to be of local/parish value.

Protected and/or notable species

7.3.13 A summary of the likely value of protected and/or notable species of relevance to the assessment is provided in Table 11.

Table 11: Protected and/or notable species within the Manchester Piccadilly Station area

Resource/ feature	Value	Receptor	Baseline and rationale for valuation
Birds	Regional	Black redstart population within the Manchester Piccadilly Station area	There are 91 desk study records of black redstart within 2km of the land required for the construction of the Proposed Scheme since 2009. These include confirmed presence of a single adult female black redstart within 7m of the land required for construction of the Proposed Scheme. Field surveys recorded a single singing male black redstart within the Manchester Piccadilly Station area adjacent to the land required for the construction of the Proposed Scheme. Black redstart are a Schedule 1 species and a conservation priority of the local Biodiversity Action Plan (BAP). The UK population of black redstart is considered to fluctuate between 80 and 100 pairs. There is a small but important breeding population of black redstarts in Manchester city centre, with possibly as few as two or three breeding pairs. Due to the large-scale redevelopment of city centre sites, the black redstart population within Greater Manchester is considered to be declining or threatened with decline.
Birds	Up to county/ metropolitan	Peregrine falcon population within the Manchester Piccadilly Station area	There is a desk study record of peregrine falcon within 2km of the land required for the construction of the Proposed Scheme. Peregrine falcon is a Schedule 1 species and a conservation priority of the local BAP. Peregrine falcon nest on buildings in Manchester city centre.
Bats	Up to county/ metropolitan	Bat assemblage associated with the habitats in the Manchester Piccadilly Station area	• Desk study records confirmed the presence of a single common pipistrelle and two *Pipistrellus* species maternity roosts, and a single *Pipistrellus* species hibernation roost in commercial properties and the viaducts at the existing Manchester Piccadilly Station within the land required for the construction of the Proposed Scheme. • There are numerous desk study records for common pipistrelle, soprano pipistrelle and noctule. • Field surveys confirmed the presence of common pipistrelle, soprano pipistrelle, and noctule within this assemblage. • No roosts have been recorded during the field survey of accessible habitats. • The assemblage is considered to be of up to county/metropolitan value on the basis that the presence of maternity and hibernation roosts are important to maintain local bat populations.

Resource/ feature	Value	Receptor	Baseline and rationale for valuation
Water vole	Up to county/ metropolitan	Water vole populations within Rochdale Canal and Ashton Canal	The desk study includes records of water vole within Ashton Canal recorded in 1998, which will be crossed by a construction traffic route and is adjacent to the land required for the construction of the Proposed Scheme. Rochdale Canal and Ashton Canal connect adjacent to the land required for construction of the Proposed Scheme. Water vole are widespread and locally common in Greater Manchester[27] and there are also desk study records in the local area. However the findings of the Northwest Lowlands Water Vole Project (Powell and Milburn, 2011[28]), suggest that water vole is largely absent due to the presence of mink coupled with encroachment by invasive plants, including Himalayan balsam[29] and Japanese knotweed, and a lack of suitable burrowing sites due to engineered banks.

[27] Cheshire Wildlife Trust (n/a), *Water vole Local Biodiversity Action Plan.* Available online at: https://www.cheshirewildlifetrust.org.uk/sites/default/files/2018-06/Water%20vole.pdf.

[28] Powell, A. and Milburn, K. (2011), *Northwest Lowlands Watervole Project, Final Report*, June 2011.

[29] The Invasive Alien Species (Enforcement and Permitting) Order (2019). Available online at: http://www.legislation.gov.uk/uksi/2019/527/contents/made.

Future baseline

Construction (2025)

7.3.14 Volume 5: Appendix CT-004-00000 provides details of the developments in the Manchester Piccadilly Station area that are assumed to have been implemented by 2025.

7.3.15 No committed developments have been identified in this study area that will materially alter the baseline conditions in 2025 for ecology and biodiversity.

Operation (2038)

7.3.16 Volume 5: Appendix CT-004-00000 provides details of the developments in the Manchester Piccadilly Station area that are assumed to have been implemented by 2038.

7.3.17 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 There are no specific measures currently identified to avoid or mitigate ecological effects during construction of the Proposed Scheme in the Manchester Piccadilly Station area.

7.4.2 The assessment assumes implementation of the measures set out within the draft Code of Construction Practice[30] (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;

[30] Volume 5: Appendix CT-002-00000, draft Code of Construction Practice.

- 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-015-0MA08.

Designated sites

7.4.5 Changes in traffic movements on roads near to the Rochdale Canal SAC in the Davenport Green to Ardwick area (MA07) will increase nitrogen deposition which could result in adverse effects on floating water-plantation *Luronium natans*, which is the sole reason for designation of the Rochester SAC. This is reported in Volume 2, Community Area report: Davenport Greet to Ardwick area (MA07), Section 7. On the information currently available, it has not been possible to rule out adverse effects from nitrogen deposition, and on a precautionary basis it is therefore concluded that there may be an adverse effect on the SAC that is significant at the international level. Further assessment will be carried out in accordance with Article 6(3) of the Habitats Directive.

7.4.6 Rochdale Canal SSSI is coincident with the SAC. On a precautionary basis it is concluded that the increase nitrogen deposition in the Davenport Green to Ardwick area (MA07), will result in an adverse effect on aquatic plant communities in the SSSI that is significant at the national level. This is reported in Volume 2, Community Area report: Davenport Green to Ardwick area (MA07), Section 7.

7.4.7 The Hollinwood Branch Canal SSSI is 26m west of the M60, on which traffic flows will increase as a result of the Proposed Scheme. As reported in Volume 2, Community Area report: Davenport Green to Ardwick (MA07), Section 7, there will no adverse effects on the SSSI from the additional nitrogen deposition form the increase in traffic, as it does not exceed critical loads for this site.

Species

Bats

7.4.8 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.

7.4.9 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 measures that are described in the draft CoCP will reduce potential disturbance effects to a level that is not significant.

7.4.10 Construction works will affect the common and soprano pipistrelle populations, which are component species of the bat assemblage associated with habitats near the land required for the construction of the Proposed Scheme. Habitats immediately adjacent to the land required for the construction of the Proposed Scheme that are utilised by foraging and commuting bats, such as those along the River Medlock upstream of the existing Manchester Piccadilly Station and along Ashton Canal and Rochdale Canal, will not be affected. Disturbance and the potential loss of maternity roosts of common and widespread species will result in a permanent adverse effect on populations in the vicinity of the existing Manchester Piccadilly Station, which will be significant at up to the county/metropolitan level.

Birds

7.4.11 Construction of Manchester Piccadilly High Speed station and Piccadilly station approach viaduct will result in the disturbance of black redstart and peregrine falcon nesting habitat, which is adjacent to the land required for the construction of the Proposed Scheme. This habitat takes the form of ledges associated with the multiple flat roof buildings. However, there is extensive alternative nesting habitat in the area and the habitat loss is, therefore, not considered to affect the conservation status of any population that may be present. In addition, the draft CoCP includes controls to prevent the disturbance of breeding birds during construction. The loss of habitat will not result in a significant effect on the conservation status of black redstart or peregrine falcon.

Other mitigation measures

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

Habitats

Grassland

7.4.13 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. 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.

7.4.14 As described in the Volume 2, Community Area report: Davenport Green to Ardwick area (MA07), Section 7, 1ha of species-rich grassland will be created adjacent to the River Medlock in the Manchester Piccadilly Station area, to compensate for the loss of 0.4ha of semi-improved grassland within the Davenport Green to Ardwick area (MA07), to the north of Ardwick depot.

Species

Bats

7.4.15 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. This will address the potential for loss or disturbance of maternity roosts of common and soprano pipistrelle bats, which are component species of the bat assemblage in the vicinity of the existing Manchester Piccadilly Station. Following the implementation of these measures, the effects on the populations of common and soprano pipistrelle bats will be reduced to a level that is not significant.

Summary of likely residual significant effects

7.4.16 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.

Cumulative effects

7.4.17 No cumulative effects on ecological receptors have been identified in the Manchester Piccadilly Station area.

7.5 Effects arising from operation

Avoidance and mitigation measures

7.5.1 There are no specific measures currently identified to avoid or mitigate ecological effects during operation of the Proposed Scheme within the Manchester Piccadilly Station area.

Assessment of impacts and effects

7.5.2 It is considered that there would be no impacts and effects on ecological features during operation of the Proposed Scheme within the Manchester Piccadilly Station area at the district/borough level or above.

7.5.3 Significant effects on ecological features at the local/parish level are listed in Volume 5 Appendix: EC-015-0MA08.

Summary of likely residual significant effects

7.5.4 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.

Cumulative effects

7.5.5 No cumulative effects on ecological receptors have been identified in the Manchester Piccadilly Station area.

Monitoring

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

7.5.7 There are no area-specific requirements for monitoring ecology and biodiversity effects or mitigation during the operation of the Proposed Scheme in the Manchester Piccadilly Station area.

8 Health

8.1 Introduction

8.1.1 This section identifies the communities within the Manchester Piccadilly Station area that will be subject to impacts associated with the Proposed Scheme and describes how these impacts are likely to affect the health and wellbeing of people within these communities, where these effects are considered to be consequential.

8.1.2 Engagement with key public health bodies, including Public Health England and local Directors of Public Health, has been undertaken to inform the health assessment process. Consultation with communities, local authorities and parish councils has been ongoing throughout the route design and assessment process, as described in Volume 1, Section 3. This has contributed to the measures identified to avoid and mitigate adverse health effects.

8.1.3 The assessment also draws on health-related information and views expressed in consultation responses from the owners and/or operators of the following affected resources within the Manchester Piccadilly Station study area:

- SOL Christian Academy;
- Manchester Action on Street Health (MASH);
- Manchester Offenders: Diversion Engagement and Liaison (MO:DEL);
- True Jesus Church; and
- Straight Blast Gym (SBG Manchester).

8.1.4 This section deals specifically with impacts at a local level within the Manchester Piccadilly Station 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)[31], are contained in Volume 5: Appendix HA-001-0MA08 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: MA08 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.

[31] Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

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.

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-001-0MA08. 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 Manchester Piccadilly Station area during construction (temporary and permanent impacts) are:

- neighbourhood quality;
- access to services, health and social care;
- access to green space, recreation and physical activity; and
- education.

8.2.5 No specific operational health effects have been identified for the Manchester Piccadilly Station area.

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 Manchester Piccadilly Station area

8.3.1 The route of the Proposed Scheme in the Manchester Piccadilly Station area will be 1km in length and lie within the local authority areas of Manchester City Council (MCC) and Greater Manchester Combined Authority (GMCA). It will extend from Ardwick in the south-east, passing close to the settlements of Brunswick to the south, and Manchester city centre and Ancoats to the north of Manchester Piccadilly Station. A more detailed description of community facilities is provided in Section 6, Community.

8.3.2 There are several community facilities which lie within the land required for the Proposed Scheme: the SOL Christian Academy, an independent nursery, primary and secondary school; The Men's Room, an arts and social care agency that works with young men who are ex-offenders, or who may have experienced homelessness, sexual exploitation, or been involved in sex work; MASH, an outreach service for women working in the sex industry in Manchester; and MO:DEL, a mental health and substance abuse service for mentally ill offenders. Also within the land required for the Proposed Scheme are True Jesus Church, with a predominantly Chinese congregation, which is located on St Andrew's Street, SBG Manchester, a mixed martial arts and Brazilian Jiu Jitsu gym, which is located directly behind Manchester Piccadilly Station on Sheffield Street; Frontline Fit Performance Centre, a personal training gym, and the Mancunian Boxing Club, a not-for-profit community boxing club, which are located on North Western Street. North-east of the existing Manchester Piccadilly Station and within the land required for the construction of the Proposed Scheme are: Totem Gymnastics, a children's gymnastics club; Cloud Aerial Arts, which offers a range of gymnastic and acrobatic classes; and CrossFit Ancoats, a CrossFit gym serving the eastern suburbs of Manchester.

8.3.3 To the south and west of the Proposed Scheme there are several other community resources within the study area. There is one day nursery (Echoes Day Nursery on Echo

Street). There are buildings for the University of Manchester, City College Manchester on the B6469 Whitworth Street and Manchester Metropolitan University on Chorlton Street.

8.3.4 Recreational facilities include a sports ground and a council-run skate park under the A57(M) Mancunian Way. Other notable community facilities include Brydon Court Homeless Centre on Union Street and Greater Manchester Youth Network on Ardwick Green.

8.3.5 The areas north and east of the land required for the Proposed Scheme mainly comprises industrial and commercial land and premises.

8.3.6 The area includes a number of open spaces, including Piccadilly Gardens to the north-west, and Sackville Gardens and Vimto Park to the west of the Proposed Scheme. Medlock Valley Way runs adjacent to the River Medlock, to the south of the Proposed Scheme, along with Cheshire Ring Canal Walk to the north-west of the Proposed Scheme.

Demographic and health profile of the Manchester Piccadilly Station area

8.3.7 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.

8.3.8 The communities affected by the Proposed Scheme in the Manchester Piccadilly Station area have a relatively high population density compared to the national average.

8.3.9 Public health indicators have been benchmarked by Public Health England[32] 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 slightly worse health status compared with the English average.

8.3.10 The English Indices of Deprivation[33] rank neighbourhoods from most to least deprived, according to a range of criteria and an overall (combined) ranking. The neighbourhoods in the Manchester Piccadilly Station area are generally more deprived than the national average, falling mainly within the 10% to 50% most deprived bands.

8.3.11 This area as a whole is considered to be 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.

[32] Public Health England (2019), *Local Authority health profiles*. Available online at: https://fingertips.phe.org.uk/profile/health-profiles.

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

8.3.12 The available data provide detail down to local authority and ward level and enable a profile to be made of the population within the Manchester Piccadilly Station 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)

8.3.13 Volume 5: Appendix CT-004-00000 provides details of the developments in the Manchester Piccadilly Station 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 12.

Table 12: Committed developments of relevance to health during construction

Map book reference[34]	Planning reference	Description	How this is considered in the assessment
MA08/222	111998/FO/2016	Location: Cheetwood House Newton Street Manchester M1 1FZ Change of use and internal/external works to the building, including the installation of four air conditioning units on the roof, to create 16 apartments (use class C3) on the first, second, third and fourth floors, with commercial uses including retail (use class A1), cafe (use class A3) and mixed use restaurant/takeaway (sui generis) provided at ground floor and basement level.	Informing future baseline
MA08/251	116793/P3OPA/2017	Location: 12 Minshull Street Manchester M1 3FR Prior notification of change of use from offices (Class B1) to apartments (use class C3) comprising 39 no. studios.	Informing future baseline
MA08/098	115178/FO/2017	Location: Part Site Of Existing Car Park Bounded By Ducie Street, The Rochdale Canal, Peak Street, Tariff Street (Multi-Storey Car Park) And Remainder Of Surface Car Park Manchester M1 2JL Erection of 2 linked buildings ranging in height from 8 to 10 storeys (plus roof top plant room) to provide residential accommodation (Use Class C3) comprising 18 x 1 bed, 84 x 2 bed, 15 x 3 bed, 2 x duplex (4 bed) and 9 townhouses (7 x 3 bed, 1 x 2 bed and 1 x 4 bed) (128 units in total) works to create provision for access and servicing, hard and soft landscaping (to include a secure external area and public realm linking Ducie Street to the Rochdale Canal) and associated works following the demolition of existing buildings. Development to include 128 cycle parking spaces.	Informing future baseline

[34] Volume 5: Planning Data/Committed Development Map Book: Maps CT-13-327 to CT-13-328.

Map book reference[34]	Planning reference	Description	How this is considered in the assessment
MA08/092	119364/P3OPA/2018	Location: Outram House Piccadilly Village Great Ancoats Street Manchester M4 7AA Prior notification of change of use from offices (Class B1) for change of use to apartments (use class C3) comprising 43 no. studios.	Informing future baseline
MA08/212	120149/FO/2018	Location: Car Park Between 57 And 59 Ducie Street Manchester M1 2JQ Erection of 7 to 8 storey residential building (Class C3) to provide 41 apartments (7 x 1-bedroom 1-person apartments, 6 x 1-bedroom 2-person apartments, 6 x 2-bedroom 3-person apartments, 22 x 2-bedroom 4-person apartments) with associated landscaping and other works.	Informing future baseline
MA08/180	122296/FO/2019	Location: Units 3A / 3B Ground Floor 3 Piccadilly Place Manchester M1 3BN Change of use of ground floor to higher education institution (class D1), together with insertion of a new mezzanine floor amounting to 365 sqm and the installation of two no. external louvres.	Informing future baseline
MA08/253	125038/FU/2019	Location: 92 Temperance Street, Manchester, M12 6HU Change of use from a warehouse to a dance studio (Use Class D2).	Informing future baseline
MA08/255	122000/FO/2018	Location: Victoria House, Great Ancoats Street, Manchester, M4 7AB Erection of a part 25 part 3 storey residential tower (Use Class C3) for 177 apartments comprising 59 x 1 bed (34 x 1 bed 1 person and 25 1 bed 2 person), 113 x 2 bed (44 x 2 bed 3 person and 69 x 2 bed 4 person) and 5 x 3 bed (3 bed 5 person) with ground floor commercial space (Use Class A1, A2, A3, A4 and D1) above partial basement level associated shared amenity spaces at 3rd floor level, realm enhancements following demolition of existing buildings.	Informing future baseline
MA08/342	119374/FO/2018	Location: Mindel House (10 Minshull Street) And 11 Bloom Street Manchester M1 3EF Change of use and alterations to Mindel House and 11 Bloom Street to accommodate 80 apartments (Use class C3) including single storey roof top extension to 11 Bloom Street.	Informing future baseline

Map book reference[34]	Planning reference	Description	How this is considered in the assessment
MA08/361	126608/FO/2020	Location: Land to the South of Store Street Manchester M1 2NE Erection of part 4, part 11 storey residential (Class C3) development (with roof top plant room) comprising 66 (Class C3) residential units (3 x 2 bed town houses, 46 x two bed apartments and 17 x one bed apartments) together with associated car parking (10 spaces including 5 EVC spaces), cycle parking (66 spaces) communal roof terrace (level 6), landscaping and ancillary infrastructure including rooftop PV panels, alterations to access onto Store Street.	Informing future baseline

8.3.14 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:

- MA08/222 will result in a residential development located immediately north-west of the land required for the construction of the Proposed Scheme;
- MA08/247 will result in a residential development located immediately west of the land required for the construction of the Proposed Scheme;
- MA08/098 will result in a residential development located immediately north of, and partially within, the land required for the construction of the Proposed Scheme;
- MA08/092 will result in a residential development located immediately south of the land required for the construction of the Proposed Scheme;
- MA08/212 will result in a residential development located immediately north of the land required for the construction of the Proposed Scheme;
- MA08/180 will result in a new higher education facility located immediately west of the land required for the construction of the Proposed Scheme;
- MA08/253 will result in a new dance studio located immediately south of the land required for the construction of the Proposed Scheme;
- MA08/255 will result in a residential development located immediately south of the land required for the construction of the Proposed Scheme;
- MA08/342 will result in a residential development located 100m to the west of the land required for the construction of the Proposed Scheme; and
- MA08/361 will result in a residential development located immediately south of the land required for the construction of the Proposed Scheme.

Operation (2038)

8.3.15 Volume 5: Appendix CT-004-00000 also provides details of the developments in the Manchester Piccadilly Station area that are assumed to have been implemented by 2038. No 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 Manchester Piccadilly Station area are described in Section 2.

8.4.2 Contractors will be required to comply with the environmental management regime for the Proposed Scheme, set out in the draft Code of Construction Practice (CoCP)[35], 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;
- 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.

[35] Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice (CoCP).

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-001-0MA08.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)[36]. These impacts are described in Section 11, Landscape and visual, Section 13, Sound, noise and vibration and Section 14, Traffic and transport.

8.4.10 Construction of Manchester Piccadilly High Speed station, Piccadilly station viaduct and highway works will be visible from street level in the vicinity of Chapeltown Street. Construction noise will be noticeable in the area for approximately seven years and nine months. There will be an increase in HGV traffic movements along Chapeltown Street during the construction period. In addition, indirect noise effects from traffic are expected to affect some properties along the road. People in this community are likely to experience these

[36] 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.

features of the Proposed Scheme as changing the quality of their neighbourhood and to regard that change as adverse.

8.4.11 Construction of New Islington turnback facility and highways works will be visible from street level in the vicinity of the A662 Pollard Street. Construction noise will be noticeable in the area for approximately two years and 11 months. The A662 Pollard Street and the A665 Great Ancoats Street are designated routes for construction traffic to enable access to construction compounds around the existing Manchester Piccadilly Station. There will be an increase in HGV traffic movements during the construction period between Helmet Street and Adair Street. 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.

8.4.12 Construction of New Islington turnback facility will be visible from street level in New Islington (in the vicinity of Old Mill Street). Construction noise will be noticeable in the area, specifically on Munday Street, Lampark Way and Vesta Street for approximately one year and 10 months. People in these communities are likely to experience these features of the Proposed Scheme as changing the quality of their neighbourhood and to regard that change as adverse.

8.4.13 Construction of Manchester Piccadilly High Speed station, utility and highway works will be visible from street level in the vicinity of Ducie Street. Construction noise will be noticeable for approximately 11 months. Ducie Street is a designated route for construction traffic to enable access to construction compounds around the existing Manchester Piccadilly Station and there will be an increase in HGV traffic movements 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.

Access to services, health and social care

8.4.14 There is strong evidence linking access to health and social care services with mental and physical health outcomes, both directly, through access to treatment and care, or access to fresh food retailers, and indirectly through issues such as access to social networks. There is also weak to moderate evidence to suggest that transport problems are a key barrier to people's ability to access these services. There is moderate evidence to suggest that access to shops and other local facilities can affect health. This is based on a range of factors affecting quality of life, and includes mental health issues such as reducing feelings of isolation and enabling participation in society, and physical health issues such as food shopping and other basic needs. A review of published research evidence linking access to services, health and social care with health and wellbeing can be found in Volume 5: Appendix HA-002-00000.

8.4.15 Construction of Piccadilly approach viaduct will require the demolition of MO:DEL. MO:DEL is an NHS mental health and substance abuse service for ex-offenders. MO:DEL works with adults with a history of offending, substance misuse and mental health conditions to seek treatment and reduce re-offending. It offers mental health assessment, risk assessment and

case management for up to 150 users for a period of up to six months. Services are available for all residents of Manchester covering the whole criminal justice pathway and to users who are not from the area but consider themselves to be Manchester residents. The Fairfield Street site acts as a central hub for the service. Greater Manchester Mental Health NHS Foundation Trust operates similar services in Bolton, Salford and Trafford. However, these services are smaller than MO:DEL and do not cover Manchester city centre. The permanent loss of MO:DEL will therefore reduce the provision of specialist services, affecting health and wellbeing, and will result in an adverse health effect.

8.4.16 Construction of Piccadilly approach viaduct will require the demolition of MASH on the B6469 Fairfield Street. MASH is a charity outreach service for women working in the sex industry in Manchester, offering sexual health services, needle exchanges, life skills support, counselling and advice. The drop-in centre is open for both afternoon and evening sessions, offering a single venue for women to access a variety of resources. As well as the drop-in centre, MASH runs outreach programmes across Manchester and Bury. Women can also phone MASH for advice. In 2017/2018, MASH engaged with more than 700 women, many of whom spoke English as a second language. There are no comparable service providers in Manchester and the service provided by MASH is unique in the North West region. The permanent loss of MASH will therefore reduce the provision of specialist services, affecting health and wellbeing, and will result in an adverse health effect.

8.4.17 Construction of Piccadilly approach viaduct will require the demolition of the True Jesus Church on St Andrew's Street. The church has approximately 40 regular congregants, the majority of whom are Chinese. The church is run by volunteers and worship takes place on Saturdays. It offers education classes for children, Bible study courses and gospel choir classes, as well as informal social events. As a result of its specific links with Manchester's Chinese community, comparable alternative resources are not available nearby. The permanent loss of the True Jesus Church will affect quality of life by limiting opportunities for accessing a community facility, limiting participation in community events and disrupting existing social networks. Therefore, this is considered to result in an adverse health effect.

Access to green space, recreation and physical activity

8.4.18 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.

8.4.19 Construction traffic, including HGVs, will be present on local roads within the Manchester Piccadilly Station 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 other means, 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 Manchester Piccadilly Station area.

8.4.20 The construction of Piccadilly approach viaduct will require the demolition of Totem Gymnastics in Aldow Enterprise Park on Blackett Street. Totem Gymnastics runs gymnastics classes for children after school during the week and during the day on Saturdays. It also offers soft play sessions for toddlers and gymnastics classes for children with autism. There are no alternatives in Manchester city centre. The nearest alternatives are in Salford and Droylesden. Permanent loss of this facility in this location will reduce the opportunity for beneficial health outcomes achieved through physical exercise and is therefore considered to result in an adverse health effect.

8.4.21 The construction of Piccadilly approach viaduct will require the demolition of Cloud Aerial Arts in Aldow Enterprise Park on Blackett Street. Cloud Aerial Arts offers aerial, circus, acrobatic and dance classes for adults. There are no alternatives that offer the same mixture and number of classes in Manchester city centre. Permanent loss of this facility in this location will reduce the opportunity for beneficial health outcomes achieved through physical exercise and is therefore considered to result in an adverse health effect.

8.4.22 The construction of Piccadilly approach viaduct will require the demolition of CrossFit Ancoats in Aldow Enterprise Park on Blackett Street. CrossFit Ancoats provides cross fit classes and training seven days a week. There are two alternatives to the north and to the south-west of Manchester city centre. However, CrossFit Ancoats is the only CrossFit gym in the southern and eastern part of the city. Permanent loss of this facility in this location will reduce the opportunity for beneficial health outcomes achieved through physical exercise and is therefore considered to result in an adverse health effect.

8.4.23 The construction of Piccadilly station viaduct will require the permanent closure of Sheffield Street. Sheffield Street provides the only pedestrian and vehicular access to SBG Manchester, a gym that offers drop-in classes in mixed martial arts, Brazilian ju jitsu, boxing, kickboxing, fitness and self-defence. The permanent closure of Sheffield Street will mean that the gym will become physically isolated, with no vehicular or pedestrian access. The road closure will affect the ability of staff and customers to access the premises, therefore affecting its ability to operate. There are several alternative gyms and exercise centres in the vicinity of SBG Manchester. However, these do not offer the same mix of specialist classes. Permanent loss of this facility in this location will reduce the opportunity for beneficial health outcomes achieved through physical exercise and is therefore considered to result in an adverse health effect.

8.4.24 The B6469 Fairfield Street diversion and the construction of a new station access ramp will require the permanent closure of North Western Street, between Chapelfield Road and

Hoyle Street. Frontline Fit Performance Centre is located on this section of North Western Street. Frontline Fit Performance Centre is a gym providing a range of individual and group personal training packages, as well as online workout programmes, nutritional health assessments and infrared sauna therapy. The permanent closure of North Western Street will mean that, the gym will become physically isolated without access and the road closure will affect the ability of staff and customers to access the premises, therefore affecting its ability to operate. There are several alternative gyms in the vicinity of Frontline Fit Performance Centre. However, these do not offer the same services. Permanent loss of this facility in this location will reduce the opportunity for beneficial health outcomes achieved through physical exercise and is therefore considered to result in an adverse health effect.

Education

8.4.25 There is moderate evidence linking low levels of education with poor mental and physical health. The majority of evidence linking education with health outcomes looks at educational attainment in the context of broader socio-demographic status. Educational attainment influences socio-economic factors such as earnings and home ownership, as well as self-esteem and lifestyle choices. A review of published research evidence linking education with health and wellbeing can be found in Volume 5: Appendix HA-002-00000.

8.4.26 Health and wellbeing effects resulting from impacts on educational facilities are reported in this section. Health and wellbeing effects associated with construction skills and training are assessed in Volume 3: Route-wide effects, Section 8. Significant effects on education facilities resulting from noise are reported in Section 13, Sound, noise and vibration.

8.4.27 Construction of Piccadilly approach viaduct will require the demolition of SOL Christian Academy on the B6469 Fairfield Street. This is an independent, co-educational faith (Pentecostal) school with nursery, primary, secondary and sixth-form provision. The school is registered to take up to 50 pupils aged between two and 18 years. The school is contained in an industrial building and is set out across four floors, with five classrooms, a design and technology room, an information technology/language room, studios, a playing area, a multi-purpose hall and a common space. The school also hosts H Pan International, a charitable arm of the organisation that focuses on youth and community work and hosts events every month. There are no resources in the local area which offer the same curriculum and wider facilities. As such, the permanent loss of the SOL Christian Academy will reduce the beneficial wellbeing effects associated with educational attainment and therefore result in an adverse health effect.

Other mitigation measures

8.4.28 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.

8.4.29 HS2 Ltd is continuing to engage with owners and operators of a number of facilities, including SOL Christian Academy, MO:DEL, MASH, True Jesus Church, Frontline Fit Performance Centre and SBG Manchester to identify reasonably practicable measures to help mitigate the likely effects identified in this assessment.

8.4.30 HS2 Ltd will engage with owners and operators of a number of facilities, including Totem Gymnastics, Cloud Aerial Arts and CrossFit Ancoats, to identify reasonably practicable measures to help mitigate the likely significant effects identified in this assessment.

Cumulative effects

8.4.31 The assessment has considered whether the cumulative effects of the Proposed Scheme and other committed developments are likely to give rise to additional health effects.

8.4.32 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.

8.4.33 No cumulative health effects have been identified.

8.5 Effects arising from operation

Avoidance and mitigation measures

8.5.1 Consideration of potential health issues is an integral part of the planning and design of the Proposed Scheme, alongside consideration of other environmental, community and economic issues. Insofar as reasonably practicable, mitigation measures have been incorporated into the design of the Proposed Scheme with the aim of avoiding or reducing adverse effects on people. The mitigation measures incorporated into the design of the Proposed Scheme in the Manchester Piccadilly Station area are described in Section 2 and includes landscape mitigation planting to the north of Ardwick embankment, along Manchester to Leeds embankment and Ardwick cutting to integrate the Proposed Scheme into the surrounding landscape.

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-001-0MA08. 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.

8.5.3 Following the application of avoidance and mitigation measures, no operational health effects within the Manchester Piccadilly Station area are predicted to occur at the community area level.

Other mitigation measures

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

Cumulative effects

8.5.5 No cumulative effects have been identified.

Monitoring

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

8.5.7 Proposals for monitoring of precursors to health effects, such as air quality and noise, are reported in Sections 5 and 13.

8.5.8 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 Manchester Piccadilly Station 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, Manchester City Council, Greater Manchester Archaeological Advisory Service, 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[37]) reports accompany this section of the report. These are:

- Volume 5, Appendix HE-002-0MA08 – Summary gazetteer, impact assessment table and archaeological character areas;
- Volume 5, Appendix HE-003-0MA08 – 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; and
- BID HE-001-0MA08 – Historic environment baseline report (including a full gazetteer of heritage assets).

9.1.4 Heritage assets have been given a Unique gazetteer identifier (UID), for example MA08_0001. These have been allocated to all heritage assets within the gazetteer and are referenced throughout the ES, BID reports and in map books.

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: MA08 Map Book. The Proposed Scheme is described in Section 2.

[37] 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.

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)[38], including the method for determining the heritage value of a heritage asset and magnitude of impact.

9.2.2 The assessment focuses on the extent to which the Proposed Scheme will affect designated and non-designated heritage assets. The Proposed Scheme could impact heritage assets through the alteration, demolition or removal of the asset, or as a result of changes within the asset's setting, where setting contributes to the value of the asset.

9.2.3 The study area for the assessment of effects on designated and non-designated heritage assets is the land required for the construction of the Proposed Scheme plus 250m on each side in urban areas. This is referred to in the remainder of this section as the 250m study area.

9.2.4 Designated heritage assets within a study area of up to 2km from the land required for the construction and operation of the Proposed Scheme have been considered in relation to potential effects arising from changes within an asset's setting. This is referred to in the remainder of this section as the 2km study area.

9.2.5 The historic environment methodology includes the consideration of the relevant interactions with other topics, including ecology and biodiversity, landscape and visual, socio-economics, sound noise and vibration, water resources and flood risk, and in-combination climate change impacts. These interactions have been included in the assessment of baseline conditions, impacts and effects.

9.2.6 Where noise is considered, this is within the context of the way in which sound and noise currently contribute to the heritage value of the assets and is not a reference to absolute noise levels or sound, or the noise or vibration impacts on the health and quality of life of people who live in or visit the area.

9.2.7 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 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;
- the train shed and undercroft at Manchester Piccadilly Station (MA08_0476), which although within the land required for the construction of the Proposed Scheme, will not be removed in whole; and
- the former goods offices to Manchester Piccadilly Station (MA08_0119); the Manchester South Junction and Altrincham Railway Viaduct (MA08_0155); the Store Street Aqueduct

[38] Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

(MA08_0001); the Manchester Piccadilly Train Station War Memorial (MA08_0810); the Victory Over Blindness Statue (MA08_0809); and Ancoats Bridge (MA08_0667); all of which, although partially or wholly within the land required for the construction of the Proposed Scheme, will not be removed.

9.2.8 No areas were identified in the Manchester Piccadilly Station area as requiring geophysical survey.

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-001-0MA08. In addition to the desk-based assessment, the following surveys have been undertaken in the Manchester Piccadilly Station area; a 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.

Designated assets

9.3.2 Designated heritage assets within the 2km study area are described in Volume 5: Appendix HE-002-0MA08. The following designated heritage assets are located partially or wholly within the land required for the construction of the Proposed Scheme:

- the Grade II* listed Store Street Aqueduct (MA08_0001) of high heritage value;
- the Grade II listed train shed and undercroft at Manchester Piccadilly Station (MA08_0476) of moderate heritage value;
- the Grade II listed Former Goods Offices to Manchester Piccadilly Station (MA08_0119) of moderate heritage value;
- the Grade II Manchester South Junction and Altrincham Railway Viaduct (MA08_0155) of moderate heritage value;
- the Whitworth Street Conservation Area (MA08_0711) of moderate heritage value;
- the Ancoats Conservation Area (MA08_0696) of moderate heritage value; and
- the Stevenson Square Conservation Area (MA08_0704) of moderate heritage value.

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:

- two scheduled monuments of high heritage value, including the remains of a Roman fort and a medieval bridge;
- twelve Grade I listed buildings, all of which are of high heritage value including four religious buildings, a station masters house, a warehouse, a railway bridge, an art gallery, a town hall, a library, a bank and a memorial statue;

- fifty-four Grade II* listed buildings of high heritage value, including: 18 textile mills, warehouses and associated buildings; 16 public buildings; eight religious buildings; four offices and shops; a hotel; three educational buildings; two private houses; a war memorial; and a railway viaduct;
- five hundred and eleven Grade II listed buildings of moderate heritage value, including: 85 shops or offices; 71 warehouses; 67 mills or industrial buildings; 58 houses; 50 buildings or structures associated with roads, canals or rail; 32 public service buildings; 24 educational buildings; 25 public houses and clubs; 22 religious buildings and associated monuments; 18 statues and monuments; 10 gardens, parks and urban spaces; nine theatre buildings; eight hospital buildings; eight hotels and hostels; eight items of street furniture; four war memorials; three prisons and associated buildings; two electricity junction boxes; two military buildings; one stable; one telephone exchange; one restaurant; one bandstand; and one park shelter; and
- fourteen conservation areas of moderate heritage value.

Non-designated assets

9.3.4 The non-designated heritage assets summarised below lie wholly or partially within the land required for the construction of the Proposed Scheme. Only assets where a significant effect is predicted, as described in Section 9.4 and 9.5, are named below.

9.3.5 The site of the non-designated St Andrew's Church and disused graveyard (MA08_0677) is an asset of high heritage value which lies wholly within land required for the construction of the Proposed Scheme.

9.3.6 There are three non-designated assets of moderate heritage value lying wholly or partially within land required for the construction of the Proposed Scheme. These include two canals and a war memorial.

9.3.7 There are 63 assets of low heritage value within the land required for the construction of the Proposed Scheme. These are a variety of types of buildings within blocks of assets including: buildings on Spring Gardens (site of) (MA08_0653); buildings on William Street (site of) (MA08_0661, MA08_0664, MA08_0665); Dining Rooms, 31-33,Pollard Street (site of) (MA08_0773); buildings on Birch Street (site of) (MA08_0658); housing on Chapelfield Road and Union Works (site of) (MA08_0666); buildings on Water Street (site of) (MA08_0669); Victoria Terrace (site of) (MA08_0673); buildings on Fairfield Street (site of) (MA08_0676); buildings on Mellor Street (site of) (MA08_0671); buildings on Heaton and Junction Street (site of) (MA08_0627); buildings on Thornhill Street (site of) (MA08_0628); buildings on Ainsworth, Meridian and Cross Street (site of) (MA08_0629); buildings on John Street (site of) (MA08_0633); buildings on Chancery Lane (site of) (MA08_0631, MA08_0632, MA08_0634, MA08_0652, MA08_0748, MA08_0749, MA08_0750); 18, Sparkle Street (MA08_0797); 104, Fairfield Street (MA08_0798) and buildings on Ogden Street (site of) (MA08_0672). There are also a variety of house types such as, terraced houses (site of) (MA08_0786); Back-to-back housing, Munday Street (site of) (MA08_0813); Granville Place (site of) (MA08_0814); Terraced housing, NW of the A662 Pollard Street (site of) (MA08_0815); 69–85, Great Ancoats Street

(site of) (MA08_0816); and sites of industrial buildings and canals, including: Maskrey's Mill (MA08_0626); Pin Mill (site of) (MA08_0663); Ardwick Mill (site of) (MA08_0670); Cotton Waste Mill (site of) (MA08_0770) Print Works (Bridge Street Mill) (site of) (MA08_0674); Dark Lane Mill (site of) (MA08_0659); Bank Top Coal Wharf (site of) (MA08_0680); two goods sheds (site of) (MA08_0686, MA08_0681); Rochdale Canal Arms (MA08_0687, MA08_0694, MA08_0733); five warehouses (sites of) (MA08_0597, MA08_0598, MA08_0684, MA08_0685, MA08_0678); Dry Dock (site of) (MA08_0683); warehouse canal tunnel (site of) (MA08_0679); Iron Works (site of) (MA08_0682, MA08_0732, MA08_0734); four public houses and two breweries, including Swann Inn (site of) (MA08_0655), Castle Brewery (site of) (MA08_0662); Mitre Inn and adjoining houses (site of) (MA08_0668); Former Bridge Inn and Bridge Inn Brewery (site of) (MA08_0675); Pollard Inn (site of) (MA08_0811); a Fire Station and Housing (site of) (MA08_0812, MA08_0731); Auld Lang Syne, 29, Pollard Street (site of) (MA08_0863); a Roman road, a statue and a road bridge.

9.3.8 The non-designated heritage assets summarised below lie wholly or partially within the 250m study area.

9.3.9 There are two assets of high heritage value, two of moderate heritage value and 225 of low heritage value within the 250m study area. There are five assets associated with religion. Several assets are associated with the textile industry including cotton mills, dye works or engine houses. There are structures, buildings and warehouses related to the canals and railway. There are numerous terraces and back-to-back worker's housing, which make up a large proportion of the assets within the study area.

Historic environment overview

9.3.10 The bedrock geology of the Manchester Piccadilly Station area is largely comprised of sandstone of the Sherwood Sandstone Group. This is overlain by superficial deposits of glacial till. However, much of Manchester is covered in made ground due to later development other than the deep alluvial layers on the River Medlock.

9.3.11 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. The earliest evidence for human activity within the study area comes from the Mesolithic period in the form of flint tools, although these were not found within their original archaeological location, redistributed most likely by 19th century development. However, as the majority of Neolithic finds of flints and stone tools were also concentrated in the Castlefield area, it seems possible that they may represent semi-permanent settlement or at least woodland clearance within the study area during the Mesolithic and Neolithic.

9.3.12 The next evidence for human activity within the study area belongs to the Iron Age. There was an increase in agriculture during this period, which resulted in clearance of woodland. Nationally, this led to a better supply of food and in turn a large-scale population increase. Within the study area a whole Iron Age ceramic vessel was recovered from the area of the Roman fort at Castlefield. This may suggest the site of the fort has an earlier Iron Age origin.

Most prehistoric remains within Manchester appear to have been displaced by 18th and 19th century industrial development.

9.3.13 Although Britain came under Roman control after AD 43 it was not until AD 70 that the Romans began to occupy the area of Greater Manchester. Manchester was the site of the Roman fort of Mamucium, which is situated within the Castlefield area. It survives today as the scheduled remains of the eastern wall of the Roman fort (MA08_0714). There is also evidence of a civilian settlement and a cemetery associated with the fort. The line of the Manchester to Castleshaw Roman Road (site of) (MA08_0647) crosses the study area following Store Street.

9.3.14 After the withdrawal of Roman rule in the 5th century AD, the region fragmented into smaller kingdoms. In the early medieval period, archaeological evidence of occupation in Manchester is very scant. Knowledge of the period is largely dependent on documentary sources. The Anglo-Saxon Chronicles mention Manchester in the year AD 919 and it may have been a defended settlement. The Roman fort is one possible location for these fortifications.

9.3.15 At the time of the Norman Conquest in 1066, north-west England was relatively sparsely populated compared to other parts of the country. Manchester was the site of a castle mentioned in 1184, which was replaced by a manor house by 1282. This site is now occupied by Chetham's College (MA08_0066). The manor had monopolies over fisheries, fulling mills and communal ovens from the late 13th century. Manchester had become a town of regional importance by the medieval period and received its market charter in 1282 as it became a regional centre for textile processing. Early development was focused in the area of the Hanging Ditch, Fennel Street, the A56 Deansgate and Market Street. Outside of the core of the settlement, the area continued to be rural farmland.

9.3.16 In the post-medieval period, Manchester was key to the early stages of industrialisation and Britain becoming a global power. The textile and coal industries were the driving force behind this growth. Manchester's damp climate was favourable in the production of cotton as it meant the fibres of the cotton were less likely to snap. The construction of extensive canal networks in the 18th century enabled Manchester to develop as an inland port. The Rochdale (MA08_0610) and Ashton Canals (MA08_0611) can both still be seen within the study area. They include elements of distinctive architecture such as the Grade II* Store Street aqueduct (MA08_0001). These canals allowed for greater access to raw materials and increased the number of outlets for its products. Individual branches off the canal and wharfs were often built to service individual warehouses or complexes, such as the Rochdale Canal arm (MA08_0687). The opening of the Rochdale Canal enabled the development of the Ancoats area. This included the Murrays Mill complex (MA08_0009, MA08_0017), which is the oldest textile mill surviving in Manchester.

9.3.17 The expanding industry in Manchester fuelled population growth. In the first half of the 19th century, the population of Manchester grew from 88,000 to over 400,000. This resulted in the widespread expansion of terraces of workers housing. These were built next to the factories where the people worked and defined the 19th century character of the study area

around the existing Manchester Piccadilly Station. Buried archaeological remains survive of terraced and back-to-back houses located alongside public houses, schools and even a piggery. These include archaeological remains in areas such as Munday Street, the A662 Pollard Street, William Street, Chancery Lane, the A6 Aytoun Street and Birch Street. These were located adjacent to factories and mills, such as the Grade II listed Crusader Works (MA08_0519), and buried archaeological remains of Maskrey's Mill (MA08_0626), Pin Mill (MA08_0663), Ardwick Mill (MA08_0670), Print Works (Bridge Street Mill) (site of) (MA08_0674) and Dark Lane Mill (MA08_0659).

9.3.18 As the population expanded, new places of worship and burial were built including the now demolished St Andrews Church and disused graveyard (MA08_0677). Built in 1831, the church was demolished in 1961, by which time the parish that once surrounded it had also been removed. The walls once surrounding the church and cemetery survive in-situ. The gravestones within the cemetery have been removed, but the human burials and archaeological remains of the church survive. The disused graveyard is capped with concrete.

9.3.19 There was also expansion of the rail network in Manchester, with railway companies investing in new sidings, stations, warehouses and goods yards. Elements of the railway are still prominent in the townscape today including the Manchester South Junction and Altrincham Railway Viaduct (MA08_0155). The Grade II listed train shed and undercroft at Manchester Piccadilly Station (MA08_0476) now serves as the main rail hub for Manchester. Formerly known as Manchester London Road Station, it opened in 1842. It was originally operated by the Manchester and Birmingham Railway, which later became the London and North-Western Railway. They were joined by a second company the Manchester, Sheffield and Lincolnshire Railway when the station was rebuilt in the 1860s. The Grade II listed former goods offices to Manchester Piccadilly Station (MA08_0119), which provided the entrance to the basement goods warehouse under the station, was built at this time and is still extant. The 1870s and 1880s saw the construction of new platforms by both companies due to the increasing number of passengers. Further refurbishment of the station took place between 1958 and 1966, and 1998 and 2002.

9.3.20 Manchester's importance as a manufacturing centre shrank from the 1850s as it became more important as a commercial centre for the textiles industry which moved to surrounding towns and villages. This led to the redevelopment of the city centre with a focus on warehousing, banks and the Former Royal Exchange (MA08_0148). These provided not just storage for finished textiles, but offices and a space to display the goods, while the banks provided loans and credit for businesses involved in the production and trading of cotton. Many of the rail or canal warehouses were used to store cotton bales imported from the United States of America before they were distributed to the mills. The London Warehouse (MA08_0212) and other warehouses in the Stevenson Square (MA08_0704) and Whitworth Street (MA08_0711) conservation areas are fine examples of these building types.

9.3.21 The disruption of the export market during the First World War along with increased availability of cheaper imports during the post-war period resulted in the decline of the cotton industry in Manchester and the surrounding region. The construction of the

Manchester Ship Canal managed to cushion the city from the worst effects of this decline; its success is reflected in the number of commercial buildings of early 20th century date. The prolific number and the quality of the architecture of some of the warehouse buildings in the Whitworth Street Conservation Area are examples of this. Textile mills were frequently converted to other industry, housing or abandoned completely. For example, Brownsfield Mill (MA08_0012) was used by aviation company Avro in the early 20th century.

9.3.22 Since the 1990s the regeneration of Manchester has been dramatic. The skyline has undergone striking changes as the development of taller buildings and skyscrapers has become more prevalent. There has been a move towards high-specification apartments, many with amenities such as concierges and fitness studios; examples include the London Warehouse (MA08_0212) and several of the listed buildings within the Whitworth Street Conservation Area (MA08_0711. This has provided access to a high standard of living within the city centre, part of a move to reverse the post-industrial decline. Sympathetic conversion of the 19th century mills has meant the retention of their outward historic appearance, especially in conservation areas. This has transformed the large parts of the city centre into residential areas, such as at Ancoats. Murray's Mill complex is now a development of 124 apartments. Manchester's city core has grown since the 1990s from less than a 1,000 to approximately 35,000 people.

Future baseline

Construction (2025)

9.3.23 Volume 5: Appendix CT-004-00000 provides details of the developments in the Manchester Piccadilly Station 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)

9.3.24 Volume 5: Appendix CT-004-00000 provides details of the developments in the Manchester Piccadilly Station 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 historic environment.

9.4 Effects arising during construction

Avoidance and mitigation measures

9.4.1 The design of the Proposed Scheme has sought to avoid adverse effects on heritage assets within the land required for construction insofar as reasonably practicable.

9.4.2 Section 8 of the draft Code of Construction Practice[39] 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.

Assessment of impacts and effects

9.4.3 Impacts on all heritage assets described above have been assessed and are set out in the Impact Assessment Table (Volume 5 Appendix HE-002-0MA08). 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-003-0MA08, and again only the significant effects are described below.

Temporary effects

9.4.4 The temporary construction works, such as excavations and earthworks for construction compounds, storage areas, and diversions of existing roads and services, have the potential to affect heritage assets during the construction period. Heritage assets could be affected as a result of changes within the assets' settings, where setting contributes to the value of the asset. The duration of the activities giving rise to the temporary effect described below are set out in the indicative construction programme in Section 2.3.

9.4.5 No significant effects are expected to occur as a result of temporary impacts on designated or non-designated heritage assets.

Permanent effects

9.4.6 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.

9.4.7 The following significant effects will occur as a result of permanent physical impacts on heritage assets within the land required for the construction of the Proposed Scheme.

9.4.8 The train shed and undercroft at Manchester Piccadilly Station (MA08_0476) is a Grade II listed building of moderate heritage value, which is located within the land required for the construction of the Proposed Scheme. The asset derives its heritage value as a well-

[39] Volume 5: Appendix CT-002-00000, draft Code of Construction Practice.

preserved example of 19th century train station architecture. The setting of the asset is its association with the railway and its infrastructure, through which it linked both historically and up to the modern day as one of Manchester's principal railway stations. To the north of Manchester Piccadilly Station, the area predominantly comprises modern buildings and areas of ground level car parking. Most of the 19th century infrastructure which once dominated this area has now gone. The presence of Manchester Piccadilly High Speed station in the setting of the asset north of the listed train shed and over the undercroft will alter views of the northern elevation. An earlier train shed and sidings of the London Road Station occupied this position in the 19th century. Therefore, the changes are an evolution of this part of the site in response to the changing transport requirements of the city. Although the Proposed Scheme will change the asset's setting, the presence of the Manchester Piccadilly High Speed station will not alter how the train shed is understood or diminish its value. The asset will be physically impacted by the modification of the listed train shed and undercroft to allow the construction of Manchester Piccadilly High Speed station. This will be adjacent and to the north of the existing train shed building. The north elevation of the train shed is both decorative and a functional element of the building. The undercroft, on the north side of the Manchester Piccadilly Station, includes brick arches and two rows of large red and white painted cast-iron columns. These support the former goods yard deck which is now a car park. The columns and deck will be partially removed. The remaining brick undercroft will remain intact. This will constitute a medium impact and result in a moderate adverse significant effect.

9.4.9 St Andrew's Church and disused graveyard (site of) (MA08_0677) is a non-designated heritage asset of high heritage value. It derives its heritage value from its archaeological interest due to the presence of a post-medieval graveyard within the still extant graveyard boundary walls. The graveyard was closed after 1855 and, after the demolition of the church in 1961, it was sealed with a concrete raft. There are below-ground archaeological remains of the church and graveyard including human remains. The archaeological remains will be removed by construction work associated with Manchester Piccadilly High Speed station car parks, New Sheffield Street Boulevard and associated changes in ground levels. This will constitute a high impact and result in a major adverse significant effect.

9.4.10 Number 18, Sparkle Street (MA08_0797) is a non-designated asset of low heritage value. The asset comprises a former end terraced house. The asset's value is derived from its architectural and historical interest as the only remaining building of its type in the surrounding area. It is located within the land required for the construction of the Proposed Scheme and will be demolished during establishment of the Manchester tunnel north portal main compound. This will constitute a high adverse impact and a moderate adverse significant effect.

9.4.11 Number 104, Fairfield Street (MA08_0798) is a non-designated asset of low heritage value. The asset comprises a two storey, former police station. The asset's value is derived from its historical and architectural interest from its former use as a police station and as one of the only 19th century buildings of its size and scale surviving in the area. It is located within the land required for the construction of the Proposed Scheme and will be demolished during

establishment of the Manchester tunnel north portal main compound. This will constitute a high adverse impact and a moderate adverse significant effect.

9.4.12 The following non-designated heritage assets are all of low heritage value. They derive their heritage value from their archaeological interest as they illustrate the industrial development of post-medieval Manchester. The archaeological remains associated with these assets will be removed to enable the establishment of Manchester tunnel north portal main compound. This will constitute a high impact and result in a moderate adverse significant effect on:

- Chancery Lane School (site of) (MA08_0652);
- buildings on Spring Gardens (site of) (MA08_0653); and
- buildings on Chancery Lane (site of) (MA08_0748).

9.4.13 Maskrey's Mill (site of) (MA08_0626) is a non-designated heritage asset of low heritage value. It derives its heritage value from its archaeological interest as it illustrates the industrial development of mills in post-medieval Manchester. The archaeological remains associated with this asset will be removed to enable the establishment of Manchester approach viaduct satellite compound B. This will constitute a high impact and result in a moderate adverse significant effect.

9.4.14 Pin Mill (site of) (MA08_0663) is a non-designated heritage asset of low heritage value. It derives its heritage value from its archaeological interest as it illustrates the industrial development of the factory system and post-medieval period Manchester. The archaeological remains associated with this asset will be removed to enable the establishment of Manchester approach viaduct satellite compound C. This will constitute a high impact and result in a moderate adverse significant effect.

9.4.15 The following non-designated heritage assets are all of low heritage value. They derive their heritage value from their archaeological interest as they illustrate the lives of working-class people, their housing and the industry that employed them in post-medieval Manchester. The archaeological remains associated with these assets will be removed to enable the establishment of Manchester approach viaduct satellite compound D. This will constitute a high impact and result in moderate adverse significant effect on:

- Ardwick Mill (site of) (MA08_0670);
- housing on Ogden Street (site of) (MA08_0672); and
- Victoria Terrace (site of) (MA08_0673).

9.4.16 The following non-designated heritage assets are all of low heritage value. They derive their heritage value from their archaeological interest as they demonstrate the importance of warehouses and transport infrastructure in the industrial development of post-medieval Manchester. The archaeological remains associated with these assets will be removed to enable the establishment of Manchester Piccadilly High Speed station main compound. This will constitute a high impact and result in a moderate adverse significant effect on:

- Warehouse (site of) (MA08_0678);

- Warehouse canal tunnel (MA08_0679);
- Goods Station (site of) (MA08_0681);
- Store Street Iron Works (site of) (MA08_0682);
- Dry Dock (site of) (MA08_0683); and
- three warehouses (site of) (MA08_0684, MA08_0598, MA08_0597).

9.4.17 The following non-designated heritage assets are all of low heritage value. They derive their heritage value from their archaeological interest as they illustrate the lives of working-class people, their housing, and public houses as well as industry and transport infrastructure in post-medieval Manchester. The archaeological remains associated with these assets will be removed to enable the construction of the Proposed Scheme. This will constitute a high impact and result in a moderate adverse significant effect on:

- buildings on Chancery Lane (site of) (MA08_0631, MA08_0632, MA08_0634, MA08_0749, MA08_0750);
- buildings on William Street (site of) (MA08_0661, MA08_0665, MA08_0664);
- buildings on John Street (site of) (MA08_0633);
- buildings on Birch Street (site of) (MA08_0658);
- buildings on Ainsworth, Meridian and Cross Street (site of) (MA08_0629);
- buildings on Thornhill Street (site of) (MA08_0628);
- Dark Lane Mill (site of) (MA08_0659);
- buildings on Heaton and Junction Street (site of) (MA08_0627);
- housing on Chapelfield Road and Union Works (site of) (MA08_0666);
- three public houses and two breweries: the Swann Inn (site of) (MA08_0655), Castle Brewery (site of) (MA08_0662), Mitre Inn and adjoining houses (site of) (MA08_0668);
- buildings on Water Street (site of) (MA08_0669);
- buildings on Mellor Street (site of) (MA08_0671);
- buildings on Fairfield Street (site of) (MA08_0676);
- terraced houses (site of) (MA08_0786);
- Bank Top Coal Wharf (site of) (MA08_0680);
- Warehouse (site of) (MA08_0685);
- Goods Shed (site of) (MA08_0686);
- Rochdale Canal Arm (MA08_0687);
- Print Works (Bridge Street Mill) (site of) (MA08_0674);
- Canal Arm (site of) (MA08_0694);
- 11, Pollard Street (site of) (MA08_0731);
- Pollard Inn (site of) (MA08_0811);
- Soho Foundry and Engineering Works (site of) (MA08_0732);
- Canal Arm (site of) (MA08_0733);

- New Foundry, 21, Pollard Street (site of) (MA08_0734);
- Cotton Waste Mill (site of) (MA08_0770);
- Auld Lang Syne, 29, Pollard Street (site of) (MA08_0863);
- Dining Rooms, 31–33, Pollard Street (site of) (MA08_0773);
- Fire Station and Housing (site of) (MA08_0812);
- Back-to-back housing, Munday Street (site of) (MA08_0813);
- Granville Place (site of) (MA08_0814);
- terraced housing, NW of Pollard Street (site of) (MA08_0815); and
- 69-85, Great Ancoats Street (site of) (MA08_0816).

9.4.18 The former Bridge Inn and Bridge Inn Brewery (MA08_0675) is a non-designated asset of low heritage value. Its heritage value is due to the architecture of the surviving former buildings of the public house and archaeological remains of the brewery and two associated houses which were demolished in 1905. The public house will be demolished, and archaeological remains removed to allow for the construction of the Proposed Scheme. This will constitute a high impact and result in a moderate adverse significant effect.

Other mitigation measures

9.4.19 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 locations where the physical impacts on heritage assets can be reduced through the detailed design of the works.

Summary of likely residual significant effects

9.4.20 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.

9.4.21 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

9.4.22 No cumulative effects on heritage assets during construction have been identified in the Manchester Piccadilly Station area.

9.5 Effects arising from operation

Avoidance and mitigation measures

9.5.1 No mitigation measures are proposed in relation to the historic environment during the operation of the Proposed Scheme in the Manchester Piccadilly Station area.

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.

Other mitigation measures

9.5.4 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

9.5.5 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

9.5.6 No cumulative effects on heritage assets during operation have been identified in the Manchester Piccadilly Station area.

Monitoring

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

9.5.8 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 Manchester Piccadilly Station 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 Manchester City Council (MCC), 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-001-0MA08. Baseline data relevant to land quality are presented on Map LQ-01-326b (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: MA08 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)[40].

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. To support this, a desk-based assessment has been undertaken for the study area, defined

[40] Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

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-002-0MA08[41].

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[42] 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).

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

[41] High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background and Information Data, Land quality baseline data*, BID LQ-002-0MA08. Available online at: https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement.

[42] Defined in the SMR as 'mineral body including aggregates, salt, coal and other hydrocarbons, Petroleum Extraction and Development Licences (PEDLs), Shale Prospective Area (SPA)'.

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), Coal Authority, Oil and Gas Authority (OGA), Network Rail, MCC, 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-001-0MA08 and BID LQ-002-0MA08 and presented on Map LQ-01-326b (Volume 5: Land quality Map Book).

Geology

10.3.2 This section describes the underlying ground conditions within the Manchester Piccadilly Station area. Recent changes in lithostratigraphic classifications by the BGS have been incorporated where appropriate[43].

10.3.3 Table 13 provides a summary of the geology (made ground, superficial and bedrock units) in the study area.

Table 13: Summary of the geology underlying the land quality study area

Category	Geology	Distribution	Formation description	Aquifer classification
Made ground	Made ground	The majority of the Manchester Piccadilly Station area has been previously developed in some form and there are likely to be deposits of made ground across the entire study area. A former landfill has been identified adjacent to the River Medlock to the east of Palmerston Street and the A665 Pin Mill Brow where deeper made ground is likely to be present.	Made ground comprising variable deposits of reworked natural and man-made materials.	Not designated
Superficial	Alluvium	Alluvial deposits are identified on BGS mapping[44] in a band approximately 100m wide along the River Medlock.	Organic-rich clay, silt, sand and gravel.	Secondary (Undifferentiated) aquifer
Superficial	Glacial till	Glacial till is located across the majority of the study area with the exception of two areas near Ancoats Bridge and Buxton Street.	Sandy silty clay with gravel.	Secondary (Undifferentiated) aquifer
Bedrock	Sherwood Sandstone Group - Chester Formation	Underlying the majority of the central study area, from Ancoats to Brunswick.	Sandstone	Principal aquifer

[43] British Geological Survey (2014), *Lithostratigraphy of the Sherwood Sandstone*. Available online at: http://pubs.bgs.ac.uk/publications.html?pubID=B07318.

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

Category	Geology	Distribution	Formation description	Aquifer classification
Bedrock	Cumbrian Coast Group - Manchester Marls Formation	Located within the study area in two bands. One stretching north- west from the south-eastern edge of the study area in Longsight to the A635 Mancunian Way at Rachel Street in Ardwick. The second consists of an approximately 200m wide band, crossing the study area in a north-westerly/south-easterly direction from the south-eastern edge of the study area in West Gorton and extending to Ancoats and beyond.	Mudstone	Secondary B aquifer
Bedrock	Appleby Group - Collyhurst Sandstone Formation	Located to the north-east of each of the two bands of the Manchester Marls Formation.	Sandstone	Principal aquifer
Bedrock	Warwickshire Group - Halesowen Formation	Underlies the study area at the boundary with the Davenport Green to Ardwick area (MA07) around the River Medlock north of Harding Street and runs in a north-western direction, exiting the study area at Chippenham Road.	Mudstone, siltstone and sandstone	Secondary A aquifer
Bedrock	Warwickshire Group, Halesowen Formation - Great Mine Limestone	An approximately 10m wide band underlying the study area at Gurney Street and runs in a north-western direction, exiting the study area at Chippenham Road.	Limestone	Secondary A aquifer
Bedrock	Warwickshire Group - Halesowen Formation - Holt Town Sandstone Bed	An approximate 60m wide band, extending north-west from the River Medlock to the south-east of the study area, up to Ashton New Road in the north-west.	Sandstone	Secondary A aquifer
Bedrock	Warwickshire Group - Etruria Formation	Underlies the study area at Purslow Close and runs in a north-western direction, exiting the study area just north of the River Medlock.	Mudstone and sandstone	Secondary A aquifer

10.3.4 A bedrock fault (the Ardwick Fault) is recorded underlying the route of the Proposed Scheme to the north of Manchester Piccadilly Station, trending in a south-east to north-west orientation, at the southern end of Baird Street.

10.3.5 Farm burial or pyre sites associated with the 2001/2 outbreak of foot and mouth disease are very unlikely to be present within the study area due to its predominantly urban setting.

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[45].

10.3.7 The majority of 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^3) for residential properties.

10.3.8 To the north of Manchester Piccadilly Station, the BGS mapping indicates an increased level of radon where 1% - 3% of homes are estimated to have radon levels at or above the action level.

Groundwater

10.3.9 Four aquifer designations have been identified within the study area, as defined by the Environment Agency. These are as follows:

- the Chester Formation and Collyhurst Sandstone Formation are designated as Principal aquifers;
- the Halesowen Formation, including the Great Mine Limestone and Holt Town Sandstone, and the Etruria Formation are designated as Secondary A aquifers;
- the Manchester Marls Formation is designated as a Secondary B aquifer; and
- the glacial till and alluvial deposits are designated as a Secondary (undifferentiated) aquifers.

10.3.10 Table 14 sets out the groundwater abstractions and designations in the land quality study area of 1km from the land required for construction of the Proposed Scheme in the Manchester Piccadilly Station area.

Table 14: Groundwater designations and abstractions in the land quality study area

Feature	Details
Source Protection Zones (SPZ) associated with licensed public water supplies	A SPZ 3 is located beneath the south-western part of the study area, more than 500m from the route of the Proposed Scheme. The SPZ is associated with an abstraction 2.3km south-west of the route of the Proposed Scheme.
Private licensed groundwater abstraction locations	Three licences registered to two locations. Two licences are for a borehole located on Lower Chatham Street, Manchester and the third for a borehole located in Chapel Street Salford. Both are used for industrial, commercial or public services.
Registered unlicensed private groundwater abstractions	None.

[45] British Geological Survey (2020), *Radon Potential.* Available online at: http://www.bgs.ac.uk/radon/hpa-bgs.html. This dataset underpins Miles J.C.H. et al. (2007) *Indicative Atlas of Radon in England and Wales.* Available online at: www.ukradon.org/information/ukmaps.

10.3.11 Further information on the groundwater in the Manchester Piccadilly Station area is described in Section 15, Water resources and flood risk.

Surface water

10.3.12 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 and culverts located within the study area are described in Volume 5 WR-003-0MA08.

10.3.13 There are no surface water abstractions or designations in the study area.

10.3.14 Further information on surface water in the Manchester Piccadilly Station area are described in Section 15, Water resources and flood risk.

Current and historical land use

10.3.15 Current potentially contaminative land uses within the study area include four industrial and commercial sites, and one railway site.

10.3.16 Historical land uses identified within the study area with the potential to have caused contamination include one landfill site and 154 industrial and commercial sites. Infilled pits and ponds may have been filled with a variety of waste materials but have not been licensed.

10.3.17 Table 15 and Table 16 summarise the key current and historical contaminative land uses in the Manchester Piccadilly Station area. These are categorised into:

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

Table 15: Current and historical landfill sites located within the study area

Name and area reference	Location	Description
Palmerston Street landfill (historical landfill) (MA08-78)	Located between Palmerston Street and the River Medlock to the east of the A665 Pin Mill Brow approximately 10m north-east of land required for the construction of the Proposed Scheme.	Environment Agency records indicate that the landfill (EAHLD16530) accepted both inert and industrial wastes between 1 September 1986 and 31 December 1987. The issue and surrender dates for the licence are noted as 20 August 1986 and 21 July 1988, respectively. No landfill engineering details are known.

Table 16: 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 petrol filling station (MA08-54)	Located on the junction of North Western Street and the B6469 Fairfield Street on land required for construction of the Proposed Scheme.	Land identified using the Envirocheck information. No local authority data have been provided.
Depot Building (MA08-89)	North-west of Travis Street and north-east of Sheffield Street, (and directly north of the existing Manchester Piccadilly Station).	Depot building identified on mapping between 1985 and 1994. Specific usage unknown. Site presently used largely for haulage vehicle parking.
Marlborough Mills (Cotton Mill) (MA08-31)	Situated at the western end of Dark Lane adjacent to the A635 Mancunian Way on land required for construction of the Proposed Scheme.	Identified on historical mapping from 1889 to 1964, potentially processed cotton waste. Site is presently occupied by warehousing.

10.3.18 Contaminants commonly associated with sites in Table 15 and Table 16 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

10.3.19 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).

10.3.20 In the Manchester Piccadilly Station area this includes:

- one major pollution incident caused by sewage to surface water from a site located in land required for the construction of the Proposed Scheme and one significant pollutant incident to surface water described only as 'colour' from within land required for construction of the Proposed Scheme, with no other detail provided;
- sixteen consented discharges to surface water within the study area, two of which are within the land required for the construction of the Proposed Scheme and all relate to sewage discharge. No consented discharges to groundwater within 1km of the route of the Proposed Scheme; and
- two Sites of Biological Importance (SBI): Ashton Canal (West) and Rochdale Canal, and Stott's Lane-Ducie Street Basin.

10.3.21 Further details of relevant regulatory data in the Manchester Piccadilly Station area can be found in Section 5 of BID LQ-002-0MA08.

10.3.22 Further information on ecological designations in the Manchester Piccadilly Station area is provided in Section 7, Ecology and biodiversity.

Mineral resources

10.3.23 There are a range of mining and mineral resources located within the study area that have the potential to be affected by the Proposed Scheme. These include sand, gravel 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

10.3.24 MCC is responsible for the regulation of minerals and waste in the study area. The MCC Core Strategy Development Plan Document[46] was adopted in July 2012. Policy EN20 sets out aims to encourage the efficient and sustainable use of mineral resources in order to enable MCC to plan for a steady and adequate supply of aggregates.

10.3.25 As the study area falls within the Greater Manchester area, it is subject to the policies set out in the 'Greater Manchester Joint Minerals Plan', which was adopted in April 2013. That document outlines how the boroughs within Greater Manchester can plan for minerals in a sustainable manner.

10.3.26 The MCC Core Strategy Development Plan Document indicates that the study area does not have any active mineral workings. No mines are recorded within the study area.

10.3.27 The Proposed Scheme will not intersect any mineral safeguarding areas (MSA) in the Manchester Piccadilly Station area.

Sand and gravel deposits

10.3.28 Sands and gravels are recorded as mineral resources in the study area, although no quarries or MSA are recorded.

Coal

10.3.29 Available plans from Manchester City Council indicate 'shallow coal located between 50m and 1.2km depth' is recorded as a resource across the entire study area.

10.3.30 The entire study area is highlighted as a Coal Mining Affected Area, with the north-eastern part of the study area being in a Development High Risk Area. Available records from the Coal Authority show that the route of the Proposed Scheme will not pass through areas of recorded historical underground coal mining activities.

[46] Manchester City Council (2012), *Adopted Manchester Core Strategy Development Plan 2012-2027.* Available online at: https://secure.manchester.gov.uk/info/200074/planning/6573/core_strategy_2012-2027.

Petroleum Exploration and Development Licences/Hydrocarbons

10.3.31 There are no current licences for hydrocarbon resources, including coal or coal bed methane exploitation, and no gas exploration licences[47] within the study area.

10.3.32 The entirety of the study area is located within a Shale Prospective Area (SPA).

Geoconservation resources

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

Receptors

10.3.34 The sensitive receptors that have been identified within the study area are summarised in Table 17. A definition of receptor sensitivity is given in the SMR.

Table 17: Summary of sensitive receptors

Issue	Receptor type	Receptor description	Receptor sensitivity
Land contamination	People	Residents at existing properties and users of schools, play areas, parks and public open space.	High
Land contamination	People	Workers in commercial, industrial and retail units.	Moderate to low
Land contamination	Groundwater	Secondary (undifferentiated) aquifer (glacial till and alluvium).	Low
Land contamination	Groundwater	Principal aquifers (Collyhurst Sandstone Formation, Chester Formation).	High
Land contamination	Groundwater	Secondary A aquifers (Halesowen Formation, Great Mine Limestone, and Etruria Formation).	Moderate
Land contamination	Groundwater	Secondary B aquifer (Manchester Marls Formation).	Low
Land contamination	Surface waters	River Medlock Ashton Canal Rochdale Canal.	Moderate
Land contamination	Built environment	Underground structures and buried services.	Low
Impacts on mining/mineral and petroleum (gas) sites (severance and sterilisation)	Mineral sites	SPA.	Moderate
Land contamination	Ecological designated site	SBI*: Ashton Canal (West) and Rochdale Canal, and Stott's Lane-Ducie Street Basin.	Low

** SBI is equivalent to LWS.*

[47] Oil and Gas Authority (2019), *Onshore Interactive Maps*. Available online at: https://ogauthority.maps.arcgis.com/apps/webappviewer/index.html?id=29c31fa4b00248418e545d222e57ddaa.

Future baseline

Construction (2025)

10.3.35 Volume 5: Appendix CT-004-00000 provides details of the committed developments in the Manchester Piccadilly Station area that are assumed to have been implemented by 2025.

10.3.36 No committed developments have been identified in this study area that will materially alter the baseline conditions in 2025 for land quality.

Operation (2038)

10.3.37 Volume 5: Appendix CT-004-00000 provides details of the committed developments in the Manchester Piccadilly Station area that are assumed to have been implemented by 2038.

10.3.38 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)[48]. The draft CoCP sets out the measures and standards of work that will be applied to the construction of the Proposed Scheme and includes requirements to ensure the effective management and control of work in contaminated areas.

10.4.2 The requirements in the draft CoCP relating to work in contaminated areas will ensure the effective management and control of the work. These requirements include:

- methods to control noise, waste, dust, odour, gases and vapours (Sections 5, 7, 11, 13, 14 and 15);
- methods to control spillage and prevent contamination of adjacent areas (Sections 5, 11 and 16);
- the management of human exposure for both construction workers and people living and working nearby (Sections 5, 7, 11, 13 and 14);
- methods for the storage and handling of excavated materials (both contaminated and uncontaminated) (Sections 6, 7, 11 and 15);
- management of any unexpected contamination found during construction (Sections 11 and 15);
- a post-remediation permit to work system (Section 11);

[48] Volume 5: Appendix CT-002-00000, draft Code of Construction Practice.

- 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. 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[49], based on CLR11[50] and British Standards BS10175[51] and BS8576[52].

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[53]. The preferred option will then be developed into a remediation strategy.

10.4.5 Contaminated soils excavated within the site, where reasonably practicable, will be treated to remove or render contamination inactive and reused within the Proposed Scheme where needed and suitable for use. Treatment techniques are likely to include stabilisation, soil washing and bio-remediation. Contaminated soil removed off-site will be taken to a soil treatment facility, another construction site (for treatment and reuse) or to an appropriately permitted landfill.

Assessment of impacts and effects

10.4.6 Construction of the Proposed Scheme in this area will require earthworks, utility diversions, deep foundations, ground improvement and other activities, including the redevelopment of Manchester Piccadilly Station and construction of the various viaducts, embankments,

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

[50] Environment Agency (2004), *CLR11 Model Procedures for the Management of Land Contamination*. Available online at: https://www.gov.uk/government/publications/withdrawn-model-procedures-for-the-management-of-land-contamination-clr11.

[51] British Standards Institution (2011), *BS10175+A2:2017 Investigation of Potentially Contaminated Sites*.

[52] British Standards Institution (2013), *BS8576:2013 Guidance on Investigations for Ground Gas.*

[53] Sustainable Remediation Forum UK (2010), *A Framework for Assessing the Sustainability of Soil and Groundwater Remediation.*

retaining walls and highways. These aspects of the Proposed Scheme, along with other construction features, are shown on the CT-05 Map Series in the Volume 2: MA08 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 Map LQ-01-326b (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 MA08-160 and on the related maps as 08-160.

10.4.8 In the Manchester Piccadilly Station area, 104 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:

- 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 18. A more detailed assessment of baseline risk is provided in Volume 5: Appendix LQ-001-0MA08. 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 15 to Table 16 have been taken further in the assessment following the initial screening.

Table 18: 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 cemetery MA08-160	Low	Very low to low	Low	N/A	Very low
On-site	Former depots MA08-89, MA08-69, MA08-76	Moderate/ low to low	Very low to low	Moderate/ low	Very low	Very low
On-site	Former and current works MA08-21, MA08-90, MA08-33, MA08-42, MA08-49, MA08-45, MA08-38, MA08-44, MA08-30, MA08-29, MA08-56, MA08-116,	Moderate/ low to low	Very low to low	Moderate/ low	Very low	Very low
On-site	Former printing works MA08-81	Moderate/ low to low	Very low to low	Moderate/ low	N/A	Low
On-site	Former garage workshop MA08-59	Moderate/ low to low	Very low to low	Moderate/ low	N/A	Very low
On-site	Former petrol filling station MA08-54	Moderate/ low to low	Very low to low	Moderate/ low	N/A	Moderate/ low to very low
On-site	Former iron and metal works MA08-62, MA08-105, MA08-109, MA08-48, MA08-158	Moderate/ low to low	Very low to low	Moderate/ low	Very low	Very low
On-site	Former and current tramway and railway land MA08-27, MA08-75, MA08-118, MA08-85	Moderate/ low to low	Very low to low	Low	Very low	Very low
On-site	Former dye works, cotton mills and cotton works MA08-66, MA08-57, MA08-31, MA08-41, MA08-46, MA08-155, MA08-80	Moderate/ low to low	Very low to low	Moderate/ low	Very low	Very low
On-site	Former warehouses MA08-97, MA08-65, MA08-84, MA08-96	Moderate/ low to low	Very low to low	Low	Very low	Very low
On-site	Former timber yard MA08-74	Moderate/ low to low	Very low to low	Moderate/ low	N/A	Moderate/ low

Category	Site group/ID	Human health risk	Groundwater risk	Surface water risk	Ecosystem risk	Buildings risk
Off-site	Former and current engineering works and works MA08-60, MA08-103, MA08-110, MA08-98, MA08-58, MA08-08, MA08-09, MA08-11, MA08-124, MA08-127, MA08-68	Moderate/ low to low	Very low to low	Moderate/ low	Very low	Low
Off-site	Former chemical works MA08-154, MA08-15, MA08-01, MA08-03, MA08-13, MA08-86	Moderate to low	Very low to low	Moderate	Very low	Moderate/ low
Off-site	Former tanks MA08-18, MA08-06, MA08-93	Moderate/ low to low	Very low to low	Moderate/ low	Very low	Low
Off-site	Former metal foundries MA08-140, MA08-142, MA08-61, MA08-82, MA08-83, MA08-115, MA08-119, MA08-121	Moderate/ low to low	Very low to low	Moderate/ low	Very low	Very low
Off-site	Former dye works and mills MA08-77, MA08-72 MA08-43, MA08-126, MA08-32 MA08-34, MA08-17 MA08-123, MA08-92, MA08-101 MA08-39, MA08-122, MA08-67 MA08-04, MA08-73 MA08-95, MA08-19, MA08-151	Moderate/ low to low	Very low to moderate	Moderate	Very low	Very low
Off-site	Former timber yards MA08-47, MA08-64, MA08-40, MA08-108, MA08-70, MA08-79	Moderate/ low to low	Very low to low	Moderate/ low	Very low	Very low
Off-site	Former gasometer MA08-94	Moderate/ low	Very low to low	Moderate/ low	Very low	Moderate/ low to low
Off-site	Historical landfill MA08-78	Moderate to low	Very low to low	Moderate	N/A	Very low to low
Off-site	Former and current warehouses MA08-106, MA08-107, MA08-111 MA08-100, MA08-125, MA08-129	Moderate/ low to low	Very low to low	Low	Very low	Very low

Category	Site group/ID	Human health risk	Groundwater risk	Surface water risk	Ecosystem risk	Buildings risk
Off-site	Former scrapyard MA08-134	Moderate/ low to low	Very low to low	Low	Very low	Very low to low
Off-site	Former railway land MA08-52	Moderate/ low to low	Very low to low	Low	N/A	Very low
Off-site	Former depot MA08-63	Moderate/ low to low	Very low to low	Moderate/ low	N/A	Very low
Off-site	Former garage workshop MA08-10	Moderate/ low	Very low to low	Moderate/ low	N/A	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).

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 18 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 area in and around Manchester Piccadilly High Speed station will require a large amount of below ground excavation. This is including excavation involved in the realignment of the Metrolink and the creation of a turn back site in New Islington as described in the Section 2. The area has been subject to significant industrial and commercial development and as a result, soils and controlled water may have been contaminated. This has been considered during the risk assessment process.

10.4.19 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.

10.4.20 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, contained within the draft CoCP, include measures to manage the risks associated with the storage of such materials, resulting in no significant effects.

Permanent effects

10.4.21 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.

10.4.22 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.

10.4.23 There are no post-construction stage significant effects identified in the study area.

Mineral resources

10.4.24 Construction of the Proposed Scheme has the potential to affect existing mineral resources and proposed areas of mineral exploitation. This could occur by sterilisation of the resource through direct excavation during construction of the Proposed Scheme or through temporary and/or permanent severance or isolation that may occur during the construction phase of the Proposed Scheme, possibly continuing through to its operation.

10.4.25 There are no MSA defined in the adopted minerals plan and so MSA are not considered as part of the assessment.

10.4.26 The Proposed Scheme will pass through a SPA.

Temporary effects

10.4.27 The following section outlines the potential temporary effects resulting from the construction of the Proposed Scheme.

10.4.28 Temporary adverse effects may occur where construction compounds are proposed within the SPA. In such cases, 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.

Petroleum Exploration and Development Licences/Hydrocarbons

10.4.29 The effect of construction of the Proposed Scheme on the identified SPA will be negligible as it is unlikely that construction of the Proposed Scheme would place a constraint on future exploitation of potential sources of shale gas or other forms of hydrocarbon resource.

10.4.30 Table 19 sets out a summary of the permanent effects identified for mineral resources.

Table 19: Summary of temporary effects for mineral resources

Mineral resource	Status	Description	Sensitivity/ value	Magnitude of impact	Effect and significance (Y/N)
Shale Gas	SPA	SPA for shale gas	Medium	Negligible	Negligible (N)

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

Permanent effects

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

Petroleum Exploration and Development Licences/Hydrocarbons

10.4.33 The effect of construction of the Proposed Scheme on the identified SPA will be negligible as it is unlikely that construction of the Proposed Scheme will place a constraint on future exploitation of potential sources of shale gas.

10.4.34 Table 20 sets out a summary of the permanent effects identified for mineral resources.

Table 20: Summary of permanent effects for mineral resources

Mineral resource	Status	Description	Sensitivity/ value	Magnitude of impact	Effect and significance (Y/N)
Shale Gas	SPA	SPA for shale gas	Medium	Negligible	Negligible (N)

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

Other mitigation measures

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

10.4.37 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 MCC and any other relevant parties to assist in achieving an effective management of minerals within the affected locations.

Summary of likely residual significant effects

10.4.38 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.

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

Cumulative effects

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

10.4.41 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 or at stations), 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 Manchester Piccadilly High Speed station, auto-transformer stations and substations, 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 other mitigation measures are expected to be required beyond what has already been outlined relating to land quality in the study area.

Summary of likely residual significant effects

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

Cumulative effects

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

Monitoring

10.5.8 Volume 1 Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme. Requirements for monitoring will be determined as part of the investigation, treatment and validation of contamination on a site specific basis as part of the detailed design process. During the operational phase, monitoring works for groundwater will continue, where required 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 Manchester Piccadilly Station 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 Greater Manchester Combined Authority (GMCA), Manchester City Council (MCC), Historic England and Natural England 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-001-0MA08, 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: MA08 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)[54].

11.2.2 Surveys were undertaken during the following periods to inform the landscape and visual assessment:

- summer surveys from July to September in 2017, 2018, 2019 and 2020; and
- winter surveys in February and March 2018, 2019, 2020 and 2021.

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 EIA 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 750m of the centre line of the route of the Proposed Scheme have been assessed as part of the study area. This reflects the limited ZTV available in this predominantly urban area. Long distance views of up to 1km have been considered within areas of open space.

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.

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

[54] Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

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 The assessment has also been carried out on the basis that the station and surrounding public realm associated with the Proposed Scheme will be subject to a high quality architectural and landscape design.

11.2.10 Within urban areas, it is assumed that on land returned to suitable development, construction compounds will be removed and hoardings retained.

11.2.11 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.

11.2.12 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)[55] 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 covers central Manchester, including the city centre, the existing Manchester Piccadilly Station and the industrial, commercial and residential areas to the north, south and east of the existing station. The city centre has been developed on an area of higher ground with a varying natural terrain, which is a result of the influence of the rivers Irwell, Medlock and Irk. These gradual level changes are largely masked by the overlying built form, except, for example, immediately north of the existing Manchester Piccadilly Station. Between Ducie Street on higher ground, and Store Street on lower ground, the sharp

[55] Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

transition in the terrain has required the Ashton Canal to cross Store Street on an aqueduct. The areas to the south and east of the city centre are relatively flat. The River Medlock passes through the area mostly unseen as it is partly in culvert or concrete channel, with highly constrained public access.

11.3.2 The history of Manchester as an economic and industrial powerhouse of the Industrial Revolution is demonstrated by the large number of buildings of high architectural interest and importance, such as Manchester Town Hall (designed by Alfred Waterhouse, 1877) in the city centre, and the London Road Fire Station (designed by Woodhouse, Willoughby and Langham, 1906) south of the existing Manchester Piccadilly Station.

11.3.3 The city centre is densely developed with retail, hotel, leisure and office uses, together with residential development in new, high-rise blocks and converted 19th century industrial buildings. Neighbourhoods such as New Islington, the Northern Quarter and China Town have a lively, eclectic character deriving from the mixture of uses and the high levels of activity generated by cafes, bars and restaurants. The area around Manchester Piccadilly Station is dominated by tall modern buildings, the 19th century Manchester Piccadilly and disused Mayfield Stations, viaducts and busy main roads, which include the A665 Great Ancoats Street, and the A635/A57(M) Mancunian Way. Low density industrial and commercial development lines the rail corridor south-east of the existing Manchester Piccadilly Station and there are medium-density residential areas to the north, south and east.

11.3.4 There is little public open space in the city centre, but Piccadilly Gardens and St Peter's Square are examples of well-used areas of public realm, where open space and transport infrastructure have been successfully integrated. Cotton Fields Park, a new mixed-use development north of the existing Manchester Piccadilly Station, and the Medlock Valley Park to the east contribute to green infrastructure in the area, though the Medlock Valley Park is poorly maintained leading to lack of use. In the scattered residential areas, treelined streets, green spaces and gardens contribute to a verdant quality in places.

11.3.5 The LCA have been determined as part of an integrated process of environmental characterisation, informed by a review of historic mapping, historic landscape characterisation datasets and the outcome from other topics including ecological assessments. Use has been made of published landscape character assessments and a wide range of supporting GIS data, aerial photography and Ordnance Survey mapping, plus desk study and fieldwork. Landscape character assessments reviewed include the relevant National Landscape Character Areas[56] and the Greater Manchester Landscape Character and

[56] 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.

Sensitivity Assessment[57] and the Local Development Framework: Strategic Level City-Wide Urban Characterisation for Core Strategy[58].

11.3.6 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

11.3.7 For the purposes of this assessment, the study area for the existing Manchester Piccadilly Station area has been subdivided into six LCA. Full descriptions of these LCA are provided in Volume 5: Appendix LV-001-0MA08.

11.3.8 Four of the six LCA will not be significantly affected by the Proposed Scheme due to distance from the Proposed Scheme, or the variations in local landform, tall buildings and structures and density of development which will contain visibility to a relatively small area.

11.3.9 A summary of the two LCA that will be significantly affected within the existing Manchester Piccadilly Station area is shown in Figure 10 and Figure 11 and described below.

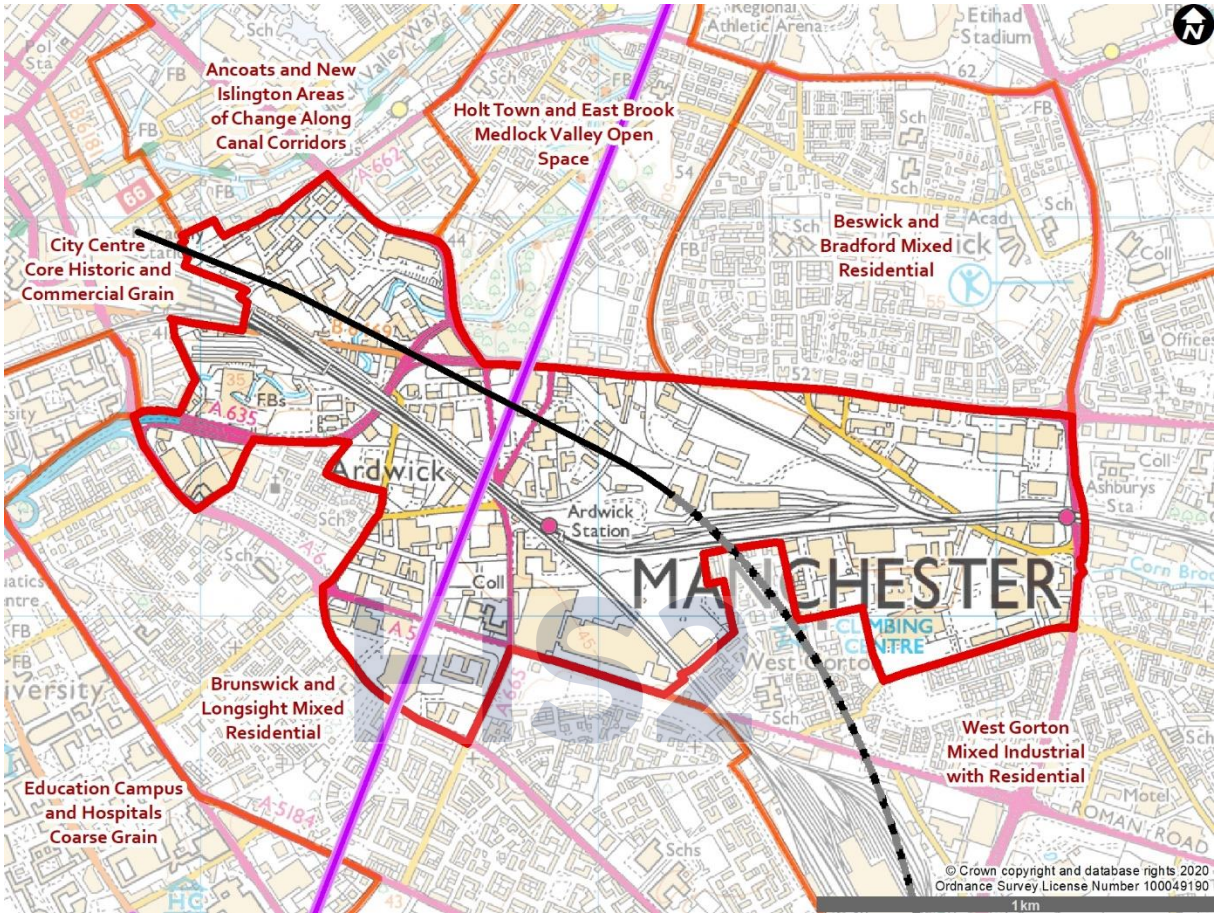
[57] LUC on behalf of Greater Manchester Combined Authority (2018), *Greater Manchester Landscape Character and Sensitivity Assessment.* Available online at: https://www.greatermanchester-ca.gov.uk/media/1727/greater-manchester-landscape-character-and-sensitivity-report.pdf.

[58] Manchester City Council (2010), *Local Development Framework: Strategic Level City-Wide Urban Characterisation for Core Strategy*. Available online at: https://www.manchester.gov.uk/download/downloads/id/15520/strategic_level_city-wide_urban_characterisation_for_core_strategy.

Significantly affected landscape character areas

Piccadilly, Ardwick and West Gorton Industrial and Infrastructure

Figure 10: Piccadilly, Ardwick and West Gorton, Industrial and Infrastructure



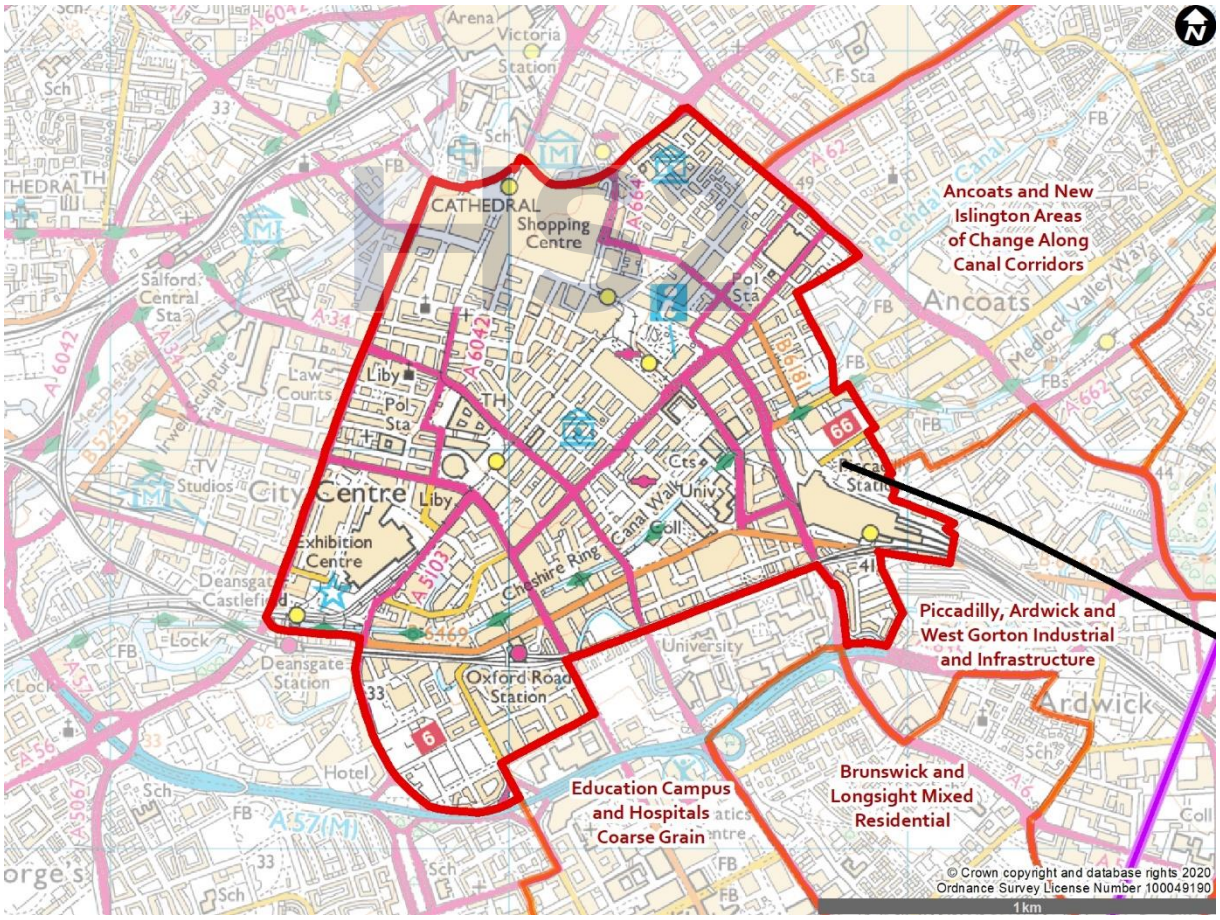
11.3.10 The Piccadilly, Ardwick and West Gorton Industrial and Infrastructure LCA, which lies between the existing Manchester Piccadilly Station and the A6010 Pottery Lane, is predominantly in industrial, commercial and infrastructure use. The LCA is heavily influenced by the infrastructure network of railways including the Hope Valley Line and Manchester – Crewe Line that cross the core of the LCA, as well as roads including the Mancunian Way the A635, the A57 Hyde Road, the A6010 Pottery Lane and the A635 Ashton Old Road. However, the LCA also includes the Manchester College of Management Sciences and the Manchester College Nicholls Campus, as well as an area of all-weather sports pitches on Union Lane. Overall, the area lacks local distinctiveness despite the presence of a number of scattered listed buildings, including the Ellen Wilkinson High School (Grade II*), the Apollo Theatre, and Star and Garter public house (both Grade II) and the 19th century brick railway viaducts of the Glossop and Manchester - Crewe Lines. A large proportion of the buildings within this LCA are single-storey brick or metal clad sheds, surrounded by hardstanding and security fencing.

11.3.11 The area is leafy in places, with street trees, planting around car parks and the perimeters of industrial and commercial properties. There are large areas of unoccupied and inaccessible railway land on which naturalised scrub vegetation has become well established. The major roads, including the A57(M)/A635 Mancunian Way/Ring Road, the A665 Midland Street and the A57 Hyde Road, as well as the railway lines limit pedestrian movement and result in low levels of tranquillity in the area. The area is brightly lit at night with security floodlighting and street lighting along the majority of local roads.

11.3.12 The Piccadilly, Ardwick and West Gorton Industrial and Infrastructure LCA is assessed as having an overall **medium-low** landscape value based on the predominance of industry, commerce and infrastructure, low tranquillity and weak sense of place but with occasional buildings of historic value.

City Centre Core, Historic and Commercial Grain

Figure 11: City Centre Core, Historic and Commercial Grain



11.3.13 The City Centre Core, Historic and Commercial Grain LCA comprises the area north-west of the existing Manchester Piccadilly Station and east of Deansgate. The local landform slopes gently down from the centre of the LCA at Portland Street towards the existing Manchester Piccadilly Station, becoming more complex around the station itself, which is on two levels to accommodate the steep but localised change. Store Street passes under Station Approach and is linked to the Northern Quarter area via the steep and cobbled Jutland Street. The

regular street pattern of the densely developed city centre is 18th and 19th century in origin, resulting in a permeable and legible historic evolution. With Portland Street sitting at a high point, the land falls away gradually towards Deansgate. A major pedestrianised, central area is located around Market Street, which leads onto the Arndale Shopping Centre where the building scale becomes larger. Transport hubs and routes are prevalent throughout the LCA with tram stops and large-scale open space at St Peters Square and Piccadilly Gardens. Much of the centre of Manchester lies within a number of conservation areas and there are many listed buildings throughout. The distinctive curved roof and the Victorian brickwork of the existing Manchester Piccadilly Station, the 19th century viaducts and the classical detailing of the B6469 Fairfield Street entrance to the station contribute to the historic character of the landscape near the station that contrasts with the glass and steel of more recent development. The centre of Manchester has experienced a high degree of redevelopment in the second half of the 20th and early 21st centuries. Tall steel and glass clad high rise blocks are often substantially higher than their older neighbours and lack the local distinctiveness of the area's 19th century architecture.

11.3.14 There is little greenspace in the area, but the Rochdale Canal (part of the Cheshire Ring Canal Walk) provides a green corridor along the partly pedestrianised Canal Street. Open spaces include Sackville Gardens and Vimto Park, with lawns and mature trees, which provide pockets of perceptible tranquillity in comparison to the busier Piccadilly Gardens, with a greater mix of public realm features. There are few street trees in the city centre owing to the density of development, but there are trees where the public realm is more extensive, such as around new developments. Central areas of Manchester are well maintained, with high quality paving and street furniture. Around the existing Manchester Piccadilly Station, utilitarian street furniture and transport infrastructure on the A6 London Road and the B6469 Fairfield Street detract from the character of the landscape. The area is very active with shops and cafes and high levels of pedestrian and transport movement, resulting in low tranquillity along the main pedestrian and traffic routes.

11.3.15 The City Centre Core, Historic and Commercial Grain LCA is assessed as having an overall **medium-high** landscape value based on the many buildings of high architectural and historic value, the conservation area status of much of the area, the influence of the extensive transport infrastructure in the area and low levels of tranquillity.

Visual baseline

11.3.16 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: MA08 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[59], 4: Transport, 5: Hotels/healthcare/schools and 6: Employment.

11.3.17 Due to the densely built-up nature of much of the study area, most views towards the existing Manchester Piccadilly Station are screened by intervening buildings set within the complex street pattern. Views are more open close to the station, where there are substantial areas of vacant land, and from elevated locations, such as the Ashton Canal aqueduct over Store Street and the upper floors of high rise buildings.

11.3.18 Residential receptors, particularly those occupying upper storeys in Wharf Close, Chapeltown Street and Sparkle Street, Piccadilly Village, the A665 Great Ancoats Street, and Brunswick and Ardwick currently have clear, narrow or partially screened views of the existing Manchester Piccadilly Station. Recreational receptors have open views from short stretches of the Cheshire Ring Canal Walk (along the Rochdale Canal), the Medlock Valley Way and Sustrans Route 86 (along the Ashton Canal) and from Sustrans Route 66, which runs along Store Street and Old Mill Street. Boat users' views towards the existing Manchester Piccadilly Station from the waterways are largely screened by intervening buildings. Road users, pedestrians, workers and hotel guests can only see the existing Manchester Piccadilly Station from the immediately surrounding streets.

11.3.19 There are no designated or protected views within the study area.

Future baseline

Construction (2025)

11.3.20 Volume 5: Appendix CT-004-00000 provides details of the developments in the MA08 area that are assumed to have been implemented by 2025. The following committed developments of relevance to landscape and visual during construction in this area are set out in Table 21.

Table 21: Committed developments of relevance to landscape and visual during construction

Map book reference[60]	Planning reference/ Allocation reference	Description	How this is considered in the assessment
MA08/089	121014/FO/2018	Location: 12 - 16 Piccadilly, Manchester, M1 3AN. Erection of 23 storey building (land at no. 14-16 Piccadilly) plus plant level and conversion of adjacent building (no. 12 Piccadilly) (basement to fourth floor) to create 356 bedroom hotel above ground floor breakfast room and lobby.	Informing future baseline.

[59] 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.

[60] Volume 5: Planning Data/Committed Development Map Book: Maps CT-13-327 to CT-13-328.

Map book reference[60]	Planning reference/ Allocation reference	Description	How this is considered in the assessment
MA08/160	118267/FO/2017	Location: Land at Chandos Hall between Echo Street, Granby Row, Vimto Gardens and Manchester South Junction and Altrincham Railway Viaduct, Manchester, M1 3QJ. Full planning permission for the demolition of existing buildings on site and their replacement with a mixed use (sui generis) development comprising 3 towers ranging in height (from 14, 20 and to 25 storeys (including lower ground floor level) and intermediary link buildings and providing: 403 units of Co-Living residential accommodation with associated shared amenity spaces; 94 units of purpose built student accommodation with associated shared amenity spaces; ground floor commercial floor space and children's day nursery together with cycle parking/recycling and refuse bin storage, associated plant and public realm enhancements to Granby Row, Echo Street, Cobourg Street and Back Acton Street.	Informing future baseline.
MA08/255	122000/FO/2018	Location: Victoria House, Great Ancoats Street, Manchester, M4 7AB. Erection of a part 25 part 3 storey residential tower (Use Class C3) for 177 apartments comprising 59 x 1 bed (34 x 1 bed 1 person and 25 1 bed 2 person), 113 x 2 bed (44 x 2 bed 3 person and 69 x 2 bed 4 person) and 5 x 3 bed (3 bed 5 person) with ground floor commercial space (Use Class A1, A2, A3, A4 and D1) above partial basement level associated shared amenity spaces at 3rd floor level, realm enhancements following demolition of existing buildings.	Informing future baseline.
MA08/361	126608/FO/2020	Location: Land to the south of Store Street, Manchester, M1 2NE. Erection of part 4, part 11 storey residential (Class C3) development (with roof top plant room) comprising 66 (Class C3) residential units (3 x 2 bed town houses, 46 x two bed apartments and 17 x one bed apartments) together with associated car parking (10 spaces including 5 EVC spaces), cycle parking (66 spaces) communal roof terrace.	Informing future baseline.
MA08/098	115178/FO/2017	Location: Part site of existing car park bounded by Ducie Street, the Rochdale Canal, Peak Street, Tariff Street (multi-storey car park) and remainder of surface car park, Manchester, M1 2JL. Erection of 2 linked buildings ranging in height from 8 to 10 storeys (plus roof top plant room) to provide residential accommodation (Use Class C3) comprising 18 x 1 bed, 84 x 2 bed, 15 x 3 bed, 2 x duplex (4 bed) and 9 townhouses (7 x 3 bed, 1 x 2 bed and 1 x 4 bed) (128 units in total) works to create provision for access and servicing.	Informing future baseline.

Map book reference[60]	Planning reference/ Allocation reference	Description	How this is considered in the assessment
MA08/402	1281191/FO/2020	Location: land bounded By Ashton Canal, Great Ancoats Street, Munday Street and Pollard Street, Manchester, M4 7DS. Erection of five office buildings and new public realm comprising: 3 no. 8 storey mixed use buildings (Buildings A, D and E) comprising workspaces (Use Class E) together with flexible uses at ground floor (Use Class E) and/or theatre/bar (Sui Generis) together with a multi use rooftop amenity area to Building A; and 2 no. 5 storey mixed use buildings (Buildings B and C) comprising workspaces (Use Class E) together with flexible uses at ground floor (Use Class E) and/or theatre/bar (Sui Generis); together with cycle parking, creation of pedestrian and cycle routes, external amenity spaces, new public realm and other associated engineering and infrastructure works.	Informing future baseline.

11.3.21 The following committed developments have been included as part of the future baseline and considered within this assessment:

- committed development MA08/089 will introduce residential receptors off the A6 Piccadilly and Gore Street. The receptors of MA08/089 are represented by viewpoint 342-02-018;
- committed development MA08/098 will introduce additional residential accommodation at Ducie Street. The additional receptors of the development MA08/098 are represented by viewpoint 342-02-013: view south from Jutland Street;
- committed development MA08/160 will introduce additional residential receptors off the A6 London Road. The additional receptors of MA08/160 are represented by viewpoint 342-02-010;
- committed development MA08/255 will introduce additional residential receptors at Great Ancoats Street and Longacre Street. The additional receptors of MA08/255 are represented by viewpoint 342-02-006;
- committed development MA08/361 will introduce additional residential accommodation at Store Street. The additional receptors of the development MA08/361 are represented by viewpoint 342-02-011: view south-west from Medlock Valley Way and Store Street Aqueduct; and
- committed development MA08/402 will introduce additional residential receptors and commercial receptors on the A662 Pollard Street. The additional receptors of the developments MA08/402 are represented by viewpoint 342-02-005: view south-west from New Islington Metrolink Stop and Ashton Canal Lock number 3.

Operation (2038)

11.3.22 Volume 5: Appendix CT-004-000000 provides details of the additional developments, including local authority land use planning allocations in the existing Manchester Piccadilly Station area that are assumed to have been implemented by 2038. No 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 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 Code of Construction Practice[61] (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[62];
- 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;

[61] Volume 5: Appendix CT-002-00000, draft Code of Construction Practice.

[62] British Standards Institution (2012), BS 5837:2012 *Trees in relation to design, demolition and construction – Recommendations.*

- 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. Key construction activities that will give rise to the most apparent changes to landscape and visual receptors are: demolition of buildings and structures, and the removal of vegetation; the installation and use of construction compounds; the construction of Manchester Piccadilly High Speed station, viaducts, embankments, cuttings and retaining walls; the addition of night time lighting; the realignment and extension of Metrolink; and the closure and diversion of roads around the Proposed Scheme. The construction of Ardwick box structure and Manchester tunnel north portal will take place in the adjoining Davenport Green to Ardwick area (MA07) but will also give rise to changes in the Manchester Piccadilly area due to their proximity to the boundary between the two areas.

11.4.7 Non-significant effects are reported in Volume 5: Appendix LV-001-008.

Landscape assessment

11.4.8 The LCA set out in Table 22 will be significantly affected during construction of the Proposed Scheme.

Table 22: Summary description and assessment of effects on LCA

Location	
Piccadilly, Ardwick and West Gorton Industrial and Infrastructure The Piccadilly, Ardwick and West Gorton Industrial and Infrastructure LCA of **medium-low** value will be directly affected by the introduction of construction activity, machinery and construction compounds into an area in industrial, commercial and rail and road infrastructure use. There will be large-scale changes due to the demolition of buildings, the realignment and closures of roads, and the construction of Ardwick embankment, Piccadilly approach viaduct, Piccadilly station viaduct and Manchester Piccadilly High Speed station. There will also be extensive utilities works across the LCA. The construction of Manchester tunnel north portal, Ardwick North cutting, Ardwick box structure, Ardwick embankment and Manchester to Leeds junction will take place in the Davenport Green to Ardwick area (MA07) but still within this LCA. Construction of these elements will also result in a substantial change to the character of this LCA. Construction activity and the use of local roads as construction traffic routes will further diminish the existing low tranquillity of the area. The construction of the Proposed Scheme will affect a large proportion of the LCA. Due to the **medium-low** value, including low levels of tranquillity together with the presence of detracting features, the landscape has a **medium-low** susceptibility to change arising from	Level of effect: **Moderate** adverse (significant)

Location	
the Proposed Scheme. The demolition of buildings, presence of construction activity and compounds and loss of connectivity in the area will result in a **high** magnitude of change to the landscape. The **high** magnitude of change for the Piccadilly, Ardwick and West Gorton Industrial and Infrastructure LCA and its **medium-low** sensitivity will result in a **moderate adverse** significant effect.	
City Centre Core, Historic and Commercial Grain The City Centre Core, Historic and Commercial Grain LCA of **medium-high** value will be directly affected by the introduction of construction activity, machinery, construction compounds and traffic movement into a densely developed city centre area. Construction effects will be limited to a relatively small proportion of the character area, on the east side of the existing Manchester Piccadilly Station due to the substantial existing development that surrounds the station. The changes will result from the construction of Manchester Piccadilly High Speed station, the realignment and extension of Metrolink and the modifications to the existing Manchester Piccadilly Station and the A6 London Road footbridge. Effects will also arise from the demolition of buildings, which will open up the streetscape east of the station, and traffic management measures, which will reduce connectivity in the area. Noise and activity generated during construction will further reduce existing low tranquillity. Due to the **medium-high** value, including low levels of tranquillity together with the presence of detracting features, the landscape has a **medium** susceptibility to change arising from the Proposed Scheme. The demolition of buildings, presence of construction activity and compounds with loss of pedestrian and vehicular connectivity in a small proportion of the area will result in a **medium** magnitude of change to the landscape. The **medium** magnitude of change for the City Centre Core, Historic and Commercial Grain LCA and its **medium-high** sensitivity will result in a **moderate adverse** significant effect.	Level of effect: **Moderate** adverse (significant)

Visual assessment

Introduction

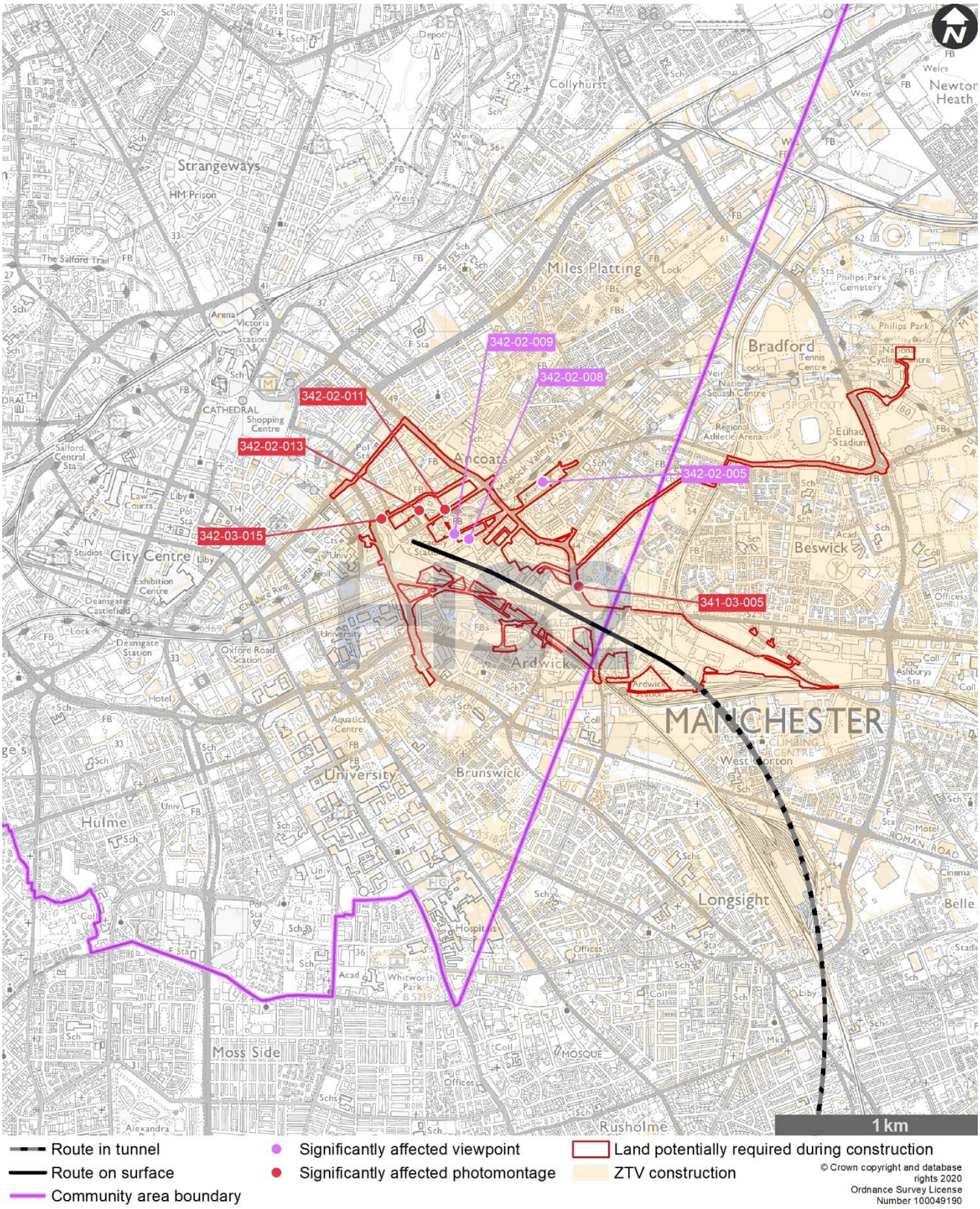
11.4.9 The following section describes the likely significant effects on visual receptors during construction. The construction assessment has been undertaken for the winter period, in line with best practice guidance, to ensure a robust assessment. However, in some cases, visibility of construction activities may be reduced during summer when vegetation, if present in a view, will be in leaf. Where visual receptors are predicted to experience significant effects at night-time arising from additional lighting, these are also presented in this section.

11.4.10 Where a viewpoint represents multiple types of receptor, the assessment is based on the most sensitive receptor. Effects on other receptor types with lower sensitivity will be lower than those reported.

11.4.11 The visual assessment has not identified any locations within this study area where additional lighting during continuous night working and/or overnight working during construction will result in significant visual effects at night.

11.4.12 Table 23 describes the construction phase potentially significant visual effects. Viewpoint locations are shown in Map Series LV-03 in the Volume 2, MA08 Map Book.

Table 23: Construction phase significant visual effects



View south-west from Ancoats Bridge on the A665 Pin Mill Brow (Medium sensitivity receptors) (VP 341-03-005)	
Cyclists on the Regional Cycle Route 86, in the Medlock Valley Park of **medium** susceptibility and road users of lower susceptibility, both with **medium-low** value views, will experience substantial changes to foreground views as a result of the realignment of the A665 Pin Mill Brow and the presence of construction traffic using the road. The demolition of the four-storey metal panelled large retail unit in the centre of the gyratory system road layout and removal of some vegetation from the River Medlock corridor will open up views of construction of Ardwick embankment and Piccadilly approach viaduct in the background. Hoardings surrounding Manchester approach viaduct satellite compound C will screen the lower parts of construction activity, but taller machinery will be prominent in the middle-distance view. Tall plant will be visible on the skyline and the emerging structures will replace views of Adlow Enterprise Park and distant views of Manchester city centre. Extensive utilities work will be visible in the view including that of electrical, telecommunications, water and gas assets in the near distance and along the re-aligned roads into the middle distance. Cyclists and motorists will have clear, direct and close views of traffic management measures and site hoardings. The large scale construction activity will be visible across the entire view. Together, the combination of the above changes will result in a **high** magnitude of visual change. The **high** magnitude of visual change and **medium** sensitivity will result in a **moderate adverse** significant effect. A photomontage illustrating this scenario is included Volume 5: Appendix LV-001-0MA08, Part 3.	Level of effect: **Moderate** adverse (significant)

View south-west from New Islington Metrolink stop and Ashton Canal Lock Number 3 (Medium-high sensitivity receptor) (VP 342-02-005)	
Residents and recreational users travelling along Ashton Canal and Medlock Valley Way of **high** susceptibility and users of Metrolink of lower susceptibility with **medium** value views will experience noticeable changes to near and middle-distance views as a result of the construction of the Proposed Scheme. Construction activities at the Metrolink New Islington turnback satellite compound associated with the Metrolink New Islington turnback will be visible in the near distance. Construction traffic and telecoms utilities works will be seen along the A662 Pollard Street. Construction of the main elements of the Proposed Scheme will be limited to the far distance of the view, seen beyond the Phoenix building (under construction at the time of assessment). Associated activities will include the presence of tall plant along the skyline and the construction of Manchester Piccadilly High Speed station main compound and the existing Manchester Piccadilly Station viaduct. As construction progresses it will obscure the arched roof of Manchester Piccadilly Station. For residents on the upper floors of the adjacent development, construction activity will be seen in the context of a wider view over the urban landscape. Recreational users and travellers along the Ashton Canal will only have views of construction where gaps between intervening buildings allow, or above the existing built form. The combination of above will result in a **medium** magnitude of visual change. The **medium** magnitude of visual change and **medium-high** sensitivity will result in a **moderate adverse** significant effect.	Level of effect: **Moderate** adverse (significant)

View south-west from Baird Street and Portugal Street East (Medium-high sensitivity receptor) (VP 342-02-008)	
Residents, of **high** susceptibility and tram users of lower susceptibility, both with **medium** value views, will experience substantial changes to near and middle-distance views as a result of the construction of the Proposed Scheme. During construction, the location in	Level of effect: **Moderate** adverse (significant)

View south-west from Baird Street and Portugal Street East (Medium-high sensitivity receptor) (VP 342-02-008)	
which the viewpoint was taken will fall within the land required for construction of the Proposed Scheme; therefore, ground level views will not be possible. However, the residents in buildings immediately adjacent to the viewpoint will overlook the construction activities. Construction activities will be seen in the foreground beyond site hoardings immediately adjoining the viewpoint within the Crusader residential development. Construction works to the changes in levels associated with the Metrolink as well as extensive utilities works to gas, sewers, telecommunications, water and electrical assets will be conspicuous in the foreground. Manchester Piccadilly High Speed station main compound will be visible immediately south and south-west. Construction activity, and demolitions associated with Manchester Piccadilly High Speed station will be immediately apparent and highly visible above site hoardings across a wide proportion of the view. The combination of the above will result in a **high** magnitude of visual change. The **high** magnitude of visual change and **medium-high** sensitivity will result in a **moderate adverse** significant effect.	

View south-west from Chapeltown Street (Medium-high sensitivity receptor) (VP 342-02-009)	
Residents, of **high** susceptibility and with **medium** value views, will experience substantial changes to foreground and middle-ground views as a result of the construction of the Proposed Scheme. Construction activities will be seen to the south in the foreground. These will be visible above the site hoardings which will be located immediately adjacent the viewpoint. In addition, extensive utilities work will be visible along Chapeltown Street and Congou Street, these works will include electrical, gas, sewers, telecommunications and water assets. Manchester Piccadilly High Speed station main compound will be immediately adjacent to the viewpoint to the south. The construction activity, and demolitions associated with construction of Manchester Piccadilly High Speed station and the realignment of Metrolink will be immediately apparent and prominent above site hoardings across the majority of the view. The combination of above will result in a **high** magnitude of visual change. The **high** magnitude of visual change and **medium-high** sensitivity will result in a **moderate adverse** significant effect.	Level of effect: **Moderate** adverse (significant)

View south-west from Medlock Valley Way and Store Street Aqueduct (High sensitivity receptors) (VP 342-02-011)	
Residents and recreational users of the Ashton Canal and Medlock Valley Way, of **high** susceptibility and with **medium-high** value views, will see noticeable changes to views as a result of the construction of the Proposed Scheme. Construction of Manchester Piccadilly High Speed station and the demolition of Piccadilly Gate and the existing Manchester Piccadilly Station car park will be clearly visible in the background of the view, from an elevated position on the aqueduct over Store Street and by adjacent residents. Water, gas, electrical and telecommunications utilities works may result in the loss of some trees along Store Street and Sparkle Street which would open up views previously filtered by tree planting. The removal of Piccadilly Gate will open up views of construction activity and machinery on Manchester Piccadilly High Speed station main compound and cranes will be prominent across the skyline. Manchester Piccadilly High Speed station main compound will be partly screened by intervening buildings and vegetation. Recreational users will have clear and direct views of construction above intervening vegetation and built form. The combination of above will result in a **medium** magnitude of visual change.	Level of effect: **Moderate** adverse (significant)

View south-west from Medlock Valley Way and Store Street Aqueduct (High sensitivity receptors) (VP 342-02-011)	
The **medium** magnitude of visual change and **high** sensitivity will result in a **moderate adverse** significant effect. A photomontage illustrating the scenario is included in Volume 5: Appendix LV-001-0MA08, Part 3.	

View south from Jutland Street (Medium-high sensitivity receptors) (VP 342-02-013)	
Residents on Jutland Street and Ducie Street, of **high** susceptibility and with **medium value** views, will experience substantial changes to views as a result of the construction of the Proposed Scheme. The demolition of Piccadilly Gate and the existing Manchester Piccadilly Station car park and removal of existing trees along Store Street will open up clear views of the construction of Manchester Piccadilly High Speed station in the middle and far distance. Telecommunications utilities works will take place along Jutland Street and may result in the loss of the small existing street trees. Hoardings around Manchester Piccadilly High Speed station main compound (bordering Jutland Street) will partly screen the lower levels of construction, but where the street rises to cross the Ashton Canal, there will be clear views down into the compound. Cranes will be prominent across the skyline and the construction works will be highly visible across the majority of the view. The combination of the above will result in a **high** magnitude of visual change. The **high** magnitude of visual change and **medium-high** sensitivity will result in a **moderate adverse** significant effect. A photomontage illustrating the scenario is included in Volume 5: Appendix LV-001-0MA08, Part 3.	Level of effect: **Moderate** adverse (significant)

View south-east from Ducie Street (Medium sensitivity receptor) (VP 342-03-015)	
Recreational users travelling the on road cycling route along Ducie Street (to connect to the Medlock Valley Way and National Cycling Network Route 66) and hotel guests, of **medium** susceptibility and with **medium** value views, will experience substantial changes to near and middle-ground views as a result of the construction of the Proposed Scheme. Construction traffic will be seen in the foreground passing along Ducie Street. Extensive works to utilities associated with water, sewers, electrical and telecommunications assets will take place along Ducie Street and within the existing Manchester Piccadilly Station car park. In addition, construction of the realignment of Ducie Street and the new junction connecting with New Sheffield Street will be visible. Recreational users of the Medlock Valley Way (along Ducie Street) and hotel guests will see substantial changes to near and middle-ground views as a result of the Proposed Scheme. Construction traffic will use Ducie Street, increasing the number of vehicles crossing the foreground. Construction of Manchester Piccadilly High Speed station and the demolition of Piccadilly Gate will be clearly visible in the background through the gap between Gateway House and the former warehouse, above the hoardings of Manchester Station High Speed station main compound. The construction works will take place within a framed view. The combination of above will result in a **high** magnitude of visual change. The **high** magnitude of visual change and **medium** sensitivity will result in a **moderate adverse** significant effect. A photomontage illustrating the scenario is included in Volume 5: Appendix LV-001-0MA08, Part 3.	Level of effect: **Moderate** adverse (significant)

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 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:

- moderate adverse effects in relation to two LCA;
- moderate adverse visual effects at five representative residential viewpoint locations; and
- moderate adverse visual effects at two representative recreational 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. Public realm that has been integrated into the design of the Proposed Scheme includes:

- tree planting, green walls, soft landscaping, footways, a single carriageway public road, a cycle way and pedestrian priority crossings on New Sheffield Street, along the northern face of Manchester Piccadilly High Speed station;
- green walls, tree and ornamental planting, soft landscaping, seating and cycle storage associated with the Station Access ramp at the western extent of Manchester Piccadilly High Speed station; and
- green walls and areas of hard and soft landscaping associated with the multi-modal transport hub to the east.

11.5.3 Non-significant effects are reported in Volume 5: Appendix LV-001-0MA08.

Assessment of impacts and effects

11.5.4 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:

- Manchester Piccadilly High Speed station, New Sheffield Street boulevard, multi-modal transport hub and multi-storey car parks;
- realignment and extension to the Piccadilly Metrolink stop;
- Ardwick box structure, Ardwick embankment and Ardwick North cutting (partly in the Davenport Green to Ardwick area (MA07);
- other rail infrastructure such as Piccadilly approach viaduct and Manchester tunnel north portal (within in the Davenport Green to Ardwick area (MA07);
- Midland Street sectioning auto-transformer station in the Davenport Green to Ardwick area (MA07); and
- realignment of local roads around Manchester Piccadilly High Speed station and the A635 Mancunian Way, the A635 Fairfield Street, the A665 Great Ancoats Street, the A665 Chancellor Lane and the A665 Pin Mill Brow.

11.5.5 Non-significant effects are reported in Volume 5: Appendix LV-001-0MA08.

Landscape assessment

11.5.6 During operation of the Proposed Scheme there will be no significantly affected LCA. Non-significant effects are reported in Volume 5: Appendix LV-001-0MA08.

Visual assessment

Introduction

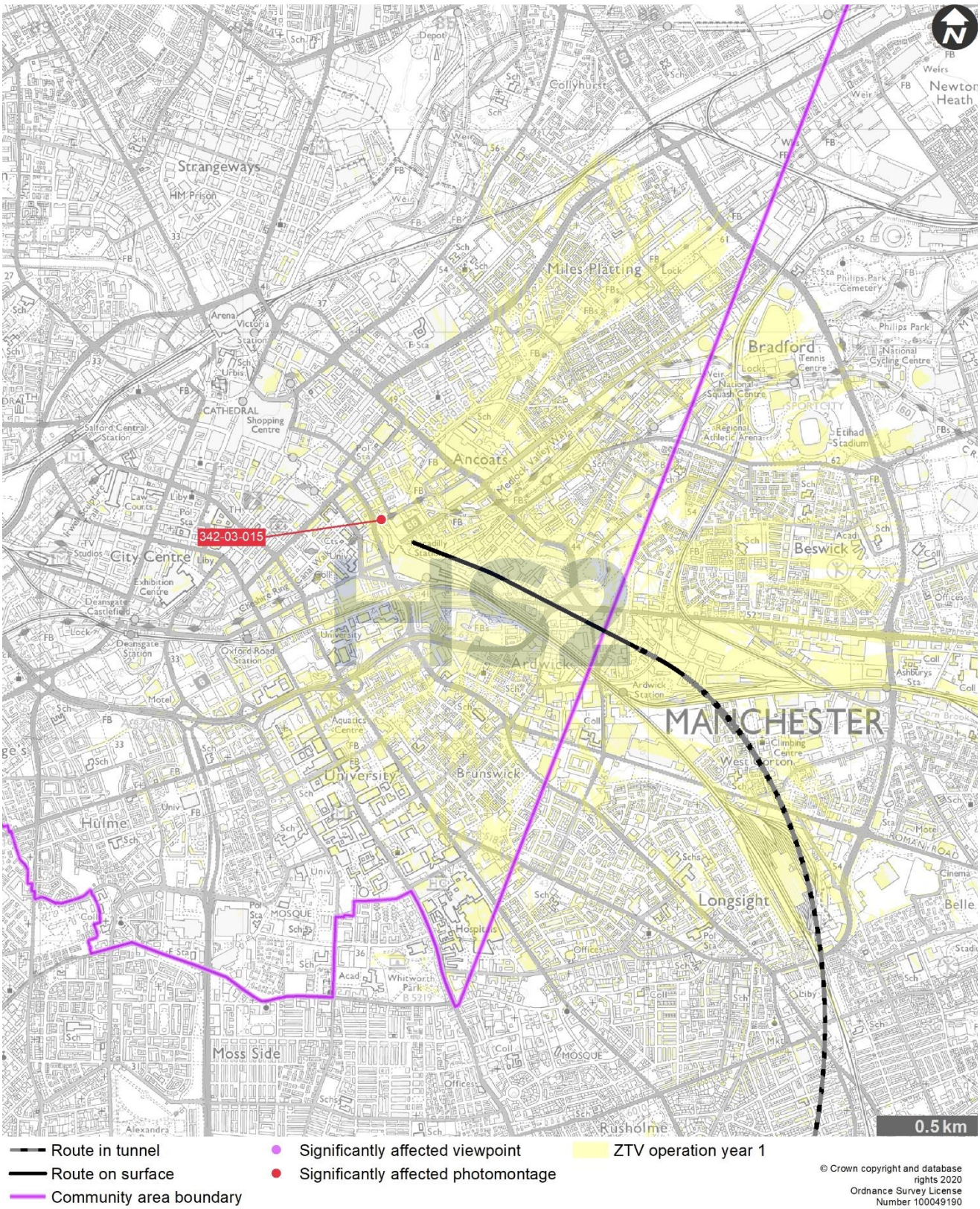
11.5.7 The following section describes the likely significant effects on visual receptors during operation in the winter and summer of year 1 and in the summer of both year 15 and year 30. The year 1 assessment includes the winter period, in line with best practice guidance, to ensure a robust assessment. 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.

11.5.8 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.

11.5.9 The assessment has not identified any locations within this study area where additional lighting during operation will result in significant visual effects at night.

11.5.10 Table 24 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, MA08 Map Book.

Table 24: Operation phase significant visual effects



View south-east from Ducie Street (Medium sensitivity receptor) (VP 342-03-015)	
Year 1 winter and summer: Recreational users travelling the on road cycling route along Ducie Street (to connect to the Medlock Valley Way and National Cycling Network Route 66) and hotel guests, of **medium** susceptibility and with **medium** value views, will see substantial changes to near and middle-ground views as a result of the Proposed Scheme. The realigned Ducie Street and the new junction connecting with New Sheffield Street will be visible. The absence of Piccadilly Gate will result in clear views of Manchester Piccadilly High Speed station. The building will be a prominent new structure in the view and will screen the existing Manchester Piccadilly Station. It will be a building of cohesive architectural design, replacing a number of buildings of disparate appearance, quality and scale. Manchester Piccadilly High Speed station and new public realm along New Sheffield Street and on the ramp on the north side of Gateway House will bring a more orderly and uniform appearance to the view than exists at present. A large proportion of the framed view will be improved, particularly within the foreground, with the area of public realm leading into the middle ground and then beyond at Manchester Piccadilly High Speed station in the background. The combination of the above will result in a **high** magnitude of visual change. The **high** magnitude of visual change and **medium** sensitivity will result in a **moderate** beneficial significant effect.	Level of effect: **Moderate** beneficial (significant)
Year 15 summer: Recreational users of the Medlock Valley Way (along Ducie Street) and hotel guests will continue to experience the substantial improved changes to a large proportion of the view as a result of the Proposed Scheme. The building will continue to be a prominent structure in the view and will be a building of cohesive architectural design. Manchester Piccadilly High Speed station and new public realm including maturing trees along New Sheffield Street and on the ramp on the north side of Gateway House will continue to bring an orderly and uniform appearance. The magnitude of visual change will remain as **high.** The **high** magnitude of visual change will remain, and effects will remain **moderate** beneficial significant.	Level of effect: **Moderate** beneficial (significant)
Year 30 summer: Recreational users of the Medlock Valley Way (along Ducie Street) and hotel guests will continue to experience the substantial improved changes to a large proportion of the view as a result of the Proposed Scheme. The building will continue to be a prominent structure in the view and will be a building of cohesive architectural design. Manchester Piccadilly High Speed station and new public realm including maturing trees along New Sheffield Street and on the ramp on the north side of Gateway House will continue to bring an orderly and uniform appearance. The magnitude of visual change will remain as **high.** The **high** magnitude of visual change will remain, and effects will remain **moderate** beneficial significant.	Level of effect: **Moderate** beneficial (significant)

Other mitigation measures

11.5.11 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

11.5.12 In many cases, significant effects will reduce over time as the proposed mitigation planting matures and reaches its designed intention. However, one recreational viewpoint location will likely result in a moderate beneficial visual effect at year 15 of operation.

Cumulative effects

Cumulative landscape effects

11.5.13 No significant cumulative effects during construction or operation are anticipated.

Cumulative visual effects

11.5.14 No significant cumulative effects during construction or operation are anticipated.

Monitoring

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

11.5.16 There are no area-specific requirements for monitoring landscape and visual mitigation during the operation of the Proposed Scheme in the existing Manchester Piccadilly Station 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 Manchester Piccadilly Station area. The assessment considers existing businesses, community organisations, local employment and local economies, including planned growth and development.

12.1.2 Engagement with Manchester City Council (MCC) and the strategic authority of 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: MA08 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)[63]. 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 There are a number of railway operational facilities that provide employment within the existing Manchester Piccadilly Station. Of those that have been confirmed to move to alternative locations within the Manchester Piccadilly High Speed station, it is assumed that the new facilities shall be built prior to the closure of the existing facilities, and therefore no job losses or displacement is considered within this assessment.

12.2.3 There are a number of retail units within the existing Manchester Piccadilly Station. For those that are not required to be demolished for the construction of the Proposed Scheme, it is assumed that suitable access shall be maintained during construction and therefore, no job losses or displacement is considered within this assessment.

[63] Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

12.3 Environmental baseline

Existing baseline

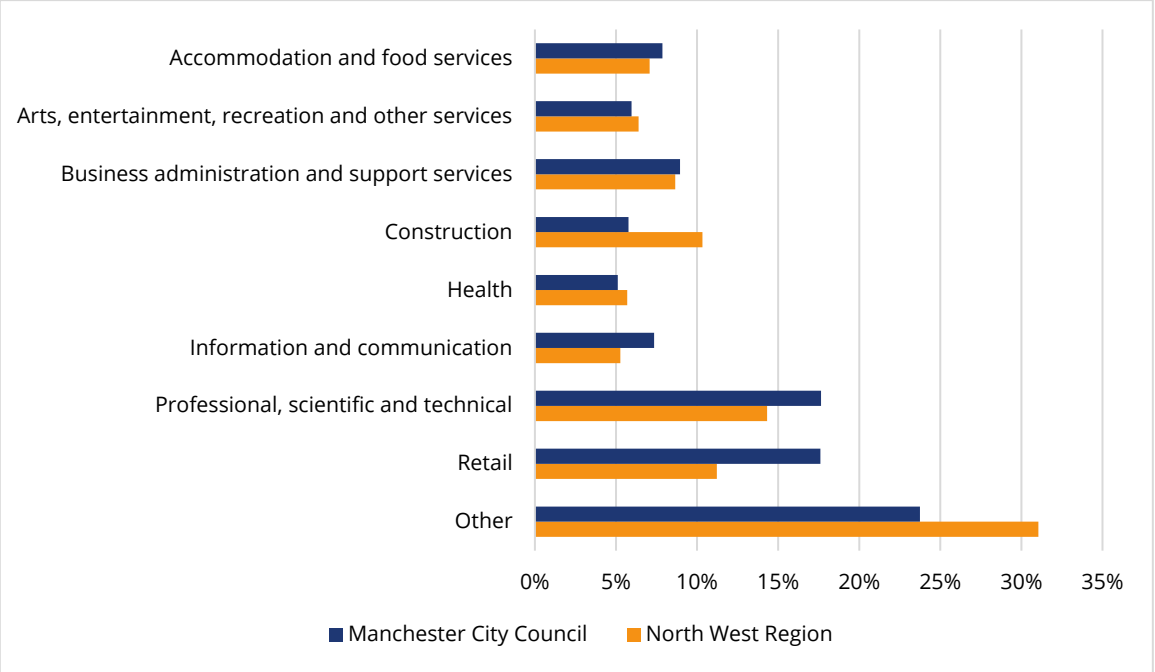
Study area description

12.3.1 The following provides a brief overview of employment, economic structure, labour market and business premises availability within the Manchester Piccadilly Station area which lies within the administrative area of MCC and within the North West region. It also falls within the Greater Manchester Local Enterprise Partnership (LEP) area and the GMCA area.

Business and labour market

12.3.2 Within the MCC administrative area there is a wide spread of business types reflecting a diverse range of commercial activities. In 2020 the professional, scientific and technical (18%) and retail (18%) sectors accounted for the two largest proportion of businesses, followed by business administration and support services (9%) and accommodation and food services (8%), as shown in Figure 12. 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%)[64].

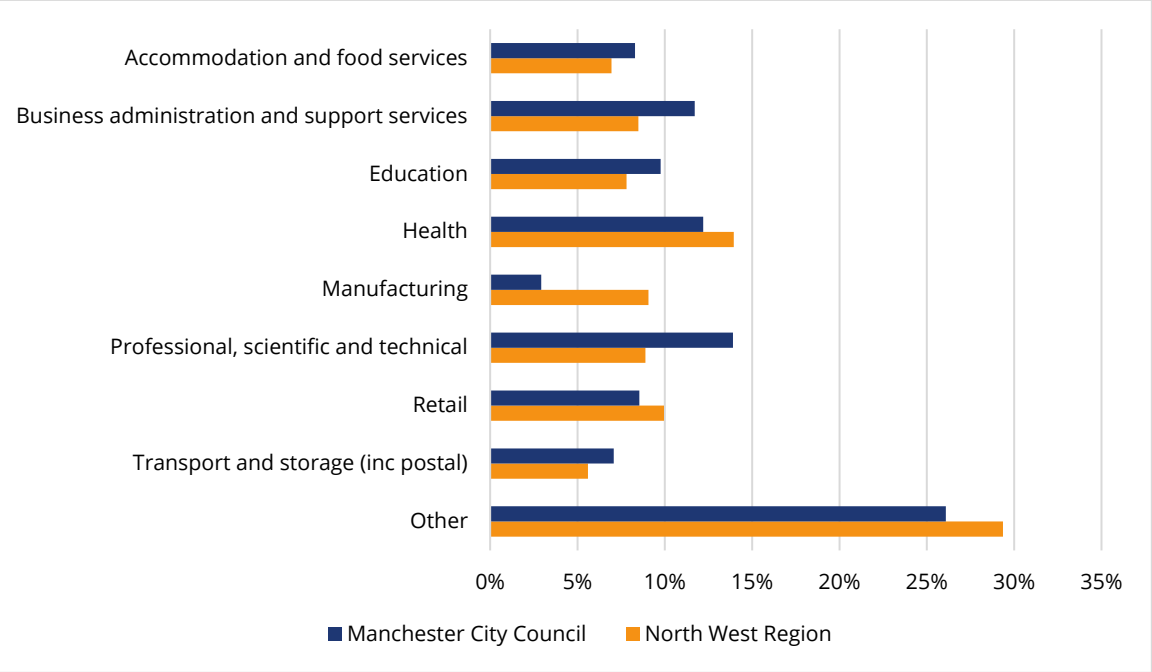
Figure 12: Business sector composition in the Manchester City Council area and the North West region



[64] 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.

12.3.3 In 2019[65], approximately 410,000 people worked in the MCC area. According to the Office for National Statistics Business Register and Employment Survey 2019, the top four sectors in terms of share of employment were: professional, scientific and technical (14%); health (12%); business administration and support services (12%); and education (10%). 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 13.

Figure 13: Employment by industrial sector in the Manchester City Council area and the North West region



12.3.4 According to the Annual Population Survey (2020)[66], the employment rate[67] within the MCC area was 66% (257,800 people), which was lower than that recorded for both the North West region (74%) and England (76%). In 2020, unemployment in the MCC area was 8.6%, which was higher than that recorded both for the North West region (4.3%) and England (4.8%).

12.3.5 The Annual Population Survey (2020)[68] also shows that 48% of MCC residents aged 16-64 were qualified to National Vocational Qualification Level Four (NVQ4) and above, which was higher than that recorded for both the North West region (39%) and England (43%), while

[65] Office for National Statistics (2019), *Business Register and Employment Survey 2019*. Available online at: http://www.nomisweb.co.uk/datasets/newbres6pub. This number includes both residents and non-residents of MCC who work within its boundaries.

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

[67] The proportion of working age (16-64 year olds) residents that is in employment.

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

7.8% of residents had no qualifications, which was higher than that recorded both for the North West region (7.5%) and England (6.2%).

Property

12.3.6 According to the latest Economy and Employment Space Study (2010), the MCC area has a need for up to 249ha of employment land to 2027 and has a current supply of 259ha (of which 233ha is allocated for office use, 15ha for industrial, 10ha for general employment and less than 1ha for distribution). Whilst this indicates a slight over-supply, the study assumes that some sites are unlikely to be fully developed in the plan period and that there is an estimated shortfall of employment land to 2027 of up to 50ha[69].

12.3.7 Following the decision of Stockport Council on 03 December 2020, Greater Manchester's Plan for Homes, Jobs and the Environment (the Spatial Framework)[70] is no longer being progressed. Although the draft Greater Manchester Spatial Framework (GMSF) is no longer being progressed, the employment land evidence base prepared for that Framework remains valid.

12.3.8 The draft GMSF (2020) provides more recent data on the MCC employment land requirements. This identified a need for 245ha of employment land between 2020 and 2037 within the MCC area. The MCC area had an existing supply of 240ha, of which 232ha is allocated for office use, along with 8ha for industrial and warehousing. It identified Manchester city centre as an area of considerable economic growth in Greater Manchester, with the priority being to protect its economic role. The importance of developing adequate employment sites was seen as central to the GMCA's strategy to support economic growth.

12.3.9 Based on the latest available data from the Estates Gazette (February 2021), the average vacancy rate for industrial and warehousing property in the MCC area has been assessed as 9.4% based on marketed space against known stock[71].

12.3.10 Based on the latest available data from the Estates Gazette (February 2021) the average vacancy rate for office space in the MCC area[72] is 21%.

[69] Nathaniel Lichfield and Partners (2010), *Manchester Economy and Employment Space Study: Manchester City Council.* Based on upper range and including a 20% flexibility factor, which is a buffer to ensure that future land supply is flexible enough to account for uncertainties in certain sites being developed.

[70] Greater Manchester Combined Authority (2020), *Greater Manchester's Plan for Homes, Jobs and the Environment: Greater Manchester Spatial Framework Publication Plan 2020*.

[71] Vacant space is based on marketed space identified from Estates Gazette data (EGi) (February 2021).

[72] Based on marketed space identified from Estates Gazette data (EGi) (February 2021).

Future baseline

Construction (2025)

12.3.11 Volume 5: Appendix CT-04-00000 provides details of the developments in the Manchester Piccadilly Station area that are assumed to have been implemented by 2025. The following committed developments of relevance to socio-economics that would materially alter the future baseline during construction of the Proposed Scheme in this area, are set out in Table 25.

Table 25: Committed developments of relevance to socio-economics during construction

Map book reference[73]	Planning reference	Description	How this is considered in the assessment
MA08/068	121810/FO/2018	Location: floors 1-7 17-21 Boulton House, Chorlton Street, Manchester, M1 3HY. Change of use to a flexible use of a Non-residential institution (Use Class D1) or Office (Use Class B1(a)) pursuant to Schedule 2 Part 3 Class V of the Town and Country Planning (General Permitted Development) (England) Order (2015) as amended, with no more than one floor occupied as Non-residential institution (Use Class D1) at any time.	Informing future baseline.
MA08/089	121014/FO/2018	Location: 12-16 Piccadilly, Manchester, M1 3AN. Erection of 23 storey building (land at no. 14-16 Piccadilly) plus plant level and conversion of adjacent building (no. 12 Piccadilly) (basement to fourth floor) to create 356 bedroom hotel above ground floor breakfast room and lobby.	Informing future baseline.
MA08/160	118267/FO/2017	Location: land at Chandos Hall between Echo Street, Granby Row, Vimto Gardens and Manchester South Junction and Altrincham Railway Viaduct, Manchester, M1 3QJ. Full planning permission for the demolition of existing buildings on site and their replacement with a mixed use (sui generis) development comprising three towers ranging in height (from 14, 20 and to 25 storeys (including lower ground floor level) and intermediary link buildings and providing: 403 units of Co-Living residential accommodation with associated shared amenity spaces; 94 units of purpose built student accommodation with associated shared amenity spaces; ground floor commercial floor space and children's day nursery together with cycle parking, recycling and refuse bin storage, associated plant and public realm enhancements to Granby Row, Echo Street, Cobourg Street and Back Acton Street.	Informing future baseline.

[73] Volume 5: Planning Data/Committed Development Map Book: Maps CT-13-327 to CT-13-328.

Map book reference[73]	Planning reference	Description	How this is considered in the assessment
MA08/216	121345/FO/2018	Location: 40 Laystall Street, Manchester, M1 2JP. Use of the 1no. ground floor commercial unit (Unit 1) as Use Class A1 (shop) or A2 (financial and professional services) or A3 (Restaurants and Cafes) or B1 (Offices) or C1 (hotels), together with installation of rooftop plant and equipment and associated works.	Informing future baseline.
MA08/220	112670/FO/2016	Location: 2 Little Lever Street, Manchester, M1 1HR. Erection of seven storey hotel extension (60 beds) with glazed bridge link at third floor to connect to rear elevation of Gardens Hotel.	Informing future baseline.
MA08/222	111998/FO/2016	Location: Cheetwood House, Newton Street, Manchester, M1 1FZ. Change of use and internal/external works to the building, including the installation of four air conditioning units on the roof, to create 16 apartments (use class C3) on the first, second, third and fourth floors, with commercial uses including retail (use class A1), cafe (use class A3) and mixed use restaurant/takeaway (sui generis) provided at ground floor and basement level.	Informing future baseline.
MA08/224	115178/FO/2017	Location: 25-27 Dale Street, Manchester, M1 1EY. Erection of six storey building (plus plant level) above basement level to create office accommodation Class B1 at first to fifth floors and ground floor and basement (A1 (Shop), A3 (Restaurant and Cafe) and A4 (Drinking Establishment) Use) with repair up to second floor and reinstatement from second floor to roof of former central feature above former entrance block, removal of brick and stone wall to Bunsen Street elevation, remains of existing chimney to gable wall of 25 Dale Street and existing stair and lift core from basement, ground and first floor.	Informing future baseline.
MA08/255	122000/FO/2018	Location: Victoria House Great Ancoats Street Manchester M4 7AB Erection of a part 25 part three storey residential tower (Use Class C3) for 177 apartments comprising 59 x one bed (34 x one bed one person and 25 one bed two person), 113 x two bed (44 x two bed three person and 69 x two bed four person) and five x three bed (three bed five person) with ground floor commercial space (Use Class A1, A2, A3, A4 and D1) above partial basement level associated shared amenity spaces at 3rd floor level, realm enhancements following demolition of existing buildings.	Informing future baseline.

Map book reference[73]	Planning reference	Description	How this is considered in the assessment
MA08/256	126672/FO/2020	Location: Hoyle Street, Manchester, M12 6HG. Erection of a temporary construction compound and logistical hub (Sui Generis) to facilitate the construction of Mayfield Phase 1 (124972/FO/2019 and 125248/FO/2019) and neighbouring infrastructure developments for a 10 year period, including associated demolition of on-site structures, erection of site cabins, physical landscaping and highway works, and car and cycle parking provision for construction workers.	Informing future baseline.
MA08/260	122599/FO/2019	Location: 1 Adair Street, Manchester, M1 2NQ. Demolition of existing building and erection of a 13 / part 14 (plant level) storey building to create a 275-bedroom hotel (Class C1) use.	Informing future baseline.
MA08/302	114707/FO/2016	Location: Sevendale House, 5 - 7 Dale Street, Manchester, M1 1JA. Change of units of vacant units B2, B3 and B4 (all basement) from Class A1 (Shop) to Class B1 (Office) use.	Informing future baseline.
MA08/316	125473/FO/2019	Location: 135-141 Oldham Street, Manchester, M4 1LN. Change of use to a flexible use as a non-residential educational institution (Use Class D1) or Office (Use Class B1) pursuant to Schedule 2 Part 3 Class V of the Town and Country Planning (General Permitted Development) (England) Order (2015) as amended.	Informing future baseline.
MA08/340	119338/FO/2018	Location: Ground Floor 42-44 Fountain Street, Manchester, M2 2BE. Change of use from vacant premises to dual use A1 hairdressers/D1 hairdressers training academy (sui generis) premises.	Informing future baseline.
MA08/344	120090/DEM/2018	Location: Rammon House, Portugal Street, East Manchester, M1 2WW. Prior approval for demolition of Rammon House.	Informing future baseline.
MA08/352	121375/FO/2018	Location: 20-36 High Street Including Church Street Market Stalls, Manchester, M4 1QB. Construction of a 22 storey building comprising 361 residential apartments (122 x one bed two person, 119 x two bed three person, 94 x two bed four person, 21 x three bed five person and five x three bed six person (34% one bed, 59% two bed and 7% three bed) ground floor commercial floorspace (Use Classes A1 (Shop), A3 (Restaurant and Cafe), A4 (Drinking Establishment) and A5 (Hot Food Take-away) associated landscaping, including new public realm and pedestrian route, together with servicing, cycle parking, access and other associated works following demolition of buildings at 20-22 and 24-26 High Street and five market stalls to Church Street.	Informing future baseline.

Map book reference[73]	Planning reference	Description	How this is considered in the assessment
MA08/356	127402/FO/2020	Location: land at Blossom Street, Great Ancoats Street, Gun Street and Henry Street Manchester. Creation of a commercial unit (Use Classes A1 (excluding convenience retail), A2, A3, B1 and / or D1) to the ground Floor of Block B of the Blossom Street development and other associated works.	Informing future baseline.
MA08/357	126638/FO/2020	Location: land bound by Back Turner Street, Shudehill, Soap Street and High Street, Manchester, M4 1FR. Erection of part 17 storey (plus roof top plant behind parapet), part six storey building and the conversion with single-storey rooftop extension of the existing building at 1 & 3 Back Turner Street to comprise office accommodation (Class B1(a)) with front of house and commercial floorspace at ground floor Class A1 (Shop), A2 (Financial and Professional Services), A3 (Café and Restaurant), A4 (Drinking Establishment) B1 (Office) and D2 (gym and cinema) use with associated landscaping and other works following demolition of existing buildings at 30 & 32 Shudehill and 1 & 3 Nicolas Croft.	Informing future baseline.
MA08/401	120508/FU/2018	Location: 35 Dale Street, Manchester, M1 2HF. Change of use of part of upper ground floor from Use Class B1 (office) to Use Class A4 (drinking establishment).	Informing future baseline.
MA08/402	128191/FO/2020	Location: land bounded by Ashton Canal, Great Ancoats Street, Munday Street and Pollard Street, Manchester, M4 7DS. Erection of five office buildings and new public realm comprising: three no. eight storey mixed use buildings (Buildings A, D and E) comprising workspaces (Use Class E) together with flexible uses at ground floor (Use Class E) and/or theatre/bar (Sui Generis) together with a multi use rooftop amenity area to Building A; and two no. five storey mixed use buildings (Buildings B and C) comprising workspaces (Use Class E) together with flexible uses at ground floor (Use Class E) and/or theatre/bar (Sui Generis); together with cycle parking, creation of pedestrian and cycle routes, external amenity spaces, new public realm and other associated engineering and infrastructure works.	Informing future baseline. Buildings B-E will not be implemented until operation.

12.3.12 Implementation of the committed developments listed above could result in approximately 4,870 additional jobs, altering the future baseline against which the Proposed Scheme is assessed. As such, these committed developments have been included as part of the future baseline and considered within this assessment.

12.3.13 The existing composition and numbers of employers, employees and economic sectors in the area is likely to change over time in ways that cannot be accurately forecast.

Operation (2038)

12.3.14 Volume 5: Appendix CT-004-00000 also provides details of the developments in the Manchester Piccadilly Station area that are assumed to have been implemented by 2038. No additional committed developments of relevance for socio-economics have been identified that would materially alter the future baseline in this area.

12.4 Effects arising during construction

Avoidance and mitigation measures

12.4.1 The draft Code of Construction Practice (CoCP)[74] 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

Businesses

12.4.2 Businesses directly affected, 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 may be clustered together.

[74] Volume 5: Appendix CT-002-00000, draft Code of Construction Practice.

12.4.3 Overall, two resources in the study area will experience temporary direct impacts as a result of the Proposed Scheme. These are as follows:

- a furniture store on the A665 Great Ancoats Street; and
- one committed development - land bounded by Ashton Canal, Great Ancoats Street, Munday Street and Pollard Street, Manchester, M4 7DS (MA08/402).

12.4.4 Both of these resources will be subject to potentially significant effects on business activities and employment. These resources are listed in Table 26.

Table 26: Resources which will potentially experience significant direct effects

Resource	Description of business activity
Furniture store on the A665 Great Ancoats Street	A designer furniture store with car parking and additional office space.
Land bounded by Ashton Canal, Great Ancoats Street, Munday Street and Pollard Street, Manchester, M4 7DS (MA08/402)	Erection of five office buildings and new public realm.

12.4.5 The magnitude of impact focuses on the number of jobs that will be affected by the Proposed Scheme, through displacement or possible job loss. The implications of this impact in relation to the scale of economic activity and opportunity in the area are also considered.

12.4.6 The following factors were taken into account when considering the sensitivity of resources:

- availability of alternative, suitable premises;
- size of the local labour market;
- skill levels and qualifications of local people; and
- levels of unemployment.

12.4.7 Taking account of the sensitivity of the resource and the magnitude of impact, the significance of the resultant effects is set out in Table 27.

Table 27: Significance of effects

Resource	Impact magnitude	Sensitivity	Significance of effect
Furniture store on the A665 Great Ancoats Street	Medium	Medium	Moderate adverse - significant
Land bounded by Ashton Canal, Great Ancoats Street, Munday Street and Pollard Street, Manchester, M4 7DS (MA08/402)	High	Low	Moderate adverse – significant

12.4.8 An overview of the resources expected to be significantly affected has been included below.

12.4.9 The diversion of a 3650mm combined sewer along the A6 London Road and Ducie Street will require the customer car park for a furniture store on the A665 Great Ancoats Street for two years. The operations of the business might be affected by the loss of all the 38 customer parking spaces. The sensitivity of the resource is assessed as medium as the business may struggle to attract customers given they will not be able to park at the site. The magnitude is

medium, based on the number of jobs located at the site. The effects are assessed to be moderate adverse and will therefore be significant.

12.4.10 The construction of New Islington turnback will result in buildings B to E of the committed development MA08/402 not being able to come forward until the Proposed Scheme is operational. Whilst building A can be implemented as consented, there will be a delay in buildings B to E being developed. There is a high availability of office space within central Manchester, therefore this resource is assessed with low sensitivity. The magnitude is high based on the number of jobs affected. The effect is assessed to be moderate adverse and will therefore be significant.

12.4.11 It is estimated that 30 jobs[75] are provided by the furniture store on the A665 Great Ancoats Street. It is estimated that 2,260 jobs at committed development MA08/402 will be delayed coming forward as a result of the construction activities of the Proposed Scheme. Businesses with an interest in land, either being acquired or possessed by the Proposed Scheme, that can demonstrate a loss of profit will be compensated in accordance with the Compensation Code.

12.4.12 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.

In-combination effects

12.4.13 Businesses within the Manchester Piccadilly Station 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.

12.4.14 Premier Inn, a hotel located on Dale Street, in Manchester city centre, 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 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

[75] Employment within businesses has been estimated through a combination of sources, for example, surveys of businesses, the Experian employment dataset, employment floor space and the Homes and Communities Agency (HCA) Employment Densities Guide 3rd Edition (2015). The estimate is calculated using standard employment density ratios and estimates of floor areas and may vary significantly from actual employment at the sites.

discourage them from using this facility. Given the duration of effects and the medium level of sensitivity, the Proposed Scheme is assessed to have a significant adverse in-combination effect on this business.

12.4.15 Native, an aparthotel located on Ducie Street in Manchester city centre, will experience significant noise effects for seven years and 11 months, 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 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 a significant adverse in-combination effect on this business.

12.4.16 Dakota Manchester, a hotel located on Ducie Street in Manchester city centre, will experience significant noise effects for 11 months 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 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 a significant adverse in-combination effect on this business.

12.4.17 Staycity Aparthotels at Gateway House, located in Manchester city centre, will experience significant noise effects for seven years and nine months and visual effects 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 a significant adverse in-combination effect on this business.

12.4.18 Committed development MA08/260, a hotel that will be located on Adair Street in Manchester city centre, will experience significant noise effects for six months 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 establishment is assessed to be medium as some users are considered 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 medium level of sensitivity, the Proposed Scheme is assessed to have a significant adverse in-combination effect on this business.

Isolation

12.4.19 Businesses within the Manchester Piccadilly Station 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.

12.4.20 Construction works on Ducie Street will require the road to be closed to traffic for three months, although pedestrian access will be maintained. Vehicular traffic will be diverted via

Peak Street, Laystall Street, the A665 Great Ancoats Street, Newton Street and the A6 London Road, increasing journey length by up to 858m. Additionally, traffic management measures and intermittent passing places will be implemented for a period of one year and nine months along Ducie Street. Approximately seven businesses remaining in this area will experience disruption as a result of construction works. Business activities include hotels (La Reserve Aparthotel, Native and Dakota Manchester), a public house, a bakery, a supermarket and a barber shop. 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.

Construction employment

12.4.21 There will be one main civil engineering compound (Manchester Piccadilly High Speed station main compound), and four civil engineering satellite compounds in the Manchester Piccadilly Station area. The main compound will continue to be used as a railway systems compound following the completion of civil engineering works. Up to 4,700 person years of construction employment opportunities will be created at these sites[76], broadly equivalent to 470 full time jobs[77]. 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).

12.4.22 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).

12.4.23 The resulting effects on employment are reported in aggregate at a route-wide level (see Volume 3, Route-wide effects).

Permanent effects

Businesses

12.4.24 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.

[76] 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.

[77] Based on the convention that 10 employment years is equivalent to one full time equivalent job.

12.4.25 Overall, 90 resources in the study area will experience direct impacts as a result of the Proposed Scheme. These are as follows:

- eleven resources on the A665 Chancellor Lane and Midland Street;
- West Way Nissan Manchester on the A665 Chancellor Lane;
- twelve resources on Dark Lane, Cresbury Street and William Street;
- two resources on the A665 Pin Mill Brow;
- car repair and yard-based businesses on the B6469 Fairfield Street and Crane Street (eight resources);
- three resources at Crusader House on the B6469 Fairfield Street;
- nine resources on the B6469 Fairfield Street;
- nine resources at Aldow Enterprise Park on Blackett Street;
- one resource on the corner of North Western Street and Coronation Square;
- three resources on Helmet Street and St Andrew's Square;
- five resources on Travis Street, Adair Street and Heyrod Street;
- Network Rail Ltd offices at Square One on Travis Street;
- the Royal Mail Vehicle and Distribution Department on Travis Street;
- The Barkside MCR on Travis Street;
- surface, sub-surface and multi-level car parks close to the existing Manchester Piccadilly Station on Sheffield Street, Baird Street, Boad Street and under Gateway House on Store Street (four resources);
- one resource on Sparkle Street;
- six resources at Piccadilly Gate on Store Street;
- four car rental companies at the existing Manchester Piccadilly Station; and
- eight resources within the existing Manchester Piccadilly Station.

12.4.26 The resources listed above are those that are anticipated to experience job losses or displacement as a result of construction of the Proposed Scheme. Additionally, land required for the construction of the Proposed Scheme will directly impact other business resources. These businesses are not listed above, as the effect upon them is not expected to result in job losses or displacement.

12.4.27 Seven of the groups of resources and one individual resource are subject to potentially significant effects on business activities and employment. These resources are listed in Table 28.

Table 28: Resources which will potentially experience significant direct effects

Resource	Description of business activity
Businesses on the A665 Chancellor Lane	A group of 11 businesses including a number of car repair businesses, a homeless charity, equipment suppliers and a service station.
West Way Nissan Manchester on the A665 Chancellor Lane	A large Nissan car dealership and car servicing centre.

Resource	Description of business activity
Businesses on Dark Lane, Cresbury Street and William Street	A group of eight businesses including clothing manufacturers and suppliers, an upholstery school, a production company, creative arts, storage and product suppliers. There are approximately four vacant units.
Car repair and yard-based businesses on the B6469 Fairfield Street and Crane Street	A group of seven car repair and yard-based businesses. There is also one vacant unit.
Businesses at Crusader House on the B6469 Fairfield Street	A group of three businesses comprising principal contracting, sourcing and distribution, and real estate.
Businesses on Helmet Street and St Andrew's Square	A group of three businesses comprising fabric wholesalers, food suppliers and a transport organisation.
Four car rental companies at the existing Manchester Piccadilly Station	Four rental agencies connected to station car parking and using a proportion of these car parks for their car storage.
Businesses within the existing Manchester Piccadilly Station	A group of businesses including fast food restaurants, retail, and a public house, along with office and cleaning premises within the existing Manchester Piccadilly Station.

12.4.28 The magnitude of impact focuses on the number of jobs that will be affected by the Proposed Scheme, either through displacement or possible job loss. It also considers the implications of this impact in relation to the scale of economic activity and opportunity in the area.

12.4.29 The following factors were taken into account when considering the sensitivity of resources:

- availability of alternative, suitable premises;
- size of the local labour market;
- skill levels and qualifications of local people; and
- levels of unemployment.

12.4.30 Taking account of the sensitivity of the resource and the magnitude of impact, the significance of the resultant effects is set out in Table 29.

Table 29: Significance of effects

Resource	Impact magnitude	Sensitivity	Significance of effect
Businesses on the A665 Chancellor Lane	High	Medium	Major adverse – significant
West Way Nissan Manchester on the A665 Chancellor Lane	Medium	Medium	Moderate adverse – significant
Businesses on Dark Lane, Cresbury Street and William Street	High	Medium	Major adverse – significant
Car repair and yard-based businesses on the B6469 Fairfield Street and Crane Street	Medium	Medium	Moderate adverse – significant
Businesses at Crusader House on the B6469 Fairfield Street	High	Low	Moderate adverse – significant
Businesses on Helmet Street and St Andrew's Square	Medium	Medium	Moderate adverse – significant

Resource	Impact magnitude	Sensitivity	Significance of effect
Four car rental companies at the existing Manchester Piccadilly Station	Medium	Medium	Moderate adverse – significant
Businesses within the existing Manchester Piccadilly Station	Medium	Medium	Moderate adverse – significant

12.4.31 The construction of the Proposed Scheme will require the acquisition of land and buildings. An overview of the resources expected to be significantly affected has been included below.

12.4.32 The construction of the Proposed Scheme including Ardwick North cutting retaining wall, Ardwick embankment retaining wall, Manchester to Leeds embankment, Piccadilly approach viaduct, Piccadilly station viaduct and associated highway works will require the demolition of premises occupied by four groups of businesses on: the A665 Chancellor Lane; Dark Lane, Cresbury Street and William Street; the B6469 Fairfield Street and Crane Street; and Helmet Street and St Andrew's Square. Although land is generally available in the Greater Manchester area, there is less availability of similar light industrial premises and sites in the centre of Manchester, and thus the sensitivity for these groups is assessed as medium. Based on the number of jobs at the groups of business premises on the B6469 Fairfield Street and Crane Street, and Helmet Street and St Andrew's Square, the magnitude is assessed as medium and the effects are assessed as moderate adverse and will therefore be significant. Due to the high levels of employment involved at the A665 Chancellor Lane, and Dark Lane, Cresbury Street and William Street, the magnitude is assessed as high. The effects are assessed to be major adverse and will therefore be significant.

12.4.33 The construction of the Piccadilly approach viaduct will require the demolition of Crusader House on the B6469 Fairfield Street which is occupied by three office-based businesses. The general availability of office space in central Manchester is reasonable, so these resources are assessed with low sensitivity. Due to the high levels of employment, the magnitude is assessed as high. The effect is assessed to be moderate adverse and will therefore be significant.

12.4.34 The construction of the Manchester tunnel north main portal, located in the Davenport Green to Ardwick area (MA07), will require use of approximately 30% of the area used by West Way Nissan Manchester for storing vehicles for nine years. Construction of Manchester to Leeds embankment and the diverted A665 Chancellor Lane will require the use of approximately a further 50% of the vehicle storage for at least one year and six months. Approximately 35% of the total car parking spaces will be required permanently. The operations of the business might be affected by the loss of approximately 259 parking spaces. The sensitivity of the resource is assessed as medium as the business may struggle to find suitable alternative premises in the area given that it requires a large prominent site on a busy road. The magnitude is medium based on the number of jobs located at the site. The effect is assessed to be moderate adverse and will therefore be significant.

12.4.35 The construction of Piccadilly station viaduct and associated highway works will require the demolition of four business units (four car rental companies associated with the existing Manchester Piccadilly Station). While the car rental businesses are located in portacabins,

they are assessed as having medium sensitivity as they may have difficulty finding suitable alternative premises in nearby locations given the land requirements for parking their vehicles and the need to be close to the existing Manchester Piccadilly Station. The magnitude is medium based on the number of jobs affected. The effect is assessed to be moderate adverse and will therefore be significant.

12.4.36 Construction of Manchester Piccadilly High Speed station will require the demolition of retail, food, office and cleaning premises and a passenger waiting lounge within the existing Manchester Piccadilly Station as part of a phased demolition process. However, the office and cleaning premises will be relocated to Manchester Piccadilly High Speed station. The sensitivity is assessed as medium since it is considered likely that most of the affected businesses are dependent upon their location in the station. Consequently, there is likely to be some loss of retail activity and employment, although this could be kept to a minimum through appropriately timed phasing and the relocation of businesses within the existing Manchester Piccadilly Station and Manchester Piccadilly High Speed station. The magnitude is medium based on the number of jobs affected. The effect is assessed to be moderate adverse and will therefore be significant.

12.4.37 Across all of the employment areas reviewed, it is expected that an estimated 2,630 jobs[78] will either be displaced or possibly lost within the Manchester Piccadilly Station area. The impact from the relocation or loss of jobs is considered to be minor in the context of the total number of people employed in the MCC area (approximately 410,000 jobs) and the scale of economic activity and opportunity in the area. There is a reasonable probability that most businesses will be able to relocate to places that will still be accessible to residents within the local area. However, there may be cases where alternative locations are problematic, especially due to the fact that a number of businesses will be looking to relocate at the same time, and the businesses may be unable to relocate on a like-for-like basis within the area.

Isolation

12.4.38 Businesses within the Manchester Piccadilly Station area may experience significant isolation effects as a result of the Proposed Scheme. As a consequence, this could lead to a loss of trade for the affected businesses.

12.4.39 Construction works to provide access to the Network Rail viaduct via a new ramp will require sections of North Western Street and Mellor Street to be closed permanently. Approximately seven businesses units, which are on North Western Street, will be physically isolated and will therefore not be able to operate from these premises. Business activities include breweries, Frontline Fitness Performance Centre (including its car park) and a printing and IT

[78] Employment within businesses has been estimated through a combination of sources, for example, surveys of businesses, the Experian employment dataset, employment floor space and the Homes and Communities Agency (HCA) Employment Densities Guide 3rd Edition (2015). The estimate is calculated using standard employment density ratios and estimates of floor areas and may vary significantly from actual employment at the sites.

equipment wholesaler. 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, which commences part way through the construction phase but continues into operation.

12.4.40 The closure of a section of Hoyle Street where it passes underneath the existing railway arches will mean customers of one business, Sunshine Studios Dance School, will be diverted for approximately 580m, which may discourage them from using the facility. 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 business, which commences part way through the construction phase but continues into operation.

12.4.41 Construction works on the approach to the existing Manchester Piccadilly station will require the permanent realignment of Sheffield Street and the permanent closure of Travis Street. Approximately 14 businesses, which are accessed via Sheffield Street, will be physically isolated and will therefore not be able to operate from these premises. Business activities include Straight Blast Gym, a brewery, bakery, car dealership and storage units. 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, which commences part way through the construction phase but continues into operation.

12.4.42 Construction works will require a temporary closure of a section of Travis Street, between the New Sheffield Street and Adair Street. In the operational phase, the southern end of Travis Street will remain open, and the northern section will be permanently closed.

12.4.43 Access to the southern end of Travis Street for those travelling from north-east of the Proposed Scheme will require a temporary diversion of up to 1.5km during the construction phase and a permanent diversion of up to 457m during the operational phase. Due to the distance of the diversion, customers may be discouraged from using the Star and Garter public house, located at the junction of Travis Street and the B6469 Fairfield Street. 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 business, which commences part way through the construction phase but continues into operation.

Other mitigation measures

12.4.44 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[79,80].

[79] High Speed Two Ltd (2022), *Phase 2b Western Leg Information Paper C7: Business relocation*.

[80] High Speed Two Ltd (2022), *Phase 2b Western Leg Information Paper C8: Compensation code for compulsory purchase*.

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.

12.4.45 The construction of the Proposed Scheme offers considerable opportunities to businesses and residents along the line of route in terms of supplying goods and services and obtaining employment. HS2 Ltd is committed to working with its suppliers to build a skilled workforce that promotes further economic growth across the UK.

Summary of likely residual significant effects

12.4.46 Likely significant residual effects are shown in Volume 5, Socio-economics Map Book: Map SE-01-326b. Land required for the construction of the Proposed Scheme will include the car parking of a furniture store on the A665 Great Ancoats Street and result in a delay to committed development (MA08/402) coming forward resulting in temporary adverse residual significant effects.

12.4.47 The Proposed Scheme will require the demolition of seven groups of socio-economic resources on: the A665 Chancellor Lane; Dark Lane, Cresbury Street and William Street; the B6469 Fairfield Street and Crane Street; Helmet Street; the B6469 Fairfield Street and St Andrew's Square; and two groups of resources at the existing Manchester Piccadilly Station, as well as land at West Way Nissan Manchester. The loss of these resources for the construction of the Proposed Scheme will result in adverse residual significant effects.

12.4.48 During construction, eight businesses along Ducie Street will experience significant temporary adverse isolation effects as a result of a temporary road closure including three hotels. During construction, customers may also be discouraged from using these hotels that are expected to be affected by the construction works associated with the Proposed Scheme. Native and Dakota Manchester, both on Ducie Street, will also experience adverse residual significant in-combination effects.

12.4.49 During construction and continuing into operation, businesses on North Western Street and Sheffield Street as well as Sunshine Studios Dance School and the Star and Garter public house will experience permanent adverse residual significant isolation effects as a result of road closure.

12.4.50 Also, during construction customers may also be discouraged from using three hotels and aparthotels, namely: Premier Inn on Dale Street; Staycity Aparthotels at Gateway House; and a hotel on Adair Street (MA08/260) that are expected to be affected by construction works associated with the Proposed Scheme. This will result in adverse residual significant in-combination effects on all of these resources.

Cumulative effects

12.4.51 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. Within the Manchester Piccadilly Station area there will be a station at Manchester Piccadilly creating 230 HS2 related jobs with a further 150 concourse retail jobs[81]. These employment opportunities will be accessible to residents in the locality.

12.5.4 The Proposed Scheme will contribute significantly to the creation of wider development opportunities in the Manchester Piccadilly Station area. To give an indication of the full-scale development potential, the 2018 Manchester Piccadilly Strategic Regeneration Framework[82] outlines plans for approximately 750,000m^2 of space including 267,700m^2 of commercial office space, 5,000 new homes, 25,375m^2 of retail/leisure space and 250 new hotel rooms, some of which will be enabled by the Proposed Scheme.

12.5.5 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.

12.5.6 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.

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

[81] These employment figures are estimates based on the current design and knowledge gained from previous phases of HS2.

[82] Bennetts Associates Architects (2018), *Manchester Piccadilly Strategic Regeneration Framework March 2018*. Available online at: https://www.manchester.gov.uk/downloads/download/6868/manchester_piccadilly_srf_march_2018.

Other mitigation measures

12.5.8 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

12.5.9 There are no significant effects arising during operation.

Cumulative effects

12.5.10 No significant cumulative effects on socio-economic receptors have been identified in the Manchester Piccadilly Station area during operation.

Monitoring

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

12.5.12 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 Manchester Piccadilly Station area.

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 Manchester Piccadilly Station 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[83] 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)[84] 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[85,86].

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

[84] Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

[85] *Environmental Noise (England) Regulations 2006 (SI 2006/2238).* Available online at: https://www.legislation.gov.uk/uksi/2006/2238.

[86] *Environmental Noise (England) (Amendment) Regulations 2009 (SI 2009/1610).* Available online at: https://www.legislation.gov.uk/uksi/2009/1610.

13.1.5 The methodology for the assessment of likely significant noise and vibration effects was developed in line with Government noise policy[87], planning policy, planning practice guidance on noise[83] and EIA Regulations as described in the SMR.

13.1.6 Engagement has been undertaken with Manchester City Council (MCC) 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 Manchester Piccadilly Station 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-002-0MA08); and
- Sound, noise and vibration operation assessment (Appendix SV-003-0MA08).

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: MA08 Map Book. Mapping to support the sound, noise and vibration assessment is presented in Map Series SV-05 (Volume 2: MA08 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 community, ecological, health, heritage and socio-economic receptors and the assessment of tranquillity are presented in Section 6, Community; Section 7, Ecology and biodiversity; Section 8, Health; Section 9, Historic environment; Section 12, Socio-economic; and Section 11, Landscape and visual of this report respectively. The Proposed Scheme is described in Section 2.

[87] Department for Environment, Food & Rural Affairs (Defra) (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.

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 Manchester Piccadilly Station area are not currently subject to appreciable vibration[88]. 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 Manchester Piccadilly Station area is an urban city centre location, where the sound environment is influenced by:

- road traffic and Metrolink services on main through roads;
- buses, taxis and cars accessing the station area;
- train movements into and out of the existing Manchester Piccadilly Station;
- fixed building services plant;
- construction activities and local neighbourhood sources including pedestrian activity;
- noise break-out from retail premises (such as shops and bars); and
- deliveries to and servicing of local businesses.

13.3.2 There are several main through roads that contribute to the sound environment near to the Proposed Scheme within the Manchester Piccadilly Station area. These include: the A57(M) Ring Road/Mancunian Way, the A635 Ring Road/Mancunian Way/Fairfield Street/Ashton Old

[88] 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.

Road, the A665 Chancellor Lane/Pin Mill Brow/Ring Road/Great Ancoats Street, the A662 Pollard Street, Downing Street/London Road/Whitworth Street/Aytoun Street, and the A34 Upper Brook Street.

13.3.3 The Hope Valley Line and Manchester to Crewe Line (spur of the West Coast Main Line), converge at Ardwick on their approach into Manchester Piccadilly Station.

13.3.4 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.

13.3.5 Further information on the existing baseline, including baseline sound levels and baseline monitoring results, is provided for the Manchester Piccadilly Station area in Volume 5: Appendix SV-002-0MA08.

Future baseline

13.3.6 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.

13.3.7 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[89], roads[90] or railways[91]. 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: MA08 Map Book) shows any noise Important Areas in the Manchester Piccadilly Station area. Further information is reported for the Manchester Piccadilly Station area in Volume 5: Appendix SV-002-0MA08.

[89] 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.

[90] 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.

[91] 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.

13.3.8 Committed developments involving sound or vibration sensitive uses within the relevant study area have been included within the assessment and are reported for the Manchester Piccadilly Station area in Volume 5: Appendix SV-002-0MA08[92]. Where applicable, noise or vibration significant effects on these committed developments are discussed in sections 13.4 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[93] (SNV Assessment location ref.)	Planning reference	Description	How this is considered in the assessment
MA08/098 (616007)	115178/FO/2017	Location: part site of existing car park bounded by Ducie Street, the Rochdale Canal, Peak Street, Tariff Street (multi-storey car park) and remainder of surface car park Manchester M1 2JL. Erection of 2 linked buildings ranging in height from 8 to 10 storeys (plus roof top plant room) to provide residential accommodation (Use Class C3) comprising 18 x 1 bed, 84 x 2 bed, 15 x 3 bed, 2 x duplex (4 bed) and 9 townhouses (7 x 3 bed, 1 x 2 bed and 1 x 4 bed) (128 units in total) works to create provision for access and servicing, hard and soft landscaping (to include a secure external area and public realm linking Ducie Street to the Rochdale Canal) and associated works following the demolition of existing buildings. Development to include 128 cycle parking spaces.	Informing future baseline (construction).
MA08/180 (615277)	122296/FO/2019	Location: Units 3A/3B, Ground Floor, 3 Piccadilly Place Manchester, M1 3BN. Change of use of ground floor to higher education institution (class D1), together with insertion of a new mezzanine floor amounting to 365 sqm and the installation of 2no. external louvres.	Informing future baseline (construction).
MA08/216 (615356)	121345/FO/2018	Location: 40 Laystall Street, Manchester, M1 2JP Use of the lower ground floor and ground floor loading bay as Use Class B1 office accommodation and external alterations to include installation of windows to replace 5 no. louvres on the B6181 Dale Street elevation and modifications to existing loading bay doors on Port Street.	Informing future baseline (construction).

[92] Volume 5: Appendix CT-004-0000 provides details of all of the developments assumed to be implemented.

[93] Volume 5: Planning Data/Committed Development Map Book: Maps CT-13-327 to CT-13-328.

Map book reference[93] (SNV Assessment location ref.)	Planning reference	Description	How this is considered in the assessment
MA08/255 (616898)	122000/FO/2018	Location: Victoria House Great Ancoats Street, Manchester, M4 7AB. Erection of a part 25 part 3 storey residential tower (Use Class C3) for 177 apartments comprising 59 x 1 bed (34 x 1 bed 1 person and 25 1 bed 2 person), 113 x 2 bed (44 x 2 bed 3 person and 69 x 2 bed 4 person) and 5 x 3 bed (3 bed 5 person) with ground floor commercial space (Use Class A1, A2, A3, A4 and D1) above partial basement level associated shared amenity spaces at 3rd floor level, realm enhancements following demolition of existing buildings.	Informing future baseline (construction).
MA08/260 (616896)	122599/FO/2019	Location: 1 Adair Street, Manchester, M1 2NQ. Demolition of existing building and erection of a 13 / part 14 (plant level) storey building to create a 275-bedroom hotel (Class C1) use.	Informing future baseline (construction).
MA08/399 (616801)	117879/FO/2017	Location: Macdonald Manchester Hotel, 91 London Road, Manchester, M1 2PG. Construction of a ground floor extension to extend the existing reception area, construction of a terrace for use as an external seating area and remodelling of the existing main entrance with the addition of a new porte-cochere entrance.	Informing future baseline (construction).
MA08/402 (616910)	128191/FO/2020	Location: land bounded by Ashton Canal, Great Ancoats Street, Munday Street and the A662 Pollard Street, Manchester, M4 7DS. Erection of five office buildings and new public realm comprising: 3 no. 8 storey mixed use buildings (Buildings A, D and E) comprising workspaces (Use Class E) together with flexible uses at ground floor (Use Class E) and/or theatre/bar (Sui Generis) together with a multi-use rooftop amenity area to Building A; and 2 no. 5 storey mixed use buildings (Buildings B and C) comprising workspaces (Use Class E) together with flexible uses at ground floor (Use Class E) and/or theatre/bar (Sui Generis); together with cycle parking, creation of pedestrian and cycle routes, external amenity spaces, new public realm and other associated engineering and infrastructure works.	Informing future baseline (construction).
MA08/361 (616900)	126608/FO/2020	Erection of part 4, part 11 storey residential (Class C3) development (with roof top plant room) comprising 66 (Class C3) residential units (3 x 2 bed town houses, 46 x two bed apartments and 17 x one bed apartments) together with associated car parking (10 spaces including 5 EVC spaces), cycle parking (66 spaces) communal roof terrace (level 6), landscaping and ancillary infrastructure including rooftop PV panels, alterations to access onto Store Street.	Informing future baseline (operation).

Construction (2025)

13.3.9 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)

13.3.10 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-002-0MA08.

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 CoCP[94].

13.4.2 Piling and vibratory compaction is likely to result in short-term appreciable ground-borne vibration at a small number of receptors, situated very close to these activities. These receptors will also be exposed to appreciable noise from the construction of the Proposed Scheme. The significance of the identified vibration effects has been assessed in combination with the airborne noise effects also identified at these receptors. The assessment is presented in Volume 5: Appendix SV-002-0MA08.

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

[94] Volume 5: Appendix CT-002-00000, draft Code of Construction Practice.

activities to minimise noise (including vibration) at neighbouring residential properties and other sensitive receptors (including local businesses and quiet areas designated by the local authority);

- as part of BPM, mitigation measures are applied in the following order:
  - noise and vibration control at source: for example, the selection of quiet and low vibration equipment, review of construction methodology to consider quieter methods, location of equipment on-site, control of working hours, the provision of acoustic enclosures and the use of less intrusive alarms, such as broadband vehicle reversing warnings;
  - screening: for example, local screening of equipment or 2.4m high perimeter hoarding or the use of temporary stockpiles; and
  - where, despite the implementation of BPM, the noise exposure exceeds the criteria defined in the draft CoCP, noise insulation or ultimately temporary re-housing will be offered at qualifying properties.
- lead contractors will seek to obtain prior consent from the relevant local authority under Section 61 of the CoPA for the proposed construction works. The consent application will set out BPM measures to minimise construction noise and vibration, including control of working hours, and provide a further assessment of construction noise and vibration, including confirmation of noise insulation/temporary re-housing provision;
- contractors will undertake and report such monitoring as is necessary to assure and demonstrate compliance with all noise and vibration commitments. Monitoring data will be provided regularly to, and be reviewed by, the nominated undertaker and made available to the local authorities; and
- contractors will be required to comply with the terms of the CoCP and appropriate action will be taken by the nominated undertaker as required to ensure compliance.

13.4.5 In addition to this mitigation, to avoid or reduce likely community significant effects, taller screening (provided by solid temporary hoarding, screening close to activities or other means to provide equivalent noise reductions), as described in the draft CoCP, has been assumed at the following construction sites and compounds or land required for construction of the Proposed Scheme:

- Manchester Piccadilly High Speed station main compound near the B6469 Fairfield Street, Helmet Street, St Andrew's Square, Sparkle Street, Store Street, Piccadilly Village, Wharf Close, Piccadilly Point, Liberty Point and Jutland Street;
- Manchester approach viaduct satellite compound B;
- Manchester approach viaduct satellite compound C;
- Manchester approach viaduct satellite compound D;
- Metrolink New Islington turnback satellite compound on the A662 Pollard Street;
- utility works on Ducie Street at the junction with A6 London Road;
- utility works on Ducie Street between Peak Street and Pigeon Street;
- utility works opposite the junction with the A6 London Road and Travis Street;

- utility works on Wadeson Road between Grosvenor Road and Kale Street; and
- utility works on the A665 Great Ancoats Street between Ducie Street and Store Street.

13.4.6 Noise insulation will be offered for qualifying buildings as defined in the draft CoCP. Noise insulation or, where appropriate, temporary re-housing will avoid residents being significantly affected by levels of construction noise inside their dwellings. The assessment reported in this section provides an estimate of the buildings that are likely to qualify for noise insulation. None are predicted to qualify for temporary re-housing.

13.4.7 Qualification for noise insulation and, where appropriate, temporary re-housing will be confirmed, as part of seeking prior consent from the local authority under Section 61 of the CoPA. Qualifying buildings will be identified, as required in the draft CoCP, so that noise insulation can be installed, or where appropriate any temporary re-housing provided, before the start of the works predicted to exceed noise insulation or temporary re-housing criteria.

Assessment of impacts and effects

Residential receptors: direct effects – individual dwellings

13.4.8 Taking account of the avoidance and mitigation measures set out in the previous paragraphs, the following 304 residential properties are forecast to experience noise above the eligibility criteria for noise insulation, but below the eligibility criteria for temporary rehousing criteria, as defined in the HS2 noise insulation and temporary rehousing policy[95]. The location of these dwellings are indicated on Map Series SV-03 (Volume 5: Sound, noise and vibration Map Book):

- twenty-eight flats on the west and south façades at 35 Chapeltown Street, Manchester (assessment location ref.: 615287);
- sixteen flats on the south façade at 37 Chapeltown Street, Manchester (assessment location ref.: 615292);
- nine flats on the west façade at 2 and 4 Wharf Close, Manchester (assessment location ref.: 615311);
- six flats on the west façade at 1 Wharf Close, Manchester (assessment location ref.: 615324);
- eighteen flats on the south façade at 4 Chapeltown Street, Manchester (assessment location ref.: 615328);
- ten flats on the southern façade at 20 Ducie Street, Manchester (assessment location ref.: 615329);

[95] Further information is provided in High Speed Two Ltd (2022), *Phase 2b Western Leg Information Paper E13: Control of construction noise and vibration.*

- ten flats on the southern façade at 26 Ducie Street, Manchester (assessment location ref.: 615332);
- ten flats on the southern façade at 16 Jutland Street, Manchester (assessment location ref.: 615333);
- eighteen flats on the southern façade at 29 Ducie Street, Manchester associated with committed development MA08/098 (assessment location ref.: 616007);
- sixty-four flats on the northern façade at Store Street, Manchester (assessment location ref.: 616805);
- twenty flats on the northern façade at 40 Ducie Street (Junction Works), Manchester (assessment location ref.: 616806);
- forty-five flats on the northern façade at 2 Malta Street, Manchester (assessment location ref.: 616867); and
- fifty apartments on the northern façade on the A665 Great Ancoats Street, committed development MA08/255 (assessment location ref.: 616898).

13.4.9 For construction, the threshold for eligibility for noise insulation is 75dB during the day, 65dB during the evening and 55dB during the night-time measured outdoors as specified in the draft CoCP. Where the baseline ambient noise level is greater than the noise insulation threshold level, the ambient noise level is used as the noise insulation threshold level.

13.4.10 The mitigation measures, including noise insulation for the 304 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

13.4.11 The avoidance and mitigation measures to be implemented during construction will reduce airborne construction noise adverse effects on receptors and communities. Residual temporary noise or vibration effects are identified later in this section.

13.4.12 In locations with lower existing sound levels[96], construction noise effects are likely to be caused by changes to noise levels outside dwellings relative to existing sound levels. These may be considered by the local community as an effect on the acoustic character of the area and hence be perceived as a change in the quality of life for that community. These effects are considered to be significant when assessed on a community basis taking account of the local context.

[96] Further information is presented in Volume 5: Appendix SV-001-00000.

13.4.13 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.

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)[97]	Type of significant effect	Time of day	Location	Cause (construction activities)[98]	Assumed approximate duration of impact
MA08-C-C1 (SV-03-327b-L1)	Construction noise	Daytime	Hulme: Approximately 15 dwellings in the vicinity of Wadeson Road	Pipe jack works in the vicinity of utility works. The typical and highest predicted monthly noise levels are approximately 65dB and 70dB to 75dB[99].	Up to four months.
MA08-C-C2 (SV-03-327b)	Construction noise	Daytime	Piccadilly: Approximately 110 dwellings at Piccadilly Point in the vicinity of Berry Street	Demolition works in the vicinity of the Manchester Piccadilly High Speed station main compound. The typical and highest predicted monthly noise levels are approximately 65dB and 70dB[99].	Up to five years and nine months.
MA08-C-C3 (SV-03-327b)	Construction noise	Daytime	Piccadilly: Approximately 120 dwellings in the vicinity of Brewer Street	Pipe jack works in the vicinity of utility works. The typical and highest predicted monthly noise levels are approximately 55dB and 65dB[99].	Up to two months.
MA08-C-C4 (SV-03-327b)	Construction noise	Daytime	Piccadilly: Approximately 130 dwellings associated with committed development MA08/098 in the vicinity of Ducie Street	Pipe jack works in the vicinity of utility works. The typical and highest predicted monthly noise levels are approximately 75dB and 80dB[99].	Up to 11 months.
MA08-C-C5 (SV-03-327b)	Construction noise and vibration	Daytime	Piccadilly: Approximately 215 dwellings in the vicinity of Ducie Street	Pipe jack works in the vicinity of utility works. The typical and highest predicted monthly noise levels are approximately 65 to 80dB and 70 to 85dB. The use of vibratory rollers associated with site setup is predicted to cause a minor to moderate vibration impact at properties near to the Proposed Scheme.	Noise for up to seven years and nine months. Vibration for up to five months.

[97] See MA08 Sound, noise and vibration report, Volume 5: Appendix SV-002-0MA08 and Volume 5 Map Book SV-03.

[98] 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.

[99] Equivalent continuous sound level at the facade, $L_{pAeq,0700-1900}$.

Significant effect number (and map reference)[97]	Type of significant effect	Time of day	Location	Cause (construction activities)[98]	Assumed approximate duration of impact
MA08-C-C6 (SV-03-327b)	Combined construction site noise and vibration and traffic noise	Daytime	Piccadilly: Approximately 390 dwellings in the vicinity of Chapeltown Street	Construction activities associated with Manchester Piccadilly High Speed station, demolitions and Piccadilly station approach viaduct construction. The typical and highest predicted monthly noise levels are approximately 60 to 80dB and 65 to 85dB. The use of vibratory rollers associated with site setup is predicted to cause a minor to moderate vibration impact at properties near to the Proposed Scheme.	Noise for up to seven years and 11 months. Vibration for up to five months.
MA08-C-C7 (SV-03-327b)	Construction noise	Daytime	Piccadilly: Approximately 15 dwellings in the vicinity of Millbank Street	Pipe jack works in the vicinity of utility works. The typical and highest predicted monthly noise levels are approximately 65dB and 70dB.	Up to three months.
MA08-C-C8 (SV-03-327b)	Construction noise	Daytime	Piccadilly: Approximately 190 dwellings in the vicinity of Store Street	Pipe jack works in the vicinity of utility works. The typical and highest predicted monthly noise levels are approximately 80dB and 80dB.	Up to three months.
MA08-C-C9 (SV-03-327b)	Construction noise	Daytime	New Islington: Approximately 800 dwellings in the vicinity of Old Mill Street	Construction activities associated with the Metrolink works. The typical and highest predicted monthly noise levels are approximately 60 to 70dB and 65 to 75dB.	Up to one year and 10 months.
MA08-C-C10 (SV-03-327b)	Construction noise	Daytime	Piccadilly: Approximately 180 dwellings associated with committed development (MA08/255) in the vicinity of the A665 Great Ancoats Street	Construction activities associated with highway works. The typical and highest predicted monthly noise levels are approximately 70dB and 80dB.	Up to three months.
MA08-C-C11 (SV-03-327b)	Construction noise	Daytime	New Islington: Approximately 240 dwellings in the vicinity of the A662 Pollard Street	Construction activities associated with the Metrolink works and highway works. The typical and highest predicted monthly noise levels are approximately 60 to 65dB and 65 to 70dB.	Up to two years and 11 months.
MA08-C-C12 (SV-03-327b)	Construction noise	Daytime	New Islington: Approximately 120 dwellings in the vicinity of the A662 Pollard Street	Construction activities associated with the Metrolink works. The typical and highest predicted monthly noise levels are both 75dB.	Up to six months.

Residential receptors: indirect effects

13.4.14 Construction traffic is likely to cause adverse noise effects to residential receptors along Chapeltown Street between Store Street and the A665 Great Ancoats Street. Approximately 150 dwellings located immediately adjacent to the road are forecast to experience an increase in road traffic noise levels of around 4dB $L_{pAeq,0700-2300}$ during the peak months, due to traffic diverting away from construction routes on nearby roads. This is considered to be a likely significant effect on a community basis at the dwellings on this road. This temporary adverse effect will combine with the effects from construction site noise and vibration denoted as MA08-C-C6 in Table 31 and Volume 5: Appendix SV-002-0MA08. This combined effect represents a change in the acoustic character of the area, which may be perceived as a change in the quality of life for that community.

Non-residential receptors: direct effects

13.4.15 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[100] compared with the existing baseline sound level):

- West Way Nissan Manchester (lower sensitivity offices), the A665 Chancellor Lane, Manchester (assessment location ref.: 616891);
- Manchester Chinese Centre (assessment location ref.: 616507) and St Thomas Conference Centre (assessment location ref.: 615188), both on Ardwick Green;
- University of Manchester buildings on Sackville Street: MSS Tower (assessment location ref.: 615365), Morton Laboratory (assessment location ref.: 615384), Moffat (assessment location ref.: 616860), and Barnes Wallis (assessment location ref.: 615386);
- The Macdonald Hotel and committed development MA08/399 (assessment location ref.: 616801), a proposed hotel at the former London Road Fire Station (assessment location ref.: 615263), Monroes Bar Hotel (assessment location ref.: 615268) and Motel One (assessment location ref.: 615391), all on the A6 London Road;
- Tower Block (offices) (assessment location ref.: 615273), 3 Piccadilly Place (offices) and committed development MA08/180 (assessment location ref.: 615277), Transport for Greater Manchester (offices) (assessment location ref.: 615393), DoubleTree by Hilton Hotel (assessment location ref.: 616804), Rodwell Tower (office) (assessment location ref.: 615309), and Abode Manchester (hotel) (assessment location ref.: 615337), all at Piccadilly;
- Manchester Crown Court, Minshull Street (assessment location ref.: 615293);
- Malmaison Hotel, Gore Street (assessment location ref.: 615300);

[100] 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-002-0MA08.

- Your Smile Clinic (healthcare), B6181 Dale Street (assessment location ref.: 615345);
- 11 Ducie Street (office) (assessment location ref.: 615334), Dakota Manchester (hotel), (assessment location ref.: 660012), Ducie House (office), (assessment location ref.: 615350) and Paradise Wharf (office) (assessment location ref.: 616807), all on Ducie Street;
- The Northern Quarters Serviced Apartments, Laystall Street and committed development MA08/216 (assessment location ref.: 615356);
- Adair Street (hotel), Manchester and committed development MA08/260 (assessment location ref.: 616896);
- Ibis Hotel (assessment location ref.: 615313) and the A662 Pollard Street (offices), Manchester and committed development MA08/402 (assessment location ref.: 616910), both on the A662 Pollard Street;
- Fabrica (office), the A665 Great Ancoats Street, (assessment location ref.: 615306); and
- St. Anne's RC Primary School (assessment location ref.: 616874) and St. Anne Presbytery, (assessment location ref.: 616875), both on Carruthers Street.

13.4.16 The assessment has identified the following non-residential receptors where the predicted airborne noise and vibration levels exceed both the relevant noise and vibration screening criteria and the noise change criterion (typically a change of greater than 3dB compared with the existing baseline sound level):

- Staycity Aparthotel (assessment locations ref.: 615281-noise, 616892-vibration);
- Premier Inn, the B6181 Dale Street (assessment location ref.: 615330);
- La Reserve Aparthotel, Ducie Street (assessment location ref.: 615326);
- Native Aparthotel, Ducie Street (assessment location ref.: 615303); and
- Aeroworks (office), Adair Street (assessment location ref.: 615282).

13.4.17 These locations are identified in the Manchester Piccadilly Station 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.

13.4.18 West Way Nissan Manchester comprises a car showroom and associated offices. The receptor is located on the A665 Chancellor Lane, Ardwick and is approximately 70m east of Manchester approach viaduct satellite compound B. West Way Nissan Manchester is a large industrial clad building and windows on the eastern and northern facades are double glazed. It is assumed that the building occupants rely on opening the windows for ventilation. The offices have been assessed against the criteria for lower sensitivity offices and have been assessed against BS 5228-1 ABC method using the screening criteria for baseline noise category A[101]. The predicted daytime monthly construction noise level is above the screening

[101] 65dB $L_{pAeq,0700-2300}$ (façade).

criteria defined for lower sensitivity office use for a period of five years and one month. The typical and highest predicted daytime monthly construction noise level at the building are 9dB and 13dB respectively above the screening criteria for lower sensitivity offices. The change during the month with the highest noise level is 16dB. West Way Nissan Manchester is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N1 in Table 7 of Volume 5: Appendix SV-002-0MA08). This temporary adverse effect may take the form of activity disturbance to users of the office.

13.4.19 Manchester Chinese Centre is located on Ardwick Green North approximately 350m south of Manchester Piccadilly High Speed station main compound. The three-storey brick building has double-glazed openable windows. Manchester Chinese Centre has been assessed against the education criteria. The predicted daytime monthly construction noise level is above the screening criteria defined in the SMR for educational use[102] for a period of seven years. The typical and highest predicted daytime monthly construction noise level at the building are 2dB and 5dB respectively above the screening criteria defined in the SMR. The change during the month with the highest noise level is 6dB. Manchester Chinese Centre is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N2 in Table 7 of Volume 5: Appendix SV-002-0MA08). This temporary adverse effect may take the form of activity disturbance to users of the centre.

13.4.20 St Thomas Conference Centre is located on Ardwick Green North and will be approximately 200m east of utility works and 250m south of Manchester Piccadilly High Speed station main compound. The two-storey brick building has double-glazed openable windows. The highest predicted daytime monthly construction noise level is above the screening criteria defined in the SMR for lecture theatres[103] for a period of four months. The highest predicted daytime monthly construction noise levels at this building are 1dB 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 during the month with the highest noise level is 5dB. Given the small exceedance of the screening criteria for a short duration, a likely significant effect is not identified at the St Thomas Conference Centre.

13.4.21 The University of Manchester buildings include the Morton Laboratory, the MSS Tower, Moffat and Barnes Wallis. The worst affected building is the Morton Laboratory building located on Sackville Street and adjacent to utility works. The five-storey brick building has double-glazed openable windows that will face the utility works. The University of Manchester Morton Laboratory has been assessed against the office criteria. The typical and highest predicted daytime monthly construction noise levels at this building are 23dB and 27dB, respectively, above the screening criteria defined in the SMR for office use[104] for a period of 11 months. The change during the month with the highest noise level is 16dB. The

[102] 50dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 53dB $L_{pAeq,0700-2300}$ (façade).

[103] 50dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 53dB $L_{pAeq,0700-2300}$ (façade).

[104] 55dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 58dB $L_{pAeq,0700-2300}$ (façade).

University of Manchester buildings are identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N3, MA08-C-N4, MA08-C-N5 and MA08-C-N6 respectively in Table 7 of Volume 5: Appendix SV-002-0MA08). This temporary adverse effect may take the form of activity disturbance to users of the university.

13.4.22 The Macdonald Hotel and committed development MA08/399 is located on the A6 London Road approximately 25m east of utility works. The 10-storey building has double-glazed windows facing the utility works. All rooms within the hotel have air conditioning. The Macdonald Hotel has been assessed against the criteria for hotels. The typical and highest predicted daytime monthly construction noise levels at this building are 18dB and 22dB, respectively, above the screening criteria defined in the SMR for hotel use[105] for a period of five months. The change during the month with the highest noise level is 9dB. The Macdonald Hotel is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N7 in Table 7 of Volume 5: Appendix SV-002-0MA08). This temporary adverse effect may take the form of activity disturbance to users of the hotel.

13.4.23 A6 London Road (hotel) is a mixed-use development under construction at the former London Road Fire Station, approximately 95m south-west of Manchester Piccadilly High Speed station main compound. The committed development has been assessed against the criteria for hotels. The typical and highest predicted daytime monthly construction noise levels at this building are 20dB and 25dB, respectively, above the screening criteria defined in the SMR for hotel use[106] for a period of eight months. The change during the month with the highest noise level is 10dB. The new hotel is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N8 in Table 7 of Volume 5: Appendix SV-002-0MA08). This temporary adverse effect may take the form of activity disturbance to users of the hotel.

13.4.24 Monroes Bar Hotel is located off the A6 London Road, approximately 85m south-west of Manchester Piccadilly High Speed station main compound. The three-storey brick building has secondary-glazed openable windows. Monroes Bar Hotel has been assessed against the criteria for hotels. The typical and highest predicted daytime monthly construction noise levels at this building are 16dB and 21dB, respectively, above the screening criteria defined in the SMR for hotel use[107] for a period of three months. The change during the month with the highest noise level is 5dB. Monroes Bar Hotel is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N9 in Table 7 of Volume 5: Appendix SV-002-0MA08). This temporary adverse effect take the form of activity disturbance to users of the hotel.

[105] 50dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 53dB $L_{pAeq,0700-2300}$ (façade).

[106] 50dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 53dB $L_{pAeq,0700-2300}$ (façade).

[107] 50dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 53dB $L_{pAeq,0700-2300}$ (façade).

13.4.25 Motel One is located off the A6 London Road, approximately 85m south-west of Manchester Piccadilly High Speed station main compound. The 14-storey brick building has double-glazed openable windows. Motel One has been assessed against the criteria for hotels. The typical and highest predicted daytime monthly construction noise levels at this building are 17dB and 24dB, respectively, above the screening criteria defined in the SMR for hotel use[108] for a period of eight months. The change during the month with the highest noise level is 10dB. Motel One is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N10 in Table 7 of Volume 5: Appendix SV-002-0MA08). This temporary adverse effect may take the form of activity disturbance to users of the hotel.

13.4.26 Tower Block and committed development MA08/180 is located in the centre of the existing Manchester Piccadilly Station and is currently. The multi-storey building is used as an office, featuring mechanical ventilation and double-glazed windows, which are sealed. Manchester Piccadilly High Speed station main compound will occupy land around the building. The Tower Block has been assessed against the office criteria. The typical and highest predicted daytime monthly construction noise levels at this building are 15dB and 18dB, respectively, above the screening criteria defined in the SMR for office use[109] for a period of seven years and 11 months. The change during the month with the highest noise level is 20dB. Tower Block is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N11 in Table 7 of Volume 5: Appendix SV-002-0MA08). This temporary adverse effect may take the form of activity disturbance to users of the office.

13.4.27 The office building at 3 Piccadilly Place is approximately 50m west of the edge of the construction site associated with Manchester Piccadilly High Speed station main compound. The multi-storey building features double-glazed windows and has mechanical ventilation. The eastern façade of the building faces the Proposed Scheme. The office building at 3 Piccadilly Place has been assessed against the office criteria. The typical and highest predicted daytime monthly construction noise levels at this building are 15dB and 20dB, respectively, above the screening criteria defined in the SMR for office use[110] for a period of eight months. The change during the month with the highest noise level is 10dB. 3 Piccadilly Place is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N12 in Table 7 of Volume 5: Appendix SV-002-0MA08). This temporary adverse effect may take the form of activity disturbance to users of the office.

13.4.28 Transport for Greater Manchester is approximately 100m west of the edge of the construction site associated with Manchester Piccadilly High Speed station main compound. The multi-storey brick building has sealed double glazed windows and is mechanically ventilated. The typical and highest predicted daytime monthly construction noise levels at

[108] 50dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 53dB $L_{pAeq,0700-2300}$ (façade).

[109] 55dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 58dB $L_{pAeq,0700-2300}$ (façade).

[110] 55dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 58dB $L_{pAeq,0700-2300}$ (façade).

this building are 17dB and 20dB, respectively, above the screening criteria defined in the SMR for office use[111] for a period of 10 months. The change during the month with the highest noise level is 13dB. Transport for Greater Manchester is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N13 in Table 7 of Volume 5: Appendix SV-002-0MA08). This temporary adverse effect may take the form of activity disturbance to users of the office.

13.4.29 DoubleTree by Hilton Hotel is located off Piccadilly Place, approximately 20m west of the utility works and 60m west of Manchester Piccadilly High Speed station main compound. The eastern façade of the multi-storey building has double-glazed openable windows. DoubleTree by Hilton Hotel has been assessed against the criteria for hotels. The typical and highest predicted daytime monthly construction noise levels at this building are 23dB and 27dB, respectively, above the screening criteria defined in the SMR for hotel use[112] for a period of 11 months. The change during the month with the highest noise level is 15dB. The DoubleTree by Hilton Hotel is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N14 in Table 7 of Volume 5: Appendix SV-002-0MA08) due to noise and vibration. This temporary adverse effect may take the form of activity disturbance to users of the hotel.

13.4.30 Rodwell Tower is an office building located off Ducie Street, adjacent to the utility works and approximately 20m north-west of Manchester Piccadilly High Speed station main compound. The multi-storey building features double-glazed windows, which are openable and mechanical ventilation is also available. Rodwell Tower has been assessed against the office criteria. The typical and highest predicted daytime monthly construction noise levels at this building are 29dB and 34dB, respectively, above the screening criteria defined in the SMR for office use[113] for a period of three years and 11 months. The change during the month with the highest noise level is 30dB. Rodwell Tower is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N15 in Table 7 of Volume 5: Appendix SV-002-0MA08). This temporary adverse effect may take the form of activity disturbance to users of the office.

13.4.31 The Abode Manchester Hotel is located on Piccadilly, approximately 75m north-west of utility works and 90m north-west of Manchester Piccadilly High Speed station main compound. Within this six-storey brick building all bedrooms have air-conditioning and secondary glazing. The Abode Manchester Hotel has been assessed against the criteria for hotels. The typical and highest predicted daytime monthly construction noise levels at this building are 7dB and 12dB, respectively, above the screening criteria defined in the SMR for hotel use[114] for a period of six years and one month. The change during the month with the highest noise level is 10dB. The Abode Manchester Hotel is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by

[111] 55dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 58dB $L_{pAeq,0700-2300}$ (façade).

[112] 50dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 53dB $L_{pAeq,0700-2300}$ (façade).

[113] 55dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 58dB $L_{pAeq,0700-2300}$ (façade).

[114] 50dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 53dB $L_{pAeq,0700-2300}$ (façade).

MA08-C-N16 in Table 7 of Volume 5: Appendix SV-002-0MA08). This temporary adverse effect may take the form of activity disturbance to users of the hotel.

13.4.32 Manchester Crown Court is located off Minshull Street, approximately 185m west of Manchester Piccadilly High Speed station main compound. The multi-storey brick building has double glazed windows. The typical and highest predicted daytime monthly construction noise levels at this building are 11dB and 17dB, respectively, above the screening criteria defined in the SMR for courts[115] for a period of two months. The change during the month with the highest noise level is 4dB. Given the small exceedance of the screening criteria for a short duration, a likely significant effect is not identified at Manchester Crown Court.

13.4.33 The Malmaison Hotel is located on Gore Street, approximately 10m west of the utility works and 50m west of Manchester Piccadilly High Speed station main compound. The seven-storey brick building has double-glazed openable windows. The Malmaison Hotel has been assessed against the criteria for hotels. The typical and highest predicted daytime monthly construction noise levels at this building are 24dB and 26dB, respectively, above the screening criteria defined in the SMR for hotel use[116] for a period of nine months. The change during the month with the highest noise level is 12dB. The Malmaison Hotel is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N17 in Table 7 of Volume 5: Appendix SV-002-0MA08) due to noise. This temporary adverse effect may take the form of activity disturbance to users of the hotel.

13.4.34 Your Smile Clinic is a dental practice located off the B6181 Dale Street, adjacent to highway works and approximately 85m north of Manchester Piccadilly High Speed station main compound. The two-storey building features double-glazed windows, which are openable. The typical and highest predicted daytime monthly construction noise levels at this building are 8dB and 11dB, respectively, above the screening criteria defined in the SMR for healthcare use[117] for a period of three months. The change during the month with the highest noise level is 8dB. Your Smile Clinic is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N18 in Table 7 of Volume 5: Appendix SV-002-0MA08) due to noise. This temporary adverse effect may take the form of activity disturbance to users of the dentist surgery.

13.4.35 The office building at 11 Ducie Street is located approximately 70m north of the edge of Manchester Piccadilly High Speed station main compound. The southern façade of the five-storey building features double-glazing with small openable windows. The office building at 11 Ducie Street has been assessed against the office criteria. The typical and highest predicted daytime monthly construction noise levels at this building are 10dB and 13dB, respectively, above the screening criteria defined in the SMR for office use[118] for a period of

[115] 50dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 53dB $L_{pAeq,0700-2300}$ (façade).

[116] 50dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 53dB $L_{pAeq,0700-2300}$ (façade).

[117] 50dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 53dB $L_{pAeq,0700-2300}$ (façade).

[118] 55dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 58dB $L_{pAeq,0700-2300}$ (façade).

seven years and nine months. The change during the month with the highest noise level is 11dB. The office building at 11 Ducie Street is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N19 in Table 7 of Volume 5: Appendix SV-002-0MA08) due to noise. This temporary adverse effect may take the form of activity disturbance to users of the office.

13.4.36 The Dakota Manchester hotel is located off Ducie Street, approximately 20m west of the utility works. The multi-storey brick building has double-glazed windows. Dakota Manchester has been assessed against the criteria for hotels. The typical and highest predicted daytime monthly construction noise levels at this building are 20dB and 23dB, respectively, above the screening criteria defined in the SMR for hotel use[119] for a period of 11 months. The change during the month with the highest noise level is 17dB. Dakota Manchester hotel is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N20 in Table 7 of Volume 5: Appendix SV-002-0MA08) due to noise. This temporary adverse effect may take the form of activity disturbance to users of the hotel.

13.4.37 Ducie House is an office building located off Ducie Street, adjacent to the utility works. The multi-storey building features double-glazed windows, which are openable. Ducie House has been assessed against the office criteria. The typical and highest predicted daytime monthly construction noise levels at this building are 24dB and 28dB, respectively, above the screening criteria defined in the SMR for office use[120] for a period of 11 months. The change during the month with the highest noise level is 22dB. Ducie House is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N21 in Table 7 of Volume 5: Appendix SV-002-0MA08) due to noise. This temporary adverse effect may take the form of activity disturbance to users of the office.

13.4.38 Paradise Wharf is an office building located off Ducie Street, adjacent to the utility works and approximately 90m north-east of Manchester Piccadilly High Speed station main compound. The two-storey building features double-glazed windows, which are openable. Ducie House has been assessed against the office criteria. The typical and highest predicted daytime monthly construction noise levels at this building are 6dB and 11dB, respectively, above the screening criteria defined in the SMR for office use[121] for a period of seven months. The change during the month with the highest noise level is 10dB. Paradise Wharf is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N22 in Table 7 of Volume 5: Appendix SV-002-0MA08) due to noise. This temporary adverse effect may take the form of activity disturbance to users of the office.

13.4.39 The Northern Quarters Serviced Apartments and committed development MA08/216 are located off Laystall Street, approximately 70m north-east of the utility works. The multi-

[119] 50dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 53dB $L_{pAeq,0700-2300}$ (façade).

[120] 55dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 58dB $L_{pAeq,0700-2300}$ (façade).

[121] 55dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 58dB $L_{pAeq,0700-2300}$ (façade).

storey brick building has double-glazed openable windows. The Northern Quarters Serviced Apartments have been assessed against the criteria for hotels. The typical and highest predicted daytime monthly construction noise levels at this building are 2dB and 4dB, respectively, above the screening criteria defined in the SMR for hotel use[122] for a period of five years. The change during the month with the highest noise level is 5dB. The Northern Quarters Serviced Apartments are identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N23 in Table 7 of Volume 5: Appendix SV-002-0MA08). This temporary adverse effect may take the form of activity disturbance to users of the apartments.

13.4.40 A hotel is proposed on Adair Street (committed development MA08/260) approximately 100m north of Manchester Piccadilly High Speed station main compound. The committed development has been assessed against the criteria for hotels. The typical and highest predicted daytime monthly construction noise levels at this building are 26dB and 29dB, respectively, above the screening criteria defined in the SMR for hotel use[123] for a period of six months. The change during the month with the highest noise level is 15dB. The new hotel is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N24 in Table 7 of Volume 5: Appendix SV-002-0MA08). This temporary adverse effect may take the form of activity disturbance to users of the hotel.

13.4.41 Ibis is a hotel located on the A662 Pollard Street, approximately 185m north of Manchester Piccadilly High Speed station main compound. The multi-storey building has openable double windows and air-conditioning. Ibis has been assessed against the criteria for hotels. The typical and highest predicted daytime monthly construction noise levels at this building are 26dB and 28dB, respectively, above the screening criteria defined in the SMR for hotel use[124] for a period of four months. The change during the month with the highest noise level is 10dB. Ibis is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N25 in Table 7 of Volume 5: Appendix SV-002-0MA08). This temporary adverse effect may take the form of activity disturbance to users of the hotel.

13.4.42 Pollard street (offices) is a proposed mixed use committed development MA08/402 adjacent to the Metrolink New Islington turnback satellite compound. The committed development has been assessed against the criteria for offices. The typical and highest predicted daytime monthly construction noise levels at this building are 20dB and 21dB, respectively, above the screening criteria defined in the SMR for office use[125] for a period of seven months. The change during the month with the highest noise level is 17dB. The new offices are identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse

[122] 50dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 53dB $L_{pAeq,0700-2300}$ (façade).
[123] 50dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 53dB $L_{pAeq,0700-2300}$ (façade).
[124] 50dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 53dB $L_{pAeq,0700-2300}$ (façade).
[125] 55dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 58dB $L_{pAeq,0700-2300}$ (façade).

effect (denoted by MA08-C-N26 in Table 7 of Volume 5: Appendix SV-002-0MA08). This temporary adverse effect may take the form of activity disturbance to users of the office.

13.4.43 Fabrica is an office located on the A665 Great Ancoats Street, approximately 185m north of Manchester Piccadilly High Speed station main compound. The multi-storey building has sealed double-glazed windows and air-conditioning. Fabrica has been assessed against the criteria for offices. The typical and highest predicted daytime monthly construction noise levels at this building are 19dB and 23dB, respectively, above the screening criteria defined in the SMR for office use[126] for a period of six months. The change during the month with the highest noise level is 11dB. Fabrica is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N27 in Table 7 of Volume 5: Appendix SV-002-0MA08). This temporary adverse effect may take the form of activity disturbance to users of the office.

13.4.44 St. Anne's RC Primary School is located on Carruthers Street, 100m east of the Metrolink New Islington turnback satellite compound. The one-storey brick building has double glazed openable windows. The highest predicted daytime monthly construction noise levels at this building is 4dB above the screening criteria defined in the SMR for school use[127] for a period of five months. The change during the month with the highest noise level is 4dB. St. Anne's RC Primary School is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N28 in Table 7 of Volume 5: Appendix SV-002-0MA08) due to noise. This temporary adverse effect may take the form of activity disturbance to users of the school.

13.4.45 St. Anne Presbytery is located on Carruthers Street, 180m east of the Metrolink New Islington turnback satellite compound. The two-storey brick building has double glazed openable windows. The highest predicted daytime monthly construction noise levels at this building is 3dB above the screening criteria defined in the SMR for church use[128] for a period of one year and six months. The change during the month with the highest noise level is 4dB. St. Anne Presbytery is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N29 in Table 7 of Volume 5: Appendix SV-002-0MA08) due to noise. This temporary adverse effect may take the form of activity disturbance to users of the church.

13.4.46 Staycity Aparthotel provides self-catering apartment accommodation and is located on Piccadilly Station Approach, adjacent to Manchester Piccadilly High Speed station main compound and the utility works. The eight-storey building features double-glazed sealed windows. Staycity Aparthotel has been assessed against the criteria for hotels. The typical and highest predicted daytime monthly construction noise levels at this building are 22dB and 29dB, respectively, above the screening criteria defined in the SMR for hotel use[129] for a

[126] 55dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 58dB $L_{pAeq,0700-2300}$ (façade).

[127] 50dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 53dB $L_{pAeq,0700-2300}$ (façade).

[128] 50dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 53dB $L_{pAeq,0700-2300}$ (façade).

[129] 50dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 53dB $L_{pAeq,0700-2300}$ (façade

period of seven years and nine months. The change during the month with the highest noise level is 31dB. The typical daytime monthly construction vibration levels at this building are below the criteria defined in the SMR for this use[130]. The highest predicted daytime monthly construction vibration levels at this building are above the criteria defined in the SMR for this use for a period of five months. The source of vibration impact is the pass-by of a vibratory roller, which is likely to be transient in nature. Staycity Aparthotel is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N30 in Table 7 of Volume 5: Appendix SV-002-0MA08) due to noise and vibration. This temporary adverse effect may take the form of activity disturbance to users of the hotel.

13.4.47 Premier Inn Piccadilly is a hotel located off Dale Street, approximately 30m south-east of Manchester Piccadilly High Speed station main compound. The multi-storey brick building has openable double-glazed windows, although mechanical ventilation is also available for all rooms. Premier Inn Piccadilly has been assessed against the criteria for hotels. The typical and highest predicted daytime monthly construction noise levels at this building are 17dB and 20dB, respectively, above the screening criteria defined in the SMR for hotel use[131] for a period of four months. The change during the month with the highest noise level is 11dB. The typical daytime monthly construction vibration levels at this building are below the criteria defined in the SMR for this use[132]. The highest predicted daytime monthly construction vibration levels at this building are above the criteria defined in the SMR for this use for a period of five months. The source of vibration impact is the pass-by of a vibratory roller, which is likely to be transient in nature. Premier Inn Piccadilly is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N31 in Table 7 of Volume 5: Appendix SV-002-0MA08) due to noise and vibration. This temporary adverse effect may take the form of activity disturbance to users of the hotel.

13.4.48 La Reserve Aparthotel is a hotel located off Ducie Street, approximately 25m north-east of Manchester Piccadilly High Speed station main compound. The multi-storey brick building has double-glazed windows, which are openable. La Reserve Aparthotel has been assessed against the criteria for hotels. The typical and highest predicted daytime monthly construction noise levels at this building are both 19dB above the screening criteria defined in the SMR for hotel use[133] for a period of four months. The change during the month with the highest noise level is 13dB. The typical daytime monthly construction vibration levels at this building are below the criteria defined in the SMR for this use[134]. The highest predicted daytime monthly construction vibration levels at this building are above the criteria defined in the SMR for this use for a period of five months. The source of vibration impact is pass-by

[130] A vibration dose value of 0.2m/s$^{1.75}$ VDV.

[131] 50dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 53dB $L_{pAeq,0700-2300}$ (façade).

[132] A vibration dose value of 0.2m/s$^{1.75}$ VDV.

[133] 50dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 53dB $L_{pAeq,0700-2300}$ (façade).

[134] A vibration dose value of 0.2m/s$^{1.75}$ VDV.

of vibratory roller, which is likely to be transient in nature. La Reserve Aparthotel is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N32 in Table 7 of Volume 5: Appendix SV-002-0MA08) due to noise and vibration. This temporary adverse effect may take the form of activity disturbance to users of the hotel.

13.4.49 Native Aparthotel is a hotel located off Ducie Street, adjacent to Manchester Piccadilly High Speed station main compound. The eight-storey brick building has double-glazed windows, which are openable. Native Aparthotel has been assessed against the criteria for hotels, although it should be noted that there is office usage within the lower floors. The typical and highest predicted daytime monthly construction noise levels at this building are 23dB and 26dB, respectively, above the screening criteria defined in the SMR for hotel use[135] for a period of seven years and 11 months. The change during the month with the highest noise level is 26dB. The typical and highest predicted daytime monthly construction vibration levels at this building are above the criteria defined in the SMR for this use[136] for a period of up to five months. The source of vibration impact is the pass-by of a vibratory roller, which is likely to be transient in nature. Native Aparthotel is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N33 in Table 7 of Volume 5: Appendix SV-002-0MA08) due to noise and vibration. This temporary adverse effect may take the form of activity disturbance to users of the hotel.

13.4.50 Aeroworks is an office building located off Adair Street, adjacent to Manchester Piccadilly High Speed station main compound. The eastern façade of the two-storey brick building has openable single-glazed windows. Aeroworks has been assessed against the office criteria. The typical and highest predicted daytime monthly construction noise levels at this building are 16dB and 22dB, respectively, above the screening criteria defined in the SMR for office use[137] for a period of seven years and nine months. The change during the month with the highest noise level is 20dB. The typical daytime monthly construction vibration levels at this building are below the criteria defined in the SMR for this use[138]. The highest predicted daytime monthly construction vibration levels at this building are above the criteria defined in the SMR for this use for a period of five months. The source of vibration impact is the pass-by of a vibratory roller, which is likely to be transient in nature. Aeroworks is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA08-C-N34 in Table 7 of Volume 5: Appendix SV-002-0MA08) due to noise and vibration. This temporary adverse effect from combined construction site noise and vibration and traffic noise (see below) may take the form of activity disturbance to users of the office.

[135] 50dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 53dB $L_{pAeq,0700-2300}$ (façade).

[136] A vibration dose value of 0.2m/s$^{1.75}$ VDV.

[137] 55dB $L_{pAeq,0700-2300}$ (free-field) during the day, which is equivalent to 58dB $L_{pAeq,0700-2300}$ (façade).

[138] A vibration dose value of 0.4m/s$^{1.75}$ VDV.

Non-residential receptors: indirect effects

13.4.51 Construction traffic is likely to cause an adverse noise effect to Aeroworks (offices), which is located adjacent to Adair Street. Road traffic noise levels due to additional construction vehicles using this route are predicted to be above the daytime screening criteria defined in the SMR for office use[139] during peak months for one or more months, with an increase of around 5dB $L_{pAeq,0700-2300}$ respectively. Increases in road traffic noise of around 5dB $L_{pAeq,0700-2300}$ from the additional construction vehicles using this route during the peak months are predicted. A likely significant effect, denoted as MA08-C-N34 as presented in Volume 5: Appendix SV-002-0MA08, has been identified at Aeroworks. This combined effect may take the form of activity disturbance to users of the office.

Other mitigation measures

13.4.52 No other mitigation measures are proposed in this area.

Summary of likely residual significant effects

13.4.53 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[140].

13.4.54 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 residential community areas are considered likely to be significant:

- Hulme (noise effects only);
- Piccadilly; and
- New Islington (noise effects only).

13.4.55 Construction traffic in this area is likely to cause significant noise effects on adjacent residential properties on Chapeltown Street between Store Street and the A665 Great Ancoats Street.

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

- West Way Nissan Manchester, the A665 Chancellor Lane, Manchester;
- Manchester Chinese Centre on Ardwick Green;
- University of Manchester buildings on Sackville Street: MSS Tower, Morton Laboratory, Moffat Building, and Barnes Wallis Building;

[139] 55dB $L_{pAeq,0700-2300}$ (free-field) during the day which is equivalent to 58dB $L_{pAeq,0700-2300}$ (façade).

[140] Refer to Volume 5: Appendix SV-001-00000.

- The Macdonald Hotel and committed development MA08/399, a proposed hotel at the former London Road Fire Station, Monroes Bar Hotel and Motel One, all on the A6 London Road;
- Tower Block (offices) and committed development MA08/180, 3 Piccadilly Place (offices), Transport for Greater Manchester, DoubleTree by Hilton Hotel, Rodwell Tower (office), Abode Manchester (hotel), all at Piccadilly;
- Malmaison Hotel, Gore Street;
- Your Smile Clinic (healthcare), Dale Street;
- 11 Ducie Street (office), Dakota Manchester (hotel), Ducie House (office) and Paradise Wharf (office), all on Ducie Street;
- The Northern Quarters Serviced Apartments, Laystall Street and committed development MA08/216;
- Adair Street (hotel), Manchester and committed development MA08/260;
- Ibis Hotel and Pollard Street (offices), Manchester and committed development MA08/402, both on the A662 Pollard Street;
- Fabrica (office), the A665 Great Ancoats Street; and
- St. Anne's RC Primary School and St. Anne Presbytery, both on Carruthers Street.

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

- Staycity Aparthotel, Piccadilly;
- Premier Inn, Dale Street;
- La Reserve Aparthotel, Ducie Street;
- Native Aparthotel, Ducie Street; and
- Aeroworks, Adair Street.

13.4.58 Construction traffic in this area is likely to cause significant noise effects at Aeroworks (offices), located adjacent to Adair Street.

13.4.59 HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid these significant effects. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the receptors, their use and the benefit of the measures.

Cumulative effects

13.4.60 This assessment has considered the potential cumulative construction noise effects of the Proposed Scheme and other committed developments[141]. It is not anticipated that there will be any significant cumulative noise effects during construction of the Proposed Scheme.

[141] Volume 5: Appendix CT-004-00000, Planning Data/Committed Development Map Book: Maps CT-13-327 to CT-13-328.

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 as outlined below for the Manchester Piccadilly Station area.

13.5.2 For the purpose of the operational sound, noise and vibration assessment it is assumed that passenger services in this area will start around 05:00. Services will increase to 16 trains per hour in each direction on the route of the Proposed Scheme[142]. 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. The services are assumed to have an operating speed of up to 70mph (110kph). 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). With regard to stations the route-wide measures include control of noise from static sources (e.g. ventilation equipment and public address systems).

[142] 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).

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[143] and European standards[144].

13.5.6 In specific locations along the route of the Proposed Scheme, where there are no noise barriers envisaged, noise will be reduced by engineering structures such as safety fences on viaducts and Manchester Piccadilly Station facade. The location of the relevant engineering structures is shown on Map Series SV-05 (Volume 2: MA08 Map Book).

13.5.7 Significant noise effects from the operational static sources, such as line-side equipment, will be avoided through their design and the specification of noise emission requirements. Further information is presented in Volume 5: Appendix SV-001-00000.

13.5.8 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[145] and the Noise Insulation Regulations 1975[146] ('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[147] or the maximum noise level criteria[148] 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

13.5.9 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.

[143] 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.

[144] EU Commission Regulation No 1304/2014 Technical Specification for Interoperability (TSI) Noise.

[145] *The Noise Insulation (Railways and Other Guided Transport Systems) Regulations 1996.* London, Her Majesty's Stationery Office.

[146] *The Noise Insulation Regulations 1975.* London, Her Majesty's Stationery Office.

[147] World Health Organization (2010), *Night Noise Guidelines for Europe*.

[148] Dependent on the number of train passes.

Assessment of impacts and effects

Residential receptors: direct effects – individual dwellings

13.5.10 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

13.5.11 Taking account of the envisaged mitigation, Map Series SV-05 (Volume 2: MA08 Map Book) shows the long term 40dB[149] night-time sound level contour from the operation of trains on the Proposed Scheme. The extent of the 40dB night-time sound level contour is equivalent to, or slightly larger than, the 50dB daytime contour. With the train flows described in the assumptions section of this report, the daytime sound level (defined as the equivalent continuous sound level from 07:00 to 23:00 or $L_{pAeq,day}$) from the Proposed Scheme would be approximately 10dB higher than the night-time sound level. The 40dB contour therefore indicates the distance from the Proposed Scheme at which the daytime sound level would be 50dB. In general, adverse effects are not expected below these levels.

13.5.12 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: MA08 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[150], there may be a significant effect when assessed on a community basis[151].

13.5.13 No isolated properties within the area have been identified as being subject to a likely adverse noise effect.

13.5.14 In this study area, the direct adverse effects on the acoustic character of the area of the residential community identified in Table 32 is considered to be significant on a community basis.

[149] Defined as the equivalent continuous sound level from 23:00 to 07:00 or $L_{pAeq,night}$.

[150] Further information is provided in Volume 5: Appendices SV-001-00000 and SV-003-0MA08.

[151] Further information is contained in Volume 1.

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

Significant effect number[152] and map reference	Source of significant effect	Time of day	Location and details
MA08-O-C1 (SV-05-326b)	Airborne noise increase from new highway layout	Daytime and night-time	Chapeltown Street Approximately 30 dwellings in the vicinity of Chapeltown Street. Forecast increases in sound from road traffic are likely to cause a moderate noise increase affecting the acoustic character of the area around the properties. There are no shared open spaces identified as being affected in this community.

13.5.15 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[153] and map reference	Source of significant effect	Time of day	Location and details
MA08-O-C2 (SV-05-326b)	Airborne noise decrease due to reduced traffic flows	Daytime and night-time	Store Street Approximately 250 dwellings adjacent to Store Street including committed development MA08/361. Forecast decreases in sound from road traffic are likely to cause a minor to 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

13.5.16 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

13.5.17 The assessment has not identified any airborne sound levels greater screening criteria relevant to the particular building use[154] and typically a change of greater than 3dB[155]

[152] Volume 5: Map Series SV-05.

[153] Volume 5: Map Series SV-05.

[154] As defined in the SMR and SV-001-00000.

[155] The exception is where the use and sensitivity of the receptor or land use is very sensitive to noise and has been included in the detailed assessment where there is a change of less than 3dB. Further information can be found in Volume 5: Appendix SV-001-00000.

compared to the existing baseline sound level at any of the non-residential receptors in the Manchester Piccadilly Station area.

Non-residential receptors: indirect effects

13.5.18 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

13.5.19 No other mitigation measures are proposed in this area.

Summary of likely residual significant effects

13.5.20 At individual residences, the proposed mitigation measures will reduce operational noise inside all dwellings such that it does not reach a level where it will significantly affect residents, and therefore, no likely residual significant effects are identified.

13.5.21 At the community level, the envisaged mitigation described in this section, and presented in Map Series SV-05 (Volume 2: MA08 Map Book), will substantially reduce the potential operational airborne sound impacts and noise effects that would otherwise arise from the Proposed Scheme. Likely residual significant adverse airborne noise effects due to increased noise levels have been identified at Chapeltown Street, including occupants of residential properties identified by MA08-O-C1 on Map SV-05-326b.

13.5.22 Likely residual significant operational beneficial airborne noise effects due to decreased noise levels have been identified at occupants of residential properties on Store Street identified by MA08-O-C2 on Map SV-05-326b.

13.5.23 The assessment of operational noise and vibration indicates that residual significant direct effects are not likely to occur on non-residential receptors in this area.

Cumulative effects

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

Monitoring

13.5.25 Volume 1 (Section 9) sets out the general approach to environmental monitoring during operation of the Proposed Scheme.

13.5.26 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.

13.5.27 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 Manchester Piccadilly Station 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, Manchester City Council (MCC), Greater Manchester Combined Authority (GMCA), Transport for Greater Manchester (TfGM) and Transport for the North (TfN) 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 Manchester Piccadilly Station 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: MA08 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)[156] (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)[157].

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

[156] 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.

[157] 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 existing Manchester Piccadilly Station and the area surrounding it, Manchester city centre and Salford; Manchester Victoria, Manchester Oxford Road and Deansgate stations; and stops on the Metrolink Altrincham, Ashton, Bury and Eccles Lines at Piccadilly Gardens, Piccadilly and New Islington.

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 M60 (including junctions 12 to 20) and the M602.

14.2.6 Forecast future transport movements by road and public transport, with and without the Proposed Scheme, have been derived from the Greater Manchester SATURN Model and the Greater Manchester Public Transport Model. These models have been developed by TfGM and cover an area approximating to Greater Manchester. These models represent the average weekday morning (08:00-09:00) and evening (17:00-18:00) peak hours.

14.2.7 For operation, passenger demand for future year HS2 and long-distance rail passengers is derived from Department for Transport's (DfT) PLANET Framework Model (PFMv9.6).

14.2.8 Junction assessments for construction have been undertaken against the peak month of construction traffic and include robust assumptions on the level of construction traffic in the peak hours. The assessments also address the impact of highway interventions. The effects identified are considered to be a reasonable worst case.

14.2.9 Where the effects vary through the construction programme the highest magnitude significant effects are reported. Where there are both adverse and beneficial effects at different times, the highest magnitude adverse and highest magnitude beneficial are both reported.

14.3 Environmental baseline

Existing baseline

14.3.1 Existing conditions in the study area have been determined through site visits, traffic and transport surveys, liaison with Highways England, MCC, GMCA, and TfGM (including

provision of information on public transport, public rights of way (PRoW) and accident[158] 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 2017 with additional surveys undertaken in November 2017 and July 2018. These data have been supplemented by existing traffic data from other sources, including TfGM. Assessment of the data indicates that the weekday peak hours in the area are generally 08:00-09:00 and 17:00-18:00 which correspond to the Proposed Scheme assessment hours.

14.3.3 PRoW surveys were not undertaken in the Manchester Piccadilly Station area as no PRoW will be crossed by the route of the Proposed Scheme. Pedestrian survey data on roadside footways surrounding the existing Manchester Piccadilly Station have been sourced from Network Rail and were carried out in May 2016.

Strategic and local highway network

14.3.4 The strategic routes in this area are the M60 and the M602. The strategic road network in and around the Manchester Piccadilly Station area is generally busy during peak hours and delays can be experienced.

14.3.5 The local roads include (ordered by road class from south to north):

- A57(M) Ring Road/Mancunian Way;
- A635 Ring Road/Mancunian Way/Fairfield Street/Ashton Old Road;
- A665 Chancellor Lane/Pin Mill Brow/Ring Road/Great Ancoats Street;
- A662 Pollard Street;
- A34 Upper Brook Street/Brook Street/Princess Street;
- A6 Stockport Road/Ardwick Green South/Downing Street/London Road/Whitworth Street/Aytoun Street/Auburn Street/Piccadilly;
- A5067 Cambridge Street;
- A5103 Princess Road;
- A5067 Chorlton Road;
- A57 Ring Road/Regent Road;
- B6469 Fairfield Street;
- B6181 Dale Street;
- Medlock Street Interchange;

[158] The term accident in this report refers to injury related collisions reported to/recorded by the police. This data, known as STATS19, relate only to personal injury accidents on public roads that are reported to the police, and subsequently recorded, using the STATS19 accident reporting form.

- Deansgate Interchange;
- Cresbury Street;
- Dark Lane;
- North Western Street;
- Mill Green Street;
- William Street;
- Midland Street;
- Crane Street;
- Coronation Square;
- Elbe Street;
- Raven Street;
- Blackett Street;
- Coburg Street;
- Helmet Street;
- St. Andrew's Street;
- Travis Street;
- Sheffield Street;
- St. Andrew's Square;
- Portugal Street East;
- Betley Street;
- Churchgate Buildings;
- Baird Street;
- Boad Street;
- Heyrod Street;
- Sparkle Street;
- Auburn Street;
- Chorlton Street;
- Adair Street;
- Minshull Street South;
- Longacre Street;
- Chapeltown Street;
- Paton Street;
- Peak Street;
- Store Street;
- Ducie Street;
- Laystall Street;
- Fountain Street;

- Every Street;
- Port Street;
- Red Lion Street;
- John Street;
- Turner Street; and
- Addington Street.

14.3.6 The local road network in this area is generally busy during peak hours and delays can be experienced.

14.3.7 Relevant accident data for the road network subject to assessment have been obtained from DfT[159]. Data for the three year period 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 Twelve accident clusters were identified within the Manchester Piccadilly Station area:

- Fountain Street/York Street junction – in total there were 10 accidents, of which one was classified as serious and nine were classified as slight;
- A57 Hyde Road/A6 Stockport Road/A6 Ardwick Green Street/A6 Brunswick Street/Higher Ardwick junction – in total there were 12 accidents, of which two were classified serious and 10 were classified as slight;
- A34 Oxford Road – in total there were 13 accidents, of which one was classified as serious and 12 were classified as slight;
- A6 Chapel Street/A34 Trinity Way/A6042 Trinity Way/Chapel Street junction – in total there were nine accidents, of which one resulted in a fatality, one was classified as serious and seven were classified as slight;
- A6042 Trinity Way/A6041 Blackfriars Road junction – in total there were 10 accidents, of which one resulted in a fatality, three were classified as serious and six were classified as slight;
- A57 Mancunian Way/A56 Chester Road/A5067 Chorlton Road (Deansgate Interchange) junction – in total there were 11 accidents, all of which were classified as slight;
- A664 Rochdale Road/Moston Lane/Factory Lane junction – in total there were nine accidents, all of which were classified as slight;
- M602 junction 3/A57 Regent Road/A57 Eccles New Road/A5063 Albion Way/A5063 Trafford Road junction – in total there were 17 accidents, of which three were classified as serious and 14 were classified as slight;
- A34 Princess Street – in total there were 10 accidents, of which one was classified as serious and nine were classified as slight;

[159] 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.

- Portland Street – in total there were nine accidents, all of which were classified as slight;
- A665 Great Ancoats Street – in total there were 11 accidents, of which two were classified as serious and nine were classified as slight; and
- A665 Cheetham Hill Road – in total there were 11 accidents, all of which were classified as slight.

14.3.9 The route of the Proposed Scheme will cross 12 roads with roadside footways within the Manchester Piccadilly Station area. These are the A665 Chancellor Lane, the A635 Fairfield Street/Ring Road, William Street, Raven Street, Elbe Street, Helmet Street, St. Andrew's Street, Travis Street, Sheffield Street, Baird Street, Boad Street and Store Street.

Parking and loading

14.3.10 There is on-street marked and unmarked parking on some roads within the Manchester Piccadilly Station area that may be impacted by the Proposed Scheme. This includes parking on Baird Street, Helmet Street, Adair Street, Travis Street, Store Street, St. Andrew's Street and St. Andrew's Square.

14.3.11 There is off-street parking within the Manchester Piccadilly Station area that may be impacted by the Proposed Scheme. This includes: customer car park for a furniture retailer on the A665 Great Ancoats Street; Travis Street car park; NCP Car Park Manchester on Sheffield Street; Gateway House car park; Sheffield Street South (informal) car park; Baird Street car park; Manchester Piccadilly Station multi-storey car park on Boad Street; NCP car park on Store Street; Network Rail undercroft; and the Network Rail Ramp.

14.3.12 Provision for the servicing of the existing Manchester Piccadilly Station takes place from an entrance off Ducie Street via the Network Rail long stay car park and the main service access off Boad Street.

Public transport network

14.3.13 The Manchester Piccadilly Station area is well served by public transport, including rail services at the existing Manchester Piccadilly Station, Metrolink and the many bus services that operate in the area. Together, they provide good connectivity between the city centre and the rest of Greater Manchester.

14.3.14 Bus services 192, 201, 202, 203, 205, 219, 220, 221 and X95 all operate along, and are served by bus stops on, the A6 London Road/Piccadilly near the existing Manchester Piccadilly Station. Manchester Piccadilly Station is also served by several bus services on the B6469 Fairfield Street (147, 219, 220 and 221), with four bus stops provided at or close to the Fairfield Street entrance to the station. Manchester free shuttle bus services 1, 2 and 3 are all served by bus stops on Station Approach near the main entrance to Manchester Piccadilly Station.

14.3.15 There are 34 bus services that operate on 12 roads that will be crossed or could be affected by the route of the Proposed Scheme in the Manchester Piccadilly Station area. Where bus

services and stops are expected to be affected by either the construction or operation of the Proposed Scheme, these are referred to in the relevant assessment sections. The bus services that could be affected by the Proposed Scheme include:

- A34 Upper Brook Street: route 50 (East Didsbury - Victoria Park - Manchester - Salford Quays - MediaCityUK), route 51 (East Didsbury - Media City), and school route 751 (Burnage High School - Manchester);
- A57 Regent Road: route 33 (Manchester - Eccles - Worsley) and route 33b (Manchester - Eccles - Worsley);
- A635 Ashton Old Road: route 219 (Manchester - Openshaw - Guide Bridge - Ashton - Stalybridge), route 220 (Manchester - Openshaw - Audenshaw - Dukinfield - Stalybridge), route 221 (Manchester - Openshaw - Audenshaw - Dukinfield), school route 725 (Ryder Brow - Trinity Church of England High School) and school route Y1 (Newton Heath - St Peters High School);
- A635 Fairfield Street/B6469 Fairfield Street: route 147 (Manchester Piccadilly Station - West Didsbury), 219 (Manchester - Openshaw - Guide Bridge - Ashton - Stalybridge), route 220 (Manchester - Openshaw - Audenshaw - Dukinfield - Stalybridge), and route 221 (Manchester - Openshaw - Audenshaw - Dukinfield);
- A665 Great Ancoats Street: route 216 (Manchester - Clayton - Droylsden - Ashton - Stalybridge), route 217 (Piccadilly Gardens - Droylsden – Ashton-under-Lyne), route 230 (Ashton - Droylsden - Clayton - Manchester) and route 231 (Ashton - Hartshead - Droylsden - Clayton - Manchester);
- A662 Pollard Street: route 216 (Manchester - Clayton - Droylsden - Ashton - Stalybridge);
- A6 Downing Street/London Road/Piccadilly: route 192 (Hazel Grove - Stepping Hill - Stockport - Levenshulme - Longsight - Manchester), route 201 (Hattersley - Hyde - Denton - Gorton - Manchester), route 202 (Manchester - Gorton - Denton - Haughton Green - Hyde - Gee Cross), route 203 (Manchester - Reddish - Belle Vue - Stockport), route 204 (Hyde - Haughton Green - Denton - Gorton - Manchester), route 205 (Denton - Dane Bank - West Gorton - Manchester), route 206 (Gee Cross - Hyde - Haughton Green - Denton - West Gorton - Manchester), route 219 (Manchester - Openshaw - Guide Bridge - Ashton - Stalybridge), and route X92 (Hazel Grove - Stockport - Manchester);
- A6 Whitworth Street: route 192 (Hazel Grove - Stepping Hill - Stockport - Levenshulme - Longsight - Manchester), route 201 (Hattersley - Hyde - Denton - Gorton - Manchester), route 202 (Manchester - Gorton - Denton - Haughton Green - Hyde - Gee Cross), route 203 (Manchester - Reddish - Belle Vue - Stockport), route 205 (Denton - Dane Bank - West Gorton - Manchester), and route X92 (Hazel Grove - Stockport - Manchester);
- A6 Aytoun Street: route 192 (Hazel Grove - Stepping Hill - Stockport - Levenshulme - Longsight - Manchester), route 201 (Hattersley - Hyde - Denton - Gorton - Manchester), route 202 (Manchester - Gorton - Denton - Haughton Green - Hyde - Gee Cross), route 203 (Manchester - Reddish - Belle Vue - Stockport), route 204 (Hyde - Haughton Green - Denton - Gorton - Manchester), route 205 (Denton - Dane Bank - West Gorton - Manchester), route 206 (Gee Cross - Hyde - Haughton Green - Denton - West Gorton - Manchester), and route X92 (Hazel Grove - Stockport - Manchester);

- Booth Street West: route 53 (Salford - Old Trafford - Cheetham Hill), route 85 (Chorlton - Whalley Range - Hulme - Piccadilly Gardens), route 85A (Arrowfield Estate - Chorlton - Hulme - Piccadilly Gardens), route 86 (Chorlton - Piccadilly Gardens), route 250 (Piccadilly Gardens - Trafford Park - The Trafford Centre), route 253 (Partington - Carrington - Stretford - Piccadilly Gardens) and route 263 (Piccadilly Gardens - Hulme - Stretford - Sale - Altrincham);
- Higher Cambridge Street: route 101 (Wythenshawe - Baguley Northenden - Moss Side - Hulme - Manchester), route 103 (Wythenshawe - Baguley Northenden - Moss Side - Hulme - Manchester) and route 108 (Timperley - Brooklands - Northern Moor - Northenden - Moss Side - Manchester), school route 724 and school route 725; and
- Travis Street: route 147 (West Didsbury - Withington - Fallowfield - Ancoats).

14.3.16 National rail services are accessible via Manchester Piccadilly Station, and local rail services are accessible via Manchester Piccadilly, Manchester Victoria, and Manchester Oxford Road stations. Manchester Piccadilly Station provides access to local and national services on the Buxton Line, Chester to Manchester Line, Crewe to Manchester Line, Glossop Line, Hope Valley Line, Liverpool to Manchester Line, Manchester to Preston Line, Mid-Cheshire Line, Stafford to Manchester Line, Styal Line, Welsh Marches Line and the West Coast Main Line. Manchester Victoria Station provides access to local services on the Caldervale Line, Huddersfield Line, Manchester to Liverpool Line, Manchester to Preston Line, Manchester to Southport Line and the Ribble Valley Line. Manchester Oxford Road Station provides access to local services on the Chester to Manchester Line, Liverpool to Manchester Line, Manchester to Preston Line and the Stafford to Manchester Line.

14.3.17 There are a number of Metrolink stops in the Manchester Piccadilly Station area including: all stops between Cornbrook and Deansgate – Castlefield on the Altrincham Line; all stops between Piccadilly Gardens and Holt Town on the Ashton Line; all stops between Deansgate – Castlefield and Bury on the Bury Line; all stops between Exchange Quay and Eccles on the Eccles Line; and all stops between Victoria and Rochdale on the Rochdale Line.

14.3.18 Coach services operate along several roads in the Manchester Piccadilly Station area including the A6 London Road, the A57 Regent Road, the A34 Upper Brook Street, the A5103 Princess Road, the B6469 Fairfield Street, and Store Street. Coach services operate out of Manchester Coach Station to and from Leeds, Liverpool, Birmingham, Manchester Airport, Heathrow Airport and London.

Non-motorised users

14.3.19 There are pedestrian footways adjacent to many of the roads in the Manchester Piccadilly Station area. Roadside footways vary in width and condition within this area. Where there is no formal roadside footway provision, non-motorised user numbers are generally low.

14.3.20 National Routes 6, 55, 60 and 66 and Regional Route 86 (part of the National Cycle Network) pass through the area. National Cycle Route 66 is crossed by the route of the Proposed Scheme.

14.3.21 No PRoW will be crossed by the route of the Proposed Scheme in the Manchester Piccadilly Station area. There are, however, local roadside footways that could be affected by the Proposed Scheme and have been included in the assessment.

14.3.22 The surveys undertaken to inform the assessment showed that the routes with the greatest daily usage during the survey period were:

- A6 London Road (south of junction with the B6469 Fairfield Street), which was used by 5,299 pedestrians;
- B6469 Fairfield Street (west of junction with the A6 London Road), which was used by 4,739 pedestrians;
- B6469 Fairfield Street (east of junction with the A6 London Road), which was used by 2,932 pedestrians;
- A6 London Road (south of junction with Store Street), which was used by 2,816 pedestrians;
- A6 London Road (north of junction with B6469 Fairfield Street), which was used by 2,370 pedestrians; and
- A6 Whitworth Street (east of junction with Minshull Street South), which was used by 1,885 pedestrians.

Waterways and canals

14.3.23 There are four navigable waterways in the Manchester Piccadilly Station area: the Manchester Ship, Rochdale, Ashton and Bridgewater canals. It is not expected that there will be any effects on these navigable waterways and this topic is not considered further in this assessment.

Air transport

14.3.24 There is no relevant air transport in the Manchester Piccadilly Station area. Consequently, this topic is not considered further in this assessment.

Future baseline

14.3.25 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 MCC, TfGM and GMCA and are considered to be appropriately reflected in the traffic forecasts.

14.3.26 The TfGM transport models include assumptions on how public transport and highway infrastructure are expected to change in the future. At the time of the assessment, the major

committed changes to the transport network relevant to the assessment of the study area that have been taken into account in the future baseline include:

- M60 junction 8 to M62 junction 20 Smart Motorways (variable speed limits M60 junction 8 to junction 18) (opened 2018);
- new Metrolink zonal fare system (implemented 2019);
- Metrolink Trafford Park line (completed March 2020);
- new Metrolink trams as part of Metrolink Capacity Improvement Programme (all new trams expected to be in service by 2022);
- M60 junction 13 and the A572 Leigh Road improvements (opened 2020);
- Trafford Park Road Safety Scheme (expected to open 2025);
- B5211 Barton Dock Road bus lanes (expected to open 2025);
- B5211 Barton Dock Road pedestrian accessibility (expected to open 2025); and
- Trafford Centre Bus Station access improvements (expected to open 2025).

14.3.27 Future year baseline forecasts have been interpolated and extrapolated as necessary from available TfGM model forecasts.

14.3.28 The future baseline takes into account changes to parking in the Manchester Piccadilly Station area. The NCP car park on Store Street and the Travis Street Car Park have temporary planning consent, which are due to expire in advance of the start of construction of the Proposed Scheme in 2025. In line with MCC's aspiration to reduce the amount of parking in the city centre, it is assumed that these car parks will no longer be operational at the time of construction of the Proposed Scheme and these car parks are not considered to be in the future baseline.

14.3.29 The future baseline takes into account changes to pedestrian and cycling facilities associated with TfGM's plan to introduce a network of active travel routes across Greater Manchester, known as the Bee Network. This includes improvements to pedestrian and cycling facilities on the Trafford Road Corridor, Liverpool Street Corridor and the Northern Quarter due to open in 2021 and a new cycle route, the Chorlton Busy Beeway, which is also due to open in 2021.

Construction

14.3.30 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.

14.3.31 The year 2030 is the common future baseline year and the impact of individual or overlapping activities are considered against this single year.

14.3.32 Future baseline traffic volumes in the peak hours are forecast to grow by an average of 17% by 2030 compared to a baseline year of 2018.

Operation

14.3.33 Future baseline traffic volumes in the peak hours are forecast to grow by an average of 23% by 2038 compared to the baseline year of 2018.

14.3.34 Future baseline traffic volumes in the peak hours are forecast to grow by an average of 29% by 2046 compared to the baseline year of 2018.

14.3.35 Future baseline daily rail passengers arriving at and departing from the existing Manchester Piccadilly Station are forecast to increase by around 13% by 2038 and 16% by 2046 compared to 2018 as shown in Table 34. Future baseline rail flows arriving at the existing Manchester Piccadilly Station in the morning (08:00-09:00) and evening (17:00-18:00) peak periods are forecast to increase by around 13% by 2038 and 16% by 2046 compared to 2018.

Table 34: Daily and peak hour rail passengers – baseline and future baseline

	2018 baseline	2038 baseline	Difference 2018-2038 (%)	2046 baseline	Difference 2018-2046 (%)
Daily 16 hour total rail boarding	55,312	62,515	13%	64,076	16%
Daily 16 hour total rail alighting	55,276	62,421	13%	63,979	16%
Daily 16 hour total rail	**110,588**	**124,936**	**13%**	**128,055**	**16%**
AM Peak total rail boarding	4,845	5,476	13%	5,613	16%
AM Peak total rail alighting	5,433	6,135	13%	6,288	16%
AM Peak total rail	**10,278**	**11,611**	**13%**	**11,901**	**16%**
PM Peak total rail boarding	6,124	6,921	13%	7,094	16%
PM Peak total rail alighting	5,686	6,420	13%	6,581	16%
PM Peak total rail	**11,809**	**13,341**	**13%**	**13,675**	**16%**

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)[160] includes measures that aim to reduce the adverse impacts and effects on local communities and maintain public access. This includes the impacts of deliveries of construction materials and equipment.

14.4.3 The measures in the draft CoCP include controls on vehicle types, hours of site operation and routes for HGVs to reduce the impact of road-based construction traffic. In order to achieve this, general and site-specific traffic management measures will be implemented during the construction of the Proposed Scheme on or adjacent to public roads and PRoW affected by the Proposed Scheme.

14.4.4 The draft CoCP includes the requirement to develop local traffic management plans in consultation with the highway and traffic authorities and the emergency services. These will consider the local traffic management strategy including consideration of sensitive receptors, such that adverse impacts will be reduced, insofar as reasonably practicable.

14.4.5 Specific measures include core site operating hours of 08:00 to 18:00 on weekdays and 08:00 to 13:00 on Saturdays with site staff and workers generally arriving before the morning peak hour and departing after the evening peak hour. Activities such as major concrete pours may involve extended working hours for reasons of engineering practicability, with very few workers travelling within the peak traffic hours.

14.4.6 The number of private car trips to and from the construction compounds (both workforce and visitors) will be reduced by encouraging alternative sustainable modes of transport or vehicle sharing. This will be supported by an overarching framework travel plan that will require construction workforce travel plans to be produced that will include a range of potential measures to mitigate the impacts of workers' traffic and transport movements associated with construction of the Proposed Scheme. The travel plans will promote the use

[160] Volume 5: Appendix CT-002-00000, draft Code of Construction Practice.

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 Manchester Piccadilly Station area. The 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;
- associated major highway works with the introduction of a gyratory system between the A635 Mancunian Way, the A635 Fairfield Street, the A665 Pin Mill Brow and the A665 Chancellor Lane (referred to as the A635/A665 Pin Mill Brow gyratory in the remainder of this document);
- alternative routes for roadside footways; and
- possessions on the conventional rail network.

14.4.10 There will also be impacts on the existing Manchester Piccadilly Station due to construction work which could affect users of the station and users of the adjacent highway network, including:

- the partial temporary closure of the Piccadilly Metrolink stop for a period of two years associated with the construction of a new, expanded Metrolink stop beneath Manchester Piccadilly High Speed station;

- the diversion of existing pedestrian routes for users of the existing Manchester Piccadilly Station; and
- the replacement of the Manchester Piccadilly Station multi-storey car park.

14.4.11 The construction assessment has also considered any impacts in the Manchester Piccadilly Station area that arise from construction of the Proposed Scheme in the adjoining community areas.

14.4.12 Construction vehicle movements required to construct the Proposed Scheme will include the delivery of plant and materials, movement of excavated materials and site worker trips. Works will include utility works, earthworks, underpass, viaduct, bridge and highway construction.

14.4.13 Details of the construction compounds are provided in Section 2.3. Table 35 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.

14.4.14 Table 35 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 35 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.

Table 35: Typical vehicle trip generation for construction compounds in the Manchester Piccadilly Station 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	Manchester approach viaduct satellite compound B	2027 Q2	4 years and 9 months	25-34	52-78	11
Satellite	Manchester approach viaduct satellite compound C	2027 Q2	4 years and 9 months	25-34	52-78	11

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	Manchester approach viaduct satellite compound D	2027 Q2	4 years and 9 months	27-38	52-78	11
Main	Manchester Piccadilly High Speed station main compound	2025 Q2	6 years and 3 months	124-188	428-576	12
Satellite	Metrolink New Islington turnback satellite compound	2025 Q2	9 months	8-8	14-14	2

14.4.15 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 36 summarises the construction HGV routes to and from each compound to the main road network. For some compounds, Table 36 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 construction HGV route varies over time to account for changes to the highway network through the construction period.

14.4.16 The average daily combined two-way HGV trips reported in Table 35 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 36, 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 36: Construction HGV routes for construction compounds in the Manchester Piccadilly Station area

Compound name	Compound access	Access route(s) to/from compound to main road network
Manchester approach viaduct satellite compound B	A635/A665 Pin Mill Brow gyratory	Route to/from the west: • A635/A665 Pin Mill Brow gyratory, A635 Mancunian Way and A57(M) Mancunian Way Route to/from the east: • A635/A665 Pin Mill Brow gyratory and A635 Ashton Old Road

Compound name	Compound access	Access route(s) to/from compound to main road network
Manchester approach viaduct satellite compound C	A635/A665 Pin Mill Brow gyratory	Route to/from the west: • A635/A665 Pin Mill Brow gyratory, A635 Mancunian Way and A57(M) Mancunian Way Route to/from the east: • A635/A665 Pin Mill Brow gyratory and A635 Ashton Old Road
Manchester approach viaduct satellite compound D	B6469 Fairfield Street	Route to/from the west: • B6469 Fairfield Street, A635/A665 Pin Mill Brow gyratory, A635 Mancunian Way and A57(M) Mancunian Way Route to/from the east: • B6469 Fairfield Street, A635/A665 Pin Mill Brow gyratory and A635 Ashton Old Road
Manchester Piccadilly High Speed station main compound	Store Street	Route to/from the west: • Store Street, A665 Great Ancoats Street, A635/A665 Pin Mill Brow gyratory, A635 Mancunian Way and A57(M) Mancunian Way • Store Street, A6 London Road, B6469 Fairfield Street, A635/A665 Pin Mill Brow gyratory, A635 Mancunian Way and A57(M) Mancunian Way (outgoing only) • A57(M) Mancunian Way, A6 London Road, A6 Whitworth Street, A6 Aytoun Street, A6 London Road and Store Street (incoming only) Route to/from the east: • Store Street, A665 Great Ancoats Street, A635/A665 Pin Mill Brow gyratory and A635 Ashton Old Road
Manchester Piccadilly High Speed station main compound	Adair Street	Route to/from the west: • Adair Street, A665 Great Ancoats Street, A635/A665 Pin Mill Brow gyratory, A635 Mancunian Way and A57(M) Mancunian Way Route to/from the east: • Adair Street, A665 Great Ancoats Street, A635/A665 Pin Mill Brow gyratory and A635 Ashton Old Road
Manchester Piccadilly High Speed station main compound	St Andrew's Street	Route to/from the west: • St. Andrew's Street, B6469 Fairfield Street, A635/A665 Pin Mill Brow gyratory, A635 Mancunian Way and A57(M) Mancunian Way Route to/from the east: • St. Andrew's Street, B6469 Fairfield Street, A635/A665 Pin Mill Brow gyratory and A635 Ashton Old Road
Manchester Piccadilly High Speed station main compound	Helmet Street	Route from the west: • A57(M) Mancunian Way, A635 Mancunian Way, A635/A665 Pin Mill Brow gyratory, A665 Great Ancoats Street and Helmet Street (incoming only) Route to the east: • Helmet Street, St. Andrew's Street, B6469 Fairfield Street, A635/A665 Pin Mill Brow gyratory and A635 Ashton Old Road (outgoing only)
Manchester Piccadilly High Speed station main compound	Travis Street	Route to/from the west: • Travis Street, B6469 Fairfield Street, A635/A665 Pin Mill Brow gyratory, A635 Mancunian Way and A57(M) Mancunian Way Route to/from the east: • Travis Street, B6469 Fairfield Street, A635/A665 Pin Mill Brow gyratory and A635 Ashton Old Road

Compound name	Compound access	Access route(s) to/from compound to main road network
Manchester Piccadilly High Speed station main compound	Ducie Street	Route to/from the west: • B6181 Ducie Street, A6 London Road and A57(M) Mancunian Way (outgoing only) • A57(M) Mancunian Way, A6 London Road, A6 Whitworth Street, A6 Aytoun Street, Auburn Street and B6181 Ducie Street (incoming only) • Ducie Street, Peak Street, Laystall Street, A665 Great Ancoats Street, A635/A665 Pin Mill Brow gyratory, A635 Mancunian Way and A57(M) Mancunian Way (outgoing only) • A57(M) Mancunian Way, A635 Mancunian Way, A635/A665 Pin Mill Brow gyratory, A665 Great Ancoats Street and Ducie Street (incoming only) Route to/from the east: • Ducie Street, Peak Street, Laystall Street, A665 Great Ancoats Street, A635/A665 Pin Mill Brow gyratory and A635 Ashton Old Road (outgoing only) • A635 Ashton Old Road, A635/A665 Pin Mill Brow gyratory, A665 Great Ancoats Street and Ducie Street (incoming only)
Metrolink New Islington turnback satellite compound	A662 Pollard Street	Route to/from the west: • A662 Pollard Street, A665 Great Ancoats Street, A635/A665 Pin Mill Brow gyratory, A635 Mancunian Way and A57(M) Mancunian Way Route to/from the east: • A662 Pollard Street, A665 Great Ancoats Street, A635/A665 Pin Mill Brow gyratory and A635 Ashton Old Road

14.4.17 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 35.

14.4.18 The effects of construction of the Proposed Scheme on the highway network in the Manchester Piccadilly Station area have been assessed by undertaking strategic model runs for a number of 'with HS2' construction scenarios, and by comparing the flows and delays against the 2030 future baseline scenario. The assessment is based on the highest volume of construction traffic on each construction HGV route in each construction scenario. Where construction HGV routes will serve more than one construction compound, the assessment is based on the highest combined volume of construction traffic on each section of each construction HGV route in each construction scenario.

14.4.19 The effects of construction of the Proposed Scheme on the highway network in the Manchester Piccadilly Station area have been assessed by undertaking strategic model runs for a number of 'with HS2' construction scenarios, and by comparing the flows and delays against the 2030 future baseline scenario.

14.4.20 In using the strategic model, the impacts and effects have been considered in a utilities scenario and four scenarios representing the main construction phases. These scenarios ensure that the assessment addresses the different combinations and interactions of

advance works, utility works, temporary highway closures and diversions and construction lorry movements through the construction period. The scenarios are:

- utilities scenario, 2025 Q1. This corresponds with the utility works in the area including any works to low voltage overhead or underground lines, gas pipes, sewers and telecommunication cables. Whilst there will be some construction traffic during this period, it is likely to be minimal;
- scenario 1, peak between 2025 Q2 and 2029 Q3. This corresponds with the peak in construction traffic movements following the closure of roads on the north side of the existing Manchester Piccadilly Station and initial construction works at the A635/A665 Pin Mill Brow gyratory. This scenario equates to 96% of the overall peak in construction traffic across the whole construction period;
- scenario 2, peak between 2029 Q4 and 2030 Q2. This corresponds with the peak in construction traffic movements associated with the main construction works and includes the temporary road layout at the A635/A665 Pin Mill Brow gyratory. This scenario equates to 100% of the overall peak in construction traffic across the whole construction period;
- scenario 3, peak between 2030 Q3 and 2031 Q2. This corresponds with the peak in construction traffic movements following the opening of the new A635/A665 Pin Mill Brow gyratory. This scenario equates to 74% of the overall peak in construction traffic across the whole construction period; and
- scenario 4, peak after 2031 Q2. This corresponds with the peak in construction traffic movements during the decommissioning of construction compounds and the completion of all construction works. This scenario equates to 57% of the overall peak in construction traffic across the whole construction period.

14.4.21 The construction works and construction traffic movements associated with the Proposed Scheme differ for each of these scenarios. The assessment considers the impacts in all scenarios and reports the highest magnitude of significant effects, regardless of which scenario they arise in. The most relevant highway interventions and works for each scenario are shown in Table 37.

Table 37: Construction highway interventions by scenario

Type	Intervention	Utilities scenario	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Utilities	Closure of Ducie Street, Store Street, the A6 London Road (southbound) and the A665 Great Ancoats Street (westbound, at Every Street)	Included	Not included	Not included	Not included	Not included
Utilities/ Main works	Closure of Travis Street	Included	Included	Included	Included	Included
Main works	Closure of the A665 Midland Street in the Davenport Green to Ardwick area (MA07)	Not included	Included	Included	Included	Included

Type	Intervention	Utilities scenario	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Main works	Temporary closure of the Metrolink Ashton Line	Not included	Not included	Not included	Included	Included
Main works	Diversion of the A665 Chancellor Lane	Not included	Not included	Included	Included	Included
Main works	Temporary road layout around the A635/A665 Pin Mill Brow gyratory	Not included	Not included	Included	Not included	Not included
Main works	New A635/A665 Pin Mill Brow gyratory	Not included	Not included	Not included	Included	Included
	Construction HGV traffic as percentage of peak construction HGV traffic	**Minimal**	**96%**	**100%**	**74%**	**57%**

14.4.22 The strategic models have been used to assess these construction scenarios taking account of the construction traffic movements and any road closures, traffic management or changes to junction operations in each scenario. The strategic model outputs for each of these scenarios are only relevant to the assessment of the effects on traffic delays to vehicle occupants, traffic related severance and public transport delay.

Highway network

Strategic and local highway network

14.4.23 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):

- M602 (including junction 3);
- A635 Ashton Old Road/Fairfield Street/Mancunian Way (between the A665 Midland Street and A57(M) Mancunian Way);
- A665 Chancellor Lane/Pin Mill Brow/Great Ancoats Street (between the A665 Midland Street and Laystall Street);
- A57(M) Mancunian Way (between the A57 Egerton Street and the A635 Mancunian Way);
- A57 Egerton Street/Dawson Street/Regent Road (between the M602 junction 3 and the A57(M) Mancunian Way);
- A34 Upper Brook Street/Brook Street (between the A57(M) Mancunian Way and Swinton Grove);
- A6 London Road/Whitworth Street/Aytoun Street (between Auburn Street and the A57(M) Mancunian Way);
- A662 Pollard Street (between A665 Great Ancoats Street and Carruthers Street);

- B6469 Fairfield Street (between the A635 Mancunian Way and Coburg Street);
- Dark Lane (between North Western Street and the A665 Chancellor Lane);
- North Western Street (between the A635 Mancunian Way and Dark Lane);
- Helmet Street (between St. Andrew's Street and the A665 Great Ancoats Street);
- St. Andrew's Street (between the B6469 Fairfield Street and Helmet Street);
- Travis Street (between the B6469 Fairfield Street and Adair Street);
- Adair Street (between Travis Street and the A665 Great Ancoats Street);
- Coburg Street (between the B6469 Fairfield Street and the A6 Aytoun Street);
- Minshull Street South (between the B6469 Fairfield Street and the A6 Whitworth Street);
- Auburn Street (between the A6 Aytoun Street and the A6 London Road);
- Store Street (between the A6 London Road and the A665 Great Ancoats Street);
- Ducie Street (between the A6 London Road and the A665 Great Ancoats Street);
- Longacre Street (between Chapeltown Street and Churchgate Buildings);
- Churchgate Buildings (between Longacre Street and Heyrod Street);
- Heyrod Street (between Churchgate Buildings and Norton Street);
- Norton Street (between Heyrod Street and Adair Street);
- Betley Street (between Heyrod Street and Adair Street);
- Laystall Street (between Peak Street and the A665 Great Ancoats Street); and
- Peak Street (between Store Street and Laystall Street).

14.4.24 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. Where works will have a longer duration, these are described below.

14.4.25 As part of the construction of the A635/A665 Pin Mill Brow gyratory there will be a number of temporary highway changes to facilitate the construction of the permanent highway diversions and realignments, which are as follows:

- A635 Fairfield Street – permanent diversion, 200m south of its current alignment for 590m, to form the eastern side of the new A635/A665 Pin Mill Brow gyratory. During construction, a temporary diversion will be in place for a period of one year. Westbound traffic will be diverted via the A665 Chancellor Lane and the A665 Chancellor Lane diversion, increasing journey length by 337m;
- A635 Mancunian Way (northbound) – permanent realignment within the existing footprint. During construction, there will be periodic, partial, temporary closures of up to one week intervals over a period of three years and six months. During this time, traffic flow along the carriageway will be maintained, resulting in no change in journey length;

- A635 Mancunian Way (southbound) – permanent realignment to form the western side of the new A635/A665 Pin Mill Brow gyratory. During construction, there will be periodic, partial, temporary closures of up to one week intervals over a period of three years and six months. During this time, traffic will be diverted via the A665 Pin Mill Brow, the A665 Chancellor Lane and the diverted A665 Chancellor Lane, increasing journey length by up to 422m;
- A665 Chancellor Lane – permanent diversion into the new A635/A665 Pin Mill Brow gyratory and permanent closure of the section north of the junction with Midland Street. The permanent diversion will be constructed offline for a period of one year and six months. During this time, a partial temporary closure will be required (south of, and at the junction with, Midland Street). Traffic will still be able to use the A665 Chancellor Lane but will be restricted to one lane under traffic signal control, resulting in no change in journey length; and
- B6469 Fairfield Street – temporary closure of a 400m section of the B6469 Fairfield Street at its junction with St Andrew's Street for a period of one year to allow the construction of a new junction. Temporary widening will allow traffic to continue through the junction, resulting in no change in journey length. Following completion of construction, this section will be permanently diverted into the A635/A665 Pin Mill Brow gyratory.

14.4.26 There will also be temporary highway changes associated with the construction of the other permanent highway diversions and realignments, which are as follows:

- A6 London Road – permanent realignment of the A6 London Road within the existing footprint. A partial temporary closure will be required for a period of one year and nine months to enable alterations to the junction with Ducie Street. Additional closures over a period of up to seven months will be required to enable the replacement of the pedestrian footbridge, realignment of the Metrolink and alterations to the existing loading bay access. Traffic management will be in place reducing the carriageway to one lane, resulting in no change in journey length;
- Travis Street – a section of Travis Street (between the B6469 Fairfield Street and Adair Street) will be permanently closed for through-traffic, with the road reinstated to provide access to the multi-modal transport hub. During construction, a temporary closure of Travis Street will be required between New Sheffield Street and Adair Street, for a period of six years, to facilitate the construction of the Manchester Piccadilly High Speed station and vertical realignment required for the new car parks. During this time, vehicles will be diverted via Adair Street, the A665 Great Ancoats Street/Pin Mill Brow/Chancellor Lane, the diverted A665 Chancellor Lane and the diverted B6469 Fairfield Street, increasing journey length by up to 1.5km;
- Temperance Street – temporary closure of a 200m section of Temperance Street for a period of two years to enable amendments to the Hoyle Street and Temperance Street junction. Traffic will be diverted via Hoyle Street, resulting in a negligible change in journey length;
- Chapelfield Road – temporary closure of Chapelfield Road for a period of two years to enable improvement works. For the section between Hoyle Street and Temperance

Street, traffic will be diverted via Hoyle Street and Temperance Street, resulting in a negligible change in journey length. No diversion will be required during the temporary closure of the section between Temperance Street and Mellor Street;

- Hoyle Street – permanent closure of a 160m section of Hoyle Street between Temperance Street and North Western Street. A temporary closure of a section of the road (between Chapelfield Road and the A635 Mancunian Way) will be required for a period of up to six years, to enable carriageway improvements for access to the Piccadilly offline access ramp. Traffic from the A635 Mancunian Way will be diverted via Crane Street and Chapelfield Road. Traffic from Chapelfield Road will be diverted via Temperance Street, the B6469 Fairfield Street, the A6 London Road and the A635 Mancunian Way, increasing journey length by up to 895m;
- Betley Street - temporary closure of Betley Street for a period of six years, to enable the realignment of Adair Street and alterations to the Betley Street and Adair Street junction. During this time, traffic will be diverted via Norton Street and Heyrod Street, increasing journey length by up to 173m;
- Portugal Street East – temporary closure of Portugal Street East for a period of three months, to enable works to facilitate connection to Heyrod Street. On completion of construction, Portugal Street East will be reopened;
- Heyrod Street – temporary closure of the southern end of Heyrod Street, for a period of three months, to facilitate changes to the junction with Portugal Street East. On completion of construction Heyrod Street will be reopened. There are existing business along this section of Heyrod Street for which access will be retained;
- Chapeltown Street – partial temporary closure of an 85m section at the south-western end of Chapeltown Street, for a period of nine months, to enable construction of a new junction with New Sheffield Street. Traffic travelling from Store Street to Chapeltown Street will be diverted via Jutland Street, Peak Street, Laystall Street and the A665 Great Ancoats Street, increasing journey length by up to 736m;
- Helmet Street – permanent closure of the southern section of Helmet Street. A temporary closure of the remaining section will be required for a period of five years, to enable widening of the highway. During this time, traffic will be diverted via the St. Andrew's Street diversion and the new A635/A665 Pin Mill Brow gyratory, increasing journey length by up to 758m;
- St. Andrew's Square – temporary closure of St Andrew's Square for a period of five years and nine months to facilitate alterations to the vertical alignment required for the new car parks, resulting in no change in journey length;
- Adair Street – temporary closure of the southern section of Adair Street for a period of six years, to facilitate alterations to the vertical realignment required for the new car parks, and a temporary closure at the northern extent for a period of six months to improve the junction with the A665 Great Ancoats Street. During this time, vehicles will be diverted via the A665 Great Ancoats Street/Pin Mill Brow/Chancellor Lane, the diverted A665 Chancellor Lane and the diverted B6469 Fairfield Street, increasing journey length by up to 1.2km. On completion, Adair Street will be re-opened;

- River Street – temporary closure of River Street at its junction with Chapelfield Road for a period of one year. Traffic will be diverted along Rachel Street, Hoyle Street and Chapelfield Road, increasing journey length by up to 139m;
- Store Street – permanent closure of an 85m section of Store Street at the southern end between the A6 London Road and Boad Street, to facilitate the connection to New Sheffield Street and Manchester Piccadilly High Speed station. A 260m section between Boad Street and Jutland Street will be temporarily closed for a period of one year to facilitate a change in level along Store Street. Traffic will be diverted via Jutland Street, Ducie Street and the A6 London Road, increasing journey length by up to 1.3km. Finishing works will be carried out later in the programme and will take three months to complete. On completion of construction this section of Store Street will be reopened;
- Jutland Street – temporary closure of Jutland Street at its junction with Store Street, for a period of three months, to enable alterations to the vertical alignment. Traffic will be diverted via Ducie Street, Peak Street, Laystall Street, the A665 Great Ancoats Street and Store Street, increasing journey length by up to 829m;
- Ducie Street – temporary closure of the south-western end of Ducie Street for a period of three months to facilitate the construction of a new junction and realignment. Traffic will be diverted via Peak Street, Laystall Street, the A665 Great Ancoats Street, Newton Street and the A6 London Road, increasing journey length by up to 858m. In addition, temporary measures such as traffic management and intermittent passing places will be implemented for a period of one year and nine months along Ducie Street to enable junction improvements with the A6 London Road, resulting in no change in journey length; and
- Dale Street - temporary closure of the southern end of Dale Street for a period of three months, to facilitate changes to the junction with Ducie Street. During this time, traffic will be diverted via Newton Street, Lena Street and the A6 London Road, increasing journey length by up to 265m. On completion of construction Dale Street will be reopened.

14.4.27 The temporary diversions or realignments will change journey lengths 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. However, some of the diversion or realignments are greater than 1km, which may result in significant effects for vehicle occupants. They may also affect non-motorised users, which is considered separately below. The effects, which are significant, will be:

- Travis Street – moderate adverse effect from an increase in journey length of up to 1.5km;
- Adair Street – moderate adverse effect from an increase in journey length of up to 1.2km; and
- Store Street – moderate adverse effect from an increase in journey length of up to 1.3km.

14.4.28 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.

14.4.29 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:

- A6 Stockport Road/A6 Ardwick Green South/A57 Hyde Road - major adverse effect during scenario 2;
- A57(M) Mancunian Way/A5067 Cambridge Street/Cambridge Street - moderate beneficial effect during the utilities scenario and scenarios 2, 3 and 4;
- A57 (M) Mancunian Way/A5103 Princess Road/A5103 Medlock Street - moderate adverse effect during the utilities scenario and scenarios 1, 3 and 4;
- A57 (M) Mancunian Way/A56 Chester Road/A5067 Chorlton Road (Deansgate Interchange) - moderate adverse effect during the utilities scenario;
- A665 Chancellor Lane diversion/A665 Midland Street - major adverse effect during scenarios 2, 3 and 4;
- A6 Downing Street/Grosvenor Street - major adverse effect during scenario 2;
- A5103 Albion Street/A5103 Medlock Street/City Road East - minor adverse effect during the utilities scenario and scenario 3;
- A635 Mancunian Way/Hoyle Street - major adverse effect during scenarios 2, 3 and 4;
- A665 Chancellor Lane diversion/A635 Mancunian Way Southbound realignment/A635 Fairfield Street diversion - major adverse effect during scenarios 3 and 4;
- A635 Mancunian Way/A635 Fairfield Street/B6469 Fairfield Street - major adverse effect during utilities scenario and scenario 1;
- A635 Mancunian Way/B6469 Fairfield Street diversion/A635 Mancunian Way Northbound realignment - major adverse effect during scenarios 2, 3 and 4;
- A34 Oxford Street/B6469 Whitworth Street West/B6469 Whitworth Street - moderate adverse effect during scenarios 1, 3 and 4;
- A5103 Albion Street/A5103 Lower Mosley Street/Great Bridgewater Street - minor adverse effect during the utilities scenario and scenarios 1, 2, 3 and 4;
- A57 Regent Road/A57 Dawson Street/A6042 Trinity Way/Water Street - minor beneficial effect during the utilities scenario and scenario 2;
- A665 Pin Mill Brow/A635 Ashton Old Road/A665 Chancellor Lane/A635 Fairfield Street - major adverse effect during scenario 1;
- A665 Pin Mill Brow realignment/A635 Ashton Old Road realignment/A635 Mancunian Way Southbound realignment - major adverse effect during scenarios 2, 3 and 4;
- A56 Deansgate/A6143 Liverpool Road/Great Bridgewater Street - minor adverse effect during the utilities scenario;
- A665 Pin Mill Brow/A635 Mancunian Way - major adverse effect during scenario 1;

- A665 Pin Mill Brow realignment/A635 Mancunian Way Northbound realignment - major adverse effect during scenario 2;
- A34 Oxford Street/A5103 Portland Street/A5103 Chepstow Street - moderate adverse effect during scenarios 1 and 3;
- A6 London Road/B6469 Fairfield Street - major adverse effect during the utilities scenario and scenario 2 and minor beneficial effect during scenario 1;
- A5066 Oldfield Road/A57 Regent Road - moderate adverse effect during scenario 2;
- A5103 Portland Street/Dickinson Street - moderate beneficial effect during scenario 1;
- New Sheffield Street/St Andrew's Square - major adverse effect during the utilities scenario;
- A6 Aytoun Street/Minshull Street - moderate adverse effect during scenario 2;
- A34 Peter Street/A6042 Mount Street/Mount Street - moderate adverse effect during scenario 2;
- A665 Great Ancoats Street/Every Street - major adverse effect during utilities scenario and scenarios 1 and 2;
- A5103 Portland Street/Sackville Street/Nicholas Street - minor beneficial effect during scenario 2;
- A665 Great Ancoats Street/Adair Street - major adverse effect during scenarios 1, 2, 3 and 4;
- A6 Piccadilly/A6 London Road/B6181 Ducie Street/Auburn Street - major adverse effect during scenarios 1, 2, 3 and 4;
- A34 Quay Street/Lower Byrom Street/Gartside Street - minor adverse effect during scenarios 3 and 4;
- B6181 Dale Street/B6181 Ducie Street - major adverse effect during scenarios 1, 2 and 3;
- A665 Great Ancoats Street/A662 Pollard Street/Chapeltown Street - major adverse effect during scenarios 1, 2, 3 and 4;
- M602 junction 3/A57 Regent Road/A57 Eccles New Road/A5063 Albion Way/A5063 Trafford Road - minor adverse effect during scenario 2;
- A5066 Oldfield Road/Liverpool Street/Middlewood Street - minor adverse effect during scenario 2;
- A6 Piccadilly/Paton Street - major adverse effect during scenario 2;
- A665 Great Ancoats Street/Old Mill Street/Store Street - major adverse effect during scenarios 1 and 2 and minor beneficial effect during the utilities scenario and scenario 3;
- Every Street/Carruthers Street - major adverse effect during scenario 1;
- A6 Dale Street/A62 Lever Street - minor adverse effect during the utilities scenario;
- A664 High Street/A6 Church Street - major adverse effect during the utilities scenario;
- A6 Crescent/A6 Chapel Street/A5066 Adelphi Street/A5066 Oldfield Road - major adverse effect during scenarios 2 and 3;

- A6042 Trinity Way/A6 Chapel Street/A34 Trinity Way - major adverse effect during the utilities scenario and scenarios 1, 2, 3 and 4;
- A6 Chapel Street/St Stephen Street - major adverse effect during scenario 2;
- A6 Blackfriars Street/Parsonage - major adverse effect during the utilities scenario and scenarios 2 and 3;
- A6 Crescent/Irwell Place - minor adverse effect during the utilities scenario and scenarios 1, 2, 3 and 4;
- A5186 Langworthy Road/Liverpool Street - minor adverse effect during scenario 2;
- A665 Great Ancoats Street/Lever Street/George Leigh Street - major adverse effect during the utilities scenario;
- A5185 Stott Lane/A57 Eccles New Road - minor adverse effect during scenarios 2 and 3;
- A6042 Trinity Way/A6041 Blackfriars Road - minor adverse effect during the utilities scenario and scenarios 1, 2, 3 and 4;
- A665 Miller Street/A664 Corporation Street/Corporation Street - minor adverse effect during scenarios 1 and 2;
- A6041 Blackfriars Road/A5066 Silk Street/St Simon Street - minor adverse effect during the utilities scenario and scenarios 1, 2, 3 and 4;
- A5186 Langworthy Road/Seedley Road - minor adverse effect during scenarios 1, 2, 3 and 4;
- A576 Eccles Old Road/A5186 Langworthy Road - minor adverse effect during the utilities scenario and scenarios 1, 2, 3 and 4;
- A56 Bury New Road/Sherborne Street - major adverse effect during scenarios 2 and 3;
- B6186 Frederick Road/Seaford Road/Broughton Road East - minor adverse effect during the utilities scenario and scenarios 1, 2, 3 and 4;
- A576 Broughton Road/A576 Cromwell Road/Lissadel Street - minor adverse effect during scenario 2;
- A56 Bury New Road/B6180 Waterloo Road - moderate adverse effect during the utilities scenario and scenarios 1, 2, 3 and 4;
- A576 Cromwell Road/A576 Broughton Road/Langley Road South - minor adverse effect during the utilities scenario and scenarios 1, 2, 3 and 4;
- A56 New Bury Road/Waterloo Road/Broughton Lane - major adverse effect during scenario 2;
- B6186 Camp Street/B6186 Fredrick Road/Lower Broughton Road - major adverse effect during scenarios 2 and 3;
- A5066 Great Clowes Street/Fenney Street - moderate adverse effect during scenario 2;
- A56 Bury Road/Fenney Street/Appian Way - minor adverse effect during scenario 2;
- A576 Great Cheetham Street West/A5066 Great Clowes Street/B6187 Great Clowest Street - major adverse effect during scenario 2;

- A580 East Lancashire Road/A572 Worsley Road - minor adverse effect during the utilities scenario and scenarios 1, 2, 3 and 4;
- A665 Cheetham Hill Road/Greenhill Road/B6180 Waterloo Road/Halliwell Lane - major adverse effect during the utilities scenario and scenarios 1, 2, 3 and 4;
- Moor Lane/Littleton Road/Kersal Vale Road - minor adverse effect during scenarios 2 and 3;
- A56 Bury New Road/ Singleton Road/Moor Lane - minor adverse effect during scenarios 2 and 3;
- A6044 Hilton Lane/A6044 Rainsough Brow/Kersal Road - minor adverse effect during scenario 2; and
- M62 junction 18/M66 junction 4/M60 junction 18/Simister Island - major adverse effect during scenario 2.

14.4.30 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 are set out in Table 38 and Table 39.

Table 38: Roads with changes in daily all vehicle movements (more than 30%) resulting in significant effects on traffic-related severance for non-motorised users, 2030

Road name	Significant effect	Construction scenario
Grafton Street (between A5184 Plymouth Grove and A34 Upper Brook Street)	Moderate adverse	Scenario 2
A34 Grosvenor Street (between A34 Brook Street and A34 Oxford Road)	Moderate beneficial	Utilities scenario
Grosvenor Street (between A6 Downing Street and A34 Brook Street)	Moderate beneficial	Utilities scenario
Union Street (between Dark Lane and Higher Ardwick)	Minor beneficial	Scenarios 1, 2, 3 and 4
A6 London Road (between A57(M) Mancunian Way and Travis Street)	Moderate beneficial	Utilities scenario
A635 Fairfield Street diversion (between A635 Ashton Old Road realignment and A665 Chancellor Lane diversion)	Major adverse	Scenarios 3 and 4
A635 Ashton Old Road (between A665 Chancellor Lane and A665 Midland Street)	Moderate adverse	Scenario 1
Travis Street (between B6469 Fairfield Street and A6 London Road)	Minor beneficial	Scenarios 1 and 2
A665 Pin Mill Brow (between A665 Great Ancoats Street and A635 Fairfield Street)	Major adverse	Scenario 1
A635 Mancunian Way northbound realignment (between A635 Fairfield Street diversion and A665 Pin Mill Brow realignment)	Major adverse	Scenario 1
B6469 Fairfield Street (between Travis Street and St Andrew's Street diversion)	Major adverse	Utilities scenario and scenarios 1, 2, 3 and 4
A6 London Road (between Altrincham Street and B6469 Fairfield Street)	Moderate beneficial	Utilities scenario
B6469 Fairfield Street (between A6 London Road and Travis Street)	Moderate beneficial	Scenario 2

Road name	Significant effect	Construction scenario
St. Andrew's Street diversion (between B6469 Fairfield Street diversion and Helmet Street)	Major adverse	Scenario 4
Helmet Street (between St. Andrew's Street diversion and A665 Great Ancoats Street)	Moderate adverse	Scenarios 2, 3 and 4
A6 Aytoun Street (between Chorlton Street and Cobourg Street)	Moderate beneficial	Utilities scenario
Adair Street (between New Sheffield Street and Station Car Park Access)	Moderate adverse	Utilities scenario
A6 Aytoun Street (between Cobourg Street and A6 Whitworth Street)	Moderate beneficial	Utilities scenario
A6 Whitworth Street (between A6 London Road and A6 Aytoun Street)	Moderate beneficial	Utilities scenario
Adair Street (between Station Car Park Access and St. Andrew's Square)	Major adverse	Utilities scenario
Chorlton Street (between B6469 Whitworth Street and Bloom Street)	Moderate adverse	Utilities scenario and scenarios 2 and 3
A6 Aytoun Street (between A6 Whitworth Street and Minshull Street)	Moderate beneficial	Utilities scenario
St. James Street (between Dickinson Street and A34 Princess Street)	Minor adverse	Scenarios 2 and 3
Adair Street (between St Andrew's Square and Great Ancoats Street)	Moderate beneficial	Utilities scenario
A6 Aytoun Street (between Minshull Street and Auburn Street)	Major beneficial	Utilities scenario
Minshull Street (between Bloom Street and A6 Aytoun Street)	Moderate beneficial	Utilities scenario
Bloom Street (between Minshull Street and Chorlton Street)	Minor beneficial	Scenario 3
A6 London Road (between Auburn Street and B6469 Fairfield Street)	Moderate beneficial	Utilities scenario
Store Street (between New Sheffield Street and Boad Street)	Major adverse	Utilities scenario and scenarios 1, 2 and 3
Major Street (between Chorlton Street and Minshull Street)	Minor beneficial	Utilities scenario and scenarios 1, 2 and 3
Auburn Street (between A6 Aytoun Street and A6 Piccadilly)	Major beneficial	Utilities scenario
Palmerston Street (between A665 Great Ancoats Street and Gurney Street)	Moderate beneficial	Scenarios 1, 3 and 4
Chapeltown Street (between Sparkle Street and A665 Great Ancoats Street)	Major adverse	Scenario 3
A6 Piccadilly (between B6181 Ducie Street and Paton Street)	Major adverse	Scenarios 1, 2, 3 and 4
Ducie Street (between B6181 Dale Street and Peak Street)	Major adverse	Utilities scenario and scenarios 1, 2 and 3
Fountain Street (between Booth Street and Spring Gardens)	Minor adverse	Utilities scenario
A6 Piccadilly (between Paton Street and Chatham Street)	Moderate adverse	Scenario 2
Every Street (between A665 Great Ancoats Street and Carruthers Street)	Moderate beneficial	Scenario 2
B6181 Dale Street (between B6181 Ducie Street and Paton Street)	Moderate beneficial	Utilities scenario and scenarios 2 and 3

Road name	Significant effect	Construction scenario
Paton Street (between B6181 Dale Street and A6 Piccadilly)	Major adverse	Scenarios 1, 3 and 4
A6 Piccadilly (between Chatham Street and A62 Newton Street)	Major adverse	Scenario 2
B6181 Dale Street (between Paton Street and Port Street)	Moderate beneficial	Utilities scenario and scenario 2
Fountain Street (between Spring Gardens and York Street)	Moderate adverse	Utilities scenario and scenarios 2 and 3
Ducie Street (between B6181 Dale Street and Peak Street)	Moderate beneficial	Scenario 4
Ducie Street (between A665 Great Ancoats Street and Peak Street)	Major adverse	Scenarios 1, 2 and 3
Gumey Street (between Palmerston Street and Every Street)	Major adverse	Scenarios 2 and 3
A62 Newton Street (between A6 Piccadilly and B6181 Dale Street)	Moderate adverse	Scenarios 2 and 4
Laystall Street (between Tariff Street and A665 Great Ancoats Street)	Minor adverse	Scenario 1
Every Street (between Carruthers Street and Gurney Street)	Moderate beneficial	Scenario 2
B6181 Dale Street (between A62 Newton Street and Port Street)	Minor beneficial	Scenario 2
Tariff Street (between Brewer Street and Laystall Street)	Moderate adverse	Scenario 1
Carruthers Street (between A662 Pollard Street and Every Street)	Major adverse	Utilities scenario
Port Street (between B6181 Dale Street and Hilton Street)	Moderate adverse	Scenarios 1, 2 and 4
A662 Pollard Street (between Munday Street and Carruthers Street)	Minor beneficial	Utilities scenario
A6 Dale Street (between A62 Lever Street and Newton Street)	Minor beneficial	Utilities scenario
Southgate (between King Street West and Back South Parade)	Minor adverse	Scenario 2
Hilton Street (between A62 Newton Street and Port Street)	Minor beneficial	Utilities scenario
Old Mill Street (between A665 Great Ancoats Street and Carruthers Street)	Moderate beneficial	Scenario 3
Every Street (between Gurney Street and A662 Merrill Street)	Moderate beneficial	Scenario 2
Back South Parade (between St. Mary's Parsonage and Southgate)	Moderate adverse	Scenario 2
A62 Lever Street (between Dale Street and Stevenson Square)	Moderate adverse	Utilities scenario
Hilton Street/Stevenson Square (between A62 Lever Street and A62 Newton Street)	Minor beneficial	Utilities scenario
A662 Merrill Street (between Carruthers Street and Every Street)	Minor beneficial	Utilities scenario and scenarios 3 and 4
A62 Lever Street (between Stevenson Square and A665 Great Ancoats Street)	Moderate adverse	Utilities scenario
Hilton Street (between Oldham Street and A62 Lever Street)	Minor beneficial	Utilities scenario
Port Street (between Hilton Street and A665 Great Ancoats Street)	Moderate adverse	Scenario 3
Carruthers Street (between Old Mill Street and A662 Pollard Street)	Moderate beneficial	Scenario 2
Red Lion Street (between A6 Church Street and Turner Street)	Minor adverse	Utilities scenario
Hilton Street (between Tib Street and Oldham Street)	Minor beneficial	Utilities scenario
Turner Street (between Red Lion Street and John Street)	Minor adverse	Utilities scenario
John Street (between Turner Street and Thomas Street)	Minor adverse	Utilities scenario
Old Mill Street (between Carruthers Street and Butler Street)	Moderate beneficial	Scenarios 2 and 3

Road name	Significant effect	Construction scenario
Tib Street (between A665 Swan Street and Thomas Street)	Moderate adverse	Utilities scenario and scenarios 2, 3 and 4
Cambrian Street (between Phillips Park Road and Bradford Road)	Moderate adverse	Scenario 2
Bradford Road (between Cambrian Street and Butler Street)	Moderate beneficial	Scenario 2

Table 39: Roads with changes in daily HGV movements (more than 30%) resulting in significant effects on traffic-related severance for non-motorised users, 2030

Road name	Significant effect	Construction scenario
A34 Upper Brook Street (between Grafton Street and A5184 Plymouth Grove)	Moderate adverse	Scenarios 1 and 2
A34 Upper Brook Street (between A5184 Plymouth Grove and Brunswick Street)	Moderate adverse	Scenarios 1 and 2
A34 Upper Brook Street (between Brunswick Street and Booth Street East)	Moderate adverse	Scenarios 1 and 2
A34 Upper Brook Street (between Booth Street East and Grosvenor Street)	Moderate adverse	Scenario 2
Grosvenor Street (between A6 Downing Street and A34 Brook Street)	Moderate beneficial	Utilities scenario and scenarios 1, 2 and 3
Mancunian Way (between A34 Brook Street and Sackville Street)	Major adverse	Scenarios 1 and 2
A635 Fairfield Street diversion (between A635 Ashton Old Road realignment and A665 Chancellor Lane diversion)	Major adverse	Scenarios 3 and 4
A635 Ashton Old Road (between A665 Chancellor Lane and A665 Midland Street)	Moderate adverse	Scenario 1
Travis Street (between B6469 Fairfield Street and A6 London Road)	Minor beneficial	Scenarios 1 and 3
A665 Pin Mill Brow (between A665 Great Ancoats Street and A635 Fairfield Street)	Major adverse	Scenario 1
A635 Mancunian Way northbound realignment (between A635 Fairfield Street diversion and A665 Pin Mill Brow realignment)	Major adverse	Scenario 1
St. Andrew's Street diversion (between B6469 Fairfield Street diversion and Helmet Street)	Major adverse	Scenario 4
Helmet Street (between St. Andrew's Street diversion and A665 Great Ancoats Street)	Moderate adverse	Scenarios 2 and 3
Adair Street (between New Sheffield Street and Station Car Park Access)	Moderate adverse	Utilities scenario
Adair Street (between Station Car Park Access and St. Andrew's Square)	Major adverse	Utilities scenario and scenarios 1, 2 and 3
A665 Great Ancoats Street (between Helmet Street and Every Street)	Moderate adverse	Scenario 1
Store Street (between New Sheffield Street and Boad Street)	Major adverse	Utilities scenario and scenarios 1, 2 and 3
A665 Great Ancoats Street (between Every Street and Adair Street)	Moderate adverse	Scenarios 1, 2, 3 and 4
Adair Street (between St Andrew's Square and A665 Great Ancoats Street)	Major adverse	Scenarios 1, 2, 3 and 4

Road name	Significant effect	Construction scenario
Chapeltown Street (between Sparkle Street and A665 Great Ancoats Street)	Major adverse	Scenario 3
B6181 Ducie Street (between A6 London Road and New Sheffield Street)	Moderate adverse	Scenarios 1, 2, 3 and 4
B6181 Ducie Street (between New Sheffield Street and B6181 Dale Street)	Major adverse	Scenario 4
Ducie Street (between B6181 Dale Street and Peak Street)	Major adverse	Scenarios 1 and 3
B6181 Dale Street (between B6181 Ducie Street and Paton Street)	Moderate adverse	Scenario 4
Ducie Street (between A665 Great Ancoats Street and Peak Street)	Major adverse	Scenario 1
A662 Pollard Street (between Munday Street and Carruthers Street)	Major adverse	Scenarios 1 and 2
A662 Merrill Street (between Carruthers Street and Every Street)	Moderate adverse	Scenarios 1 and 2

14.4.31 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

14.4.32 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

14.4.33 The Proposed Scheme will have impacts on parking in the local area. This is likely to result in the following effects, which are significant:

- a customer car park for a furniture retailer on the A665 Great Ancoats Street – major adverse effect as a result of the temporary loss of 38 off-street spaces including two blue badge bays for a period of two years during construction; and
- Manchester Piccadilly Station parking at Manchester Piccadilly Station multi-storey car park, Network Rail Ramp, Network Rail undercroft and Gateway House car park – major adverse effect due to the increased journey length of up to 775m associated with diversions to pedestrian routes during construction. All spaces will be affected, including 39 blue badge bays. An accessible motorised link will be provided to mitigate the increase in journey length.

14.4.34 HS2 Ltd will work with the businesses affected to identify opportunities where reasonably practicable to mitigate effects on parking.

14.4.35 Permanent loss of parking is reported under the operational assessment.

Public transport network

14.4.36 Construction of the Proposed Scheme will require temporary bus route diversions and traffic management, with consequential changes in journey times and the need to relocate bus stops. However, the impact of these bus route changes and diversions will not result in significant effects in the Manchester Piccadilly Station area.

14.4.37 There will, however, be impacts for bus passengers on routes into Manchester City Centre operating on the A635 Ashton Old Road, A6 Stockport Road and A57 Hyde Road in the adjacent Davenport Green to Ardwick area (MA07). Effects for bus passengers on these routes are discussed in Volume 2: Community Area report: Davenport Green to Ardwick (MA07), Section 14.4.

14.4.38 There will be impacts for passengers on the Metrolink Ashton Line. This is associated with the temporary closure of the line and the partial temporary closure of the Piccadilly Metrolink stop for a period of two years to enable the relocation and extension of the Piccadilly Metrolink stop beneath Manchester Piccadilly High Speed station. A replacement bus service will be in place during this period. This will result in a major adverse effect, which is significant.

14.4.39 The replacement bus service will call at bus stops close to the majority of the existing stops on the Metrolink Ashton Line. However, users of the Piccadilly Metrolink stop (on the Ashton Line only) will be required to board and alight the service at Piccadilly Gardens with an increase in journey length of up to 700m. This will result in a major adverse effect, which is significant, on passengers who board and alight at the Piccadilly Metrolink stop and passengers who interchange with National Rail services. Access to the Piccadilly Metrolink stop will be maintained for passengers from the west on the Eccles Line, however trams will turn back at Piccadilly until the new Piccadilly Metrolink stop becomes fully functional.

14.4.40 There are interfaces with the existing rail network in this area, in particular on the operation of the Crewe to Manchester Line, Glossop Line, and Liverpool to Manchester Line and its passenger and rail freight services.

14.4.41 However, rail possessions will have little or no impact on the operation of rail services as they will be relatively minor localised works, such as work on and adjacent to track when not in use.

14.4.42 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).

14.4.43 Throughout the construction period passenger circulation between platforms and the concourse within the existing Manchester Piccadilly Station will be affected. The proposed phasing of construction works will allow the majority of interchange routes and surface connections to be maintained. However, during construction, there will be an increase in journey length of more than 100m between the existing Manchester Piccadilly Station and parking at Manchester Piccadilly Station multi-storey car park Network Rail Ramp, Network

Rail undercroft and Gateway House car park. The effect of this increase in journey length is reported under Parking and Loading. An accessible motorised link will be provided to help mitigate the increase in journey length during construction.

Non-motorised users

14.4.44 The construction works associated with the Proposed Scheme will require the temporary closure, diversion or realignment of 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.

14.4.45 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 footway and road realignments or diversions at:

- A635 Fairfield Street and B6469 Fairfield Street – minor adverse effect from increase in journey length of up to 171m;
- A635 Mancunian Way southbound – minor adverse effect from increase in journey length of up to 220m;
- Travis Street – major adverse effect from increase in journey length of up to 1km;
- Hoyle Street – moderate adverse effect from increase in journey length of up to 344m;
- Betley Street – minor adverse effect from increase in journey length of up to 173m;
- Chapeltown Street – major adverse effect from increase in journey length of up to 736m;
- Helmet Street – moderate adverse effect from increase in journey length of up to 311m;
- Adair Street – major adverse effect from increase in journey length of up to 695m;
- River Street – minor adverse effect from increase in journey length of up to 139m;
- Store Street – major adverse effect from increase in journey length of up to 1.3km;
- Jutland Street – major adverse effect from increase in journey length of up to 829m;
- Ducie Street – major adverse effect from increase in journey length of up to 516m; and
- Dale Street – major adverse effect from increase in journey length of up to 265m.

14.4.46 Permanent diversions to roads are reported under the operational assessment.

Permanent effects

14.4.47 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

14.4.48 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.

14.4.49 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

14.4.50 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.

14.4.51 Temporary diversions or realignments will result in changes to journey lengths for vehicle occupants, which will result in moderate adverse effects on three roads, which are significant.

14.4.52 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 32 junctions;
- moderate adverse effects at nine junctions;
- minor adverse effects at 23 junctions;
- moderate beneficial effect at three junctions; and
- minor beneficial effects at four junctions.

14.4.53 Changes in traffic during the construction period will result in the following temporary effects, which are significant, on traffic-related severance for non-motorised users:

- major adverse effects on 20 roads;
- moderate adverse effects on 26 roads;
- minor adverse effects on seven roads;
- major beneficial effects on two roads;
- moderate beneficial effects on 22 roads; and
- minor beneficial effects on 12 roads.

14.4.54 There will be a temporary major adverse significant effect on users of one Metrolink line associated with its temporary closure and replacement bus service.

14.4.55 There will also be a temporary major adverse significant effect on users of one public transport interchange due to an increase in journey length.

14.4.56 The loss of parking during the construction period will result in temporary major adverse effects, which are significant, at a number of locations in the vicinity of Manchester Piccadilly Station and at one other location. Changes in journey length for non-motorised users during the construction period will result in the following temporary effects, which are significant:

- major adverse effects on users of seven roads;
- moderate adverse effects on users of two roads; and
- minor adverse effects on users of four roads.

Cumulative effects

14.4.57 The assessment includes the cumulative effects of planned and committed development during construction by taking this into account within the background traffic growth.

14.4.58 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 design of the Manchester Piccadilly High Speed station will avoid or reduce impacts on transport users through the following measures:

- provision of sufficient concourse and platform space to accommodate growth in rail passenger demand up to 2046, allowing for additional loading of train services and for growth beyond 2046, including passive provision and capacity for Northern Powerhouse Rail (NPR);
- provision for access by sustainable modes, such as walking and cycling to promote non-car access, including new pedestrian access, a new cycleway along New Sheffield Street and provision of bicycle parking spaces;
- provision of dedicated taxi, private hire vehicle and private vehicle drop-off facilities on New Sheffield Street and pick-up facilities at both New Sheffield Street and dedicated taxi, private hire vehicle and private vehicle pick-up in the multi-modal transport hub (accessed via the B6469 Fairfield Street/Travis Street);
- provision of two new multi-storey car parks on Adair Street;
- changes to the highway network to provide access to Manchester Piccadilly High Speed station from New Sheffield Street and the multi-modal transport hub from the B6469 Fairfield Street/Travis Street;

- changes to the public transport network to provide electric shuttle bus stops on New Sheffield Street and space provided for a bus/coach interchange facility at the multi-modal transport hub; and
- improved access to Metrolink services including relocation of Piccadilly Metrolink stop beneath Manchester Piccadilly High Speed station and provision for a new Metrolink stop immediately south-east of the Manchester Piccadilly High Speed station, called Piccadilly Central.

14.5.3 In addition, the following measures have been included in the area around the station:

- reinstatement of roads on or close to their existing alignments, where reasonably practicable;
- replacement, diversion or realignment of roadside footways; and
- the introduction of a gyratory system between the A635 Mancunian Way, the A635 Fairfield Street, the A665 Pin Mill Brow and the A665 Chancellor Lane, to be known as the A635/A665 Pin Mill Brow gyratory.

14.5.4 A station travel plan for Manchester Piccadilly High Speed station will be developed and will include measures that aim to reduce the impacts and effects of traffic and transport movements.

Assessment of impacts and effects

14.5.5 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

14.5.6 The assessment takes account of all of the impacts of the Proposed Scheme in the Manchester Piccadilly Station area. The main impacts of the operation of the Proposed Scheme can be summarised as:

- improved journey times between Manchester, the Midlands and the south of England, increases to rail capacity, reduced pressure and lower crowding on the conventional rail network and improved Metrolink facilities; and
- impacts on the highway and public transport networks within this area due to increased rail users and traffic associated with the Manchester Piccadilly High Speed station. However, the maintenance of the Proposed Scheme will generate limited vehicular trips and their effect will not be significant.

14.5.7 The operational impacts will, therefore, primarily relate to the improved public transport provision together with changes to traffic due to highway changes and traffic associated with passenger access to Manchester Piccadilly High Speed station and the permanent diversion, realignment and stopping up of roads. This includes the introduction of a new gyratory system, known as the A635/A665 Pin Mill Brow Gyratory, and access to Manchester Piccadilly High Speed station.

Public transport network

14.5.8 The design of the Proposed Scheme and its operation will create a number of beneficial effects, which are significant. These are:

- the increase in rail capacity resulting from the introduction of HS2 services at Manchester Piccadilly High Speed station, which represents a major beneficial effect;
- substantially improved journey times between Manchester, the Midlands and the south of England, as detailed in Volume 1, which is a major beneficial effect; and
- released capacity on the existing rail network easing pressure and reducing crowding on other passenger rail services creating major beneficial effects to other rail users and potentially freeing up space on the rail network for freight.

14.5.9 Annual HS2 passenger use of Manchester Piccadilly High Speed station in 2038 and 2046 is forecast to be 11.1 million passengers in 2038, increasing to 11.8 million in 2046. Forecast use of the Manchester Piccadilly High Speed station, as set out in Table 40, Table 41, and Table 42 for daily, morning peak and evening peak periods respectively, is summarised as:

- with the introduction of the Proposed Scheme in 2038, total HS2 passengers during the morning peak period will be 3,268 passengers. Total long-distance rail passengers will increase from 5,241 to 6,823 passengers (30% increase) compared with the 2038 future baseline, and total rail passengers will increase from 11,611 to 13,286 (14% increase). Total HS2 passengers during the evening peak period will be 3,755 passengers in 2038. Total long-distance rail passengers will increase from 6,027 to 7,843 passengers (30% increase) compared with the 2038 future baseline, and total rail passengers will increase from 13,341 to 15,267 (14% increase); and
- by 2046, total HS2 passengers during the morning peak period will be 3,475 passengers. Total long-distance rail passengers will increase from 5,458 to 7,172 passengers (31% increase) compared with the 2046 future baseline, and total rail passengers will increase from 11,901 to 13,705 (15% increase). Total HS2 passengers during the evening peak period will be 3,993 passengers in 2046. Total long-distance rail passengers will increase from 6,276 to 8,243 passengers (31% increase) compared with the 2046 future baseline and total rail passengers will increase from 13,675 to 15,749 (15% increase).

Table 40: Daily rail passengers – future baseline and Proposed Scheme

Type	Boarding, alighting or total	2038 Baseline	2038 Proposed Scheme	Difference %	2046 Baseline	2046 Proposed Scheme	Difference %
Long distance rail: HS2	Boarding	-	17,573	-	-	18,694	-
Long distance rail: HS2	Alighting	-	17,589	-	-	18,696	-
Long distance rail: HS2	**Total**	**-**	**35,162**	**-**	**-**	**37,390**	**-**
Long distance rail: other	Boarding	28,435	19,273	-32%	29,617	20,034	-32%

Type	Boarding, alighting or total	2038 Baseline	2038 Proposed Scheme	Difference %	2046 Baseline	2046 Proposed Scheme	Difference %
Long distance rail: other	Alighting	27,986	18,994	-32%	29,139	19,757	-32%
Long distance rail: other	**Total**	**56,421**	**38,268**	**-32%**	**58,756**	**39,792**	**-32%**
Total long distance rail	**Total**	**56,421**	**73,430**	**30%**	**58,756**	**77,182**	**31%**
Suburban rail	Boarding	34,080	34,746	2%	34,458	35,131	2%
Suburban rail	Alighting	34,435	34,785	1%	34,840	35,160	1%
Suburban rail	**Total**	**68,514**	**69,532**	**1%**	**69,299**	**70,291**	**1%**
Total rail	Boarding	62,515	71,593	15%	64,076	73,860	15%
Total rail	Alighting	62,421	71,369	14%	63,979	73,613	15%
Total rail	**Total**	**124,936**	**142,961**	**14%**	**128,055**	**147,473**	**15%**

Table 41: Morning peak hour (08:00-09:00) rail passengers – future baseline and Proposed Scheme

Type	Boarding, alighting or total	2038 Baseline	2038 Proposed Scheme	Difference %	2046 Baseline	2046 Proposed Scheme	Difference %
Long distance rail: HS2	Boarding	-	1,539	-	-	1,638	-
Long distance rail: HS2	Alighting	-	1,729	-	-	1,837	-
Long distance rail: HS2	**Total**	**-**	**3,268**	**-**	**-**	**3,475**	**-**
Long distance rail: other	Boarding	2,491	1,688	-32%	2,594	1,755	-32%
Long distance rail: other	Alighting	2,751	1,867	-32%	2,864	1,942	-32%
Long distance rail: other	**Total**	**5,241**	**3,555**	**-32%**	**5,458**	**3,697**	**-32%**
Total long distance rail	**Total**	**5,241**	**6,823**	**30%**	**5,458**	**7,172**	**31%**
Suburban rail	Boarding	2,985	3,044	2%	3,018	3,077	2%
Suburban rail	Alighting	3,384	3,419	1%	3,424	3,456	1%
Suburban rail	**Total**	**6,370**	**6,462**	**1%**	**6,443**	**6,533**	**1%**
Total rail	Boarding	5,476	6,271	15%	5,613	6,470	15%
Total rail	Alighting	6,135	7,014	14%	6,288	7,235	15%
Total rail	**Total**	**11,611**	**13,286**	**14%**	**11,901**	**13,705**	**15%**

Table 42: Evening peak hour (17:00-18:00) rail passengers – future baseline and Proposed Scheme

Type	Boarding, alighting or total	2038 Baseline	2038 Proposed Scheme	Difference %	2046 Baseline	2046 Proposed Scheme	Difference %
Long distance rail: HS2	Boarding	-	1,946	-	-	2,070	-
Long distance rail: HS2	Alighting	-	1,809	-	-	1,923	-
Long distance rail: HS2	**Total**	**-**	**3,755**	**-**	**-**	**3,993**	**-**
Long distance rail: other	Boarding	3,148	2,134	-32%	3,279	2,218	-32%
Long distance rail: other	Alighting	2,879	1,954	-32%	2,997	2,032	-32%
Long distance rail: other	**Total**	**6,027**	**4,088**	**-32%**	**6,276**	**4,250**	**-32%**
Total long distance rail	**Total**	**6,027**	**7,843**	**30%**	**6,276**	**8,243**	**31%**
Suburban rail	Boarding	3,773	3,847	2%	3,815	3,889	2%
Suburban rail	Alighting	3,542	3,578	1%	3,584	3,616	1%
Suburban rail	**Total**	**7,315**	**7,425**	**2%**	**7,398**	**7,506**	**1%**
Total rail	Boarding	6,921	7,926	15%	7,094	8,177	15%
Total rail	Alighting	6,420	7,341	14%	6,581	7,572	15%
Total rail	**Total**	**13,341**	**15,267**	**14%**	**13,675**	**15,749**	**15%**

14.5.10 The forecast onward mode share for HS2 passengers in 2038 and 2046 is set out in Table 43.

Table 43: HS2 Onward mode share

Mode	Mode share % alighting from trains. AM peak hour (08:00-09:00)	Mode share % boarding trains. AM peak hour (08:00-09:00)	Mode share % alighting from trains. PM peak hour (17:00-18:00)	Mode share % boarding trains. PM peak hour (17:00-18:00)
Bus	5%	6%	6%	5%
Suburban rail	22%	31%	31%	22%
Metrolink	12%	18%	18%	12%
Taxi	15%	14%	14%	15%
Private car (park and ride)	1%	12%	12%	1%
Private car (kiss and ride)	15%	10%	10%	15%
Walk/cycle	29%	9%	9%	29%

14.5.11 Table 43 indicates that the largest onward mode share for passengers boarding in the AM peak and alighting in the PM peak is local rail, whilst walk/cycle is the largest for passengers alighting in the AM peak and boarding in the PM peak.

14.5.12 The Proposed Scheme includes provision for improved bus access, including bus stops along New Sheffield Street. It is expected that as a result of the Proposed Scheme use of buses will

increase but that bus operators will adjust their services to match this change in demand therefore the impact will not result in significant effects.

14.5.13 The operation of the Proposed Scheme in the Manchester Piccadilly Station area will result in the permanent re-routing of several bus routes due to the introduction of the A635/A665 Pin Mill Brow gyratory, the diversion of the B6469 Fairfield Street and the permanent closure of Travis Street. However, the impact of these bus route changes and diversions will not result in significant effects in the Manchester Piccadilly Station area.

14.5.14 There will, however, be impacts for bus passengers on routes into Manchester City Centre operating on the A635 Ashton Old Road, A6 Stockport Road and A57 Hyde Road in the adjacent Davenport Green to Ardwick area (MA07). Effects for bus passengers on these routes are discussed in Volume 2, Community Area report: Davenport Green to Ardwick (MA07), Section 14.5.

14.5.15 Demand for taxis, private hire and private vehicles will increase as a result of the operation of the Proposed Scheme. The Proposed Scheme includes the provision of enhanced taxi, private hire and private vehicle facilities to accommodate the forecast use of these access modes and there will be no significant effects arising from the increased use.

Highway network

Strategic and local highway network

14.5.16 The Proposed Scheme will involve the remodelling of the road network around the A635/A665 Pin Mill Brow gyratory, which will require the permanent widening, diversion, closure or realignment of:

- A635 Ashton Old Road – permanent realignment of a 150m section of the A635 Ashton Old Road to accommodate the closure of the northern section of the A665 Chancellor Lane and the diverted A635 Fairfield Street. The realigned A635 Ashton Old Road will tie in with the realigned A665 Pin Mill Brow, increasing journey length by up to 392m;
- A665 Chancellor Lane – permanent diversion of the A665 Chancellor Lane, 70m north-west of its current alignment for 210m, increasing journey length by up to 436m;
- A635 Mancunian Way (northbound) – permanent realignment of a 307m section of the A635 Mancunian Way northbound carriageway, within the footprint of the existing road, resulting in a negligible change in journey length;
- A635 Mancunian Way (southbound) – permanent realignment of the southbound carriageway of the A635 Mancunian Way, 100m north-west of its current alignment for 200m to form the western side of the A635/A665 Pin Mill Brow gyratory. The realigned A635 Mancunian Way will tie in with the realigned A665 Pin Mill Brow and the junction between the diverted B6469 Fairfield Street and the diverted A665 Chancellor Lane, resulting in a negligible change in journey length;
- A665 Pin Mill Brow – permanent realignment of a 300m section of the A665 Pin Mill Brow at its southern extent to accommodate the closure of the A665 Chancellor Lane and

diverted A635 Fairfield Street. The realigned A665 Pin Mill Brow will be within the existing carriageway and will tie in with the diverted A635 Fairfield Street, the realigned A635 Ashton Old Road and the realigned A635 Mancunian Way, increasing journey length by up to 394m;

- A635 Fairfield Street – permanent diversion of the A635 Fairfield Street, 200m south of its current alignment for 590m. The diverted A635 Fairfield Street will tie in with the diverted A665 Chancellor Lane, increasing journey length by up to 151m; and
- B6469 Fairfield Street – permanent diversion up to 85m south-east of its current alignment for 245m. The diverted B6469 Fairfield Street will tie in with the realigned A635 Mancunian Way, increasing journey length by up to 121m.

14.5.17 In addition, the Proposed Scheme will require the permanent widening, diversion, closure or realignment of (ordered by road class from south to north):

- A665 Great Ancoats Street – permanent realignment of the A665 Great Ancoats Street at its junction with Adair Street to facilitate junction improvements. The junction with the A665 Great Ancoats Street will be changed to an all movement traffic signal-controlled junction, resulting in no change in journey length;
- A6 London Road – permanent realignment of the A6 London Road at the junction with Ducie Street to facilitate junction improvements and accommodate the realignment of Ducie Street resulting in no change in journey length;
- Helmet Street – permanent closure of a 100m section of Helmet Street at the southern extent between New Sheffield Street and St. Andrew's Street. A short section of Helmet Street will be realigned to form a new junction with New Sheffield Street, resulting in a negligible change in journey length;
- St. Andrew's Street – permanent diversion of St. Andrew's Street, 100m east of its current alignment for 260m, and forming part of New Sheffield Street, resulting in a negligible change in journey length;
- Travis Street – permanent closure of a 215m section of Travis Street between the junction with the diverted B6469 Fairfield Street and New Sheffield Street, increasing journey length by up to 457m;
- Sheffield Street – diversion of Sheffield Street, 70m north of its current alignment for 886m onto New Sheffield Street, which will connect to Ducie Street, Helmet Street, Travis Street, Chapeltown Street and Store Street, immediately north of Manchester Piccadilly High Speed station, resulting in a negligible change in journey length ;
- Baird Street – permanent closure of a 105m section of Baird Street at the southern end between the junction with Sheffield Street to where it will be crossed by New Sheffield Street. Access to the northern section of Baird Street will be retained via Congou Street, resulting in a negligible change in journey length;
- Boad Street – diversion of Boad Street, 60m to the north-east, to run parallel and north of the Manchester Piccadilly High Speed station, forming part of New Sheffield Street and resulting in a negligible change in journey length;

- Store Street – closure of an 85m section of Store Street at the southern end between the A6 London Road and Boad Street. Store Street will be realigned to facilitate connection to New Sheffield Street, and will be retained as a one-way exit from New Sheffield Street, providing access to the A665 Great Ancoats Street, increasing journey length by up to 217m;
- St. Andrew's Square – permanent closure of a 26m section of St. Andrew's Square at the southern end. St. Andrew's Square will join onto New Sheffield Street. It will form part of the gyratory system that provides access to the new car parks and will become one-way northbound between New Sheffield Street and Adair Street, resulting in a negligible change in journey length;
- Adair Street – will join onto New Sheffield Street and will form part of the gyratory system that provides access to the new car parks. Adair Street will become one-way southbound between St. Andrew's Square and New Sheffield Street, resulting in a negligible change in journey length;
- Chapeltown Street – permanent realignment of an 85m section at the south-western end and junction improvements with New Sheffield Street to enable access between the two streets. Chapeltown Street will become one-way southbound at its southern end. Traffic will be diverted via New Sheffield Street and the diverted Store Street, increasing journey length by 101m;
- Ducie Street – permanent realignment of a 100m section at the western extent to accommodate the construction of a new junction with New Sheffield Street. There will be no change in journey length;
- Mellor Street – closed as a public highway and will form part of the new access road to the Network Rail maintenance compound. There will be no change in journey length;
- Union Street – permanent closure of a 10m section of Union Street at the northern extent to enable construction of the new link road between the A635 Mancunian Way and A665 Chancellor Lane, resulting in a negligible change in journey length; and
- permanent closure of Cresbury Street, Dark Lane, William Street, Mill Green Street, Adlington Street, North Western Street, Crane Street, Coronation Square, Blackett Street, Elbe Street, Raven Street, Sparkle Street and Leycroft Street. The units that are served by these roads will also be removed, therefore, there will be no change in journey length.

14.5.18 The permanent diversions or realignments will change journey length for vehicle occupants. However, all 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.

14.5.19 The operation of Manchester Piccadilly High Speed station will lead to changes to traffic levels in the Manchester Piccadilly Station area due to passengers accessing the station, particularly by car or taxi.

14.5.20 The diversion of traffic associated with highway changes, including the new A635/A665 Pin Mill Brow gyratory and closure of 20 roads, combined with changes in traffic due to passengers and staff accessing Manchester Piccadilly High Speed station will lead to flow

changes on the highway network. This will result in changes to congestion and delays at junctions. The junctions with changes in delay in 2038, which are significant, will be:

- A6 Stockport Road/A6 Ardwick Green South/A57 Hyde Road - minor adverse effect;
- A57 (M) Mancunian Way/A5103 Princess Road/A5103 Medlock Street - moderate adverse effect;
- A57 (M) Mancunian Way/A56 Chester Road/A5067 Chorlton Road (Deansgate Interchange) - moderate adverse effect;
- A665 Chancellor Lane diversion/A665 Midland Street - major adverse effect;
- A635 Mancunian Way/Hoyle Street - major adverse effect;
- A665 Chancellor Lane diversion/A635 Mancunian Way Southbound realignment/A635 Fairfield Street diversion - major adverse effect;
- A635 Mancunian Way/B6469 Fairfield Street diversion/A635 Mancunian Way Northbound realignment - major adverse effect;
- A34 Oxford Street/B6469 Whitworth Street West/B6469 Whitworth Street - moderate adverse effect;
- A665 Pin Mill Brow realignment/A635 Ashton Old Road realignment/A635 Mancunian Way Southbound realignment - major adverse effect;
- B6469 Fairfield Street/Travis Street - major adverse effect;
- A665 Pin Mill Brow realignment/A635 Mancunian Way Northbound realignment - major adverse effect;
- A6 London Road/B6469 Fairfield Street - moderate adverse effect;
- New Sheffield Street/Adair Street realignment - major adverse effect;
- A6 London Road/A6 Whitworth Street/Store Street/Tram Crossing - major adverse effect;
- A665 Great Ancoats Street/Every Street - major adverse effect;
- A665 Great Ancoats Street/Adair Street - major adverse effect;
- A6 Piccadilly/A6 London Road/B6181 Ducie Street/Auburn Street - major adverse effect;
- A34 Quay Street/Lower Byrom Street/Gartside Street - minor adverse effect;
- A34 New Quay Street/A34 Quay Street/B5225 Quay Street/Gartside Street - moderate adverse effect;
- B6181 Dale Street/B6181 Ducie Street - major adverse effect;
- A665 Great Ancoats Street/A662 Pollard Street/Chapeltown Street - major adverse effect;
- A34 Bridge Street/St Mary's Parsonage - minor adverse effect;
- A6 Crescent/A6 Chapel Street/A5066 Adelphi Street/A5066 Oldfield Road - major adverse effect;
- A6042 Trinity Way/A6 Chapel Street/A34 Trinity Way - major adverse effect;
- A6 Chapel Street/St Stephen Street - major adverse effect;
- A6 Chapel Street/New Bailey Street - major adverse effect;
- A6 Blackfriars Street/Parsonage - major adverse effect;

- A56 Chapel Street/A56 Victoria Bridge Street - moderate adverse effect;
- A6042 Trinity Way/A6041 Blackfriars Road - minor adverse effect;
- A665 Miller Street/A664 Corporation Street/Corporation Street - minor adverse effect;
- A576 Eccles Old Road/A5186 Langworthy Road - major adverse effect;
- A56 Bury New Road/Sherborne Street - moderate adverse effect;
- B6186 Frederick Road/Seaford Road/Broughton Road East - minor adverse effect;
- A56 Bury New Road/B6180 Waterloo Road - minor adverse effect;
- A56 New Bury Road/Waterloo Road/Broughton Lane - moderate adverse effect;
- B6186 Camp Street/B6186 Fredrick Road/Lower Broughton Road - minor adverse effect;
- A5066 Great Clowes Street/B6186 Camp Street/B6187 Great Clowes Street/B6186 Upper Camp Street - moderate adverse effect;
- A576 Great Cheetham Street West/A5066 Great Clowes Street/B6187 Great Clowest Street - moderate adverse effect; and
- A572 Worsley Road/B5231 Folly Lane - minor adverse effect.

14.5.21 The junctions with changes in delay in 2046, which are significant, will be:

- A6 Stockport Road/A6 Ardwick Green South/A57 Hyde Road - minor adverse effect;
- A57 (M) Mancunian Way/A56 Chester Road/A5067 Chorlton Road (Deansgate Interchange) - minor beneficial effect;
- A665 Chancellor Lane diversion/A665 Midland Street - major adverse effect;
- A5103 Albion Street/A5103 Medlock Street/City Road East - minor adverse effect;
- A635 Mancunian Way/Hoyle Street - major adverse effect;
- A665 Chancellor Lane diversion/A635 Mancunian Way Southbound realignment/A635 Fairfield Street diversion - major adverse effect;
- A635 Mancunian Way/B6469 Fairfield Street diversion/A635 Mancunian Way Northbound realignment - major adverse effect;
- A34 Oxford Street/B6469 Whitworth Street West/B6469 Whitworth Street - moderate beneficial effect;
- A5103 Albion Street/A5103 Lower Mosley Street/Great Bridgewater Street - minor beneficial effect;
- A665 Pin Mill Brow realignment/A635 Ashton Old Road realignment/A635 Mancunian Way Southbound realignment - minor adverse effect;
- B6469 Fairfield Street/Travis Street - major adverse effect;
- A665 Pin Mill Brow realignment/A635 Mancunian Way Northbound realignment - minor adverse effect;
- A34 Oxford Street/A5103 Portland Street/A5103 Chepstow Street - minor adverse effect;
- A6 London Road/B6469 Fairfield Street - moderate adverse effect;
- A34 Princess Street/Bloom Street - major adverse effect;
- New Sheffield Street/Adair Street realignment - major adverse effect;

- A6 London Road/A6 Whitworth Street/Store Street/Tram Crossing - major adverse effect;
- A665 Great Ancoats Street/Every Street - major adverse effect;
- A665 Great Ancoats Street/Adair Street - major adverse effect;
- A6 Piccadilly/A6 London Road/B6181 Ducie Street/Auburn Street - major adverse effect;
- A34 Quay Street/Lower Byrom Street/Gartside Street - minor adverse effect;
- B6181 Dale Street/B6181 Ducie Street - major adverse effect;
- A665 Great Ancoats Street/A662 Pollard Street/Chapeltown Street - major adverse effect;
- M602 junction 3/A57 Regent Road/A57 Eccles New Road/A5063 Albion Way/A5063 Trafford Road - major adverse effect;
- A5066 Oldfield Road/Liverpool Street/Middlewood Street - minor adverse effect;
- A34 Bridge Street/St Mary's Parsonage - minor adverse effect;
- A6 Dale Street/A62 Lever Street - minor adverse effect;
- A6 Crescent/A6 Chapel Street/A5066 Adelphi Street/A5066 Oldfield Road - moderate adverse effect;
- A6042 Trinity Way/A6 Chapel Street/A34 Trinity Way - major adverse effect;
- A6 Chapel Street/St Stephen Street - major adverse effect;
- A6 Chapel Street/New Bailey Street - major adverse effect;
- A6 Blackfriars Street/Parsonage - moderate adverse effect;
- A6041 Chapel Street/A6 Blackfriars Street/A6 Chapel Street/A6041 Blackfriars Road - major adverse effect;
- A6042 Trinity Way/A6041 Blackfriars Road - minor adverse effect;
- A665 Miller Street/A664 Corporation Street/Corporation Street - minor adverse effect;
- A6 Broad Street/B6186 Frederick Road - minor adverse effect;
- A56 Bury New Road/Sherborne Street - moderate adverse effect;
- A56 Bury New Road/B6180 Waterloo Road - minor adverse effect;
- A56 New Bury Road/Waterloo Road/Broughton Lane - moderate adverse effect;
- A56 Bury Road/Fenney Street/Appian Way - minor adverse effect;
- A576 Great Cheetham Street West/A5066 Great Clowes Street/B6187 Great Clowest Street - major beneficial effect;
- A664 Rochdale Road/Prescot Road/Harpurhey Road - minor beneficial effect; and
- Moor Lane/Littleton Road/Kersal Vale Road - minor adverse effect.

14.5.22 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 are forecast to result in changes in peak hour traffic flow (more than 10% for all vehicles) that will result in changes in pedestrian severance, which are significant, as set out in Table 44. Where there is no significant effect on a road during a particular time period it is represented by a dash.

Table 44: 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
Grafton Street (between A5184 Plymouth Grove and A34 Upper Brook Street)	Minor adverse	-	Minor adverse	-
Dover Street (between B5117 Oxford Road and A34 Upper Brook Street)	-	Major beneficial	-	Major beneficial
Royce Road (between A5067 Chorlton Road and City Road)	-	-	Moderate adverse	-
B5177 Oxford Road (between Booth Street East and Grosvenor Street)	-	-	Moderate adverse	-
Higher Ardwick (between A57 Hyde Road and Ardwick Green North)	Moderate beneficial	-	Moderate beneficial	-
A34 Grosvenor Street (between A34 Brook Street and A34 Oxford Road)	-	Moderate beneficial	-	Major beneficial
Higher Ardwick (between Ardwick Green North and Union Street)	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial
Cambridge Street (between A5103 Mancunian Way and Chester Street)	Moderate adverse	-	-	-
Chester Street (between Cambridge Street and A34 Oxford Road)	Moderate beneficial	-	-	-
Grosvenor Street (between A6 Downing Street and A34 Brook Street)	-	Major beneficial	-	Moderate beneficial
Union Street (between Dark Lane and Higher Ardwick)	Moderate beneficial	Moderate beneficial	Major beneficial	Moderate adverse
Hulme Street (between Lower Chatham Street and Cambridge Street)	Major adverse	-	Moderate adverse	-
A665 Chancellor Lane (between A665 Midland Street and Dark Lane)	Moderate adverse	-	Moderate adverse	-
Sackville Street (between A57(M) Mancunian Way and Charles Street)	-	Moderate beneficial	-	Moderate beneficial
Charles Street (between A34 Princess Street and Sackville Street)	Moderate adverse	-	Moderate adverse	-
A635 Fairfield Street diversion (between A635 Ashton Old Road realignment and A665 Chancellor Lane diversion)	Major adverse	Major adverse	Major adverse	Major adverse
A34 Oxford Street (between B6469 Whitworth Street and A5103 Portland Street)	-	-	Moderate adverse	-
Travis Street (between B6469 Fairfield Street and A6 London Road)	Major adverse	-	Major adverse	-
A6 London Road (between Travis Street and Altrincham Street)	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial
A665 Pin Mill Brow (between A665 Great Ancoats Street and A635 Fairfield Street)	Major adverse	Major adverse	Major adverse	Major adverse
A635 Mancunian Way northbound realignment (between A635 Fairfield Street diversion and A665 Pin Mill Brow realignment)	Major adverse	Major adverse	Major adverse	Major adverse

Road name	2038 AM peak hour	2038 PM peak hour	2046 AM peak hour	2046 PM peak hour
B6469 Whitworth Street (between A34 Princess Street and Sackville Street)	Moderate beneficial	Moderate beneficial	-	Moderate beneficial
B6469 Fairfield Street (between Travis Street and St Andrew's Street diversion)	Major adverse	Major adverse	Major adverse	Major adverse
A6 London Road (between Altrincham Street and B6469 Fairfield Street)	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial
B6469 Fairfield Street (between A6 London Road and Travis Street)	Major beneficial	Major adverse	Major beneficial	Major adverse
B6469 Whitworth Street (between Sackville Street and Chorlton Street)	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial
St. Andrew's Street diversion (between B6469 Fairfield Street diversion and Helmet Street)	Major adverse	Major adverse	Major adverse	Major adverse
Helmet Street (between St. Andrew's Street diversion and A665 Great Ancoats Street)	Moderate adverse	Moderate adverse	Moderate adverse	Moderate adverse
A665 Pin Mill Brow (between Palmerston Street and A635 Mancunian Way)	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial
Bloom Street (between Sackville Street and A34 Princess Street)	-	Moderate adverse	-	Moderate adverse
A6 Aytoun Street (between Chorlton Street and Cobourg Street)	Minor beneficial	-	Minor beneficial	-
Adair Street (between New Sheffield Street and Station Car Park Access)	Moderate adverse	Major beneficial	Major adverse	Major beneficial
A6 London Road (between A6 Whitworth Street and B6469 Fairfield Street)	Major beneficial	-	Major beneficial	-
A6 Aytoun Street (between Cobourg Street and A6 Whitworth Street)	Minor beneficial	-	Minor beneficial	-
Adair Street (between Station Car Park Access and St. Andrew's Square)	Major beneficial	-	Major beneficial	-
Chorlton Street (between B6469 Whitworth Street and Bloom Street)	-	-	Major adverse	-
A665 Great Ancoats Street (between Helmet Street and Every Street)	Moderate beneficial	Moderate beneficial	-	Moderate beneficial
A6 Aytoun Street (between A6 Whitworth Street and Minshull Street)	-	Moderate beneficial	-	Moderate beneficial
St. James Street (between Dickinson Street and A34 Princess Street)	Minor adverse	-	Minor adverse	-
New Sheffield Street (between Adair Street and Chapel Town Street)	Major beneficial	Major adverse	Major beneficial	Major adverse
A6 Aytoun Street (between Minshull Street and Auburn Street)	Moderate beneficial	-	Moderate beneficial	-
Minshull Street (between Bloom Street and A6 Aytoun Street)	Moderate beneficial	-	-	-
Bloom Street (between Minshull Street and Chorlton Street)	Moderate beneficial	-	-	-

Road name	2038 AM peak hour	2038 PM peak hour	2046 AM peak hour	2046 PM peak hour
A6 London Road (between Auburn Street and A6 Whitworth Street)	-	Moderate adverse	-	Moderate adverse
Store Street (between New Sheffield Street and Boad Street)	Minor adverse	Moderate beneficial	Minor adverse	Moderate beneficial
A665 Great Ancoats Street (between Every Street and Adair Street)	-	-	-	Moderate beneficial
George Street (between Nicholas Street and A34 Princess Street)	Moderate adverse	-	-	-
Chorlton Street (between Silver Street and Major Street)	Moderate adverse	-	Moderate adverse	Moderate adverse
Adair Street (between St. Andrew's Square and A665 Great Ancoats Street)	-	Major adverse	-	Major adverse
Nicholas Street (between St James Street and George Street)	Major adverse	-	Moderate adverse	-
Auburn Street (between A6 Aytoun Street and A6 Piccadilly)	Moderate beneficial	-	Moderate beneficial	-
Palmerston Street (between A665 Great Ancoats Street and Gurney Street)	Major adverse	Major beneficial	Major adverse	Major beneficial
Nicholas Street (between George Street and Mosley Street)	Moderate adverse	-	-	-
A665 Great Ancoats Street (between Adair Street and A662 Pollard Street)	-	Moderate beneficial	-	Moderate beneficial
B6181 Ducie Street (between A6 London Road and New Sheffield Street)	Major adverse	Moderate adverse	-	Moderate adverse
Faulkner Street (between New York Street and Charlotte Street)	Moderate adverse	-	-	-
B6181 Ducie Street (between New Sheffield Street and B6181 Dale Street)	Major adverse	Major adverse	Moderate adverse	Major adverse
Nicholas Street (between Mosley Street and Cooper Street)	Moderate adverse	-	-	-
A6 Piccadilly (between B6181 Ducie Street and Paton Street)	Major adverse	Major adverse	Major adverse	Major adverse
A665 Great Ancoats Street (between Pollard Street and Chapeltown Street)	-	Moderate beneficial	-	Moderate beneficial
New York Street (between George Street and Faulkner Street)	Moderate adverse	-	-	-
New York Street (between George Street and Mosley Street)	Moderate adverse	-	-	-
Ducie Street (between B6181 Dale Street and Peak Street)	Major adverse	Major beneficial	Major adverse	Major adverse
Fountain Street (between Booth Street and Spring Gardens)	Moderate adverse	-	Minor adverse	-
Every Street (between A665 Great Ancoats Street and Carruthers Street)	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial

Road name	2038 AM peak hour	2038 PM peak hour	2046 AM peak hour	2046 PM peak hour
B6181 Dale Street (between B6181 Ducie Street and Paton Street)	Major beneficial	Moderate beneficial	Major beneficial	Moderate beneficial
Paton Street (between B6181 Dale Street and A6 Piccadilly)	Major adverse	Major adverse	Major adverse	Major adverse
A665 Great Ancoats Street (between Chapeltown Street and Store Street)	-	Moderate beneficial	-	Moderate beneficial
B6181 Dale Street (between Paton Street and Port Street)	Moderate beneficial	Major adverse	Moderate beneficial	Major adverse
Fountain Street (between Spring Gardens and York Street)	Major adverse	Major adverse	Major adverse	Major adverse
York Street (between Fountain Street and West Mosley Street)	Moderate adverse	-	-	-
Ducie Street (between A665 Great Ancoats Street and Peak Street)	Major adverse	-	Major adverse	Major beneficial
A665 Great Ancoats Street (between Store Street and Ducie Street)	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial
Gumey Street (between Palmerston Street and Every Street)	Moderate adverse	Moderate adverse	Moderate adverse	-
Laystall Street (between Tariff Street and A665 Great Ancoats Street)	-	-	Moderate adverse	-
Every Street (between Carruthers Street and Gurney Street)	Moderate beneficial	Moderate adverse	Moderate beneficial	-
A665 Great Ancoats Street (between Ducie Street and Laystall Street)	-	Moderate beneficial	Moderate beneficial	Moderate beneficial
B6181 Dale Street (between A62 Newton Street and Port Street)	Major beneficial	-	Major beneficial	Moderate adverse
Fountain Street (between York Street and Market Street)	Moderate adverse	-	Moderate adverse	-
Tariff Street (between Brewer Street and Laystall Street)	-	Major adverse	Major adverse	Major adverse
Carruthers Street (between A662 Pollard Street and Every Street)	Major adverse	Moderate adverse	Major adverse	-
Port Street (between B6181 Dale Street and Hilton Street)	Moderate adverse	Major adverse	Moderate adverse	Major adverse
King Street West (between St Mary's Parsonage and Southgate)	Moderate adverse	-	-	-
A662 Pollard Street (between Munday Street and Carruthers Street)	Major beneficial	-	Major beneficial	-
A6 Dale Street (between A62 Lever Street and Newton Street)	-	-	Moderate beneficial	-
A62 Newton Street (between A6 Dale Street and Hilton Street)	-	Moderate adverse	-	Moderate adverse
A665 Great Ancoats Street (between Laystall Street and Urban Exchange car park access)	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial

Road name	2038 AM peak hour	2038 PM peak hour	2046 AM peak hour	2046 PM peak hour
Southgate (between King Street West and Back South Parade)	Moderate adverse	-	Minor adverse	-
Hilton Street (between A62 Newton Street and Port Street)	-	Moderate beneficial	-	Moderate beneficial
Old Mill Street (between A665 Great Ancoats Street and Carruthers Street)	-	Moderate beneficial	-	Moderate beneficial
Every Street (between Gurney Street and A662 Merrill Street)	Major beneficial	-	Major beneficial	-
Back South Parade (between St. Mary's Parsonage and Southgate)	-	-	Moderate adverse	-
A62 Lever Street (between Dale Street and Stevenson Square)	-	-	Major adverse	-
Hilton Street/Stevenson Square (between A62 Lever Street and A62 Newton Street)	-	Moderate beneficial	-	-
A662 Merrill Street (between Carruthers Street and Every Street)	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial
A665 Great Ancoats Street (between Urban Exchange car park access and Port Street)	Moderate beneficial	-	Moderate beneficial	Moderate beneficial
A62 Lever Street (between Stevenson Square and A665 Great Ancoats Street)	-	-	Major adverse	-
Hilton Street (between Oldham Street and A62 Lever Street)	-	Moderate beneficial	Moderate beneficial	-
Port Street (between Hilton Street and A665 Great Ancoats Street)	-	Major adverse	-	Major adverse
High Street (between Market Street and A6 Church Street)	Moderate adverse	-	Moderate adverse	-
A62 Newton Street (between Hilton Street and A665 Great Ancoats Street)	-	Minor adverse	-	-
Carruthers Street (between Old Mill Street and A662 Pollard Street)	-	-	Moderate beneficial	-
A665 Great Ancoats Street (between Port Street and A62 Newton Street)	Moderate beneficial	-	Moderate beneficial	-
Red Lion Street (between A6 Church Street and Turner Street)	Minor adverse	Minor adverse	Minor adverse	Minor adverse
Hilton Street (between Tib Street and Oldham Street)	-	Moderate beneficial	Moderate beneficial	-
Beswick Street (between Old Mill Street and A662 Merrill Street)	Major beneficial	-	-	-
Turner Street (between Red Lion Street and John Street)	Minor adverse	Minor adverse	Minor adverse	Minor adverse
Thomas Street (between Tib Street and John Street)	-	-	Moderate beneficial	-
John Street (between Turner Street and Thomas Street)	Minor adverse	Minor adverse	Minor adverse	Minor adverse

Road name	2038 AM peak hour	2038 PM peak hour	2046 AM peak hour	2046 PM peak hour
A665 Great Ancoats Street (between A62 Newton Street and A62 Lever Street)	Moderate beneficial	-	Moderate beneficial	-
Old Mill Street (between Carruthers Street and Butler Street)	-	Moderate beneficial	-	Major beneficial
Thomas Street (between John Street and High Street)	-	Moderate adverse	-	Moderate adverse
A6 Blackfriars Street (between A6041 Chapel Street and Parsonage)	Moderate adverse	-	-	-
A665 Great Ancoats Street (between A62 Lever Street and A62 Oldham Road)	Moderate beneficial	-	Moderate beneficial	-
A664 Nicholas Croft (between A6 Church Street and Shudehill)	Moderate adverse	-	-	-
Shudehill (between Dantzic Street and A664 Nicholas Croft)	-	Major adverse	-	Major adverse
A665 Swan Street (between Oldham Street and Tib Street)	-	Moderate beneficial	-	Moderate beneficial
Thomas Street (between Shudehill and High Street)	-	Major beneficial	-	Moderate beneficial
Withy Grove (between A6042 Corporation Street and Dantzic Street)	-	Major adverse	-	Major adverse
A664 Shudehill (between A664 Nicholas Croft and Thomas Street)	-	Major adverse	-	Major adverse
A62 Oldham Road (between A665 Addington Street and A665 Great Ancoats Street)	Moderate beneficial	-	Moderate beneficial	-
A664 Shudehill (between Thomas Street and Bus Station Entry)	-	Major beneficial	Moderate beneficial	Major beneficial
Bradford Road (between Cambrian Street and Butler Street)	-	Moderate beneficial	-	Moderate beneficial
A6042 Corporation Street (between Withy Grove and Todd Street)	-	Major adverse	-	Major adverse
A664 Shudehill (between Bus Station Entry and Hanover Street)	-	Major beneficial	Moderate beneficial	Major beneficial
A665 Swan Street (between Tib Street and A664 Rochdale Road)	-	Moderate beneficial	-	Moderate beneficial
A6042 Corporation Street (between Todd Street and Hanover Street)	Moderate adverse	Major adverse	-	Major adverse
Gravel Lane (between A6041 Blackfriars Road and Queen Street)	Moderate adverse	-	Major adverse	-
A664 Shudehill (between Hanover Street and A665 Swan Street)	-	Major beneficial	-	Major beneficial
A665 Addington Street (between A664 Rochdale Road and A62 Oldham Road)	Moderate beneficial	-	Moderate beneficial	-
Gravel Lane (between Queen Street and Greengate)	Moderate adverse	-	Major adverse	-

Road name	2038 AM peak hour	2038 PM peak hour	2046 AM peak hour	2046 PM peak hour
A6042 Corporation Street (between Hanover Street and Long Millgate)	Moderate adverse	Moderate adverse	-	Major adverse
Greengate (between B6182 New Bridge Street and Gravel Lane)	Moderate adverse	-	Major adverse	-
Butler Street (between A62 Oldham Road and Old Mill Street)	Moderate beneficial	Major beneficial	-	Moderate beneficial
A6042 Trinity Way (between A6041 Blackfriars Road and B6182 New Bridge Street)	Moderate adverse	-	-	-
A6041 Blackfriars Road (between Mount Street and A6042 Trinity Way)	Moderate adverse	-	-	-
A6042 Corporation Street (between Long Millgate and A665 Cheetham Hill Road)	Moderate adverse	Moderate adverse	-	Major adverse
B6182 New Bridge Street (between A6042 Trinity Way and B6182 Greengate)	Moderate adverse	-	Major adverse	-
A664 Rochdale Road (between Livesey Street and Osborne Street)	Moderate beneficial	-	Moderate beneficial	-
Elton Street (between Alexandra Street and Cottenham Lane)	-	Moderate adverse	Minor adverse	-
Cottenham Lane/Sherbourne Street West (between Edward Street and A56 Bury New Road)	-	Moderate adverse	Minor adverse	-
A664 Rochdale Road (between Osborne Street and Collyhurst Street)	Moderate beneficial	-	Moderate beneficial	-
Collyhurst Road (between Dalton Street and Smedley Road)	-	Moderate beneficial	-	-
A6010 Hulme Hall Lane (between A62 Oldham Road and Drewett Street)	Moderate beneficial	Moderate beneficial	-	-
B6180 Waterloo Road (between A6010 Elizabeth Street and Dudley Street)	Moderate adverse	-	Moderate adverse	-
B6180 Waterloo Road (between Dudley Street and A665 Cheetham Hill Road)	Moderate adverse	-	Moderate adverse	-

Accidents and safety

14.5.23 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

14.5.24 As part of the Proposed Scheme a total 2,029 short and long stay car park spaces will be provided to serve the Manchester Piccadilly High Speed station. This will comprise 1,068 parking spaces to replace some of the existing parking spaces that will be displaced by the Proposed Scheme (including 39 blue badge bays) and 961 additional parking spaces.

14.5.25 The relocation of spaces to the new multi-storey car parks on Adair Street will result in an increase in journey length of more than 100m between the new car parks and the existing

Manchester Piccadilly Station, particularly for users of the blue badge spaces, which are currently located on the Network Rail Ramp adjacent to the Manchester Piccadilly Station concourse. The number of travellers affected will be high resulting in a major adverse significant effect for existing car park users, including users of Blue Badge parking, due to an increase in journey length for pedestrians of up to 650m.

14.5.26 The Proposed Scheme will also result in a permanent loss of general car parking in the Manchester Piccadilly Station area where spaces will not be replaced, which is significant. This will include:

- NCP Car Park Manchester on Sheffield Street (Sheffield Street North) – major adverse effect due to the permanent loss of 160 spaces;
- parking under Gateway House and ramp – major adverse effect due to the permanent loss of 140 spaces;
- Baird Street Car Park – major adverse impact due to the permanent loss of 100 spaces; and
- Baird Street (on-street parking bays) – major adverse impact due to the permanent loss of nine spaces.

14.5.27 HS2 Ltd will work with the highway authority to seek re-provision near to the existing facilities for priority users, particularly Blue Badge parking and loading.

14.5.28 HS2 Ltd will work with the businesses affected to identify opportunities where reasonably practicable to mitigate effects on parking.

Non-motorised users

14.5.29 The layout of Manchester Piccadilly High Speed station will provide good permeability and connectivity through the station and enhance connectivity across the Manchester Piccadilly Station area to destinations including the existing Manchester Piccadilly Station, and will provide pedestrian connectivity between Manchester Piccadilly High Speed station entrances and the city centre and surrounds. The Proposed Scheme includes the following changes for pedestrians:

- two new entrances and connections to Manchester Piccadilly High Speed station from New Sheffield Street;
- ramped access to Manchester Piccadilly High Speed station from its interface with New Sheffield Street (at the Boad Street diversion) and Ducie Street;
- a new eastern entrance to Manchester Piccadilly High Speed station providing access from the new multi-modal transport hub to the ground level concourse as well as the pedestrian thoroughfare; and
- a new pedestrian and cycleway thoroughfare between New Sheffield Street and the existing taxi rank on the B6469 Fairfield Street.

14.5.30 It is expected that the Proposed Scheme will generate additional pedestrian movements accessing Manchester Piccadilly High Speed station, particularly in the morning and evening

peak hour. These pedestrian movements will then be dispersed to access onward travel modes and nearby destinations, increasing use of roadside footways and crossings in the local area.

14.5.31 There will be permanent realignment, diversion or extension of seven roads in the Manchester Piccadilly Station area that will have an impact on journey lengths or introduce hindrances such as substantial changes in levels for non-motorised users. The Proposed Scheme will also result in a number of permanent highway changes that will affect pedestrians and cyclists.

14.5.32 There will be effects, which are significant, on non-motorised users of six of these roads as a result of severance from increased journey lengths and/or hindrances. These are:

- A635 Fairfield Street and B6469 Fairfield Street – minor adverse effect from increase in journey length of up to 104m;
- A635 Mancunian Way southbound – minor adverse effect from increase in journey length of up to 220m;
- A665 Chancellor Lane – minor adverse effect from increase in journey length of up to 208m;
- Store Street – minor adverse effect from increase in journey length of up to 217m;
- Travis Street – major adverse effect from increase in journey length of up to 457m; and
- Chapeltown Street – minor adverse effect from increase in journey length of up to 101m.

Other mitigation measures

14.5.33 No further appropriate traffic and transport mitigation measures have been identified. HS2 Ltd will, however, continue to work with the relevant highway authorities to identify whether further mitigation measures should be provided.

Summary of likely residual significant effects

14.5.34 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.

14.5.35 The Proposed Scheme will generate significant major beneficial effects for rail passengers as a result of the introduction of HS2 services at Manchester Piccadilly High Speed station, including substantially improved journey times between Manchester, the north of England, the Midlands and the south of England and released capacity on the network easing pressure on other passenger rail services.

14.5.36 The operation of the Proposed Scheme will cause changes in traffic that will result in the following effects, which are significant, through changes in congestion and/or delays for road users in 2038:

- major adverse effects at 20 junctions;
- moderate adverse effects at 10 junctions; and
- minor adverse effects at nine junctions.

14.5.37 The residual significant effects of changes in congestion and/or delays for road users in 2046 will be:

- major adverse effects at 18 junctions;
- moderate adverse effects at five junctions;
- minor adverse effects at 15 junctions;
- major beneficial effects at one junction;
- moderate beneficial effects at one junction; and
- minor beneficial effects at three junctions.

14.5.38 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 28 roads;
- moderate adverse effects on 36 roads;
- minor adverse effects on seven roads;
- major beneficial effects on 13 roads;
- moderate beneficial effects on 44 roads; and
- minor beneficial effects on two roads.

14.5.39 The residual significant effects on traffic-related severance for non-motorised users in 2046 will be:

- major adverse effects on 35 roads;
- moderate adverse effects on 21 roads;
- minor adverse effects on 10 roads;
- major beneficial effects on 10 roads;
- moderate beneficial effects on 43 roads; and
- minor beneficial effects on two roads.

14.5.40 The operation of the Proposed Scheme will result in permanent major adverse effects, which are significant, at four locations due to loss of parking spaces in 2038 and 2046.

14.5.41 There will be a major adverse significant effect, on users of car parks in the vicinity of Manchester Piccadilly Station as a result of an increase in journey length in 2038 and 2046.

14.5.42 Changes in journey length for non-motorised users during operation of the Proposed Scheme will result in the following effects, which are significant, in 2038 and 2046:

- major adverse effect on users of one road; and
- minor adverse effects on users of five roads.

Cumulative effects

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

Monitoring

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

14.5.45 A travel plan will detail how travel associated with the operation of Manchester Piccadilly High Speed station will be monitored.

14.5.46 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 Manchester Piccadilly Station 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;
- Manchester City Council (MCC), which is the Lead Local Flood Authority (LLFA);
- Canal & River Trust; and
- United Utilities Group plc (the local water and sewerage undertaker).

15.1.3 The purpose of this engagement has been to obtain relevant baseline information and to discuss the Proposed Scheme and potential impacts and effects. The engagement has informed the assessments, including issues such as flood risk and associated mitigation in the River Medlock valley.

15.1.4 Maps showing the location of the key environmental features (Map Series CT-10), and the key construction (Map Series CT-05) and key operational (Map Series CT-06) features of the Proposed Scheme can be found in the Volume 2: MA08 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 Manchester Piccadilly Station area are contained in the Volume 5 appendices. These comprise:

- Appendix WR-003-0MA08, Water resources assessment;
- Appendix WR-005-0MA08, Flood risk assessment; and
- Appendix WR-006-00008, Hydraulic modelling report – River Medlock.

15.1.7 Volume 5 also includes a detailed route-wide, stand-alone Water Framework Directive (WFD) compliance assessment (Appendix WR-001-00001) and a draft route-wide water resources and flood risk operation and maintenance plan (Appendix WR-007-00000).

15.1.8 In addition, the following documents are provided as Background Information and Data (BID)[161]:

- BID WR-004-0MA08 – 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)[162].

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)[163].

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 500m of the route of the Proposed Scheme, as described in Section 2.2 of this report.

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

[161] 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.

[162] 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/810507/NPPF_Feb_2019_print_revised.pdf.

[163] 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 modelling has been undertaken of watercourses and key structures within flood risk areas. This includes modelling of flood risk impacts on the River Medlock. Interpretation of the hydraulic modelling carried out can be found in Appendix WR-005-0MA08 - Flood risk assessment.

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-003-0MA08, Water resources assessment and Volume 5: Appendix WR-001-00001, 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.

15.3 Environmental baseline

Existing baseline – Water resources

Surface water

15.3.1 All surface water bodies in the study area fall within the Irwell management catchment of the North West river basin district (RBD).

15.3.2 The current river basin management plan[164] 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[165] is to achieve 'good status' for all designated water bodies. The purpose of the WFD compliance assessment[166] is to demonstrate that the Proposed Scheme does not result in a deterioration in current water body status and that water bodies are not prevented from achieving status objectives.

[164] 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.

[165] *The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (SI 2017 No. 407).*

[166] Volume 5: Appendix WR-001-00000, Water Framework Directive compliance assessment.

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 on a precautionary basis 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 45. 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 45: Surface water body receptors

Water body name and location	Type (at point closest to the Proposed Scheme)	Q95 value (m^3/s)[167]	Receptor value	Parent WFD water body name and identification number[168]	Current WFD status/ Objective[169]	Crossed by the Proposed Scheme?
Tributary of River Medlock WR-01-310b - I4	Ordinary watercourse	<0.002	Moderate	Medlock (Lumb Brook to Irwell) GB112069061152	Moderate/ moderate by 2015	No
River Medlock WR-01-310b - I4	Main river	0.2	High	Medlock (Lumb Brook to Irwell) GB112069061152	Moderate/ moderate by 2015	Yes
Shooters Brook Downstream[170] WR-01-310b - I2	Ordinary watercourse	N/A	Low	Medlock (Lumb Brook to Irwell) GB112069061152	Moderate/ moderate by 2015	No
Rochdale Canal WR-01-310b - I2	Canal	N/A	Moderate	Medlock (Lumb Brook to Irwell) GB112069061152	Moderate/ moderate by 2015	No
Ashton Canal WR-01-310b - J3	Canal	N/A	Moderate	Medlock (Lumb Brook to Irwell) GB112069061152	Moderate/ moderate by 2015	No

[167] This is the flow within the watercourse that is exceeded for 95% of the time. The Q95 has been provided as an indication of watercourse size but is only one of several criteria used to inform receptor value. Other criteria include the WFD watercourse classification which takes into account the value of any habitat which the watercourse supports. Details are provided in the Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

[168] The Environment Agency has attributed each surface water and groundwater body a unique water body identification (ID) number.

[169] Status and objectives are based on those set out in the 2015 River basin management plan (RBMP). The 2015 RBMP is the most up to date and will be updated in 2021.

[170] Shooters Brook Downstream is culverted along its entire length within the study area. It discharges into a culverted section of the River Medlock beneath Charles Street.

Abstractions and permitted discharges (surface water)

15.3.6 Table 46 sets out the surface water abstractions and permitted discharges within 500m of the route of the Proposed Scheme in the Manchester Piccadilly Station area.

Table 46: Surface water abstraction and permitted discharges in water resources and flood risk study area

Feature	Details	Value
Licensed surface water abstractions	None	None
Registered private unlicensed surface water abstractions	None	None
Consented discharges to surface water	Five, of which two are 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 $20m^3$ per day. There is no obligation to register private water supplies, but available records have been obtained from the local authorities. Unregistered private surface water supplies may be present. Private water supplies are assumed to be high value receptors unless details obtained from supply owners indicated otherwise.

15.3.8 The number of abstractions and permitted discharges listed in Section 10, Land quality may be different to that stated here, due to different definitions of spatial scope. This is because the Water resources and flood risk study area comprises all land within 500m 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 47 (for superficial deposits) and Table 48 (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 underlying water body.

Table 47: 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
Alluvium	Secondary (Undifferentiated)	Not assessed by the Environment Agency	Not assessed by the Environment Agency	Moderate
Glacial till	Secondary (Undifferentiated)	Not assessed by the Environment Agency	Not assessed by the Environment Agency	Moderate

Table 48: 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
Sherwood Sandstone Group – Chester Formation	Principal	Manchester and East Cheshire Permo-Triassic Sandstone Aquifer (GB41201G101100) Poor	Good by 2021	High
Cumbrian Coast Group - Manchester Marls Formation Not crossed by the Proposed Scheme	Secondary B	Manchester and East Cheshire Permo-Triassic Sandstone Aquifer (GB41201G101100) Poor	Good by 2021	Moderate
Appleby Group - Collyhurst Sandstone Formation Not crossed by the Proposed Scheme	Principal	Manchester and East Cheshire Permo-Triassic Sandstone Aquifer (GB41201G101100) Poor	Good by 2021	High
Warwickshire Group – Halesowen Formation Not crossed by the Proposed Scheme	Secondary A	Manchester and East Cheshire Permo-Triassic Sandstone Aquifer (GB41201G101100) Poor	Good by 2021	Moderate

Superficial deposit aquifers

15.3.11 The basis of the receptor values attributed to the superficial deposit aquifers present within the study area is shown in Table 47. Alluvium and glacial till are classified as a Secondary (Undifferentiated) aquifers by the Environment Agency. They may be capable of supporting water supplies at a local rather than regional scale and may also form an important source of baseflow to rivers. These aquifers have, therefore, been classified as moderate value receptors.

Bedrock aquifers

15.3.12 The basis of the receptor values attributed to the bedrock aquifers present within the study area, as shown in Table 48, is outlined briefly as follows:

- the Sherwood Sandstone Group (locally comprising the Chester Formation) and the Appleby Group (locally comprising the Collyhurst Sandstone Formation) have been

classified as Principal aquifers by the Environment Agency. Principal aquifers can provide water supplies that are of strategic importance and can also contribute an important component of baseflow to rivers. They have, therefore, been assessed as high value receptors;

- the Warwickshire Group (locally comprising the Halesowen Formation) has been classified as a Secondary A aquifer by the Environment Agency. This aquifer can provide a component of baseflow to rivers and has, therefore, been classified as a moderate value receptor; and
- the Cumbrian Coast Group (locally comprising the Manchester Marls Formation) is classified as a Secondary B aquifer by the Environment Agency. The formation 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 rock formation. It has, therefore, been assessed as a moderate 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 47. The value attributed to each of these receptors is also indicated.

15.3.14 The superficial aquifers in the study area are not formally designated as WFD groundwater bodies but may be hydraulically connected to the underlying WFD bedrock groundwater body.

Abstraction and permitted discharges (groundwater)

15.3.15 Table 49 sets out the groundwater abstraction and permitted discharges within 500m of the route of the Proposed Scheme in the Manchester Piccadilly Station area.

Table 49: Groundwater abstraction and permitted discharges in Water resources and flood risk study area

Feature	Details	Value
Source Protection Zones (SPZ) associated with licensed public water supplies	None	None
Private licensed groundwater abstractions	None	None
Registered unlicensed private groundwater abstractions	None	None
Consented discharges to groundwater	One trade discharge (cooling water) discharging 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 no features within the study area that had the potential to be springs or sinks.

15.3.17 There are no ponds within the land required for the construction of the Proposed Scheme.

Water dependent habitats

15.3.18 No groundwater dependent designated nature conservation sites have been identified within the study area that have the potential to be affected by the Proposed Scheme.

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.

Existing baseline – flood risk and land drainage

15.3.20 The Environment Agency's Flood map for planning (rivers and sea)[171] has been used to scope the baseline flood risk for fluvial flooding from main rivers and ordinary watercourses. These plans define Flood Zone 2 (land assessed as having between a 1 in 100 (1%) and 1 in 1,000 (0.1%) annual probability of river flooding) and Flood Zone 3 (land assessed as having a 1 in 100 (1%) or greater annual probability of river flooding). The Risk of Flooding from Surface Water map[172] has been used to scope surface water flood risks. All of these flood zones are shown in Volume 5, Water resources and flood risk Map Book: Map Series WR-01.

15.3.21 Infrastructure failure flood risks have been scoped using the Environment Agency Risks of flooding from reservoirs national dataset[173]. The British Geological Survey (BGS) Susceptibility to groundwater flooding dataset[174] has been used to assess the future risk of groundwater flooding.

15.3.22 The following reports were used to help determine the baseline flood risk within the study area:

- MCC Preliminary Flood Risk Assessment (2011)[175];
- Manchester, Salford and Trafford Strategic Flood Risk Assessment (SFRA) (2011)[176]; and
- MCC Local Flood Risk Management Strategy (LFRMS) (2014)[177].

[171] Environment Agency (2021), *Flood map for planning.* Available online at: https://flood-map-for-planning.service.gov.uk.

[172] Environment Agency (2021), *Check the long term flood risk for an area in England.* Available online at: https://flood-warning-information.service.gov.uk/long-term-flood-risk/.

[173] Environment Agency (2021), *Flood map for planning.* Available online at: https://flood-warning-information.service.gov.uk/long-term-flood-risk/.

[174] British Geological Survey (2020), *Susceptibility to groundwater flooding dataset.* Available online at: http://www.bgs.ac.uk/products/hydrogeology/groundwaterFlooding.html.

[175] JBA Consulting (2011), *Manchester City Council Preliminary Flood Risk Assessment (PFRA).* Available online at: https://www.manchester.gov.uk/egov_downloads/MCC_PFRA.pdf.

[176] JBA Consulting (2011), *Manchester, Salford and Trafford Strategic Flood Risk Assessment (SFRA).* Available online at: https://www.trafford.gov.uk/planning/strategic-planning/docs/manchester-salford-and-trafford-councils-level-2-hybrid-sfra-level-1-sfra-march-2010.pdf.

[177] Manchester City Council (2014), *Manchester City Council Local Flood Risk Management Strategy (LFRMS).* Available online at: https://www.manchester.gov.uk/downloads/download/5603/lfrms_documents.

15.3.23 Historical flood investigation reports published by the LLFA, under Section 19 of the Flood and Water Management Act[178], relevant to this area have been reviewed (see Appendix WR-005-0MA08 – Flood risk assessment for further details). None of these reports include details of any historical flooding within the study area.

River flooding

15.3.24 The study area includes substantial areas of floodplain (Flood Zones 2 and 3) associated with the River Medlock. Table 50 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 50: River flood risk sources and receptors

Source	Location description and figure/coordinate	Receptor potentially affected	Receptor value/ sensitivity to flooding
River Medlock	East of Helmet Street WR-05-326b	Electricity substation	Very high
River Medlock	Palmerston Street WR-05-326b G7	Residential properties along Palmerston Street	High
River Medlock	Linton Close WR-05-326b G7	Residential properties along Linton Close	High
River Medlock	Ancoats Grove WR-05-326b G7	Residential properties along Ancoats Grove	High
River Medlock	West of River Medlock WR-05-326b G6 – G9	Several streets and roads including Palmerston Street, Gurney Street, the A665 Great Ancoats Street and the A665 Pin Mill Brow	Moderate
River Medlock	A665 Pin Mill Brow and A635 Fairfield Street WR-05-326b F6	Commercial property on the A665 Pin Mill Brow and A635 Fairfield Street	Moderate
River Medlock	Enterprise Park industrial estate WR-05-326b G6	Enterprise Park industrial estate	Moderate
River Medlock	St Andrew's Street WR-05-326b G5	Car park on St Andrew's Street	Low
River Medlock	A635 Mancunian Way industrial estate WR-05-326b G4	Industrial estate on the A635 Mancunian Way	Moderate

[178] *Flood and Water Management Act 2010 (c.29)*. London, Her Majesty's Stationary Office.

Source	Location description and figure/coordinate	Receptor potentially affected	Receptor value/ sensitivity to flooding
River Medlock	Nether Street and Baring Street WR-05-326b G4	Commercial property on Nether Street and Baring Street	Moderate
River Medlock	A635 Mancunian Way WR-05-326b G3	A635 Mancunian Way	Moderate
River Medlock	Baring Street WR-05-326b G4	Car park at Baring Street	Low

Surface water flooding

15.3.25 There are numerous areas that are susceptible to surface water flooding within the study area. The key sources and receptors with potential to be affected by the Proposed Scheme are shown in Table 51. The value of these receptors, based on Section 21 of the SMR, is also indicated. The location description and figure/coordinate is the location at which the source intersects the Proposed Scheme, as indicated by the grid coordinates on the relevant Volume 5, Water resources and flood risk Map Book: Map Series WR-01.

Table 51: Surface water flood risk sources and receptors

Source	Location description and figure/coordinate	Receptor potentially affected	Receptor value
Surface water flow along Travis Street	Travis Street WR-01-310b I3	Travis Street	Moderate
Surface water flow along Heyrod Street	Heyrod Street WR-01-310b I3	Heyrod Street	Moderate
Surface water flow along Heyrod Street	Heyrod Street WR-01-310b I3	Portugal Street East	Moderate
Surface water flow along Heyrod Street	Heyrod Street WR-01-310b I3	Car park	Low
Surface water flow along Sheffield Street	Sheffield Street WR-01-310b I3	Electricity substation	Very high
Surface water flow along Sheffield Street	Sheffield Street WR-01-310b I3	Commercial property	Moderate
Surface water flow along Sheffield Street	Sheffield Street WR-01-310b I3	Sheffield Street	Moderate

Artificial water bodies

15.3.26 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:

- Rochdale Canal (located approximately 140m north of Manchester Piccadilly Station); and
- Ashton Canal (located approximately 110m north of Manchester Piccadilly Station).

15.3.27 The Proposed Scheme will not encroach into the Rochdale Canal or Ashton Canal channels or embankments and will therefore not increase the risk of a failure that could lead to flooding. In the event of embankment failure, flood risk posed to the Proposed Scheme will be unchanged as the Proposed Scheme is elevated (Proposed Scheme track elevations designed following HS2 technical standards).

Groundwater flooding

15.3.28 Information related to historical incidents of groundwater flooding in the Manchester Piccadilly Station area is provided within the MCC SFRA[176] and LFRMS[177]. The SFRA and LFRMS state that there is no history of groundwater flooding within the area.

15.3.29 The BGS Susceptibility to groundwater flooding dataset indicates that there is some potential for groundwater flooding to occur at the surface immediately north of the A635 Fairfield Street and the A665 Pin Mill Brow interchange as well as to residential properties along Palmerston Street.

Future baseline

Construction (2025)

15.3.30 Volume 5: Appendix CT-004-00000 provides details of the developments in the Manchester Piccadilly Station 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 set out in Table 52.

Table 52: Committed developments of relevance to water resources and flood risk during construction

Map book reference[179]	Planning reference	Description	How this is considered in the assessment
MA08/096	Manchester Core Strategy (2012): Strategic Employment Location – Policy EC1	Location: Regional Centre including Manchester City Centre (33ha); City Centre Fringe (25ha); Central Park and Eastlands (65ha); and Manchester Airport and the surrounding area (50ha). Airport City, Manchester Proposed 140ha for office development (B1a), Proposed 25ha for research and development and industry (B1b, B1c and B2), Proposed 35ha for distribution and warehousing (B8). Site allocated located across Manchester city centre, Ancoats and Bradford. Suitable for mixed use economic development (30ha) including high technology industries, logistics, offices, warehousing and ancillary commercial facilities.	Informing future baseline

[179] Volume 5: Appendix CT-004-00000, Planning Data/Committed Development Map Book: Maps CT-13-327 to CT-13-328.

Map book reference[179]	Planning reference	Description	How this is considered in the assessment
MA08/038	Manchester Core Strategy (2012): Strategic Employment Location – Policy CC1	Location: Manchester City Centre and City Fringe (including Strangeways, Collyhurst, Ancoats, Chancellors Place, Manchester Science Park). Proposed 33ha in the city centre and 25ha in City Fringe of B1a high density offices or similar employment development.	Informing future baseline
MA08/042	Manchester Core Strategy (2012): Strategic Employment Location – Policy CC2	Location: Manchester City Centre including Primary Shopping Area (PSA) Proposed 70,000sqm net comparison retail development in the city centre.	Informing future baseline
MA08/044	Manchester Core Strategy (2012): Housing Allocation – Policy CC3	Location: Manchester City Centre (key locations will be Castlefield, Piccadilly, the Southern Gateway and Northern Quarter). Proposed delivery of approximately 16,720 residential units in the city centre.	Informing future baseline

15.3.31 Implementation of these proposed land use allocations will result in the introduction of flood risk receptors within the study area. As such, these committed developments have been included as part of the future baseline and considered within this assessment.

Operation (2038)

15.3.32 Volume 5: Appendix CT-004-00000 also provides details of the developments in the Manchester Piccadilly Station area that are assumed to have been implemented by 2038.

15.3.33 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

15.3.34 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.

15.3.35 Although no definitive guidance is available, climate change may also affect future surface water and groundwater resources. However, any such changes are unlikely to alter the significance of the effects identified in this assessment.

15.4 Effects arising during construction

Avoidance and mitigation measures

15.4.1 The principal strategy adopted to limit the temporary and permanent effects of the Proposed Scheme is through avoidance of sensitive receptors wherever reasonably practicable. Where receptors could not be avoided, mitigation measures have been incorporated where appropriate and reasonably practicable, to limit the potential effects. Section 16 of the draft Code of Construction Practice (CoCP)[180] 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 River Medlock and its associated floodplain. Instead it will pass over this larger watercourse on viaduct 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: MA08 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 A watercourse realignment is proposed at Shooters Brook Downstream (380m in length), which is culverted along its entire length. The realignment will be designed with equivalent hydraulic capacity to the existing culvert, and with an appropriate hydraulic gradient. The design of the Proposed Scheme will also ensure that existing drainage outfalls can be adapted to discharge into the new culvert.

[180] Volume 5: Appendix CT-002-00000, draft Code of Construction Practice.

15.4.6 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 the study area.

15.4.7 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.

15.4.8 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.

15.4.9 There are no new permanent culverts proposed on the smaller watercourse crossings within the Manchester Piccadilly Station area.

15.4.10 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.

15.4.11 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.

15.4.12 The exact requirements will be refined and method of mitigation will be designed following ground investigation at foundations and cutting locations, where appropriate.

15.4.13 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 minimise 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.

15.4.14 No borrow pits are proposed in the Manchester Piccadilly Station area.

Flood risk

15.4.15 The design of the Proposed Scheme will, as far as reasonably practicable, mitigate permanent impacts on flood risk 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 Piccadilly approach viaduct and the highway realignments in the Manchester Piccadilly Station area, which will be located in the River Medlock floodplain. The Proposed Scheme includes replacement floodplain storage areas to compensate for the loss of flood storage volume associated with the piers and highway realignments;
- the temporary works shown on Map Series CT-05 in the Volume 2: MA08 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 flows around above ground structures, such as retaining walls and basement structures, that will cross surface water flow paths where reasonably practicable. This will be achieved using perimeter drainage;

- in locations where the alignment of the Proposed Scheme will cross watercourses, the 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 land required for the operation of the Proposed Scheme 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;
- attenuation tanks 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.

15.4.16 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. 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 construction 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.

15.4.17 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.

15.4.18 For major utilities, the following specific measures are considered in addition to the above points:

- trenchless crossing techniques will be used wherever practicable for main rivers/sensitive watercourses to minimise the impact of temporary watercourse diversions on flood risk; and
- at watercourse crossings, hard bank reinforcement and piers in flood plains will be avoided where reasonably practicable.

Assessment of impacts and effects

15.4.19 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

15.4.20 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.

15.4.21 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 Manchester Piccadilly Station area, the current Environment Agency Abstraction Licensing Strategy (ALS)[181] information available suggests that there will not be restrictions on obtaining water supplies from surface water sources.

15.4.22 Where construction highway drainage is discharged to local watercourses, assessments for determining whether routine runoff and spillage risk from construction traffic are likely to have detrimental impacts on water quality are carried out using the Highways England Water

[181] Environment Agency (2019), *Northern Manchester abstraction licensing strategy.* Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/300488/LIT_7849_fa7980.pdf.

Risk Assessment Tool (HEWRAT)[182]. No construction HEWRAT assessments were required, as there are no temporary highway drainage discharges to watercourses in this area.

Groundwater

Aquifers

15.4.23 The proposed Ardwick North cutting retaining wall, Ardwick embankment, offline retaining walls (St Andrew's Street, Baird Street, Store Street, A635 Mancunian Water southbound and Sparkle Street retaining walls), Piccadilly approach viaduct, Piccadilly station viaduct and Manchester Piccadilly High Speed station (including the Metrolink station and Ashton Line connection) in the study area will intersect the alluvium (Secondary (Undifferentiated) aquifer), the glacial till (Secondary (Undifferentiated) aquifer) and the Sherwood Sandstone Group (Principal aquifer). The temporary works have the potential to affect shallow groundwater quality. Whilst there may be minor localised impacts, the implementation of the measures outlined in the draft CoCP will mean that any impacts on the overall status of these aquifers will not be significant.

15.4.24 Where foundations or cuttings could affect local receptors, such as groundwater abstractions or springs, this is reported in the sections below, while impacts on groundwater flood risk as assessed and described within the flood risk section.

15.4.25 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 and basements. 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[181], has been carried out. A review of current ALS covering the Manchester Piccadilly Station area suggests that there will not be restrictions on obtaining approvals for these dewatering activities. 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

15.4.26 No groundwater abstractions have been identified in the study area.

Groundwater – surface water interactions

15.4.27 The assessment has not identified any temporary significant effects on groundwater – surface water interactions.

[182] Highways England (2019), *Design Manual for Roads and Bridges (DMRB), Sustainability and Environment Appraisal, LA 113 Road drainage and the water environment* (formerly HD 45/09). Available online at: http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol11/section3/LA%20113%20Road%20drainage%20and%20the%20water%20environment-web.pdf.

Water dependent habitats

15.4.28 The assessment has not identified any temporary hydrological impacts on water dependent habitats in the study area.

Temporary effects – Flood risk

15.4.29 Construction of the Piccadilly approach viaduct, which crosses the River Medlock, will require temporary working within flood zones. Construction sequencing and temporary works will be designed to reduce potential flood risk to a level that is not significant. Method statements will be produced by the nominated undertaker and subject to approvals required under the protective provisions in the Bill for the EA and LLFA[183].

Permanent effects – Water resources

15.4.30 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. The assessment has not identified any significant effects on committed developments relating to water resources.

Surface water

15.4.31 Shooters Brook Downstream will need to be realigned around the proposed Manchester Piccadilly High Speed station and associated basements. The impact on this low value watercourse is assessed to be moderate, leading to a minor adverse effect which is not significant.

15.4.32 There is an existing culvert of the River Medlock upstream of the Proposed Scheme crossing at Enterprise business park, which will be removed as part of the Proposed Scheme. The removal of this culvert is assessed to have a minor impact on the high value River Medlock, leading to a moderate beneficial effect, which is significant.

15.4.33 Where new or modified highway drainage is discharged to local watercourses, assessments for determining whether routine runoff and spillage risk are likely to have detrimental impacts on water quality are carried out using the HEWRAT[22]. No HEWRAT assessments were required, as there are no highway drainage discharges to watercourses in this area.

Groundwater

Aquifers

15.4.34 It is anticipated that implementation of the avoidance and mitigation measures will ensure that there are no permanent significant effects related to the impact of Ardwick North cutting retaining wall, offline retaining walls (St Andrew's Street, Baird Street, Store Street,

[183] High Speed Two Ltd (2022), *Phase 2b Western Leg Information Paper E15: Water resources flood risk and authorisation of related works.*

A635 Mancunian Water southbound and Sparkle Street retaining walls), Piccadilly approach viaduct, Piccadilly station viaduct and Manchester Piccadilly High Speed station (including the Metrolink station and Ashton Line connection) on water levels and quality in the alluvium (Secondary (Undifferentiated) aquifer), the glacial till (Secondary (Undifferentiated) aquifer) and the Sherwood Sandstone Group (Principal aquifer). Impacts on groundwater flood risk as assessed are described within the flood risk section.

Abstractions

15.4.35 No groundwater abstractions have been identified in the study area.

Groundwater – surface water interactions

15.4.36 The assessment has not identified any permanent significant effects on groundwater – surface water interactions.

Water dependent habitats

15.4.37 The assessment has not identified any permanent hydrological impacts on water dependent habitats in the study area.

Permanent effects – Flood risk

15.4.38 Manchester Piccadilly High Speed station will include basement levels, incorporate space for a new Metrolink stop and provision for the Ashton Line connection. The Proposed Scheme will therefore extend through the glacial till into the underlying Chester Formation. Two car parks to the north of the station will also include basement levels. These below ground works may form a complete barrier to groundwater flow in the glacial till, potentially leading to groundwater flooding on the upgradient side of the structures. There is currently no information on groundwater levels in the glacial till. Therefore, on a precautionary approach, pending further investigation, this is assessed to be a potential major impact on receptors upgradient of the station. The receptors include commercial buildings (moderate value), residential properties (high value), an electrical substation (very high value), along with committed developments (MA08/096, MA08/038 and MA08/042) for mixed commercial and industrial use (moderate value) and committed development (MA08/044) for residential use (high value). Therefore, on a precautionary basis, the potential impact on groundwater flooding could lead to a major adverse effect, which is significant.

15.4.39 The assessment has not identified any other permanent significant effects on flood risk, due to inclusion of replacement floodplain storage in the Proposed Scheme.

Summary of significant effects

15.4.40 On a precautionary basis the Proposed Scheme is anticipated to result in the following significant effects which require other mitigation:

- major adverse effect on groundwater flooding from the glacial till aquifer to the north of Manchester Piccadilly High Speed station; and
- moderate beneficial effect on River Medlock from the removal of the existing culvert at Enterprise park.

Other mitigation measures

15.4.41 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

15.4.42 During design development, further investigation will identify the exact location and nature of Shooters Brook Downstream watercourse, which is culverted along its entire length. The design of this realignment will be carried out with due consideration to WFD objectives and in consultation with the Environment Agency and LLFA, to ensure no significant adverse effect on this watercourse.

Groundwater

15.4.43 There are considered to be no further measures required to mitigate adverse effects on groundwater resources.

Groundwater – surface water interactions

15.4.44 There are considered to be no further measures required to mitigate adverse effects on groundwater – surface water interactions.

Flood risk

15.4.45 There is potential for groundwater level rise north of Manchester Piccadilly High Speed station and car parks which could result in major impacts on groundwater flood risk. Additional mitigation measures for the management of groundwater flood risk may be required. During design development, further investigations will be carried out, and if needed, mitigation measures will be designed in consultation with the Environment Agency and the LLFA. Mitigation may include behind wall drainage to allow groundwater flow around the below ground structures, to ensure no significant adverse effect on groundwater flood risk.

15.4.46 The assessment has concluded that, as a result of the mitigation included in the design, there will be no permanent significant effects related to fluvial flood risk associated with the River Medlock. Further topographical survey, other surveys as required, hydraulic modelling, design development, and refinement of the mitigation measures will be undertaken during design development to ensure no impacts on peak flood levels. Particular focus will be given

to removal of the redundant culverts in the vicinity of the proposed Piccadilly approach viaduct, where it crosses the River Medlock, to potentially improve flood flow conveyance in this area. Any refinement to the design of this mitigation will be identified and agreed with the Environment Agency during design development, where appropriate.

Summary of likely residual significant effects

15.4.47 With the implementation of the other mitigation measures as described above, there will be no significant adverse residual effects related to water resources and flood risk due to the construction of the Proposed Scheme in this study area.

15.4.48 There will be a potential residual moderate beneficial effect on the hydromorphology of the River Medlock from the removal of the existing culvert at Enterprise Park.

Cumulative effects

15.4.49 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-005-0MA08. Evidence of application of the Sequential Test and Exception Tests in the NPPF is provided on a route-wide basis in Volume 3: Route-wide effects.

15.5.3 Sustainable drainage systems will be used where reasonably practicable. These will help to remove any suspended material within runoff from the Proposed Scheme through filtration, vegetative adsorption or settlement. The drainage systems proposed will ensure that the quantity and quality of water draining from the Proposed Scheme during its operational phase will have a negligible impact on the water environment.

15.5.4 A route-wide WFD compliance assessment is provided in Volume 5: Appendix WR-001-00000. This describes how the Proposed Scheme complies with the requirements of the WFD.

Assessment of impacts and effects

15.5.5 There are considered to be no significant adverse effects related to water resources and flood risk arising from operation of the Proposed Scheme.

Other mitigation measures

15.5.6 There are considered to be no further measures required to mitigate adverse effects on surface water resources, groundwater resources or flood risk.

Summary of likely residual significant effects

15.5.7 The assessment indicates that there will be no residual significant effects on surface water, groundwater or flood risk during operation of the Proposed Scheme.

Cumulative effects

15.5.8 No significant cumulative effects during operation related to water resources or flood risk are anticipated.

Monitoring

15.5.9 Volume 1, Section 9 sets out the general approach to monitoring of water resources and flood risk during operation of the Proposed Scheme.

15.5.10 There are no area-specific requirements for monitoring water resources and flood risk during operation of the Proposed Scheme.

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