

High Speed Rail (Crewe to Manchester and West Midlands to Leeds)

Working Draft Environmental Statement

Non-technical Summary

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for Transport

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

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

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Foreword

High Speed Two (HS2) is a new high speed railway proposed by the Government to connect major cities in Britain. It will be built in phases. Phase One comprises the first section of the HS2 rail network of approximately 230 kilometres (km) (143 miles) between London and the West Midlands that is due to become operational in 2026. The High Speed Rail (London – West Midlands) Act received Royal Assent in February 2017 and works have commenced.

Phase Two of HS2 would extend the line to the north-west and north-east: to Manchester with connections to the West Coast Main Line at Crewe and Bamfurlong (south of Wigan), and to Leeds with a connection to the East Coast Main Line approaching York, completing what is known as the ‘Y network’.

Phase Two would be constructed in two phases:

- Phase 2a: the western section of Phase Two between the West Midlands and Crewe, comprising approximately 58km (36 miles) of HS2 main line (including the section that would connect with and form the first part of Phase 2b) and two spurs (approximately 6km (4 miles)) south of Crewe. The spurs

would allow trains to transfer between the HS2 main line and the West Coast Main Line. Construction of Phase 2a would commence in 2020, ahead of the rest of Phase Two, with operation planned to start in 2027. Phase 2a was the subject of an Environmental Statement (ES) which the Government submitted to Parliament in support of the High Speed Rail (West Midlands – Crewe) Bill in July 2017. This was followed by a supplementary ES deposited with an Additional Provision to that Bill in March 2018. The Phase 2a Bill is expected to receive Royal Assent in 2019; and

- Phase 2b (the Proposed Scheme): comprising the remainder of Phase Two, between Crewe (where it would connect with Phase 2a south of Crewe Station) and Manchester, and between the West Midlands and Leeds, with connections onto the West Coast Main Line and the East Coast Main Line. Construction is expected to start in 2023 and operation is planned to start by 2033.

HS2 Ltd is consulting on the working draft ES in order to inform interested parties on the design of the Proposed Scheme and the likely

significant environmental effects, as understood at this stage, with a view to completion of the formal ES. The working draft ES is based on the best information available to date and the assessment of effects and conclusions will be updated to reflect further work and decisions between now and when the hybrid Bill is deposited. Nothing included at this stage is intended to limit the form of the final scheme that will be presented in the hybrid Bill and formal ES in light of further scheme development and the ongoing discussions with stakeholders such as Transport for the North and Midlands Connect.

This consultation

Consultation on the working draft ES is not a statutory requirement. Parliamentary Standing Orders do not require a working draft ES. However, HS2 Ltd recognises the importance of ensuring widespread engagement on the Proposed Scheme and has, therefore, decided to consult on a working draft ES. The period of public consultation is taking place during October 2018 – December 2018; the first day of the consultation period being the date

the Secretary of State for Transport formally announces the consultation and the publication of the working draft ES documents on www.gov.uk/hs2.

Stakeholder feedback will be considered in the development of the Proposed Scheme through:

- the ongoing design;
- the collection of relevant baseline environmental information and data;
- the assessment of the likely significant environmental effects arising from construction and operation of the Proposed Scheme;
- the enhancement of the beneficial effects of the Proposed Scheme; and
- the measures identified to avoid, reduce or manage significant adverse effects.

This consultation may identify issues that result in changes being made to the design of the Proposed Scheme or mitigation measures. Proposed Scheme refinements may also be made as a result of the ongoing design development work. These changes and their

effect on the outcome of the environmental assessment will be reflected in the formal ES to be deposited to Parliament with the hybrid Bill. A summary of the consultation responses and how they have been addressed will be provided in a consultation summary report, provided alongside the formal ES. Following deposit of the hybrid Bill, a public consultation will be undertaken on the formal ES by Parliament.

A separate consultation on the working draft Equality Impact Assessment for Phase 2b is also being undertaken at the same time as the consultation on the working draft ES.

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1. Introduction

This is the Non-Technical Summary (NTS) of the working draft Environmental Statement (ES) for Phase 2b of the proposed High Speed Two (HS2) rail between Crewe and Manchester and the West Midlands and Leeds. The purpose of the working draft ES is to provide the public and other stakeholders with an opportunity to review and comment on preliminary environmental information for Phase 2b, based on a stage in the ongoing design development and environmental assessment process.

The working draft ES sets out the Proposed Scheme and its likely significant environmental effects based on a stage in the ongoing design and assessment.

The assessment will be updated for the formal ES to reflect the changes following the consultation and further work on the design and assessment between now and when the hybrid Bill is deposited in Parliament.

The Proposed HS2 network

HS2 is a new high speed railway proposed by the Government to connect major cities in Britain. New stations in London, Birmingham, Leeds, Manchester, and the East Midlands would be served by high speed trains running at speeds of up to 360 kilometres per hour (kph) (225 miles per hour (mph)). Trains would also run on to the existing conventional rail network to serve destinations including Crewe, Preston, Liverpool, Sheffield, Newcastle, York, Glasgow and Edinburgh.

HS2 is being built in Phases. Phase One comprises the first section of the HS2 rail network of approximately 230 kilometres (km) (143 miles) between London and the West Midlands and is planned to become operational in 2026. It was the subject of an ES deposited with the High Speed Two (London – West Midlands) Bill in 2013. Supplementary ESs were deposited with Additional Provisions to that Bill in 2014 and 2015. The High Speed Rail (London – West Midlands) Act 2017 authorises the construction and operation of the Phase One scheme. Works on Phase One have commenced.

Phase Two of HS2 would extend the line to the north-west and north-east: to Manchester with connections onto the West Coast Main Line at Crewe and Bamfurlong, south of Wigan; and onto Leeds with a connection to the East Coast Main Line approaching York.

Phase Two would be constructed in two phases:

- Phase 2a: the western section of Phase Two between the West Midlands and Crewe, comprising approximately 58km (36 miles) of HS2 main line (including the section that would connect with and form the first section of Phase Two) and two spurs (approximately 6km (4 miles)) south of Crewe. The spurs would allow trains to transfer between the HS2 main line and the West Coast Main Line. Construction of Phase 2a would commence in 2020, ahead of the rest of Phase Two, with operation planned to start in 2027. Phase 2a was the subject of an ES which the Government submitted to Parliament in support of the High Speed Rail (West Midlands – Crewe) Bill in July 2017. This was followed by a supplementary ES deposited with an Additional Provision to that Bill in

March 2018. The Phase 2a Bill is expected to receive Royal Assent in 2019; and

- Phase 2b (the Proposed Scheme): comprising the remainder of Phase Two, between Crewe (where it would connect with Phase 2a south of Crewe Station) and Manchester, and between the West Midlands and Leeds, with connections to the West Coast Main Line near Bamfurlong, south of Wigan, and to the East Coast Main Line, approaching York. Operation is planned to start by 2033.

The Proposed Scheme would connect with Phase One near Marston, to the north-east of Birmingham. It would connect with, and include the electrification of a section of, the Midland Main Line, and join the conventional rail network at Church Fenton, south-west of York, before joining the East Coast Main Line. The Proposed Scheme would connect with Phase 2a south of Crewe railway station and the West Coast Main Line at Bamfurlong, south of Wigan. Connections with the conventional rail network would enable HS2 trains to provide onward services beyond the HS2 network. Phase One and Phase Two, once constructed, would form what is known as the Y network (see Figure 1).

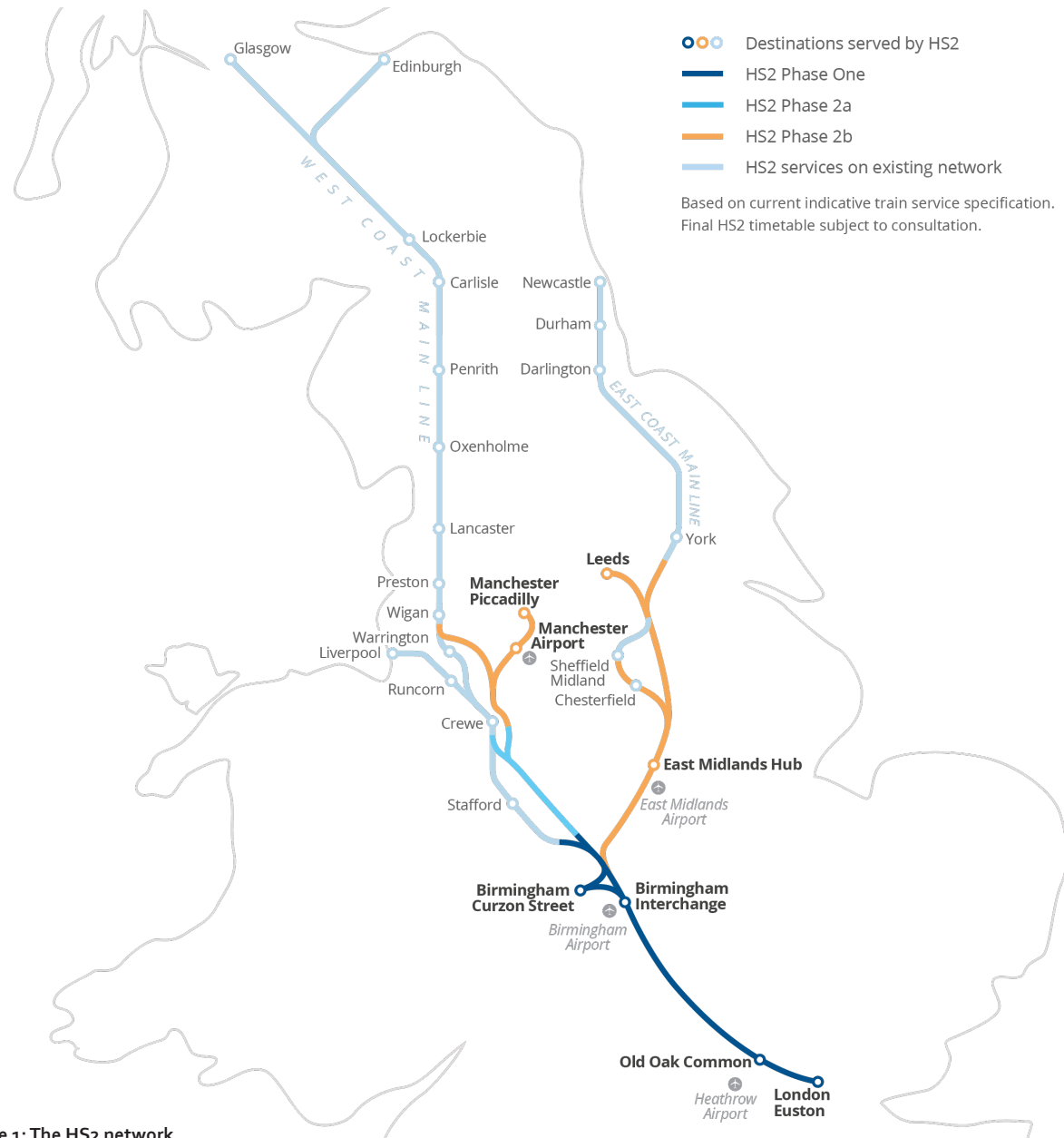


Figure 1: The HS2 network

The Proposed Scheme is the subject of this working draft ES. The working draft ES comprises a suite of documents that describe the Proposed Scheme, the reasonable alternatives studied, the environmental baseline, an assessment of the likely significant beneficial and adverse environmental effects, and mitigation and monitoring measures, as identified at a stage in the ongoing design and environmental assessment process. It also includes a description of consultation and engagement undertaken to date to inform the design and assessment of the Proposed Scheme.

For environmental assessment and community engagement purposes the Proposed Scheme has been divided into community areas, which was the approach taken on Phase One and Phase 2a of HS2. The 28 community areas for Phase 2b are shown in Figure 2 and Figure 3.

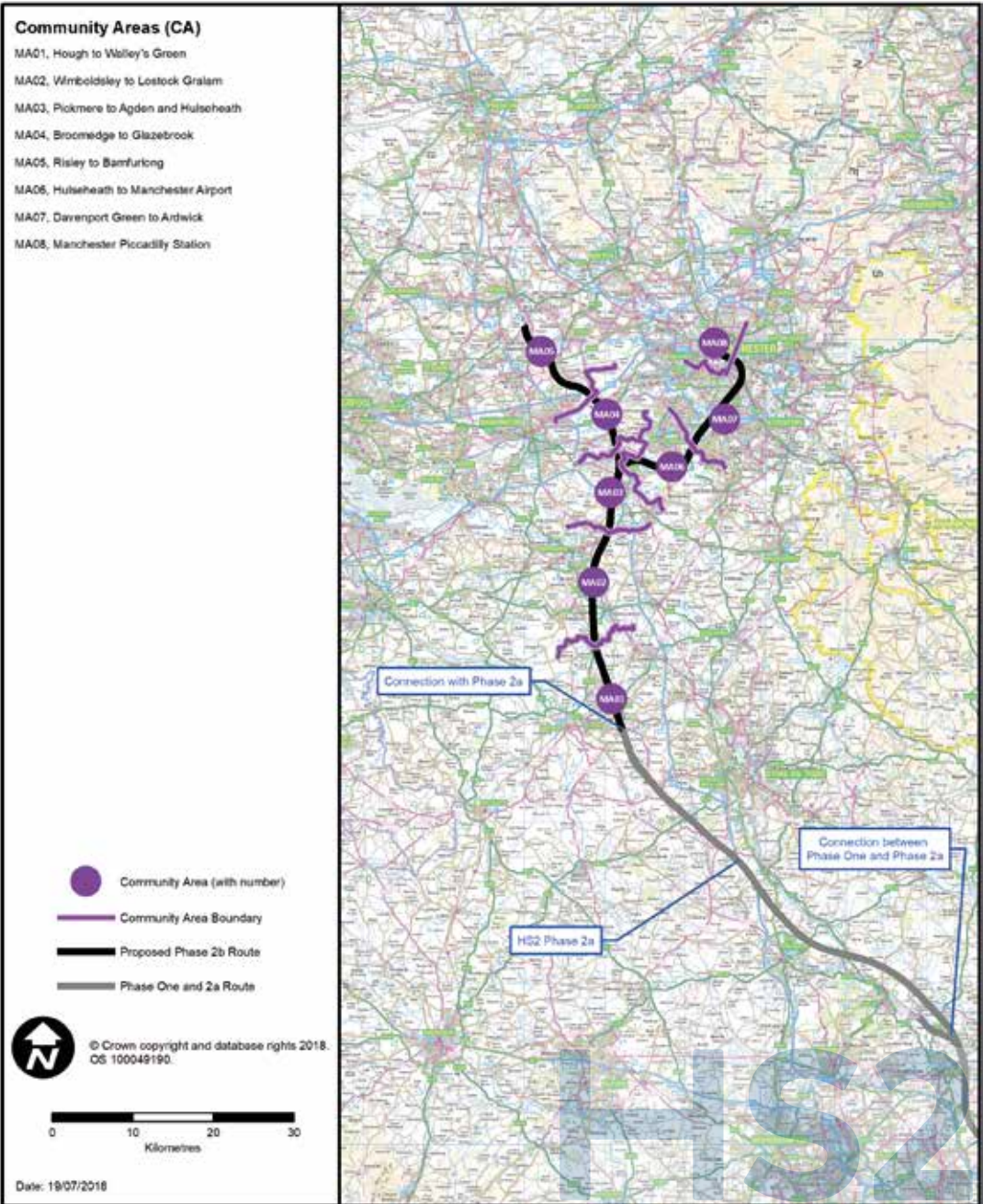
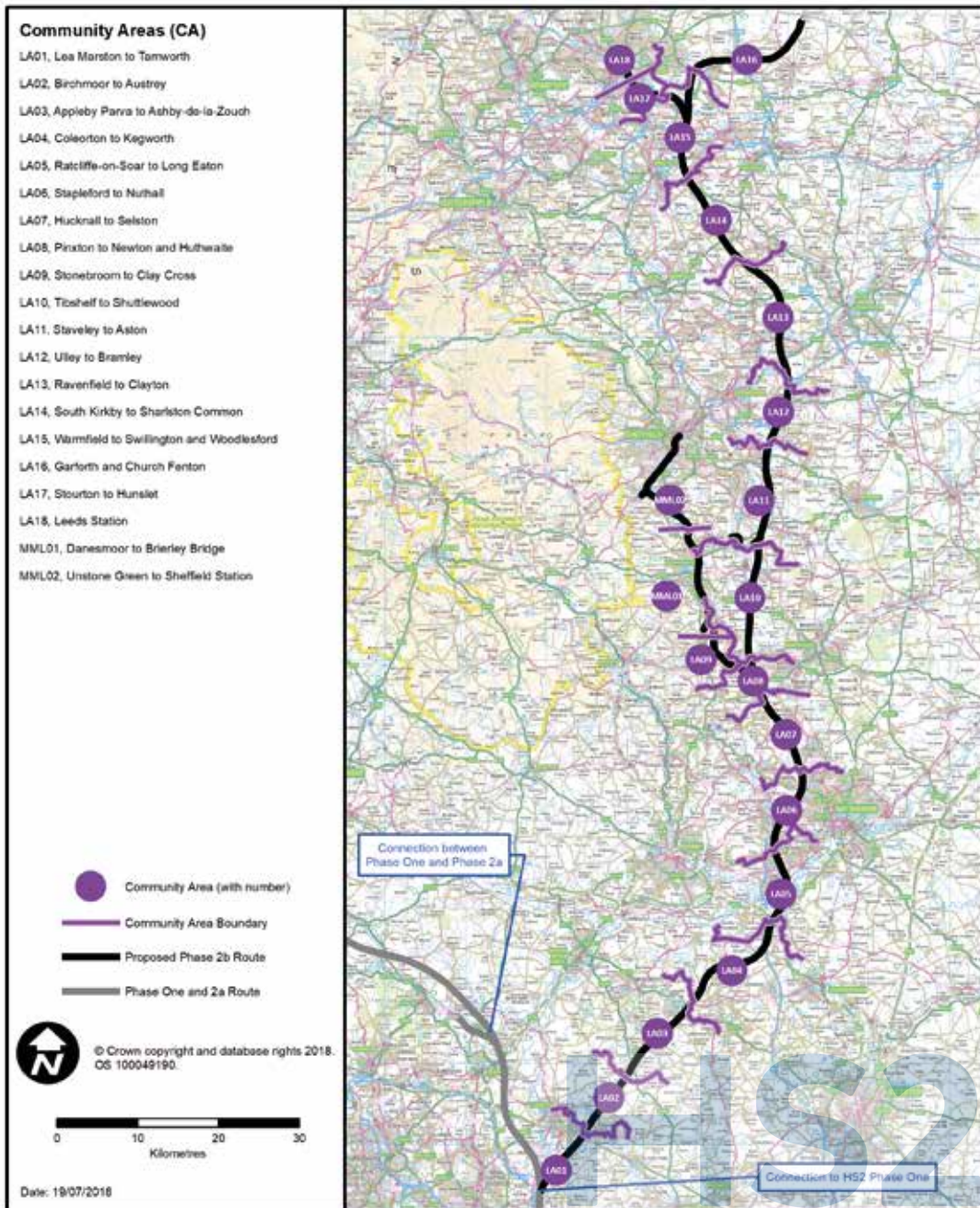


Figure 2: Phase 2b community areas western leg



The hybrid Bill for Phase 2b of HS2

The Government has decided that it should obtain approval for Phase 2b of HS2 through primary legislation - an Act of Parliament. Use of primary legislation rather than promoting a development consent order under the Planning Act 2008 allows the Government to seek the full range of statutory powers and authorisations that a project of this size and complexity requires. This includes revisions to the rail regulatory regime and the planning regime and provisions to enable the making of subsequent orders and regulations by way of statutory instrument. The Government followed the same approach for Phase One and Phase 2a of HS2, as well as for High Speed One (HS1) (formerly Channel Tunnel Rail Link) and the Elizabeth Line (formerly Crossrail).

The Government’s Bill for Phase 2b of HS2 will be a ‘hybrid’ Bill. In practice, this means that persons whose property or interests are directly and specially affected by the hybrid Bill will be able to petition Parliament and to present their case to a Select Committee of Members of Parliament. Such persons include those whose properties are to be compulsorily purchased for

Figure 3: Phase 2b community areas eastern leg

the Proposed Scheme. Local authorities situated along the route of the Proposed Scheme will be able to petition on behalf of their local communities. The Select Committee will then report to the House of Commons. A similar procedure applies in the House of Lords. In other respects, a hybrid Bill proceeds essentially in the same way as a Government Bill.

Phase 2b of HS2 – working draft Environmental Statement

The working draft ES includes the following documents:

- **This non-technical summary (NTS).** The NTS provides a summary in non-technical language of the Proposed Scheme, the reasonable alternatives studied and its likely significant residual effects on the environment based on the current level of information and understanding. The NTS summarises those features of the design and other measures included in the Proposed Scheme in order to avoid, prevent or reduce likely significant adverse environmental effects. Residual effects are the significant environmental effects of the

Proposed Scheme that are likely to remain after those measures are in place. The NTS also outlines the monitoring measures to manage the effects of construction and the effectiveness of mitigation post construction, as well as monitoring during operation, where appropriate;

- **Glossary of terms and list of abbreviations.** This contains terms and abbreviations, including units of measurements used throughout the working draft ES documentation;
- **Volume 1: Introduction and methodology.** Volume 1 provides an overview of HS2, the environmental impact assessment (EIA) process and the approach to consultation and engagement. It gives details of the permanent features of the Proposed Scheme and it gives generic construction techniques based on the current level of design. It summarises the scope and methodology for the environmental topics. Volume 1 outlines the approach to mitigation and monitoring (including measures to manage the effects of construction, the effectiveness of mitigation post construction, as well as the approach

to monitoring during the operational phase). Volume 1 also provides a summary of the reasonable alternatives studied;

- **Volume 2: Community area reports and map books.** Volume 2 consists of 28 community area reports together with maps where available, as follows:
 - for 26 of the community areas, these reports present an overview of the area, a description of the construction and operation of the Proposed Scheme within the area based on the current level of design, a description of the environmental baseline and the assessment of the likely significant effects of the Proposed Scheme on the environment. They provide a summary of the local alternatives considered since the July 2017 route announcement and explain the design and other mitigation measures included in the Proposed Scheme in order to avoid, prevent or reduce, and if possible offset, the likely significant adverse environmental effects. The reports also outline measures to monitor the adverse effects of the Proposed Scheme on the environment; and

- for the other two community areas, reports are provided at an earlier stage of the design and environmental assessment process, following the amendment of the route of the Proposed Scheme to include the electrification of a section of the Midland Main Line between Clay Cross and Sheffield Midland Station. They include an overview of the area, a description of the proposed works within the area, an outline of potential effects and an overview of stakeholder engagement and consultation to be carried out as part of the EIA process. Mitigation and monitoring measures have not been identified at this stage but will be reported in the formal ES.
- **Volume 3: Route-wide effects.** Volume 3 describes the likely significant environmental effects of the Proposed Scheme based on a stage in the ongoing design at a geographical scale greater than the community areas described in Volume 2;
- **Volume 4: Off-route effects.** Volume 4 provides an overview of the anticipated off-route works and surrounding environment (where locations are known). These works are at an early stage of design and will be reported in full in the formal ES.
- **Supporting documents:**
 - **EIA Scope and Methodology Report.** A technical document that outlines the approach to the EIA, which was subject to consultation in July 2017. A Consultation Summary Report for the EIA Scope and Methodology Report has been included with the working draft ES. This updated version takes into consideration comments received, where appropriate, in addition to changes required as a result of updates to legislation or industry best practice guidance;
 - **Alternatives report.** Describes the evolution of the Proposed Scheme and the alternatives studied during design development; and
 - **Draft Code of Construction Practice.** Contains a series of measures and standards of work to provide effective planning, management and control of potential impacts on individuals, communities and the environment during construction.

1.1 Approach to the environment

Environmental considerations have been central to the development of the Proposed Scheme in route selection, design development and arrangements for construction and operation of the Proposed Scheme. In developing the Proposed Scheme, HS2 Ltd's aim has been twofold: to enable the nation to take full advantage of the opportunities and benefits offered by the Proposed Scheme and to mitigate the adverse environmental effects of the Proposed Scheme as effectively as reasonably practicable.

HS2 Ltd has continued to develop and refine the design to reduce its effects on the environment and on communities, to resolve engineering issues and to improve value for money.

The Government recognises that the Proposed Scheme would have significant effects on those who live close to the route and upon the local environment through which it would pass. HS2 Ltd is, therefore, engaging with local communities along the route of the Proposed Scheme and other stakeholders to identify and seek to resolve issues of concern, as described in Section 1.2 of this NTS.

The working draft ES includes a description of the measures proposed in order to avoid, prevent or reduce likely significant adverse environmental effects. It also describes measures to manage and monitor the adverse effects of the Proposed Scheme on the environment. HS2 Ltd's approach to mitigating adverse effects and monitoring the effects of the Proposed Scheme on the environment is described in Section 7 of this NTS. HS2 Ltd's aim is to ensure that, during construction and operation of the Proposed Scheme, significant adverse environmental effects would either be avoided or mitigated as far as reasonably practicable. Mitigation measures will continue to be identified, considered and incorporated into the Proposed Scheme as it is further refined. The Proposed Scheme design including the proposed mitigation measures will be presented in the formal ES.

As with Phase One and Phase 2a, the Secretary of State for Transport will establish a set of controls known as Environmental Minimum Requirements (EMR) to ensure that the environmental effects of the Proposed Scheme generally do not exceed those reported in the formal ES. The EMR are described in Section 5.3 of this NTS.

1.2 Engagement and consultation

Stakeholders with whom HS2 Ltd is consulting and engaging during the development of the design and impact assessment of the Proposed Scheme include:

- communities – communities that may be directly affected by the Proposed Scheme have been engaged in the development of the Phase 2b proposals to-date, and will continue to be a key focus of the engagement and formal consultation process. During the design and assessment process, engagement with communities will continue to be carried out to fulfil regulatory and best practice guideline requirements. Consultation will be undertaken in a timely and appropriate manner to ensure communities have the opportunity to input to and influence the development of the Proposed Scheme. The role of ongoing community engagement will be to consider local issues and discuss potential ways to avoid or mitigate impacts of the Proposed Scheme, such as screening views of the railway, managing noise and reinstating highways, and identifying possible community benefits;
- local authorities – engagement will continue with local authorities throughout the design and assessment processes to maximise the opportunity for local authorities and parish councils to positively inform the development of the Proposed Scheme both in the context of technical input to the assessment and local knowledge and issues;
- expert, technical and specialist groups – this group comprises stakeholders with specific expert, technical or specialist knowledge or particular interest in the Proposed Scheme, many of whom will have a high level of influence on the design and assessment process, particularly in relation to technical feasibility and likely environmental and community impacts. This stakeholder group includes environmental statutory authorities and government departments, as well as non-statutory technical/specialist organisations at the national, regional and local level. These stakeholders are likely to input into baseline information and help influence project-wide mitigation strategies and principles;

- directly affected individuals, major asset owners and businesses – these are recognised as priority stakeholders whose property would be potentially affected by the Proposed Scheme. There is an ongoing programme of direct engagement for these stakeholders throughout the design and assessment development; and
- utility companies – engagement will continue with utility companies and statutory undertakers to establish how the Proposed Scheme may affect their infrastructure.

A variety of mechanisms have been used to ensure an open and inclusive approach to engagement and consultation, reflecting the differing requirements and expectations of stakeholders (e.g. information events and formal and informal engagement with organisations such as Natural England, the Environment Agency and local planning authorities). Stakeholders have informed the design and assessment of the Proposed Scheme

to date, and this process will continue. Feedback from the consultation on the working draft ES and emerging scheme design, and ongoing engagement will continue to be considered as part of the design and assessment of the Proposed Scheme, ultimately presented in the formal ES.

HS2 Ltd published a draft EIA Scope and Methodology Report for consultation in July 2017, outlining the proposed scope and methodology for the EIA of the Proposed Scheme. This report was issued to statutory bodies, non-government organisations, local authorities and parish councils, and was made available on the Government's website, allowing comment by local interest groups and the public. The consultation period ended in September 2017 and the consultation responses informed the EIA Scope and Methodology Report published alongside the working draft ES. This provides the framework within which the working draft ES has been prepared.

Publication of this working draft ES forms part of the ongoing engagement process, which enables interested parties to comment on the Proposed Scheme, environmental baseline, likely significant environmental effects (both beneficial and adverse) and proposed mitigation identified at a stage in the ongoing design and environmental assessment process. The assessment will be updated for the formal ES to address comments on the working draft ES and reflect further work and decisions between now and when the hybrid Bill is deposited in Parliament in 2020.

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2. The case for HS2

2.1 The need for high speed rail

The Government is committed to building a stronger, more balanced economy capable of delivering lasting growth and widely shared prosperity. For rail transport, the Government has stated the following key objectives:

- to provide sufficient capacity to meet long term demand;
- to improve connectivity by delivering better journey times and making travel easier; and
- to improve resilience and reliability across the network.

The Government's case for a new high speed rail network is primarily to ensure that the inter-urban rail network supports the economic development of the country by providing sufficient capacity and improved connectivity between urban centres. This will help to build a stronger, more balanced economy, capable of delivering growth and economic benefits.

The Government's view is that further incremental upgrades to the existing rail network will be insufficient to meet these objectives, which are required to meet the country's long-term economic needs and would

result in prolonged and unacceptable disruption to the existing network. Therefore, a new railway is needed.

This could operate at conventional speeds or at high speed. The Government has concluded that building a new conventional railway line would not be significantly cheaper than a new high speed line, nor would its effects on the environment and communities be significantly less than those of high speed rail. A conventional railway line would deliver far fewer benefits in terms of enhanced connectivity and support for long-term economic growth. The Government also considers that high speed rail would have greater potential to attract travellers from air and road transport, creating opportunities to reduce carbon emissions.

2.2 Enhancing capacity and connectivity

Demand for rail travel in Britain is increasing. It is the Government's view that even major enhancement packages to existing railway lines cannot provide sufficient rail capacity between London, the Midlands and the North over the coming decades. The Government has concluded that a new line must be built. Such

a line would provide new, fast, long-distance services and release significant capacity on existing conventional rail network routes, which could be used to benefit both passenger and freight movements.

In addition to the gain in capacity, enhanced connectivity is one of the key objectives of HS2, which will help to deliver wider transport choice, reduced journey times and more reliable rail services that translates into long-term economic benefits.

Once completed, Phase 2b would unlock the full benefits of HS2. It would offer journey time reductions within the Midlands and the North, as well as to London, and would deliver a step change in capacity on the West Coast Main Line and the East Coast Main Line. It would relieve pressure on the existing conventional rail network, thereby improving reliability and performance.

HS2 Ltd is working with other transport bodies, such as Transport for the North and Midlands Connect, to consider how HS2 can help further improve connectivity. The Government is currently considering whether any additional connections should be included in the Proposed Scheme.

2.3 Generating growth

Efficient movement of people and freight is essential for economic growth as enhanced capacity and good connectivity strengthen the links between businesses, workers and customers and lessen geographical barriers to markets, skills and knowledge. The ability of rail to provide direct connections into urban centres makes it a particularly effective means of moving large numbers of people into and between urban areas. The extension of the high speed rail network to the north of England reflects the Government's intention that the regional benefits of high speed rail travel are distributed as widely as possible.

2.4 The case for Phase 2b

Delivering Phase 2b would:

- deliver more capacity and faster and more reliable journeys between the Midlands, the north of England, London and Scotland by;
 - allowing high speed services to run entirely on dedicated high speed track to Manchester Airport, Manchester, the East Midlands and Leeds, and via a spur on the Midland Main Line to Sheffield;

- allowing services to Preston, Glasgow and Edinburgh to bypass the West Coast Main Line around Crewe and Warrington; and
- connecting with the East Coast Main Line for services to York, Darlington, Durham and Newcastle.

Phase 2b would, therefore, deliver further journey time benefits and improvements in connectivity in addition to those already to be delivered by Phase One and Phase 2a (see Table 1) by;

- allowing passengers travelling to or from a wide range of places to connect onto HS2 services via local, regional and long distance connections at Manchester, Sheffield, Leeds and the proposed East Midlands Hub station. Phase 2b would also help to create the conditions for the Midlands Engine, a scheme to improve economic growth across the Midlands (Shropshire to Lincolnshire), and Northern Powerhouse Rail, a vision to improve the capacity, frequency and journey time of train services between major northern cities;
- bringing economic benefits to the Midlands, the North and Scotland, helping to rebalance the economy. Some

of these economic benefits would come from businesses being more accessible to one another as well as offering improved accessibility to labour markets, supply chains, finance and research; and

- relieving pressure and releasing capacity across the West Coast Main Line and East Coast Main Line, which would allow additional local and regional passenger services and freight services to run on those lines.

| Leg of Phase 2b | Train origin/destination | Train destination/origin | Current fastest journey time by conventional rail (hours:minutes) | Fastest journey time with the Proposed Scheme (including Phase One and Phase 2a) (hours:minutes) | |
|-----------------|--------------------------|--------------------------|---|--|------|
| Western leg | London | Crewe | 1:30 | 0:55 (requires Phase One and Phase 2a only) | |
| | | Manchester Airport | 2:24 (to existing conventional rail station) | 1:03 (to high speed station) | |
| | | Manchester Piccadilly | 2:07 | 1:07 | |
| | | Preston | 2:08 | 1:18 | |
| | | Liverpool Lime Street | 2:14 | 1:34 | |
| | | Glasgow | 4:30 | 3:40 | |
| | | Edinburgh (Haymarket) | 4:22 | 3:40 | |
| | Birmingham | Liverpool | 1:34 | 1:09 | |
| | | Manchester | 1:28 | 0:40 | |
| | | Glasgow | 4:02 | 3:20 | |
| | | Edinburgh (Haymarket) | 4:07 | 3:11 | |
| | Eastern leg | London | East Midlands Hub | N/A (new station as part of the Proposed Scheme) | 0:52 |
| | | | Derby | 1:25 | 1:12 |
| Nottingham | | | 1:40 | 1:09 (to East Midlands Hub) | |
| Sheffield | | | 2:01 | 1:27 | |
| Leeds | | | 2:11 | 1:21 | |
| York | | | 1:51 | 1:24 | |
| Newcastle | | | 2:50 | 2:17 | |
| Birmingham | | Nottingham | 1:09 | 0:20 (to East Midlands Hub) | |
| | | Sheffield Midland | 1:03 | 0:49 | |
| | | Leeds | 1:58 | 0:49 (if served via the HS2 main line, not via Sheffield)* | |
| Nottingham | | Sheffield Midland | 0:50 | 0:27 (from East Midlands Hub) | |

Table 1: Fastest typical journey times between key destinations 'without' and 'with' HS2 in operation. For journeys to destinations that are not on the core HS2 network, a change on to the conventional rail network would be required.

* Note: If electrification and capacity improvements were provided between Sheffield Midland Station and Clayton Junction, a Birmingham to Leeds service via Sheffield is estimated to take 1 hour and 18 minutes. On this basis, a Sheffield to Leeds journey time is estimated to take 27 minutes.

2.5 Climate change

The Proposed Scheme has been developed to mitigate climate change through reductions in greenhouse gas emissions and to be resilient to future climate change impacts and risks.

The Kyoto Protocol of 1997 took the lead in converting concern regarding climate change into action at an international level. In October 2016 a legally binding treaty on climate action (the Paris Agreement) was approved. One of the central aims of the Agreement is to pursue efforts to limit global temperature increase to 1.5 degrees Celsius above pre-industrial levels. This essentially sets a target to achieve net zero global greenhouse gas emissions in the second half of this century.

At a national level, the Climate Change Act 2008 requires at least an 80% reduction in the United Kingdom's (UK) greenhouse gas emissions as compared to 1990 levels by 2050. To ensure that regular progress is made towards the target, the Climate Change Act established a system of carbon budgets. The first five carbon budgets have been set in law.

The fifth carbon budget (2028-32) target would reduce UK greenhouse gas emissions in 2030 by 57% relative to 1990 levels. To deliver the fourth and fifth carbon budgets (2023-2027 and 2028-2032), the UK Government published its Clean Growth Strategy in 2017, setting out a detailed set of policies and proposals that aim to accelerate economic growth and decrease carbon emissions. In terms of enhancing inter-urban connectivity, high speed rail is one of the most carbon efficient means of transporting large numbers of people, measured in terms of emissions per passenger kilometre. Furthermore, the carbon emissions of high speed rail are likely to reduce in future as the energy supply is decarbonised, as Britain continues to move towards renewable and low carbon sources of energy. There is a large carbon benefit associated with the operation of Phase One of HS2. The operation of Phase 2a and the Proposed Scheme is expected to provide some additional carbon benefits through modal shift (such as shifting from road vehicles to trains) of passengers and potentially freight through released capacity on conventional rail lines.

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3. Description of the Phase 2b scheme

3.1 Stations

Four new stations are proposed as part of Phase 2b:

- western leg:
 - **Manchester Airport High Speed station** – a new interchange station near Manchester Airport;
 - **Manchester Piccadilly High Speed station** – a new terminus station alongside the existing Network Rail Manchester Piccadilly Station;
- eastern leg:
 - **East Midlands Hub station** – a new interchange station at Toton, located between Nottingham and Derby; and
 - **HS2 Leeds station** – a new terminus station adjacent to the River Aire connected to the existing Network Rail Leeds Station via a common concourse.

3.2 The route

The following sections provide a summary description of the route of the Proposed Scheme based on the current stage of design. Maps illustrating the route of the Proposed Scheme through each community area are included in Section 8 of this NTS.

Western leg

The route of the Proposed Scheme from Crewe to Manchester forms the northern approximately 85km (approximately 53 miles) section of the western leg of Phase Two. This section would commence to the south of the existing Crewe Station and the A500 Shavington Bypass where it would join the Phase 2a route.

The Proposed Scheme would continue beneath Crewe in tunnel. Emerging to the north of the town, the route of the Proposed Scheme would run parallel to the West Coast Main Line before bearing north. Where the route diverges from the West Coast Main Line, a rolling stock depot would be provided on land between the HS2 main line and the existing West Coast Main Line.

The route of the Proposed Scheme would continue north passing between the towns of Winsford and Middlewich on a series of embankments and viaducts to the west of Lostock Green and east of Rudheath, Lostock Gralam and Higher Wincham. The route of the Proposed Scheme would then cross the M6 before diverging at Hoo Green where the HS2 main line would continue north towards Golborne and the Manchester Spur would continue east towards Manchester.

The Manchester spur would turn east and would pass to the north of Rostherne Mere, and run broadly parallel to the M56. It would then turn north and pass under the M56 at Warburton Green and into an interchange station to the north-west of Manchester Airport. Just beyond the station, the route would enter twin tunnels under south Manchester, emerging in the Ardwick area, where it would rise onto a viaduct to enter the terminus station at Manchester Piccadilly High Speed station.

Continuing north from the Manchester spur junction, the HS2 main line would pass under the M56 and then on viaduct over the Manchester Ship Canal to the east of Hollins Green. The route would pass over the M62 and would curve to the west of Culcheth, after which the route would run through Lowton and connect to the West Coast Main Line at Bamfurlong, to the south of Wigan.

Eastern leg

The eastern leg of the route of the Proposed Scheme would run from the West Midlands to Leeds with a total route length of approximately 198km (approximately 123 miles). It would also provide a connection to the Midland Main Line (via the Erewash Valley Line to the south-east

of Chesterfield). The HS2 main line would also connect to the conventional network at Church Fenton, south-west of York to join the East Coast Main Line.

The eastern leg would begin north-east of Birmingham where it would connect to Phase One of HS2 near Marston. The route of the Proposed Scheme would connect with the Phase One route, and follow the M42 and A42 corridor to Kegworth, near East Midlands Airport. After Kegworth the route would curve on viaduct in a northerly direction, passing over the flood plain of the River Soar and River Trent. Following this the route would pass through Long Eaton to the new East Midlands hub station at Toton. The route would then follow the M1 corridor, to the east of the motorway.

Prior to Tibshelf, there would be a spur to provide a connection to the existing conventional network near Clay Cross. The spur would be located near the A38 and Hilcote and would pass under the M1 south of Newton before joining the existing Erewash Valley Line east of Stonebroom. The spur would enable HS2 services to connect to the Midland Main Line to serve the existing Chesterfield Station and Sheffield Midland Station.

From Tibshelf, the HS2 main line would pass Hardwick Hall on a short embankment and travel north via Stainsby and Heath, mainly following the M1 corridor in cutting. In the Bolsover area, the route would be on embankment and in cutting as it passes Sutton Scarsdale, Staveley and Shuttlewood.

A spur would diverge from the HS2 main line near Barlborough. The spur would be in a combination of cuttings and on embankments and would follow an existing disused railway to the proposed Staveley Infrastructure Maintenance Depot. The infrastructure maintenance depot would be located on the former Staveley Chemical Works site. The spur would then connect to the existing conventional Chesterfield to Beighton Railway.

North of the spur at Staveley, the route would alternate between embankment and cutting as it would follow a narrow corridor aligned with the M1 passing close to several communities including Barlborough, Wales, and Aston.

At Thurcroft, the route of the Proposed Scheme would cross over the M1 and M18 on two viaducts. It would then run in cutting and on embankment between Bramley and

Mexborough. The route would then pass to the east of Barnburgh on embankment and Hickleton in deep cutting, before heading north-west to pass north of Thurnscoe and Clayton on a viaduct over the existing railway.

To the north of Clayton, a spur would allow trains travelling north from Sheffield Midland Station on the Midland Main Line to continue on the HS2 main line. The route would then travel north-west towards Hemsworth and Crofton on a series of cuttings and embankments.

North of the village of Crofton the route would travel between Wakefield and Normanton and would pass over a viaduct east of Methley Junction. At this location, the route would divide with the HS2 main line travelling north to Swillington and with a spur continuing north-west towards the existing Leeds Station.

The HS2 main line would cross a long viaduct and would proceed northwards to the west of Swillington and then east towards Church Fenton where it would connect to the conventional rail network (York to Church Fenton Line) prior to joining the East Coast Main Line. The approach to the conventional network would be on a long viaduct.

The spur towards the existing Leeds Station would start at Methley and would proceed towards Woodlesford where it would pass through a tunnel under the village. The route of the spur would exit the tunnel before travelling west within the existing conventional rail corridor in a series of cuttings and on embankments.

The route of the Proposed Scheme would pass through the southern outskirts of Leeds prior to approaching the new high speed station adjacent to the River Aire. A common concourse would connect the new high speed station with the existing Network Rail station. A new rolling stock depot would be located to the east of Leeds city centre, near the M1 junction 45.

Additional scheme features for consideration in the formal ES

Since the Government announced the preferred route for Phase 2b in July 2017, the Proposed Scheme was amended in July 2018 to include the electrification of a section of the Midland Main Line between Clay Cross and Sheffield Midland Station.

Electrification of this section of the Midland Main Line would require works to approximately

29km (18 miles) of existing conventional railway from the proposed spur off the HS2 main line at Clay Cross to Sheffield Midland Station, via Chesterfield Station. In addition, works would be required to a further 1km of existing conventional railway beyond the Clay Cross, Tapton and Dore Junctions to facilitate the operation of HS2 train services. The works associated with electrification of this section of the Midland Main Line are likely to include: the installation of necessary power supply infrastructure for operation of HS2 trains (e.g. overhead line equipment, electricity cables, and power supply points from the National Grid); providing appropriate clearance for HS2 trains at stations, tunnels, bridges etc. by raising existing structures, lowering existing track levels or realigning existing track as appropriate; additional track and track widening requirements at a number of locations along the route of the Proposed Scheme; realignment of roads, public rights of way and access routes, drainage features and any utility diversions; signalling and telecommunications infrastructure; necessary arrangements to accommodate HS2 trains at Chesterfield and Sheffield Midland stations; and provision of maintenance arrangements such as access points.

Development of the design and the associated environmental assessment process for the electrification works in this section of the Midland Main Line is at an earlier stage and will be reported in the formal ES. The environmental assessment of any likely significant effects of the electrification works in the section of the Midland Main Line between Clay Cross and Sheffield Midland Station will be reported in Volume 2: Community area reports for the MMLo1 Danesmoor to Brierley Bridge and MMLo2 Unstone Green to Sheffield Station areas of the formal ES. Any works that may be required to the existing conventional railway between the northern boundary of MMLo2 (north of Sheffield Midland Station) and Clayton Junction would be defined as off-route works for the purposes of the environmental assessment of the Proposed Scheme and this assessment would be reported in Volume 4: Off-route effects of the formal ES.

Land required

The land required for the Proposed Scheme would include:

- the operational rail corridor (which includes any land required for stations,

an infrastructure maintenance depot and rolling stock depots);

- land required for mitigation (including earthworks, landscape planting and new ecological habitats);
- land required to divert or realign roads, public rights of way, utilities and watercourses; and
- land required for construction activity, including: storage of excavated materials and soils, site compounds; worker accommodation sites; and temporary diversion of roads, public rights of way, private access routes and for permanent access to the railway for maintenance purposes.

Based upon a reasonable worst-case approach, the design and assessment at this stage generally assumes that all property falling within the land required for the Proposed Scheme would be demolished to enable construction and operation. However, as the design develops, it is likely that not all the properties reported within the assessment would need to be demolished, for example where not all of the land is required for permanent works.

Land used only for construction purposes would be restored as agreed with the owner of the land

and the relevant planning authority once the construction works in that area are complete.

Rail corridor

In most locations the route of the Proposed Scheme would comprise two railway tracks, one for northbound and one for southbound services. The rail corridor would also include other features including: overhead line equipment; electricity cables; railway drainage; line-side walkways and noise fence barriers, where required. The width of the rail corridor would vary along its length in order to accommodate the existing ground, cuttings and embankments.

In addition, some sections of the rail corridor would be wider to accommodate more than two tracks, for example, on sections of the route where different railway lines converge, on the approach to stations, and on the approach to the infrastructure maintenance depot and rolling stock depots.

The railway would be continuously fenced along the length of the rail corridor. The type of fencing used at each location would depend on the functional requirements and its context, for example, whether it is in a rural or urban setting.

An indicative cross-section through a two-track rail corridor at ground level is shown in Figure 4.

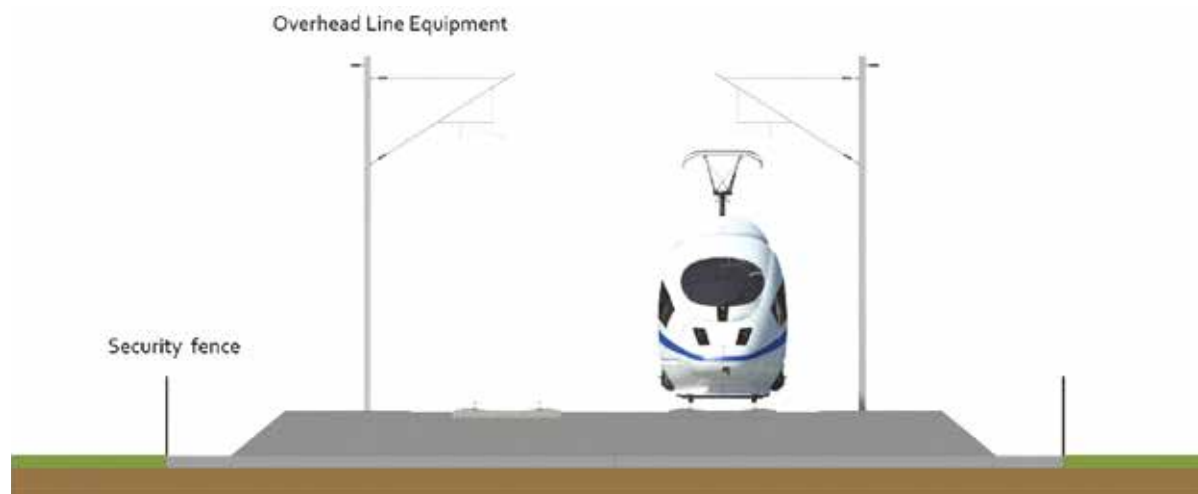


Figure 4: Indicative two-track rail corridor

3.3 Other components of the Proposed Scheme

Bridges and viaducts

Bridges or viaducts would be used where the route of the Proposed Scheme would cross an existing feature, such as a public right of way, road, river, canal, floodplain or existing railway (an example of a bridge is shown in Figure 5). Viaducts are constructed where embankments would not be a practicable or effective solution (an example of a viaduct is shown in Figure 6). The height of the bridges and viaducts is determined by the route alignment, surrounding ground levels and the feature being crossed.

HS2 Ltd is considering the need for green bridges as part of the Proposed Scheme and would be provided where necessary in order to maintain habitat connectivity and to enable the safe movement of animals across the route of the Proposed Scheme. The design of these bridges will take into account the surrounding topography and landscape patterns to support landscape integration and where appropriate the position of the heritage and cultural assets. Typically, these bridges would be multi-functional and provide other types of access such as footpath, road or agriculture as their

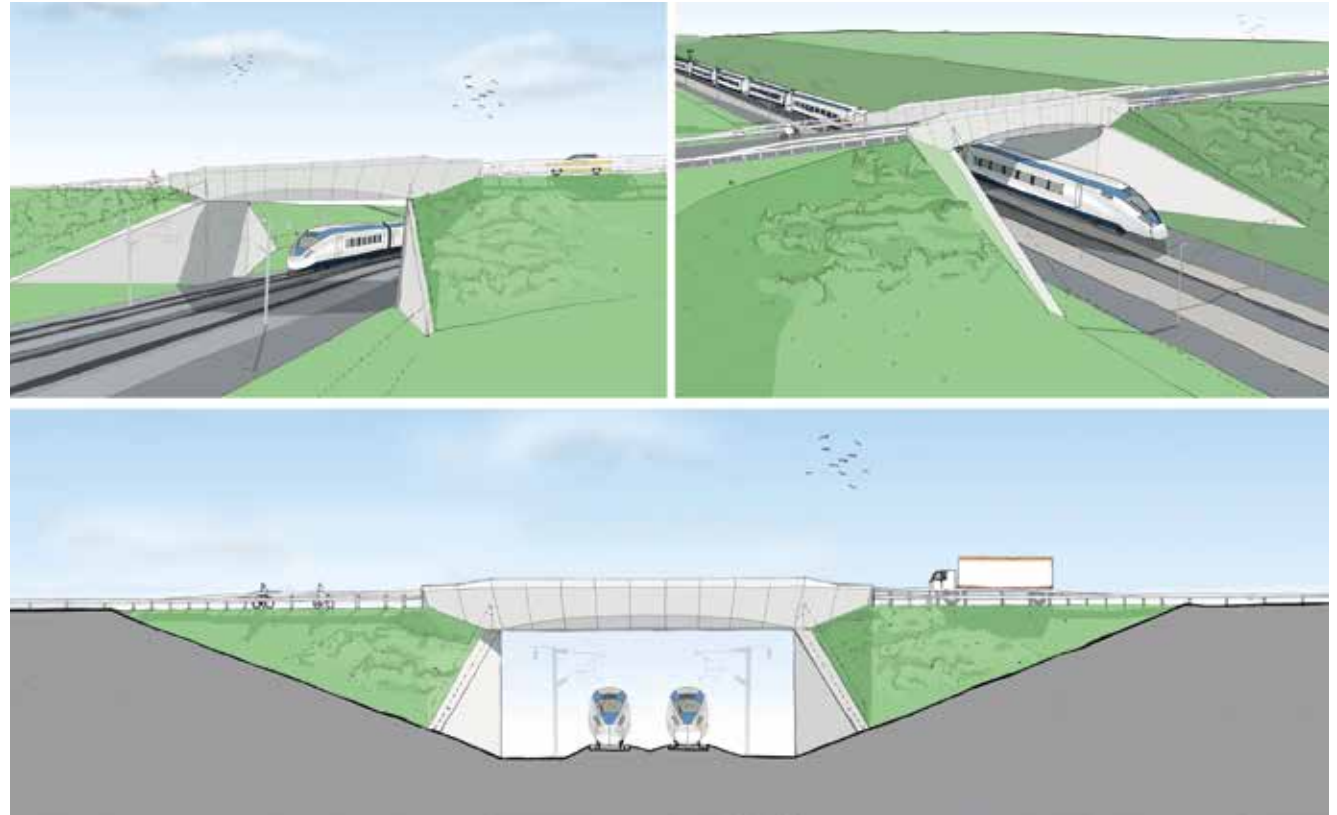


Figure 5: Illustration of a single span bridge

primary purpose. The main difference between a standard bridge and a green bridge is the increased width to allow vegetation, typically including one or two hedgerows comprising a range of local or native species, to be planted across the bridge.

Some underbridges would provide ecological connectivity through their design and planting approach.

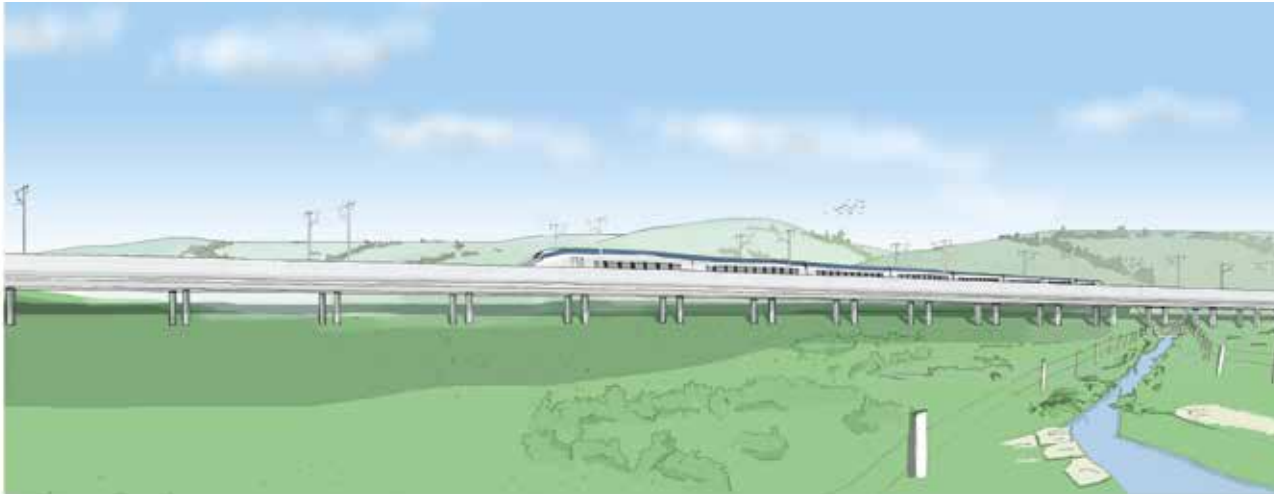


Figure 6: Illustration of a viaduct



Figure 7: Illustration of cut-and-cover tunnel portal

Tunnels

Tunnels would be constructed at a number of locations along the route of the Proposed Scheme, using a variety of construction methods. Long or deep tunnels would be created using a tunnel boring machine and would be twin-bore, comprising two parallel tunnels each containing a single rail track. Short tunnels would be constructed using a cut-and-cover method, which involves excavating downwards, building a structural box and then restoring the land over the top. Mined tunnelling/sprayed concrete lined techniques would be used on shorter sections of tunnels and cross passages, and where the tunnel geometry is complex. These tunnels would be excavated in stages, with excavated faces stabilised with sprayed concrete and other support measures.

All tunnels would have portals at each entry/exit. Portals would take different forms, depending on ground conditions, local topography, train speeds and whether they need to accommodate a tunnel boring machine during construction. Where necessary, tunnel portals are being designed to reduce noise and air pressure effects as trains enter/exit the tunnels. An example of a tunnel portal is shown in Figure 7.

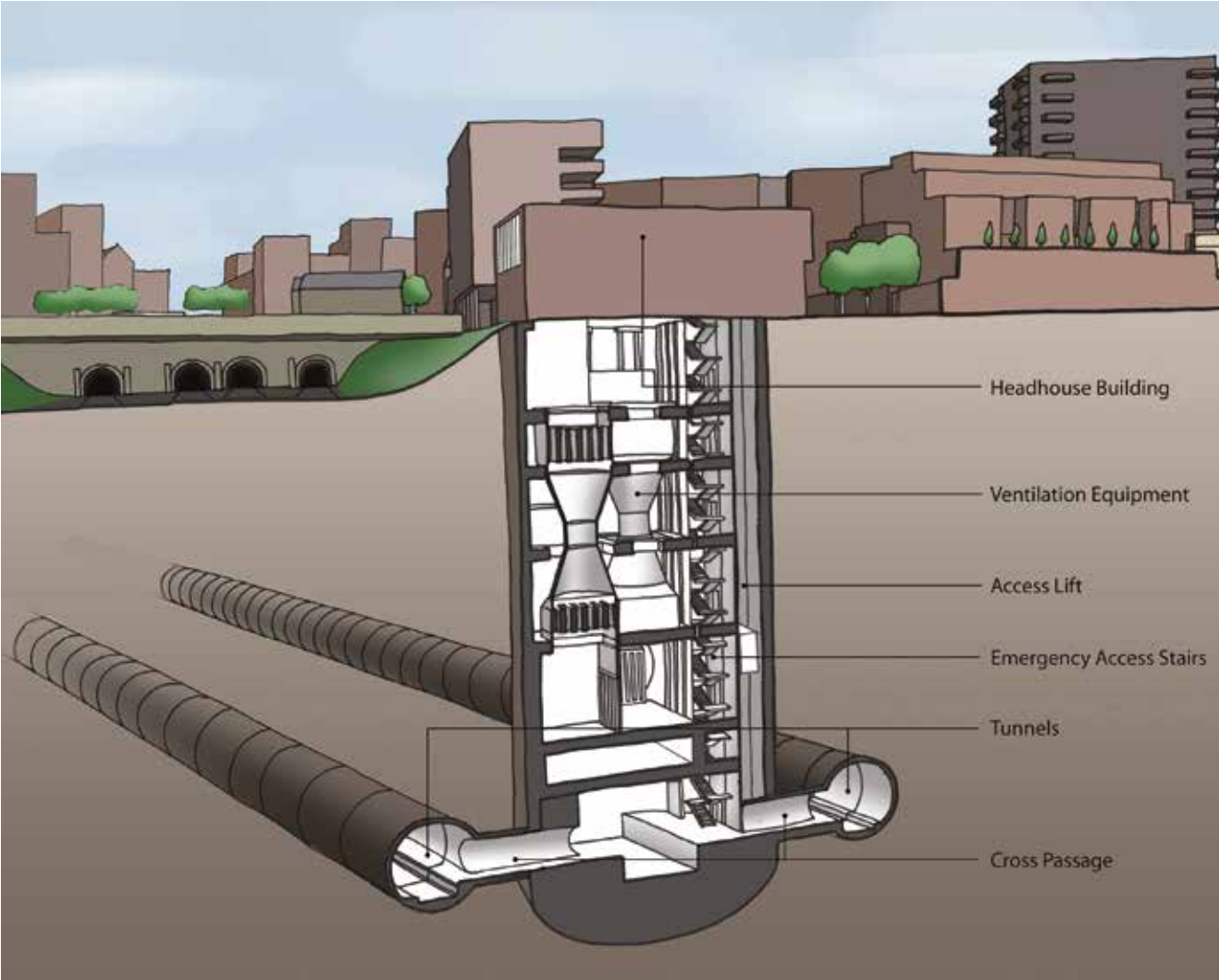


Figure 8: Illustration of a ventilation shaft and headhouse in an urban location

For safety reasons, tunnels are required to have cross-passage evacuation escape, spaced every 350m, between individual twin-bore tunnels. Shafts for ventilation (and in some cases, for emergency services access and exit) will be required at approximately 2-3km (1.2-1.9 mile) intervals and would incorporate both lifts and stairs, which surface at ground level in headhouses. These headhouses would accommodate ventilation fans, lift machinery and emergency access doors. The design and external appearance of headhouses would be approved by relevant local authorities in order to fit into the local surroundings. An example of a cross-section of a ventilation shaft and headhouse in an urban location is shown in Figure 8. Examples of a headhouse in a rural location are shown in Figure 9.



Figure 9: Illustration of a ventilation shaft and headhouse in a rural location

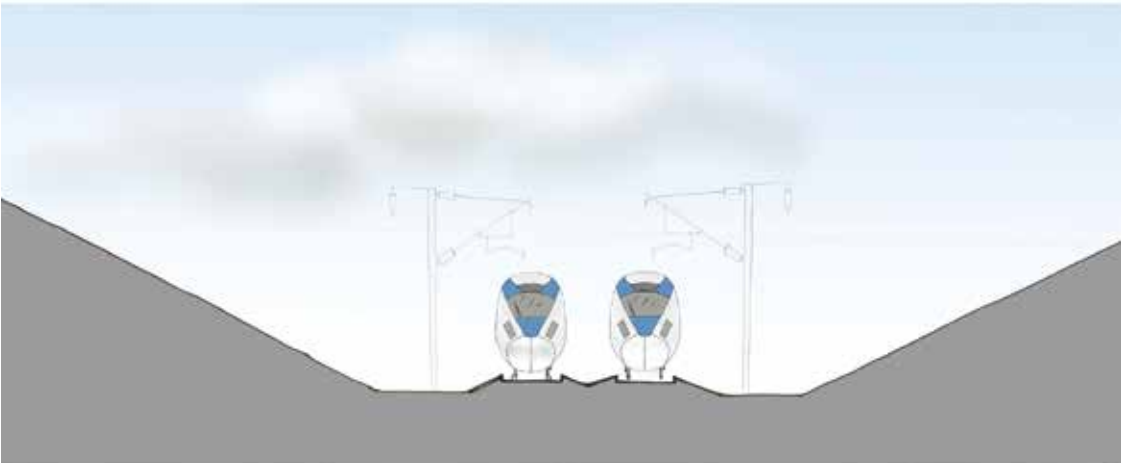


Figure 10: Illustration of a cutting and cross-section of cutting

Cuttings and embankments

The route of the Proposed Scheme is being designed without tight curves or steep gradients so that the high speeds required can be achieved. To facilitate this, sections of the route would be in cutting or on embankment. Cuttings are sections of the route where material has been excavated to make way for the railway and maintain rail levels below the existing ground level. An example of a cutting is shown in Figure 10.

In some locations, retaining walls are proposed on one or both sides of a cutting to reduce the amount of land required for the railway, as shown in Figure 11.

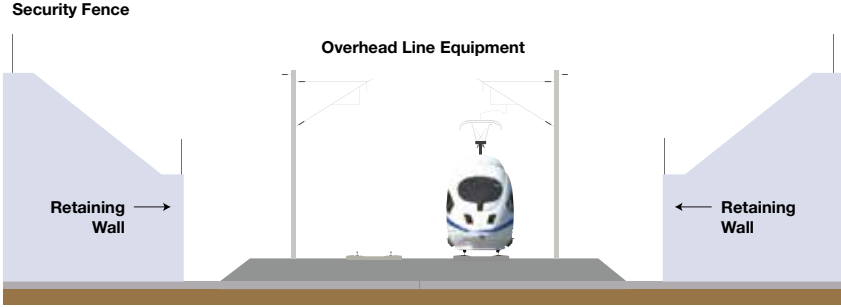


Figure 11: Illustration of retaining walls

False cuttings would also be used along the route of the Proposed Scheme. False cuttings involve forming raised earth bunds on one or both sides of the route of the Proposed Scheme to help screen and integrate it into the landscape.

Embankments are where the rail level is maintained above the existing ground level using compacted soils or rock material, known as 'fill' on which the rail track is laid. An example of an embankment is shown in Figure 12.

Priority would be given to using acceptable material excavated locally from cuttings and tunnels to form rail or road embankments and mitigation earthworks ('bunds') for noise and visual mitigation. A number of options are being considered for where additional high quality material is needed for rail embankment construction.

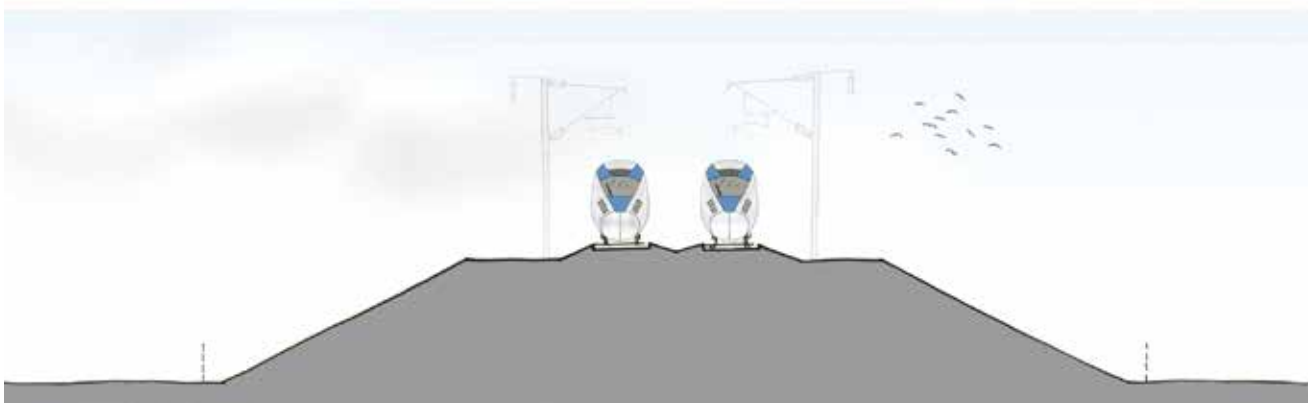


Figure 12: Illustration and cross-section of an embankment

Depots

The Proposed Scheme includes an infrastructure maintenance depot at Staveley to serve the eastern leg of the Proposed Scheme. The infrastructure maintenance base - rail at Stone, which is included in the Phase 2a Bill, would serve the western leg of the Proposed Scheme. Rolling stock depots would be located to the north of Crewe and to the east of Leeds city centre. More information on depots can be found in Section 4.4 of this NTS.

Track

The track would either be ballasted and/or slab track. Ballasted tracks are fastened to concrete sleepers supported by stone ballast (a form of crushed rock). Slab track would comprise pre-cast concrete slabs supported on a continuous structural layer. A final decision on the track form would be made during the detailed design of the Proposed Scheme.

Train control and telecommunications

The train control and telecommunications system would be operated from a route-wide HS2 network control centre at the Washwood Heath depot in Birmingham, which forms part of

Phase One. The purpose of the network control centre will be to supervise and control activities on the railway.

The Proposed Scheme would use radio communications for its operations and train control system, which would require radio antennae to be installed at fixed locations, approximately every 2-3km, along the route of the Proposed Scheme to provide coverage.

Power supply

Electrical power for the Proposed Scheme would be provided from National Grid grid supply points to auto-transformer feeder stations located adjacent to the route of the Proposed Scheme, either by underground or overhead power line connections. Each auto-transformer feeder station would occupy an area of approximately 3ha and would require road access for maintenance purposes.

Traction power auto-transformer stations, mid-point auto-transformer stations and express feeder auto-transformer stations would be required at regular intervals along the route of the Proposed Scheme, in order to distribute and manage the power supply from the auto-transformer feeder stations to trains. Power

would be transmitted to the trains through overhead line equipment.

Each of these traction power auto-transformer stations and mid-point auto-transformer stations would require an area of approximately 0.2ha and road access. Express feeder auto-transformer stations would require an area of approximately 0.4ha and road access. In addition to the power supply infrastructure required, some sites may also contain radio transmission masts up to 25m in height to carry train safety-critical communications.

Road, public right of way, utility and watercourse diversions

The nature and timing of any road diversions will be planned in consultation with the relevant highway authority. Roads, public rights of way and utilities that need to be diverted or realigned would normally follow the shortest practicable route, taking into account safety, pedestrian, cyclist and horse rider flows, motorised traffic flows, construction duration and local environmental effects.

Where new roads, bridges and public rights of way are required to cross the route of the Proposed Scheme, they would, where

reasonably practicable, be constructed in advance and offline to allow the existing route to continue in use until its replacement is ready to be brought into public use.

Where watercourses require diversion, channel flow would be designed and maintained in consultation with the relevant regulatory authority.

Site haul routes

Where reasonably practicable, movement of construction material, construction machinery and/or construction workers between the construction compounds and work sites would be on designated temporary roads within the area of land required for construction (known as site haul routes), along the line of the route of the Proposed Scheme, or running parallel to it. Using site haul routes would reduce the need for construction vehicles to use the existing public highway network, thereby reducing traffic related impacts on the road network and local communities.

Site haul routes would generally be no wider than 10m (including land for any associated infrastructure, such as signalling). Where a site haul route crosses a public highway or public

rights of way, the crossing points would be safely managed by either temporary traffic lights, roundabouts or manned control points.

Site haul routes would be surfaced at the connection point between a site haul route and public highway. This would help to maintain the cleanliness of the public highway.

Following construction, site haul routes would be appropriately restored.

Noise barriers

The Proposed Scheme would incorporate noise barriers where needed to avoid or reduce significant noise effects. These would generally take the form of landscape earthworks, such as cuttings and embankments, noise fence barriers and parapet barriers on viaducts. An example of a noise fence barrier is shown in Figure 13.



Figure 13: An example of a noise fence barrier

Design development

Design development continues for the Phase 2b route as further engineering and environmental baseline is collated, including from field surveys, and as part of ongoing engagement and consultation. Any further changes resulting from this would be reported in the formal ES.

The main areas of design development being considered include:

- refinement of the vertical and horizontal alignment of the Proposed Scheme;
- refinement of tunnel options including proposed lengths, design and construction methods;
- refinement of the proposed lengths and heights of viaducts and other river crossing structures and associated replacement flood storage areas, following the completion of flood modelling and assessment;
- environmental features required to help to integrate the railway into the landscape and mitigate likely significant adverse environmental effects;
- temporary and permanent utility diversions;
- refinement of the realignment of roads and public rights of way crossing the Proposed Scheme;
- refinement of drainage features required for rail and highways;
- refinement of accommodation works and crossings of the Proposed Scheme for private means of access;
- refinement of construction compound locations and site haul routes;
- potential need for, and location of, additional railheads to support construction of the Proposed Scheme;
- refinement of stations designs taking place in conjunction with stakeholders;
- potential need for, and location of, additional infrastructure maintenance depots and rolling stock depots;
- refinement of embankment heights;
- refinement of ventilation/intervention shaft locations for tunnels; and
- refinement of power supply.

HS2 Ltd recognises the importance of good design and has produced guidance for the appointed designers to achieve a high quality design which is functional, works well and responds sensitively in terms of scale to the local context along the route of the Proposed Scheme. It is also intended that the architectural and landscape design delivers a strong identity for the Proposed Scheme, including the creation of new landscapes, structures and transformational public spaces and places. Good design provides the opportunity to create new ecological habitats, improve water quality, provide opportunities for green infrastructure and build in resilience to the effects of climate change.

4. Construction and operation of the Proposed Scheme

4.1 Construction programme

The Proposed Scheme is expected to be constructed between 2023 and 2033 (including a period of system testing and commissioning). The duration, intensity and scale of construction along the route of the Proposed Scheme would vary over this period.

Initial works (refer to Figure 14) would include site establishment, erection of temporary fencing, establishment of construction compounds, and preliminary activities, such as utility diversions. Landscape planting would also be implemented as early as is reasonably practicable before the main construction activities, where there is no conflict with construction activities or other requirements of the Proposed Scheme.

Preparatory mitigation works would also take place at this time. This would be followed by the main period of construction activity and civil engineering works, to construct the main earthworks and structures of the Proposed Scheme, including cuttings, embankments, bridges and viaducts. Once these major components have been built,

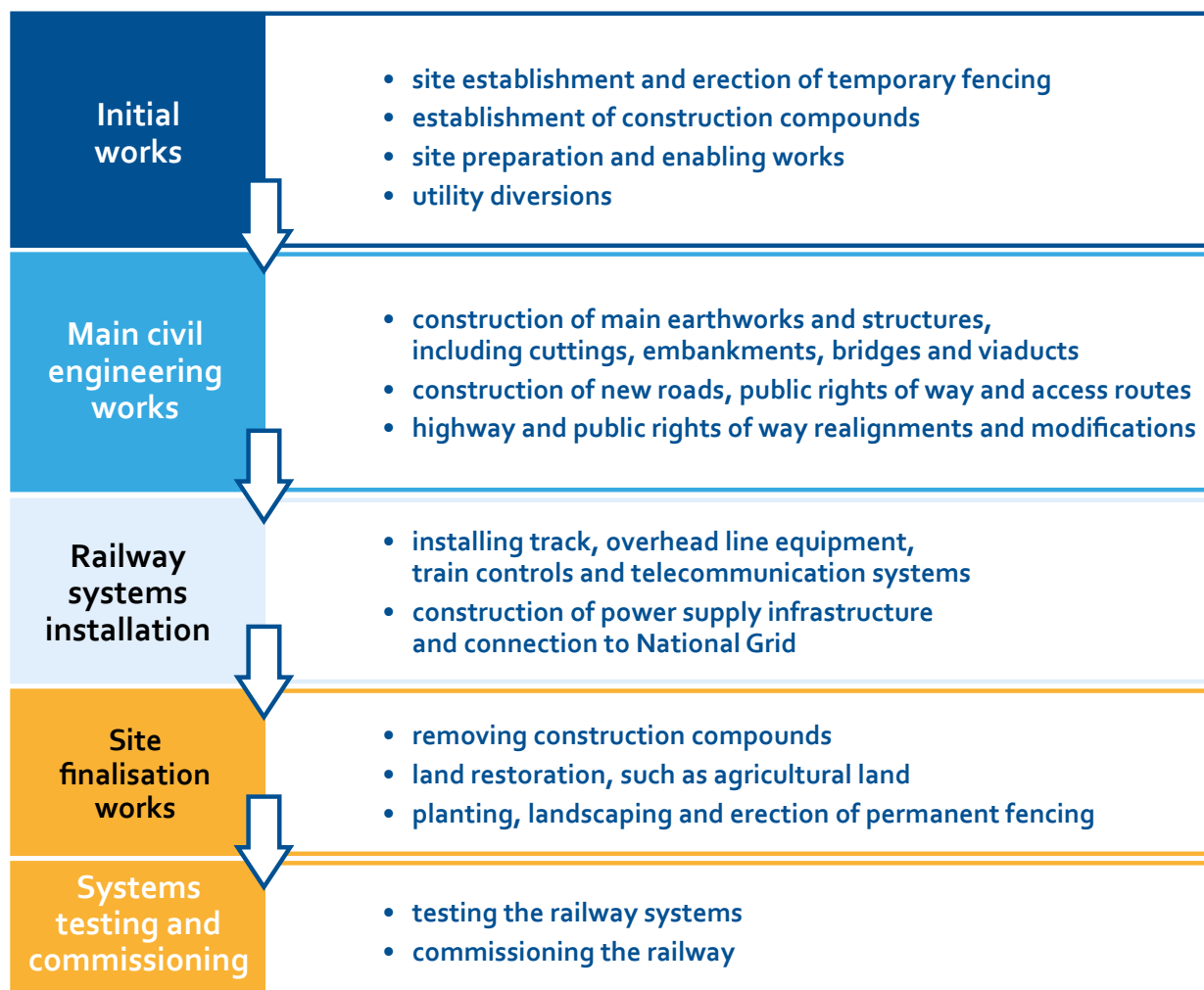


Figure 14: Stages of construction activities

activity would focus on the installation of track, overhead line equipment, train control and telecommunications systems. Finalisation works, including removing construction compounds and land restoration, would be carried out before a period of system testing and commissioning.

4.2 Construction management

Code of Construction Practice and local environmental management plans

The construction of the Proposed Scheme would be required to comply with the Code of Construction Practice, a draft of which has been provided as part of the working draft ES.

Construction works would be undertaken by appropriately experienced construction contractors. The draft Code of Construction Practice sets out the proposed measures to manage and control the effects of construction.

The draft Code of Construction Practice also includes arrangements for monitoring of environmental effects during construction, where appropriate. At a local level, site-specific control measures would be included within local environmental management plans.

The draft Code of Construction Practice would be finalised when the hybrid Bill is enacted. The nominated undertaker (the body or bodies appointed to implement the powers of the hybrid Bill to construct and maintain the Proposed Scheme) would be required to comply with the Code of Construction Practice throughout the construction period.

The local environmental management plans would build on the project-wide environmental requirements contained within the Code of Construction Practice. The plans would set out how the Proposed Scheme would adapt and deliver the required environmental and community protection measures within each relevant local authority area, through a series of topic-specific measures (including, for example, air quality and noise monitoring reports) that reflect the general requirements of the Code of Construction Practice.

The nominated undertaker and its contractors would engage with the community, focusing on those who may be affected by construction, such as local residents, businesses and community facilities. The nominated undertaker or its contractors would notify

local communities in advance of any road or public right of way realignments, diversions or closures.

Construction compounds

There would be two types of construction compound along the route of the Proposed Scheme: main and satellite compounds.

Main compounds would act as strategic hubs for core project staff, such as engineering, planning and construction delivery staff. They would include areas for the storage of construction equipment and materials, maintenance and parking facilities, together with the main welfare facilities and office accommodation for construction staff.

Satellite compounds would generally be smaller than main compounds, and would be used as the base to manage specific works along a section of the route of the Proposed Scheme. 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.

Some compounds would be used for major stockpiling of materials such as soil, for transfer nodes (where bulk deliveries or excavated materials leave or enter the construction worksites from public roads).

A number of satellite compounds would continue to be used for railway systems works, testing and commissioning of the railway following the completion of civil engineering works at these locations. The railway systems compounds would facilitate installation, testing and commissioning of the railway systems, including track, overhead line equipment, communication and signalling equipment, and power supply.

Buildings within compounds would generally be temporary modular units that would be positioned to maximise construction space and limit the area of land required. In urban areas, or where there is limited space, it may be necessary to stack these units.

The total number of compounds per community area is set out in Section 8 of this NTS. The siting of construction compounds has been influenced by a number of factors including:

- size of the site required;
- proximity to locations of major construction activities;
- proximity to main roads and rail/bus routes;
- accessibility for local workforce and the presence of existing local facilities (e.g. shops);
- existing land use and proximity to sensitive features of the environment and communities;
- avoiding floodplains; and
- ease of establishing and maintaining security.

Security fencing or hoarding would be provided around the perimeter of each construction compound.

Overnight accommodation for construction staff would be provided at a number of compounds in order to help to reduce daily travel for those not normally based locally. This will be assessed and reported in the formal ES.

Details for construction compounds are provided for each area in the relevant Volume 2: Community area report, Section 2.

Construction worksites

Construction compounds, both main and satellite, would act as the main points of entry to the construction worksites. Access to the construction worksites would be by road (including heavy goods vehicles and light goods vehicles), site haul route or rail to deliver construction material or machinery.

Railheads

Railheads would be required for construction of the Proposed Scheme. The railheads would be used as the delivery location for bulk materials such as fill material, concrete beams, ballast, pre-cast slab track, rails and sleepers. Facilities at the railheads would include offices, welfare facilities, storage areas, workshops, a rail marshalling yard and pre-assembly area and car parking areas. Rail deliveries into the railhead would be undertaken both during day and night-time hours and at weekends, although unloading would generally be undertaken during core working hours.

Railheads would be located in proximity to the existing conventional railway and strategic road network to facilitate the movement of material. At this stage in the design, the requirement for a railhead has been identified at the site of the proposed Staveley Infrastructure Maintenance Depot. In addition, sites for potential railheads are currently being considered in the Ashby-de-la-Zouch area and within the Hulseheath to Manchester Airport area. The potential need for, and location of, additional railheads for construction of the Proposed Scheme would be confirmed in the formal ES. Stakeholders associated with potential railhead locations and operational characteristics would be engaged during the design development process.

Borrow pits

For construction of the Proposed Scheme, there is anticipated to be a shortfall of acceptable engineering material (typically sands and gravels) from the excavation of cuttings and other works (for example, tunnels or balancing ponds) to construct the HS2 railway embankments. As part of the ongoing development of the Proposed Scheme design, three options are being considered to overcome

this shortfall: using materials extracted during the construction of the Proposed Scheme, which are unlikely to be acceptable on their own, and stabilise with cement or lime; using suitable granular material imported from commercial quarries; and excavating acceptable engineering material from borrow pits.

Excavating borrow pits would provide an option for acceptable engineering material to be extracted and processed more locally to the Proposed Scheme, generating lower construction traffic movements than importing the material from commercial quarries.

Potential borrow pit locations will be identified as part of the ongoing design development and assessment process. Where borrow pits are identified for inclusion in the design of the Proposed Scheme, the environmental assessment will be reported in the formal ES.

Working hours

The draft Code of Construction Practice outlines the proposed working hours for construction. Core working hours would be from 08:00-18:00 on weekdays (excluding bank holidays) and from 08:00-13:00 on Saturdays. The nominated

undertaker would require its contractors to adhere to these core working hours, subject to the activities during additional hours described in the following paragraphs.

Tunnelling (excluding cut-and-cover tunnels) and directly associated activities (such as removal of excavated material, supply of materials and maintenance of tunnelling equipment) would be carried out on a 24 hours a day, seven days a week basis. Where reasonably practicable, excavated material would be stored within the compound boundary for removal during core working hours.

Certain activities, such as earthworks, are season-and weather-dependent. Contractors may seek to extend the core working hours and/or days for such operations to take advantage of daylight hours and weather conditions, subject to the approval of the relevant local authority. Certain other specific construction activities would require extended working hours for reasons of engineering practicability. Abnormal loads, or those requiring a police escort, may be delivered outside core working hours subject to the requirements and approval of the relevant authorities.

Guidance on site-specific variations to core working hours and/or additional hours likely to be required would be included within the local environmental management plans following consultation with the relevant local authority. To maximise productivity within the core working hours, the contractors would require a period of up to one hour before and up to one hour after core working hours for start-up and closedown of activities. Activities within these periods would include (but not be limited to) deliveries, movement to place of work, unloading, maintenance and general preparation works. Activities within these periods would not include operation of plant or machinery likely to cause a disturbance to local residents or businesses.

Site restoration

All temporary plant, materials, equipment, buildings, access roads and vehicles would be removed from site when construction is complete. This would allow the land used temporarily for construction purposes to be restored.

Where agricultural and forestry land is required only for construction purposes, it would be restored as agreed with the landowner and the relevant local planning authority.

System testing and commissioning

The railway would be fully tested to ensure it can operate safely and reliably. Commissioning would allow operational procedures to be tested and refined alongside the training of staff. The period of testing, commissioning and trial operation is expected to take place between 2030 and 2033.

Testing and commissioning would start on the section of route of the Proposed Scheme closest to the connection with Phase 2a on the western leg and the connection with Phase One on the eastern leg.

4.3 Services and operating characteristics

HS2 trains

HS2 could be used by two types of service. Services running on both the HS2 main line and existing rail infrastructure will use specially designed high speed trains (referred to as 'conventional compatible' trains). Services only

operating on the HS2 main line would use standard European-sized high speed trains (referred to as 'captive' trains) or conventional compatible trains.

Depending on demand and the time of day, services will operate as 200m long trains, carrying up to approximately 550 passengers, or as two trains coupled together to form 400m long trains, carrying up to approximately 1,100 passengers.

High speed trains would generally operate at up to 360kph (225mph), where the alignment allows. However, where possible, the alignment of the route of the Proposed Scheme has been designed to allow for train speeds of up to 400kph (approximately 250mph) in the future where there is a commercial justification for doing so. Operation at up to 400kph would require demonstration that improved train design enables services to operate at that higher speed without giving rise to further significant environmental effects.

The maximum operating speeds over each section of the route of the Proposed Scheme are anticipated to be as follows:

- up to 360kph (225mph) on the western leg between the interface with Phase 2a and the connection to the West Coast Main Line near Golborne;
- up to 230kph (142mph) on the western leg spur into Manchester;
- up to 360kph (225mph) on the eastern leg between the interface with Phase One and the connection to the conventional railway network and the East Coast Main Line near Ulleskelf;
- up to 200kph (125mph) on the Sheffield Southern spur and 120kph (75mph) on the connection to the Midland Main Line; and
- up to 230kph (142mph) on the eastern leg spur into Leeds.

HS2 services

Services would operate between 05:00 up to midnight from Monday to Saturday and between 08:00 up to midnight on Sunday. Maintenance and engineering works would normally take place outside these operational hours, unless the works can be safely undertaken with trains operating at the same time.

The expected fastest typical journey times with the Proposed Scheme are set out in Table 1 of this NTS.

4.4 Maintenance and stabling of trains

Maintenance

Inspections of the railway would take place on a regular basis, at night when the railway is not operating. There would be routine preventative maintenance to keep the track and other equipment (e.g. electrical and mechanical

equipment) in good condition, and more periodic heavy maintenance as necessary.

HS2 trains would be maintained at rolling stock depots north of Crewe and to the east of Leeds city centre, where activities would include cleaning and servicing.

An infrastructure maintenance depot at Staveley would provide the base for maintenance work along the eastern leg. The western leg would be served by the infrastructure maintenance base-rail near Stone which forms part of the Phase 2a route.

Stabling and use of off-route depots

Overnight train stabling and service preparation would likely be required to take place at off-route locations in order to reduce the number of empty train movements at the beginning and end of service. These depots/stabling facilities are discussed in Section 10 of this NTS.

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5. Preparation of the Environmental Statement

5.1 Introduction

The main steps in the preparation of the working draft ES and formal ES for the Proposed Scheme are shown in Figure 15 and are outlined in this section. The ES is being prepared in accordance with UK and European legislation on environmental impact assessment, and relevant guidance.

While the UK has notified its intention to withdraw from the European Union (EU), the UK remains a member until withdrawal, meaning that rights and obligations under EU law apply until the date of departure. Environmental assessment has been and will continue to be integral to the development of the Proposed Scheme.

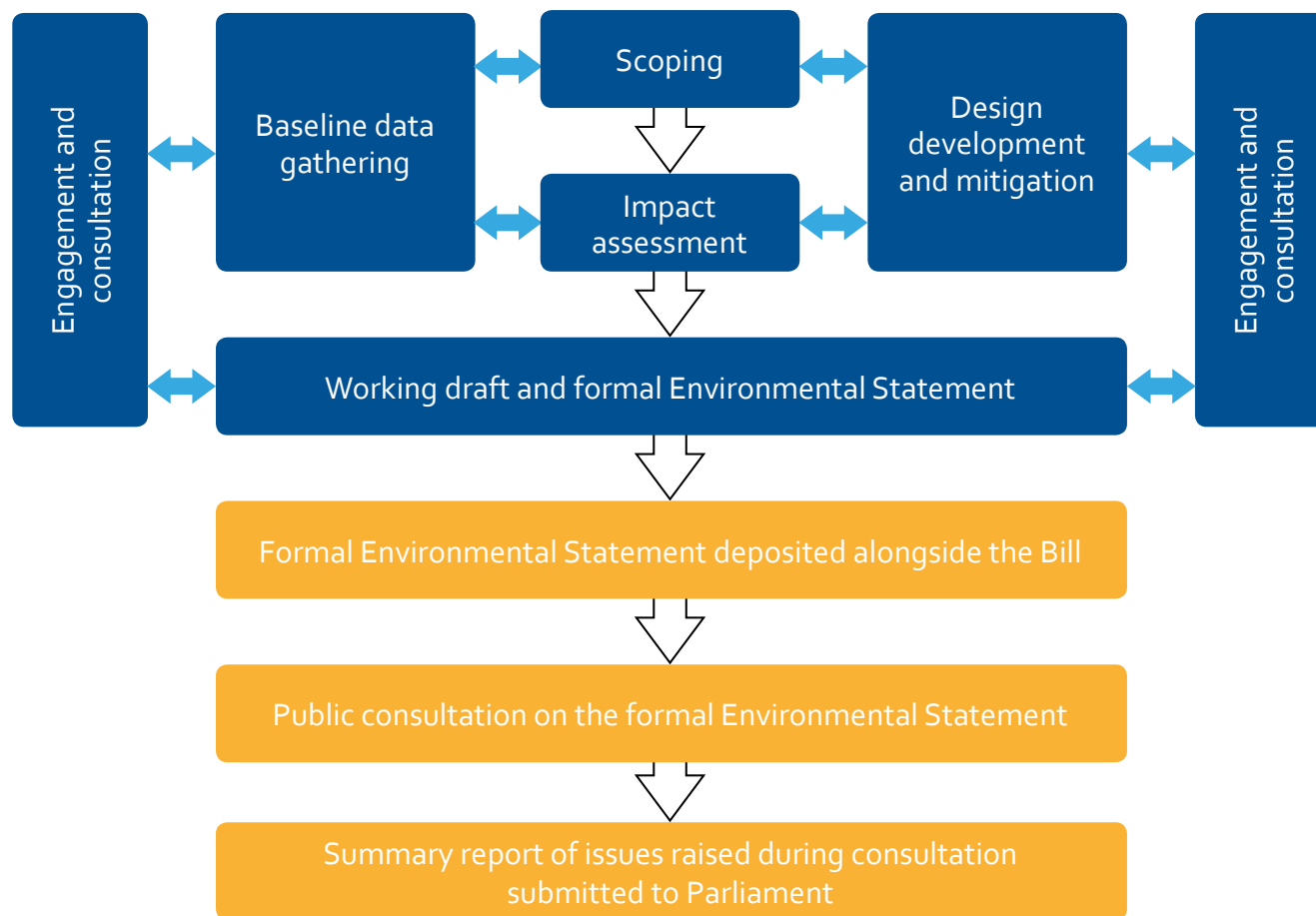


Figure 15: Environmental assessment process for the Proposed Scheme

5.2 The Environmental Statement

The working draft ES sets out the Proposed Scheme, its likely significant environmental effects and the measures envisaged to avoid, prevent, reduce or offset and monitor those effects, based on the current level of understanding.

The purpose of the working draft ES is to provide the public and other stakeholders with an opportunity to review and comment on preliminary environmental information for Phase 2b, based on a stage in the ongoing design development and environmental assessment process. Survey and assessment work is ongoing and baseline information is not complete at this stage. The assessment for this working draft ES is, therefore, provisional and has been undertaken based on a precautionary approach. The EIA and design of the Proposed Scheme will continue to be refined during and following this consultation and a full assessment will be reported in the formal ES.

The EIA process for the Proposed Scheme comprises the following related activities:

- preparation of EIA Scope and Methodology Report ('scoping') to determine the scope of the assessment, including the range of environmental topics to be addressed. The draft Scope and Methodology Report was published in July 2017 for consultation with the public, local authorities and a wide range of environmental organisations. The EIA Scope and Methodology Report is published as a supporting document to the working draft ES;
- collection of information about current environmental conditions ('the baseline') in the vicinity of the Proposed Scheme. As this is a working draft ES, where information is not currently available professional judgement and reasonable assumptions have been used to provide an indication of likely impact to inform consultation and engagement on the Proposed Scheme;
- prediction of future environmental conditions without the Proposed Scheme ('the future baseline'). This will be reported in the formal ES;
- environmental input to design development including consideration of reasonable alternatives;
- assessment of the likely beneficial and adverse significant environmental effects of the Proposed Scheme in accordance with the EIA Scope and Methodology Report;
- development and assessment of proposed mitigation for identified likely significant adverse environmental effects;
- assessment of the remaining significant adverse environmental effects of the Proposed Scheme assuming the proposed mitigation is in place (referred to as 'residual effects');
- engagement and consultation with stakeholders on a working draft ES to help inform the design and assessment of the Proposed Scheme. The working draft ES presents preliminary environmental information in the form of available baseline data, likely significant environmental impacts and proposed mitigation measures, where required, based on a stage in the ongoing design development and environmental assessment process;
- further environmental assessment and refinement of the Proposed Scheme design, including consideration of comments received on the working draft ES;

- finalisation and submission of the formal ES with the hybrid Bill for the Proposed Scheme; and
- following deposit of the hybrid Bill and the formal ES, there is public consultation on the formal ES during the Parliamentary process. Consultation responses will be summarised by an independent assessor to inform Members of Parliament ahead of the Second Reading of the hybrid Bill.

5.3 Meeting environmental requirements

In order to ensure that the environmental effects of the Proposed Scheme do not significantly exceed those assessed in the formal ES the Secretary of State for Transport will establish a set of Environmental Minimum Requirements (EMR). The EMR will sit alongside the statutory environmental controls included in the hybrid Bill. The nominated undertaker will be required to comply with both the EMR and those statutory environmental controls throughout construction and operation of the Proposed Scheme.

The EMR, together with the controls in the hybrid Bill, will include the general principles that ensure that the impacts identified in the ES will not be exceeded, unless:

- this results from a change in circumstances that was not foreseeable at the time the ES was prepared;
- any such changes will be unlikely to have significant adverse environmental effects;
- the relevant works will be subject to a separate consent process and further EIA; or
- any such change results from a change or extension to the project, where that change or extension does not itself require an EIA.

The EMR will also require the nominated undertaker to use reasonable endeavours to adopt measures to further reduce the adverse environmental effects, provided that such measures are reasonably practicable and do not add unreasonable cost or delay to the construction or operation of the Proposed Scheme.

The EMR will be set out in the formal ES and are anticipated to include:

- a Code of Construction Practice: which will set out measures to provide effective planning, management and control during construction;
- an Environmental Memorandum; which provides a framework for HS2 Ltd and its contractors and stakeholders, such as the Environment Agency and Natural England, to work together to ensure that the design and construction of the Proposed Scheme is carried out with due regard for environmental considerations;
- a Planning Memorandum, which will set out the agreements between the Department for Transport, the nominated undertaker and the local planning authorities relating to the processing of detailed planning approvals under the provisions of the hybrid Bill, including the design and appearance of stations, depots, bridges, viaducts, tunnel portals, noise barriers and earthworks;

- a Heritage Memorandum, which will set out a commitment to limit the impact on the historic environment and will address the elements of the design and construction works that would have a direct impact on heritage assets; and
- undertakings and assurances given during the passage of the hybrid Bill.

If changes are made to the Proposed Scheme after Royal Assent, these would be assessed to ensure that the environmental impacts assessed in the formal ES would not be exceeded. If the significant environmental effects identified in the ES are likely to be exceeded, all reasonable steps would be taken to reduce or eliminate those additional impacts.

5.4 Monitoring

The working draft ES sets out monitoring requirements during the construction period and for environmental topics during operation of the railway, where this is appropriate.

The draft Code of Construction Practice sets out indicative inspection and monitoring procedures to assess the effectiveness of measures to prevent or reduce environmental effects during construction. Relevant local authorities and regulatory authorities, such as the Environment Agency, would be consulted on the monitoring procedures to be implemented prior to construction.

Monitoring during operation would, where appropriate, be with the relevant planning authorities or other regulatory authorities.

Further information on monitoring is set out in Section 7 of this NTS.

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6. Strategic, route-wide and local alternatives

6.1 Strategic alternatives to the Y network previously studied

The Government has concluded that action is needed to meet the future travel needs of Britain and 'doing nothing' is not an option.

Before deciding to proceed with HS2, a wide range of options to address Britain's inter-urban transport challenges were reviewed. These included domestic aviation, new motorways, a new conventional speed rail line as well as upgrades to existing roads and railways.

The potential for capacity upgrades to the existing conventional rail network has been explored. The Government rejected this option as further upgrades would not provide the scale of capacity increase and connectivity benefits needed to fulfil the Government's objectives. This would also fail to meet Government objectives for future performance of the conventional rail network and would cause considerable disruption to existing train services during construction.

Carbon emissions from air travel are significantly greater than from high speed rail. The capacity of London's airports is limited and providing for future growth in international travel will be a significant challenge without also serving

additional demand from domestic air services. The Government's policy, therefore, is to enable and encourage more people to take the train instead of flying for domestic and short-haul journeys, to achieve environmental benefits and to release capacity at airports for longer journeys.

The Government also decided not to give further consideration to major new motorways as an alternative to HS2, as high speed rail is preferable in terms of both capacity and journey times and has lower carbon emissions and environmental effects.

The cost of a new conventional speed railway would be almost as high as that of high speed rail without delivering the reduced journey times and would have only marginal environmental benefits. For these reasons, a new conventional rail line option was rejected.

Prior to the introduction of the Phase One hybrid Bill into Parliament in November 2013, the Government considered and reported on alternative configurations for its proposed high speed rail Y network. The Government's conclusions and its reasons for promoting the network were reported both in the Command Paper High Speed Rail: Investing in Britain's

Future (2012) and in the ES deposited in Parliament alongside the Phase One hybrid Bill in accordance with standing orders. The Phase One hybrid Bill was enacted in February 2017.

6.2 Alternatives to the Proposed Scheme

The Government and HS2 Ltd considered four categories of alternatives for the Proposed Scheme:

- strategic alternatives: including doing nothing, alternative modes (air or road) and alternative high speed configurations to the Y network;
- route-wide rail alternatives: alternatives to Phase Two, including rail alternatives to Phase 2b;
- route corridor alternatives: variations of the Phase 2b route, or sections of it; and
- local alternatives: different design, construction and mitigation arrangements for the route at or around a community area level.

For each of the categories, alternatives have been evaluated on a comparative basis against benefits, cost, engineering design and environmental impact.

Strategic alternatives

Do nothing

The 'do nothing' scenario would involve not delivering the Proposed Scheme between Crewe and Manchester and between the West Midlands and Leeds, nor connections to the West Coast Main Line, the East Coast Main Line or the Midland Main Line. However, the Government has concluded that action is required to meet the rising demand for inter-city rail travel, and reduce crowding and congestion on the existing conventional rail network, to support economic growth. The Government does not, therefore, believe that it is tenable to do nothing.

Alternative modes air or road

The Government considers that a continuing increase in demand will create a need for additional capacity to cater for inter-city journeys between London and the major conurbations in the Midlands and the North. It does not, however, believe transferring rail demand to road or domestic aviation to be an appropriate solution. Rather, the Government considers that the rail network needs to deliver new capacity and that this new capacity should be a new high speed rail network.

Route-wide rail alternatives

In November 2016 the Department for Transport commissioned a study to assess the route-wide rail alternatives to Phase 2b of HS2. Five options, that all tried to varying degrees to overcome capacity and journey time limitations on the West Coast Main Line, the East Coast Main Line, and the Midland Main Line, were developed and considered against the Proposed Scheme and a 'do minimum' (with Phase 2a) scenario.

The appraisal of alternatives found that:

- the Proposed Scheme would offer the fastest journey times between London and Leeds, Manchester, Newcastle, the East Midlands and Sheffield;
- the Proposed Scheme and the route-wide rail alternatives would create extra capacity on the existing conventional rail network for other services, but only the Proposed Scheme would meet the strategic objectives of HS2;
- the Proposed Scheme would provide more train seating capacity to key destination cities;
- the resilience of the rail network would be improved with the introduction of

the Proposed Scheme due to a new high speed line coming into operation;

- construction of the route-wide rail alternatives would require significant disruption to rail passengers at weekends and on weekday nights; and
- the route-wide rail alternatives would have a reduced environmental impact when compared to the Proposed Scheme, largely because they could be delivered through upgrades and alterations to sections of the existing conventional rail network within or adjacent to existing railway land.

Route corridor alternatives

The Proposed Scheme has evolved through a refinement process referred to as sifting. The sifting process consisted of a successively more detailed appraisal of route options whereby sustainability performance was considered alongside cost, operational and engineering considerations. Since the Government first started considering plans for a Y-shaped high speed rail network, many thousands of kilometres of options for Phase Two have been appraised.

Various route alignments were considered for the western leg, including the examination of different routes across the Cheshire plains, different approaches into Manchester, different terminus stations in Manchester city centre, and proposed depot locations.

Consideration of route corridor alternatives on the eastern leg included locations for stations in the East Midlands and Yorkshire, route alignments around Derby and Nottingham, approaches to, and the location and form of, the terminus station in Leeds city centre, connections to the East Coast Main Line and proposed depot locations.

Local alternatives

Local alternatives to the Proposed Scheme have been considered both prior to the Government's announcement of the route in July 2017 (as part of the early design and examination of route-corridor alternatives), and since that route announcement as part of the EIA process.

The local alternatives considered prior to the route announcement comprised those raised during the course of HS2 Ltd consultations, those resulting from the implementation of

revised engineering standards, and general improvements in relation to cost and ease of construction. Most of the alternatives studied took the form of different alignments and were assessed against their cost, engineering feasibility, journey times and potential environmental impact. In some locations it was concluded that the alternatives proposed did not offer any net benefit and were not taken forward. In others the route was amended. The revised scheme formed the basis of the route that was the subject of the Government's route announcement in July 2017.

Since July 2017, as part of the design development, a process of considering potentially feasible local alternatives by engineering, planning and environmental specialists has been undertaken. This will continue following this consultation, and be reported in the formal ES. Alternatives are being developed for individual areas of the route, which can be broadly categorised as follows:

- route alignment: for example moving the route further away from residential areas and other sensitive areas, or raising or lowering the route in places to reduce the

area of land required for construction, or to mitigate landscape and visual impacts;

- how the route passes through an area: for example, having the route run on embankment instead of viaduct;
- location and/or design of Proposed Scheme features: including viaducts, embankments, tunnels, tunnel portals; and
- design and/or location of diversions for utilities, watercourses, public rights of way and roads.

These alternatives are being assessed against the Proposed Scheme, based on the following criteria:

- engineering requirements: the degree of design complexity and the impact this would have on construction durations;
- cost: whether the alternatives would be more cost effective or incur additional costs; and
- potential environmental impact: whether the alternatives would have more or fewer potential environmental impacts (e.g. sound, noise and vibration and landscape and visual).

7. Approach to environmental mitigation and monitoring

7.1 Introduction

Mitigation

Environmental legislation requires an ES to include a description of the measures envisaged in order to avoid, prevent or reduce the significant adverse effects of the Proposed Scheme on the environment. Such measures are described as 'mitigation measures'.

HS2 Ltd's aim is to avoid or prevent adverse environmental effects, where reasonably practicable (for example, through changes in route alignment). Where this is not achievable, HS2 Ltd is considering mitigation measures to reduce or avoid such effects (for example, lowering the alignment to reduce visual impact). Where, despite efforts to avoid and reduce them, significant adverse environmental effects are predicted to occur, HS2 Ltd seeks to propose restoration and compensation measures.

This approach is driven by the HS2 Sustainability Policy and the HS2 Environmental Policy, with the latter stating HS2 Ltd's commitment to "developing an exemplar project, and to limiting negative impacts through design, mitigation and by challenging industry standards whilst seeking environmental enhancements and benefits".

Furthermore, the Environmental Minimum Requirements (EMR) would impose a general requirement on the nominated undertaker to use reasonable endeavours to adopt measures to reduce the adverse environmental effects reported in the formal ES, provided that this does not add unreasonable cost or delay to the construction and operation of the Proposed Scheme. The draft Code of Construction Practice is being produced in conjunction with the working draft ES and later with the formal ES, so that the EIA process can take account of the measures that would be imposed during construction to avoid or limit the occurrence of environmental impacts and effects.

The measures to avoid, reduce or manage environmental effects depend on the nature and severity of the adverse environmental effect and of the effectiveness and value for money of the mitigation measures under consideration. Mitigation that is being incorporated into the route alignment and design of the Proposed Scheme includes:

- selection of the Proposed Scheme from a range of alternatives taking account of environmental issues;

- developing the route of the Proposed Scheme to avoid where possible likely significant adverse environmental effects, including on residential properties, community facilities, public open space, businesses, farm buildings, sites of ecological and/or heritage importance;
- using mitigation earthworks and/or planting to screen views and integrate the Proposed Scheme into the local landscape;
- providing noise barriers (fence barriers or earthworks) to reduce effects on communities;
- providing links under or over the Proposed Scheme to maintain access for roads, public rights of way and properties and allow safe passage of wildlife;
- creating new habitats and other features of ecological value to compensate for unavoidable losses;
- limiting, as far as reasonably practicable, the amount of land required for the construction and operation of the Proposed Scheme;
- avoiding or reducing impacts on floodplains and the provision of replacement floodplain storage areas; and

- providing balancing ponds to control surface water run-off from the Proposed Scheme in rural areas.

Monitoring

Environmental legislation requires an ES to include a description, where appropriate, of any proposed monitoring arrangements of significant adverse effects on the environment that arise from the construction and operational phases of a scheme.

As described in Section 4.2 of this NTS, the draft Code of Construction Practice includes commitments to monitoring significant effects during construction. During operation of the Proposed Scheme, appropriate post-construction monitoring would be carried out for both:

- ‘general’ monitoring, for example, monitoring of the progress of habitat creation works, the condition of restored agricultural land, and the establishment of landscape planting; and
- ‘specific’ monitoring agreed for particular significant adverse effects where appropriate, for example, monitoring of a public water supply borehole.

The EIA process is iterative and mitigation and monitoring will be reviewed and developed during the assessment process and will be informed by consultation. Mitigation and monitoring opportunities will, therefore, continue to be identified during development of the Proposed Scheme prior to submission of the hybrid Bill.

The remainder of this section provides a preliminary description of the range of measures and policies that have either already been adopted or will be considered as the assessment proceeds.

7.2 Agriculture, forestry and soils

Mitigation

In rural areas, agriculture is the most common land use. In developing the Phase 2b route, HS2 Ltd is working to limit the adverse impacts on agricultural land and farm holdings as far as is reasonably practicable.

In designing the Proposed Scheme, HS2 Ltd’s aim is to avoid the highest quality agricultural land, insofar as this can be reconciled with the need to satisfy or balance a number of other important environmental and engineering

considerations. Where the Proposed Scheme would affect agricultural land, a range of measures would be put in place to help reduce impacts. Topsoil and subsoil would be stripped prior to construction and stored appropriately to enable agricultural land to be restored. The design objective is to avoid any reduction in long term capability, which would downgrade the quality of the disturbed land, through the adoption of good practice techniques in soil handling.

Land drainage schemes and water supplies used for livestock and irrigation may be severed or otherwise affected by the Proposed Scheme. These effects would be accommodated by suitable works in order to maintain continuity of land drainage and supply of water so far as reasonably practicable during the period of construction of the Proposed Scheme. Where it is not possible to maintain continuity of land drainage or supply of water, the facilities would be reinstated or made good as soon as reasonably practicable.

Work is also being undertaken to assist in mitigating the effects of the Proposed Scheme on land-based businesses where reasonably practicable. Measures would be put in place

to maintain access for land management and, where appropriate access arrangements cannot be provided during construction, consideration would be given to the acquisition of severed land. Owners and operators of affected agricultural holdings would be entitled to receive compensation under existing statutory compensation arrangements.

Monitoring

Construction

Appropriately qualified environmental management staff would be appointed to secure compliance with the Code of Construction Practice in relation to soils. Their responsibilities would include the monitoring of topsoil and subsoil stripping, handling, storage and replacement, as appropriate. On-site inspections of works would be carried out by the nominated undertaker, to monitor progress and standards of restoration.

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

Operation

Where noise mitigation measures are agreed in respect of effects on housed livestock (for example, cows), some monitoring of noise levels may form part of an agreement with owners and occupiers. No other significant agriculture, forestry and soils effects are anticipated during operation of the Proposed Scheme. Therefore, no further operational monitoring has been identified at this stage in the ongoing design and assessment process.

7.3 Air quality

Mitigation

Emissions associated with activities on the construction sites would be controlled by measures within the Code of Construction Practice. No further air quality mitigation measures beyond those contained in the draft Code of Construction Practice are, therefore, proposed at this stage in the ongoing design and assessment process. This will be confirmed in the formal ES.

Monitoring

Construction

Contractors would implement inspection and monitoring procedures to assess the effectiveness of measures to prevent dust and air pollutant emissions.

Monitoring of dust and particulate matter during construction of the Proposed Scheme would be undertaken following the current best practice guidance.

Monitoring of significant air quality effects adjacent to highways would be undertaken following current best practice guidance.

Operation

No operational monitoring in relation to air quality is currently proposed at this stage in the ongoing design and assessment process. This will be confirmed in the formal ES.

7.4 Climate change

Mitigation

The HS2 Environmental Policy seeks to “minimise the carbon footprint (of the Proposed Scheme) and deliver low carbon, long-distance journeys that are supported by low-carbon energy”. The potential to reduce carbon emissions across the design, construction and operation phases, as a best practice framework, will continue to be developed and applied.

The policy also considers the Proposed Scheme’s approach to climate change as seeking to “minimise the combined effect of the Proposed Scheme and climate change on the environment”. The in-combination climate change impacts assessment considers how climate change impacts, in combination with the impacts of the Proposed Scheme, may affect the receiving environment, in order to identify appropriate mitigation.

The HS2 Sustainability Policy seeks to “build a network which is resilient to climate change in the long term and adaptable to future trends and demands”. To address this objective, the climate change resilience assessment considers how climate change risks may affect the

resilience of infrastructure and assets associated with the Proposed Scheme. Measures are being considered for incorporation into the Proposed Scheme to ensure it is resilient to climate change risks, for example, it is being designed to accommodate rainfall and flooding levels that include an allowance for climate change.

Monitoring

Construction

Contractors would produce carbon management plans detailing ‘the approach to energy and carbon dioxide monitoring and reporting from relevant site activities’. The contractor would also monitor extreme weather events during construction.

Operation

Carbon dioxide emissions would be calculated and monitored during operation. Monitoring of any significant adverse in-combination climate change effects during operation would form part of the operational monitoring strategies for the relevant environmental topics.

Weather and climate change resilience would also be monitored.

7.5 Community

Mitigation

The assessment of community effects takes into account a range of impacts, including demolition or partial loss of residential properties, community facilities and public open space, and road closures and diversions. The formal ES will also consider in-combination effects of traffic, noise and visual impacts.

The draft Code of Construction Practice includes measures to reduce noise, air quality, visual and construction traffic effects on local communities during construction. Proposed measures include the appointment of community relations personnel, a community helpline to handle enquiries from the public, the sensitive laying out of construction sites to reduce nuisance and maintaining public roads and rights of way around construction sites wherever reasonably practicable, to avoid deterioration due to construction traffic.

HS2 Ltd is developing the design of the Proposed Scheme with the aim of reducing demolitions of residential properties and loss of community facilities so far as reasonably

practicable. The Government has developed a package of property compensation measures over and above statutory requirements. Where it has not proved possible to avoid adverse impacts resulting from the temporary or permanent loss of public open space, HS2 Ltd would seek to engage with the local authorities in order to identify and put in place appropriate further mitigation measures. Such measures could include the provision of new open space or community facilities to replace those lost to the Proposed Scheme.

Monitoring

Any construction and operational monitoring requirements in relation to in-combination effects arising from air quality, visual, noise and construction traffic effects are being considered in the relevant air quality; landscape and visual; sound, noise and vibration; and traffic and transport topic sections of this working draft ES.

7.6 Ecology and biodiversity

Mitigation

HS2 Ltd is designing the Proposed Scheme to avoid or reduce adverse impacts on habitats,

species and other features of ecological value, where reasonably practicable.

Where adverse impacts cannot be avoided, HS2 Ltd are considering mitigation and compensation measures to reduce effects on species and habitats. Measures will include, where appropriate, translocation or relocation of protected species, provision of replacement habitat and provision of ecological features such as ecological underpasses and green bridges to facilitate the movement of species across the route.

The Proposed Scheme is being designed to seek to achieve no net loss in biodiversity at a route-wide level.

Monitoring

Construction

Detailed surveys would be undertaken prior to and during construction. These surveys would help refine the mitigation and control measures required during construction as appropriate, and to provide appropriate monitoring during construction.

The nominated undertaker would undertake appropriate monitoring of the consequences of construction works on ecological resources. As well as monitoring of the effectiveness of the management measures designed to control ecological effects, associated with works that may affect protected or notable species, statutory designated or non-statutory sites of ecological interest. Monitoring would be put in place throughout the habitat establishment period to measure its success. This may need to continue beyond the establishment period.

HS2 Ltd is committed to monitoring the effectiveness of ecological mitigation and compensation measures for a sufficient period to ensure the objectives of the proposals for nature conservation are achieved, as set out in the Environmental Memorandum (see Section 5.3 of this NTS). An Ecology Review Group would review the outputs of monitoring for habitat creation sites and make recommendations for remedial action where appropriate.

Operation

Monitoring of the effective management and performance of ecological mitigation and compensation measures would be undertaken.

7.7 Electromagnetic interference

The generation of electromagnetic fields would be managed during construction and operation of the Proposed Scheme to ensure that electrical equipment and human health are not adversely affected. Electromagnetic interference would be managed during construction in line with British and European standards and industry best practice. The main source of electromagnetic fields from operation of the Proposed Scheme would be the power supply system along the railway. The voltage and current generated by the power supply system would not be high enough to cause significant electromagnetic fields outside the railway boundary.

7.8 Health

Mitigation

The route of the Proposed Scheme has been selected to avoid (where reasonably practicable) residential properties and other sensitive receptors, and landscape earthworks and other measures are being considered to reduce visual intrusion and noise. Mitigation measures would be implemented during construction and through ongoing management and delivery of

the Proposed Scheme. These are incorporated into the draft Code of Construction Practice and other HS2 strategies and policies as appropriate.

Monitoring

Any construction and operational monitoring requirements in relation to impacts generated from air quality, noise and vibration, traffic and transport, and visual effects that have the potential to influence health are being considered in the relevant air quality; sound, noise and vibration; landscape and visual; and traffic and transport topic sections of this working draft ES.

7.9 Historic environment

Mitigation

In designing the Proposed Scheme, HS2 Ltd's aim is to avoid or reduce direct adverse impacts on heritage assets. Where this is not possible, a range of measures would be implemented to mitigate the impact on such assets.

A Heritage Memorandum would be prepared setting out the commitments of the Secretary of State for Transport to the historic environment

and heritage assets. The memorandum provides a framework for the nominated undertaker, Historic England, local authorities and other stakeholders to work together to ensure that the Proposed Scheme is designed and constructed with proper regard to the historic environment. The memorandum would form part of the EMR (as described in Section 5.3 of this NTS).

Provision is being made in the design for appropriate measures to mitigate the impact of the Proposed Scheme on the setting of heritage assets. For example, landscape planting and noise mitigation measures would be used to help preserve rural setting and character.

Monitoring

Construction

Contractors would be required to implement appropriate monitoring of the consequences of construction work, as required, on all heritage assets (designated and non-designated) to ensure the effectiveness of management measures and compliance with agreed approaches to construction activities and heritage assets.

Risk assessments identifying appropriate surveys, for example, structural or condition surveys, and settlement and vibration monitoring would be undertaken at locations of archaeological or built heritage interest adjacent to the construction site prior to, during and following construction works.

Operation

It is assumed that any heritage assets within the land required for construction would have been removed unless excluded as a result of the mitigation process. Where required, selected heritage assets would also be monitored.

7.10 Land quality

Mitigation

The draft Code of Construction Practice contains measures to mitigate the effects of any land contamination, to ensure no significant adverse effects would arise. Pre-existing contaminated soils or groundwater may be treated. If remediation of contaminated soils or groundwater is required, there could be a beneficial effect for the environment in the long term with respect to contamination.

Monitoring

Construction

The nominated undertaker would require monitoring procedures to be implemented, as appropriate, in areas of contaminated land. Groundwater and surface water monitoring plans would be prepared, in the vicinity of contamination remediation works, or where piling risk assessment has indicated a potential effect on below-ground contamination.

Monitoring of any works that have the potential to impact identified geological resources would be carried out. Appropriate health, safety and environmental monitoring would be set out to support adherence to the procedures relating to working on or adjacent to land affected by contamination.

Operation

During the operational phase, monitoring works (such as for groundwater and landfill gas) would continue where required.

7.11 Landscape and visual

Mitigation

Measures to mitigate landscape and visual impacts are part of an integrated design approach that includes consideration of engineering requirements, environmental considerations and best practice design. The landscape design proposals for the Proposed Scheme incorporate mitigation measures for a range of environmental topics including agriculture, ecology and biodiversity, historic environment, landscape, noise, and open space.

A wider landscape approach to ecological compensation and mitigation is being adopted for the Proposed Scheme. The form and location of trees and grassland is being planned to reconnect existing and fragmented habitats to create a joined up ecological network and contribute to HS2 Ltd's policy aspiration for a Green Corridor. Distributing the planting over a wider area would better help to maintain landscape character, as planting is not concentrated in large blocks of woodland, which has the effect of changing the appearance of the local landscape and reducing the amount

of land available for agriculture and other land uses. The provision of new planting and landscape earthworks would help to integrate the Proposed Scheme into the local topography, landscape character and landscape pattern. This would provide visual screening for residents and other sensitive receptors (such as users of recreational sites and public rights of way). Landscape design and mitigation would create new ecological habitats and features, help reduce noise and help to reduce the effect on the setting of heritage assets.

In urban areas the design of the Proposed Scheme will include the provision of public realm, including tree planting and green space, to help integrate the new railway stations and associated operational requirements into their local context, and to contribute to urban green infrastructure networks and city resilience.

Individual elements of the Proposed Scheme, such as bridges and viaducts, would be designed to be in keeping with the local landscape character. Detailed design, materials and finishes would be subject to approval by the local planning authority under the provisions of the hybrid Bill.

The draft Code of Construction Practice includes measures to limit landscape and visual impacts during construction. These include protecting existing trees, use of well-maintained fencing around construction areas and designing lighting to avoid intrusion on any adjacent residential properties.

Monitoring

Construction

The nominated undertaker would implement appropriate monitoring of any new advanced permanent or temporary planting to ensure they become established and are properly maintained throughout the construction period.

Operation

The nominated undertaker and its contractors would maintain and monitor newly planted and landscaped areas. This would ensure that the planting (woodlands, grasslands, wetlands and hedgerows) successfully establishes and develops so that it achieves its mitigation objective and remains effective thereafter.

7.12 Major accidents and disasters

Mitigation

The Proposed Scheme, as a modern, high-speed railway, is being designed and would be built and operated in line with best international current practice, and as such, major accidents would be very unlikely.

The Proposed Scheme is being designed and its implementation guided by legal requirements, and numerous industry standards and codes, many of which are mandatory. These require risks associated with major accidents and disasters to be identified, assessed and reduced during the design, construction, operation and maintenance of the Proposed Scheme. Infrastructure and systems must also be designed in accordance with the latest safety standards and codes so that risks to people and the environment are either eliminated or reduced to levels that are considered acceptable.

In addition, the Code of Construction Practice would include the requirement for construction contractors and suppliers to prepare plans and

protocols that address accident and disaster risk issues. This includes the preparation of community emergency plans (where relevant), traffic management plans, measures to control pollution risks, and plans to prevent fires and deal with the impacts of extreme weather events.

Monitoring

Construction

Weather events would be monitored and consideration would be given to the potential impacts of extreme weather events and related conditions.

Specific monitoring solutions, for example during tunnelling activities, would be developed as part of detailed design.

Operation

A rigorous safety management system would be established and adhered to as part of the Proposed Scheme to record adverse incidents and monitor these in order to take appropriate action where appropriate.

7.13 Socio-economics

Mitigation

The construction of the Proposed Scheme offers considerable opportunities to businesses and residents along the line of the route in terms of supplying goods and services and accessing employment opportunities. HS2 Ltd at this stage assumes that it would, therefore, adopt a policy to work with its suppliers to build a skilled workforce that promotes further economic growth across the UK as it has done on Phase One and Phase 2a.

In order to construct the Proposed Scheme, it is expected that some businesses would be required to move to alternative premises. Displaced businesses would be entitled to receive compensation where required to relocate to alternative premises, under existing statutory compensation arrangements. HS2 Ltd would also provide, where appropriate, additional support to help businesses relocate to alternative premises.

Monitoring

Where there are likely residual significant environmental effects at existing businesses, the specific operational monitoring requirements in relation to noise, vibration, construction traffic, air quality and visual effects, are considered in the relevant sound, noise and vibration; and landscape and visual topic sections of this working draft ES.

7.14 Sound, noise and vibration

Mitigation

HS2 Ltd is designing the Proposed Scheme with the aim of minimising significant adverse effects due to railway noise and vibration insofar as reasonably practicable.

The development of the Proposed Scheme alignment has sought to reduce noise impact as far as reasonably practicable. Operational noise would be further reduced, at source through the effective design and specification of the trains and track, as well as by noise barriers. Noise barriers would take the form of landscape earthworks, noise fence barriers and/

or parapet barriers on viaducts. Tunnel portals would also be designed to avoid adverse noise effects caused by trains entering the tunnel. Noise insulation would be offered with the aim of avoiding residual significant adverse effects inside qualifying dwellings close to the Proposed Scheme.

The draft Code of Construction Practice sets out measures to control noise and vibration during construction; the primary measure being that best practicable means would be applied to minimise noise (including vibration) at neighbouring properties. The draft Code of Construction Practice also sets out the order in which, as part of the application of best practicable means, mitigation measures should be applied. Firstly mitigation to control noise at source should be applied, for example, the use of quiet and/or low-vibration equipment and restricted working hours. Secondly screening would be provided, for example local screening of equipment, as well as screening along the edge of the construction worksites. HS2 Ltd would offer noise insulation and/or temporary rehousing to dwellings which satisfy the applicable qualifying criteria, where required.

Monitoring

Construction

The nominated undertaker would require its contractors to undertake and report such monitoring, including real-time noise and vibration monitoring, as is necessary to ensure compliance with the Code of Construction Practice.

Operation

Noise and vibration monitoring would be carried out at different times during the lifetime of the Proposed Scheme at appropriate monitoring locations. Where noise and vibration performance deviates from expected conditions, either this information would be used to inform possible improvements (where measurements indicate better than expected performance), or investigations would be undertaken to inform reasonable remedial measures (where measurements indicate worse than expected performance).

7.15 Traffic and transport

Mitigation

The draft Code of Construction Practice includes mitigation measures to reduce and manage traffic and transport impacts during construction of the Proposed Scheme. Construction would lead to increased vehicular traffic and have the potential to cause increased congestion and journey times at a number of locations. HS2 Ltd would, where reasonably practicable, limit the use of local roads by HS2 construction heavy goods vehicles through use of the strategic road network, site haul routes and the use of rail. In order to control disruption and congestion resulting from construction traffic, HS2 Ltd would put in place measures to reduce the impact of construction vehicles using the public road network, especially local roads. Workforce travel plans would be implemented to help mitigate transport-related effects during construction (such as through the promotion of public transport, car sharing and, where appropriate, works buses).

It would be necessary to close, realign or divert certain local roads and public rights of way along the Proposed Scheme, both during construction, and in some cases, permanently. In these cases, alternative routes would be available either through the use of temporary alternative routes of the existing wider network. There may, however, be some limited effects on road users, including non-motorised users (i.e. pedestrians, cyclists and horse riders), due to increased journey distances and times. Where a new route alignment is required, it would, where reasonably practicable, be constructed offline so as to enable the existing route to continue in use until its replacement is ready to be brought into public use.

Monitoring

Construction

The nominated undertaker and its contractors would undertake the necessary monitoring to ensure compliance with the requirements of the Code of Construction Practice, associated Local Traffic Management Plans and construction workforce travel plans.

Operation

Travel plans would detail monitoring associated with the operation of the proposed high speed stations and depots. No other area specific monitoring requirements are currently identified for traffic and transport. This will be confirmed in the formal ES.

7.16 Waste and material resources

Mitigation

During the construction and operation of the Proposed Scheme, HS2 Ltd's objective is to limit the use of materials and generation of waste. Sustainable materials would be sourced and made efficient use of for construction of the Proposed Scheme.

The principles of the waste hierarchy would be followed, with priority given to the prevention of waste generation, followed (where this is not possible) by reuse, recycling and recovery of waste respectively, with disposal to landfill adopted only as a last resort.

The principles of the circular economy would be considered throughout the lifecycle of the Proposed Scheme, in accordance with the HS2 Circular Economy Principles. The circular economy is an alternative approach to the typical 'linear' way of using resources. By finding opportunities of remanufacturing, reusing or recycling materials and keeping them in use for longer, both resource use and waste generation can be reduced.

An integrated design approach would be followed that uses excavated material to satisfy the engineering and environmental mitigation earthworks requirements of the Proposed Scheme, thereby reducing both the need for imported materials and the amount of excavated material requiring disposal. Only if excavated material is not required, is unsuitable for use or cannot be economically treated to make it suitable for use, should it be considered for off-site reuse, off-site treatment/recycling or disposal.

Monitoring

Construction

Monitoring of waste management activities would be undertaken by contractors in accordance with the Code of Construction Practice.

Operation

Monitoring of waste management activities would be undertaken by train operating companies and other users of the Proposed Scheme in accordance with statutory requirements.

7.17 Water resources and flood risk

Mitigation

HS2 Ltd is designing the Proposed Scheme to avoid or reduce adverse impacts on surface water and groundwater resources and flood risk as far as is reasonably practicable.

The Proposed Scheme would cross watercourses either by viaduct, bridge or culvert. Cuttings and embankments are being designed to take

into account the potential impact on surface waters and groundwater. Minor realignments or short diversions of watercourses are proposed in some locations to reduce the number of crossings. The approach is to ensure the quality of watercourses is not significantly adversely affected.

Measures set out in the draft Code of Construction Practice would reduce effects during construction as far as is reasonably practicable, including effects on local groundwater levels during excavation works. Where a potential risk to groundwater abstractions is identified, HS2 Ltd would agree a management strategy with the Environment Agency in consultation with the relevant water company to effectively manage this risk. HS2 Ltd would be required, for certain works, to seek the approval of the Environment Agency and the relevant water and drainage authorities.

The Proposed Scheme aims to avoid an increase in the risk of flooding from all sources, taking into account the projected impact of climate change. Where required, the Proposed Scheme would mitigate loss of floodplain by

creating replacement floodplain storage areas. Sustainable drainage is also being incorporated into the design, where reasonably practicable, to control the rate, volume and quality of runoff.

Monitoring

Construction

Contractors would implement appropriate surface water and groundwater inspection and monitoring procedures. This would include procedures to monitor the effectiveness of the mitigation measures associated with potentially significant effects.

Any potentially significant effects on Water Framework Directive water bodies would also be monitored. The Environment Agency would be consulted regarding water quality, flow and level monitoring that would be undertaken of surface and groundwater water bodies that have potential to be affected by construction of the Proposed Scheme.

The nominated undertaker would require its contractors to undertake monitoring to identify, for example, pollution risks that are unacceptably high, spillages and leakages and suspected pollution incidences. Appropriate action would be taken if any impacts are identified.

Operation

Monitoring would be undertaken in agreement with the Environment Agency to confirm the effectiveness of implemented mitigation.

8. Summary of environmental effects by community area

8.1 Introduction

As set out in Section 5 of this report, the assessment for this working draft ES is provisional and has been undertaken based on a precautionary approach. The EIA, design and mitigation of the Proposed Scheme will continue to be developed and refined during and following this consultation. The likely significant effects reported in this section are the residual effects based on the current stage of design.

Effects of the Proposed Scheme that are likely to occur at a geographical scale greater than the community areas are reported in Section 9 of the NTS. This section provides the following for each of the 26 community areas:

- a summary of the existing environment within the area;
- a brief description of the Proposed Scheme in the area;
- a description of the likely significant residual environmental effects in the area for the following environmental topics:
 - agriculture, forestry and soils;
 - air quality;
 - community;

- ecology and biodiversity;
- health;
- historic environment;
- land quality;
- landscape and visual;
- socio-economics;
- sound, noise and vibration;
- traffic and transport; and
- water resources and flood risk.

- a description of the proposed mitigation measures that have been identified to avoid, reduce or manage the likely significant effects.

For each Community area, the summary of significant environmental effects is generally confined to residual effects, i.e. those significant beneficial and adverse environmental effects of the project which are likely to remain after the range of mitigation and monitoring measures identified at this stage of the Proposed Scheme. For those topics not reported, for example air quality, there are no residual significant construction or operational environmental effects at this stage of the design and assessment, and incorporation of mitigation measures including application of the draft Code of Construction Practice.

Those topics not listed above (climate change, major accidents and natural disasters, and waste and material resources) are not considered to give rise to local level impacts. The route-wide impacts for these topics are described in Section 9 of the NTS. Section 9 also considers the overall changes to employment levels arising from the construction and operation of the Proposed Scheme.

The design of the proposed electrification of the section of the Midland Main Line between Clay Cross and Sheffield Midland Station is at an earlier stage of development and the associated environmental assessment of the likely significant effects of these works will be reported in the formal ES. Therefore, this summary of environmental effects by community area for the working draft ES does not include the works in the Danesmoor to Brierley Bridge (MMLo1) and Unstone Green to Sheffield Station (MMLo2) areas at this stage. The formal ES will report the likely significant effects from the works across all 28 community areas and these effects will be summarised in this section of the formal ES NTS.

8.2 Hough to Walley's Green (MA01)

Overview

The Hough to Walley's Green area (MA01) is approximately 11km in length, extending from Hough to Wimboldsley. The area falls within the local authority area of Cheshire East Council (see Figure 16).

The southern section of the area is urban in character, with land use comprising light industrial and commercial uses, railway infrastructure and residential areas through the centre of Crewe. To the north of Crewe, the area is predominantly rural, characterised by open space, woodland and farmland.

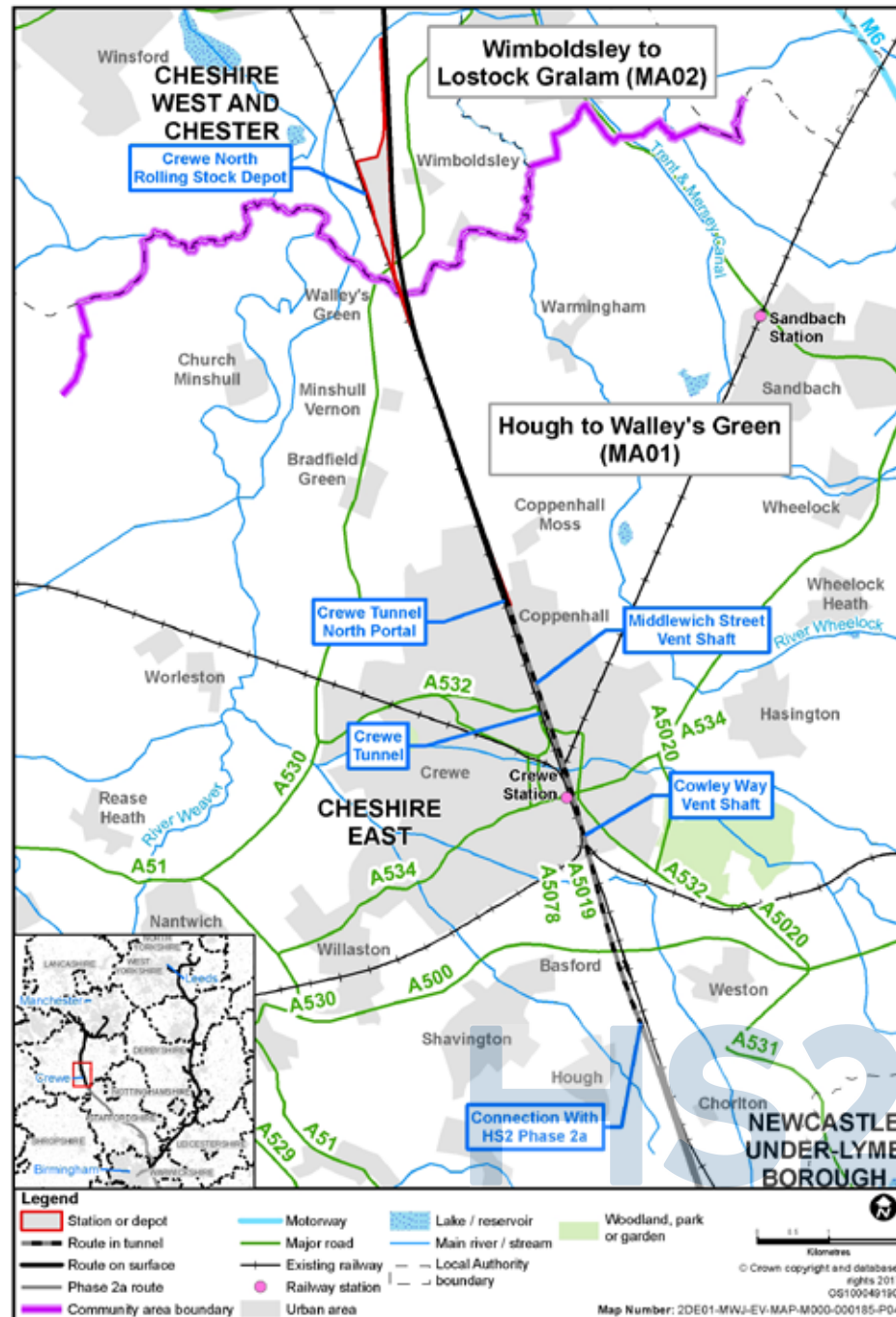


Figure 16: Hough to Walley's Green area (MA01) context map

The Proposed Scheme

The route of the Proposed Scheme would connect to the HS2 Phase 2a scheme at Hough at the start of the Crewe tunnel. The tunnel would pass under Crewe before transitioning into cutting and then running on embankment north-west towards Wimboldsley, passing to the east of Bradfield Green and Walley's Green. The route of the Proposed Scheme would then continue into the Wimboldsley to Lostock Gralam area (MA02).

In this area, the Proposed Scheme would require the demolition of two residential properties and three commercial/business properties (including farm outbuildings). Permanent realignment of two roads would be required. Two public rights of way would be permanently realigned or closed. Two watercourses would be permanently realigned. One main construction compound and four satellite construction compounds would be required in this area.

Residual effects

This section provides a summary of the likely significant residual environmental effects identified for the Hough to Walley's Green area at this stage of the design and assessment.

Agriculture, forestry and soils

Construction

It is currently expected that approximately 76ha of agricultural land would be temporarily required for construction of the Proposed Scheme in this area, of which approximately 11ha is likely to be high quality agricultural land. Some of this land would be restored following construction, with approximately 55ha permanently required, 8ha of which is high quality land. The quality of the land is currently based on publicly available information and will be confirmed in the formal ES once agricultural land surveys are complete, as will the extent of land required for the Proposed Scheme.

To avoid or reduce environmental impacts, soils from the areas required temporarily and permanently for the Proposed Scheme would be stripped and stored. This would enable agricultural land that is required temporarily for construction to be returned to agricultural use. It would also enable soils to be put to other uses, such as to support landscape planting.

Construction of the Proposed Scheme would be likely to result in significant effects at 13 farm holdings in this area due to the proportion of land required for the Proposed Scheme, either

temporarily or permanently. Land required temporarily would, in accordance with a restoration scheme agreed with the landowner and the relevant planning authority, be returned to the farm holding following the completion of construction.

Community

Construction

Construction of the Middlewich Street vent shaft and head house would require the temporary use of 0.6ha of informal open space between the West Coast Main Line and Middlewich Street.

The land required to construct the Proposed Scheme would result in the permanent loss of the livery facilities at Winton Equestrian Centre.

Ecology and biodiversity

Construction

It is currently expected that there would be a permanent loss of woodland potentially classifiable as ancient woodland, ancient and veteran trees, 11 ponds, and fragmentation of the hedgerow network. The removal and fragmentation of these habitat types has the potential to affect their conservation status as

well as potentially resulting in significant effects on bat, bird, polecat and terrestrial invertebrate populations.

Significant effects are likely to be experienced by water vole in watercourses affected by the Proposed Scheme, as a result of the loss of water-margin habitat. Similarly aquatic invertebrates, great crested newt and white-clawed crayfish may be affected as a result of construction disturbance to watercourses and water bodies.

Operation

During operation of the Proposed Scheme, bats and barn owls would be at risk of mortality caused by passing trains.

Health

Construction

The Proposed Scheme would impact on a range of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health effects, judgements have been made as to the level and type of impact that could potentially affect population health.

Construction of the Proposed Scheme would require the temporary use of 0.6ha of informal open space between the West Coast Main Line and Middlewich Street. In addition, the livery facilities at Winton Equestrian Centre would be permanently lost. These spaces provide a positive contribution to the wellbeing of local communities and their loss would have an adverse effect on health and wellbeing.

The combination of construction noise, visual and traffic impacts would change the character of neighbourhoods, and may impact on residents' quality of life. For rural communities dependent on shops and services in nearby towns, temporary closures and diversions of local roads may reduce the accessibility of key services. In addition, levels of physical activity could potentially be affected by disruption to roads and public rights of way that may be used as active travel routes.

The temporary construction workforce is likely to comprise a mixture of local people and workers from further afield. This could mean that local communities see temporary changes to the local population size and demographics.

Operation

Where the Proposed Scheme is not in tunnel within this area, the presence of rail infrastructure and noise from passing trains may change the character of surrounding neighbourhoods, and may reduce the quality of life for residents.

Historic environment

Construction

The Proposed Scheme is being designed to reduce impacts on heritage assets as far as reasonably practicable. However, construction of the Proposed Scheme would be likely to require the permanent removal of one non-designated heritage asset; a post-medieval farmstead south of Heath Farm.

Construction of the Proposed Scheme would also permanently affect the Grade II listed Park House at Middlewich Road through alterations to its setting. This would result in changes to the way that the building is experienced and understood.

Landscape and visual

Construction

The presence of construction works and changes to the existing landform and vegetation patterns would affect the character of the local landscape. Where possible, effects would be reduced by the measures incorporated into the design to reduce the visibility of the Proposed Scheme (for example, tree planting to provide screening along the route, land shaping to link earthworks into their wider landscape context, woodland planting to provide habitat connectivity, and hedgerow replacement and restoration).

Construction activities would be visible from 13 viewpoints within the area, for example views from: residential properties on Casey Lane and Newcastle Road in Hough, Middlewich Street, Audley Street West, Ridgway Street and Rosedale Manor Nursing Home Crewe, Broughton Road at Coppenhall Moss; and public rights of way Chorlton Footpath 7 and 8 and Chorlton Footpath 1 and 12.

Operation

During operation, the significant effects of the Proposed Scheme on the character and appearance of the local landscape would substantially reduce over time as mitigation planting grows and matures, however, effects may remain significant.

During operation, the Proposed Scheme would be visible from three viewpoints within the area, for example views from: residential properties along Broughton Road and Coppenhall Moss; farmsteads and residential properties at Warmingham Moss, public rights of way Crewe Footpath 28 and 29, Crewe Footpath 30 and Warmingham Footpath 16; and Park House Farm, Park Hall Farm, and public right of way Minshull Vernon Footpath 8.

Socio-economics

Construction of the Proposed Scheme would result in the loss of land or buildings from the following businesses in the area: Cowley Way (two units engaged in the provision of heavy goods vehicle parking and associated café); and Bridge Farm (one unit providing boarding kennels and cattery); and Moss Bridge Farm (one unit providing horse riding and livery). Any

likely significant residual effects will be assessed and reported in the formal ES.

Sound, noise and vibration

Construction

Noise from construction would result in significant effects on residential communities closest to the construction works at: Basford, Weston, Chorlton, Hough and Hough Common; the centre of Crewe (including residential properties on roads leading off Goode Way and the B5071 Gresty Road, between the A534 Nantwich Road and Basford Road, Middlewich Street, and neighbouring streets including Sherborne Road, Henry Street and Badger Avenue; the north of Crewe, Leighton, Coppenhall and Coppenhall Moss); and Walley's Green (including residential properties in the vicinity of the A530 Nantwich Road between Walley's Green and Occleston Green).

Noise from construction would result in significant effects on the following non-residential properties in Crewe: Premier Inn Crewe Central; YMCA Crewe; Bentley Manor Care Home; Sherborne Court Neurological Centre; Crewe Cemetery and Crematorium; and Bright Stars Children's Day Nursery.

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works.

Further work is currently being undertaken to confirm the likely significant construction noise and vibration effects, including any temporary effects from construction traffic. This assessment will be reported in the formal ES.

Operation

Operational noise would be reduced at source through the effective design and specification of the trains and track. A number of measures have also been incorporated into the design of the Proposed Scheme to mitigate noise effects during operation. These include noise barriers in the form of landscape earthworks and/or noise fence barriers.

Operation of the railway would potentially result in noise effects, due to noise increases above recognised thresholds, and hence change in the existing acoustic character around those properties closest to the Proposed Scheme on the east and north side of Leighton in Crewe.

During operation of the railway, noise insulation would be offered to avoid significant effects at residential properties that satisfy the applicable qualifying criteria. At this stage this is anticipated to be at or around Parkfield Farm in the vicinity of Middlewich Road.

It is currently anticipated that the operation of the railway would give rise to likely significant noise and vibration effects due to potential ground-borne noise and vibration above the tunnel sections of the Proposed Scheme at the following residential properties closest to the Crewe tunnel: Brierley Street, North Stafford Street, Wallis Street, Sheppard Close, Earle Street, the B5076 Middlewich Street, Henry Street, Audley Street, Greenacres, Crossway, Greenway, Sherborne Road, Cranborne Road, Hazel Grove, Chapelmere Court, Broughton Road, North Street, Castlemere Drive, Churchmere Drive and Broad Street.

Further assessment work is currently being undertaken to confirm the likely significant effects due to operational noise and vibration, especially at non-residential locations and quiet areas and in terms of establishing existing baseline conditions. This will be reported in the formal ES.

HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid likely significant effects due to noise and vibration. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand potentially affected receptors, their use and the benefit of the measures.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on the following routes: the A500 Shavington Bypass; the A5078 Dunwoody Way; the A51 Middlewich Road; the A530 Nantwich Road; the A532 Weston Road/West Street; the B5076 Bradfield Road; Broughton Road; Casey Lane; Cowley Way; and Parkers Road. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes. Construction of the Proposed Scheme is expected to result in temporary closure of Parkers Road.

Construction of the Proposed Scheme has the potential to lead to diversion of bus route 78 due to the closure of Parkers Road.

Construction of the Proposed Scheme has the potential to temporarily suspend parking spaces off the B5076 Middlewich Street and Ridgeway Street and in the vicinity of Broughton Road, Weston Road and Cowley Way.

Temporary closure of four public rights of way could result in increased journey times for non-motorised users of Crewe Footpath 29, Minshull Vernon Footpath 8, Warmingham Footpath 16 and Leighton Footpath 7.

Temporary possession of the West Coast Main Line would be required for construction works, with potential disruption to rail passenger and freight services. This could result in significant adverse effects on rail passenger and freight operations.

Operation

Operation of the Proposed Scheme would result in permanent loss of car parking and/or loading areas at the B5076 Middlewich Street and Ridgeway Street.

Operation of the Proposed Scheme would result in Minshull Vernon Footpath 8 and Minshull Vernon Footpath 13 being permanently realigned or diverted increasing the length of journeys. This could result in increased severance for non-motorised users of these routes.

8.3 Wimboldsley to Lostock Gralam (MA02)

Overview

The Wimboldsley to Lostock Gralam area (MA02) is approximately 15km in length, extending north from Wimboldsley to the east of Higher Wincham. The area falls within the local authority areas of Cheshire West and Chester Council and Cheshire East Council (see Figure 17).

The area is predominantly rural in character, with agriculture being the main land use. Low lying agricultural land is interspersed with occasional woodland, including ancient woodland, the smaller settlements of Walley's Green, Wimboldsley, Stanthorne, Bostock Green and Lach Denis, and a scattering of residential properties and farmsteads.

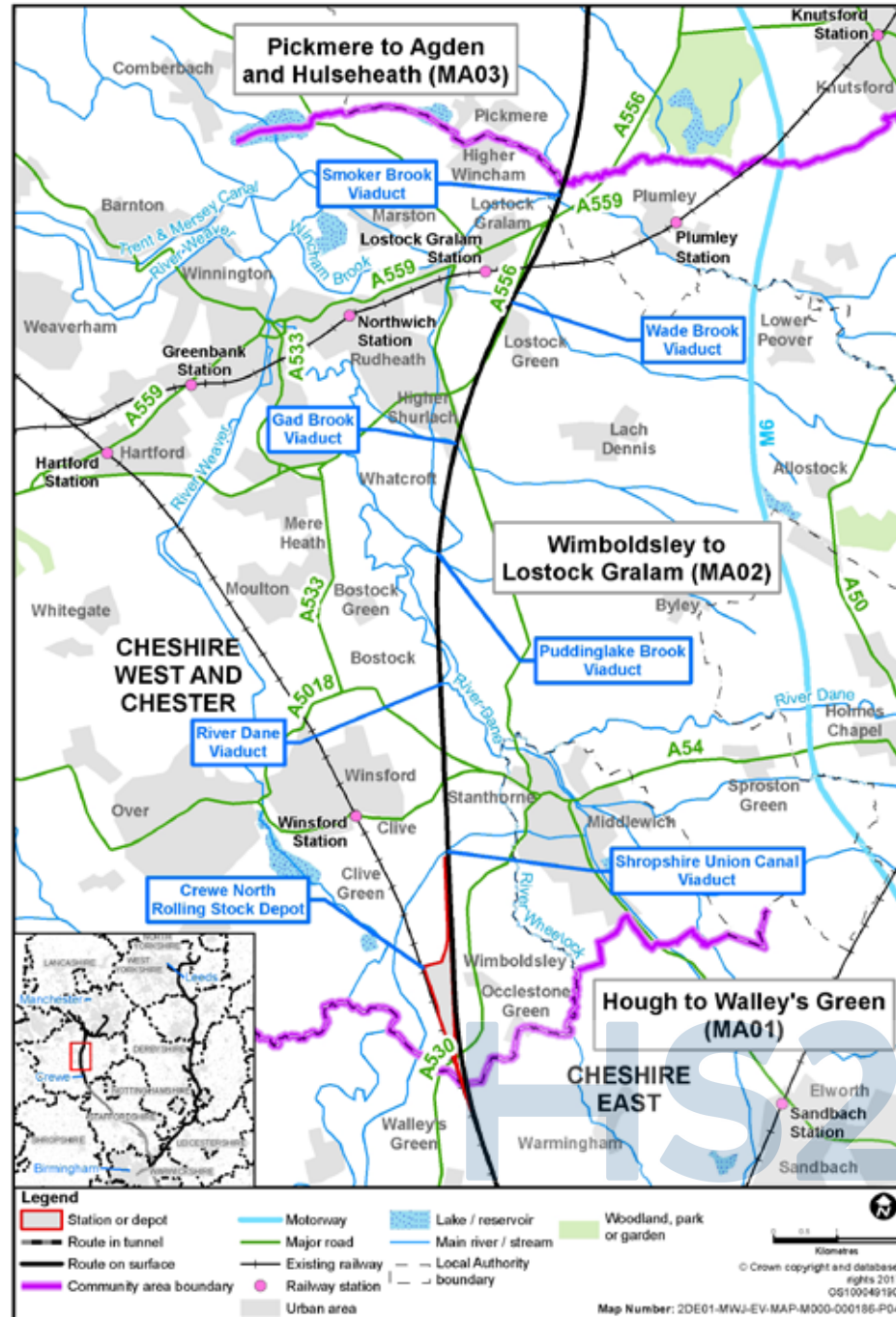


Figure 17: Wimboldsley to Lostock Gralam area (MA02) context map

The Proposed Scheme

In this area, the Proposed Scheme would include the Crewe north rolling stock depot, which would be located between the existing West Coast Main Line and route of the Proposed Scheme to the west of Wimboldsley (see Figure 15).

The route would continue northwards passing Middlewich to the east, and Winsford to the west before crossing over the Middlewich branch of the Shropshire Union Canal on a viaduct. The route would continue northwards on embankment and viaduct towards Northwich then cross the River Dane and Trent and Mersey Canal.

The route would continue on viaduct and embankment crossing the Davenham Road underbridge and Gad Brook before continuing to the east of Northwich. The route would then return to viaduct to cross Wade Brook and transition to embankment to the east of Lostock Gralam. The route would then return to viaduct to cross the Peover Eye and Smoker Brook floodplains where it would continue into the Pickmere to Agden and Hulseheath area (MA03).

In this area, the Proposed Scheme would require the demolition of 24 residential properties and one commercial/business property (which includes farm outbuildings). There would be permanent realignment or diversion of seven roads. Four public rights of way would be permanently diverted. Three watercourses would be permanently realigned. Seventeen satellite construction compounds and three transfer nodes would be required.

Residual effects

This section provides a summary of the likely significant residual environmental effects identified for the Wimboldsley to Lostock Gralam area (MA02) at this stage of the design and assessment.

Agriculture, forestry and soils

Construction

It is currently expected that approximately 367ha of agricultural land would be required for construction of the Proposed Scheme in this area, of which approximately 147ha is likely to be high quality agricultural land. Some of this land will be restored following construction, with approximately 246ha permanently required,

98ha of which is high quality land. The quality of the land is currently based on publicly available information and will be confirmed in the formal ES once agricultural land surveys are complete, as will the extent of land required permanently for the Proposed Scheme.

To avoid or reduce environmental impacts, soils from the areas required temporarily and permanently for the Proposed Scheme would be stripped and stored. This would enable agricultural land that is required temporarily for construction to be returned to agricultural use. It would also enable soils to be put to other uses, such as to support landscape planting.

Construction of the Proposed Scheme would be likely to result in significant effects at 19 farm holdings in this area due to the high proportion of land required and impacts on farm infrastructure and/or severance (where the Proposed Scheme causes areas of land to become 'cut off' from the rest of the farm), both temporarily and permanently. Land required temporarily would, in accordance with a restoration scheme agreed with the landowner and the relevant planning authority, be returned to the farm holding following the completion of construction.

Community

Construction

Construction of the Proposed Scheme would lead to significant community effects due to the demolition of: six residential properties near the junction of the A530 Nantwich Road; nine on Cooke's Lane, Broken Cross; and five on Birches Lane, Lostock Green. The loss of these properties represents a high proportion of each of these small communities.

Land required for construction of the Proposed Scheme would result in the loss of a community facility at Lostock picnic area, which includes picnic benches, public toilets and green space.

Construction of the Proposed Scheme would permanently require approximately 1.4ha of woodland from Winnington and Peas Wood Local Wildlife Site located to the north of the A556/A559 and north-east of Lostock Gramam. The requirement for land would fragment the site, although the majority of the woodland would remain accessible from the north and west.

Ecology and biodiversity

Construction

Construction of the Proposed Scheme would result in the temporary adverse effect on site integrity due to potential pollution impacts at Plumley Lime Beds Site of Special Scientific Interest.

Construction of the Proposed Scheme would result in permanent shading and fragmentation of approximately 0.4ha (3%) of Shropshire Union Canal Middlewich Branch Local Wildlife Site. In addition, construction of the Proposed Scheme would require the permanent loss of approximately: 0.6ha (9%) of Long Wood Local Wildlife Site; 1.4ha (11%) of Winnington and Peas Wood Local Wildlife Site; 0.4ha (5%) of Leonard's and Smoker Wood Local Wildlife Site; 0.6ha (7%) of Winnington Wood Ancient Woodland Inventory Site; 0.4ha of Leonard's Wood and Smoker Wood Ancient Woodland Inventory Site; and 4,000m² (3%) of Bull Wood Ancient Woodland Inventory Site.

It is currently expected that there would be a permanent loss of 7.7ha of deciduous woodland and 36 ponds, in addition to hedgerows, ancient and veteran trees and sections of

small watercourses and severance of river corridors. The removal and fragmentation of these habitat types has the potential to affect their conservation status as well as potentially resulting in significant effects on bat, bird, polecat and terrestrial invertebrate populations.

Significant effects are likely to be experienced by otter and water vole in watercourses affected by the Proposed Scheme, as a result of the loss of habitat. Similarly, aquatic invertebrates, great crested newt, white-clawed crayfish and fish may be affected as a result of construction disturbance.

Operation

During operation of the Proposed Scheme, bats and barn owls would be at risk of mortality caused by passing trains.

Health

Construction

The Proposed Scheme would impact on a range of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health effects, judgements have been made as to the

level and type of impact that could potentially affect population health.

The proposed demolition of seven residential properties in the village of Wimboldsley would result in the displacement of households within this community. This has the potential to reduce beneficial health effects that are gained through social contact and support.

Construction of the Proposed Scheme would result in changes to access and temporary loss of green space, including Lostock picnic area and Winnington and Peas Wood Local Wildlife Site, during construction. These spaces provide a positive contribution to the wellbeing of local communities and their loss would have an adverse effect on health and wellbeing.

The combination of construction noise, visual and traffic impacts would change the character of neighbourhoods, and may impact on residents' quality of life. For rural communities dependent on shops and services in nearby towns, temporary closures and diversions of local roads may reduce the accessibility of key services. In addition, levels of physical activity could potentially be affected by disruption to roads and public rights of way that may be used as active travel routes.

The temporary construction workforce is likely to comprise a mixture of local people and workers from further afield. This could mean that local communities see temporary changes to the local population size and demographics.

Operation

The presence of rail infrastructure and noise from passing trains may change the character of surrounding neighbourhoods, and may reduce the quality of life for residents.

Historic environment

Construction

The Proposed Scheme is being designed to reduce impacts on heritage assets as far as reasonably practicable. Construction of the Proposed Scheme would result in the permanent loss of the following six non-designated assets: the locally listed Greenheyes Farm located on the A533 Bostock Road; Railway Cottages on the A530 Nantwich Road; and Numbers 5, 7, 9 and 11 Birches Lane in Lostock Green.

Construction of the Proposed Scheme would also permanently affect a number of Grade II and II* listed buildings and the Trent and Mersey

Canal Conservation Area. Alterations to their settings would result in changes to the way that they are experienced and understood.

Construction of the Proposed Scheme would permanently affect the setting of the following 12 heritage assets: two Grade II* listed buildings (Whatcroft Hall and Lea Hall), nine Grade II listed buildings (Lea Hall gate piers; Park Farmhouse, Clive Green; The Middlewich Branch Canal Hughes Bridge; Stanthorne Hall; Stanthorne Lodge; Bank Farmhouse, Stanthorne; The Old Hall Farmhouse, Bostock; The South Lodge, Railings, Gates and Gatepiers; Bridge Cottage and Canal Cottage); and one conservation area (The Bostock Conservation Area).

Landscape and visual

Construction

The presence of construction works and changes to the existing landform and vegetation patterns would affect the character of the local landscape. Where possible, effects would be reduced by the measures incorporated into the design to reduce the visibility of the Proposed Scheme (for example, tree planting to provide screening along the route, land shaping to link earthworks into their wider landscape context,

compensatory woodland planting and hedgerow replacement and restoration).

Construction activities would be visible from 43 viewpoints within the area, for example views from: residential properties at Park Farm and Stanthorne Park Mews, Birch Lane, the A54 Middlewich Road and Coal Pit Lane, the A533 Bostock Road, the A530 King Street near Whatcroft Lane and Pear Tree Farm Cottages; Lostock Gralam Footpath 4, the Trent and Mersey Canal and Wimboldsley Footpath 5.

Operation

During operation, the significant effects of the Proposed Scheme on the character and appearance of the local landscape would substantially reduce over time as mitigation planting grows and matures, however, effects may remain significant. The Crewe North rolling stock depot would represent a significant alteration of the existing farmland landscape.

During operation, the Proposed Scheme would be visible from 32 viewpoints within the area, for example views from: residential properties at Park Farm and Stanthorne Park Mews, the

A54 Middlewich Road at Clive, Coal Pit Lane, the A533 Bostock Road, Pear Tree Farm Cottages; and Lostock Gralam Footpath 4.

Socio-economics

Construction of the Proposed Scheme would result in a likely significant effect from the loss of land or buildings and the resulting loss or displacement of jobs from a section of car park at the Morrisons distribution centre. Any likely significant residual effects will be assessed, and reported in the formal ES.

Sound, noise and vibration

Construction

Noise from construction could result in significant effects on residential communities closest to the construction works at: Occleston Green; Wimboldsley; Clive Green; Clive; Stanthorne; western part of the Newtonia area of Middlewich; Whatcroft; Pear Tree Farm Cottages on Davenham Road; B5082 Penny's Lane; Rudheath; Lostock Green; Lostock Gralam; and Ascol Drive to the East of Lostock Gralam.

Noise from construction could result in significant effects on non-residential facilities including: Wimboldsley Community Primary School; Travelodge Northwich, Lostock Gralam; and Lostock Lodge Care Home.

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works.

Further work is currently being undertaken to confirm the likely significant construction noise and vibration effects, including any temporary effects from construction traffic. This assessment will be reported in the formal ES.

Operation

Operational noise would be reduced at source through the effective design and specification of the trains and track. A number of measures have also been incorporated into the design of the Proposed Scheme to mitigate noise effects during operation. These include noise barriers in the form of landscape earthworks and/or noise fence barriers.

Operation of the railway would potentially result in noise effects on occupants of residential properties, due to potential noise increases above recognised thresholds, and hence change in the existing acoustic character around those properties closest to the Proposed Scheme in the following areas: Clive Green (Stanthorne Park Mews and Clive Green Lane); Stanthorne (Birch Lane); Whatcroft (Whatcroft Hall Lane); Lostock Green (Birches Lane, Greenside Drive and Birch Grove); Lostock Gralam (Cheshire Avenue, Pack Horse Close, Pavillion Avenue and Wells Avenue); and Ascol Drive.

During operation of the railway noise insulation would be offered to avoid significant effects at residential properties that satisfy the applicable qualifying criteria. At this stage this is anticipated to be at: Park Farm on Clive Green Lane; Heyescroft on Bostock Road; Canal Cottage, Bridge Cottage and The Barn at Bridge Farm on Whatcroft Hall Lane; and Lostock Green in the vicinity of Birches Lane. Further assessment work is being carried out and will be reported in the formal ES.

Operation of the railway would potentially result in noise effects, due to potential noise increases above recognised thresholds, and hence change in the existing acoustic character around those non-residential receptors closest to the Proposed Scheme at Chrysalis Day Nursery in Rudheath, and Lostock Green Methodist Church.

Further assessment work is currently being undertaken to confirm the likely significant effects due to operational noise and vibration, especially at non-residential locations and quiet areas and in terms of establishing existing baseline conditions. This will be reported in the formal ES.

HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid likely significant effects due to noise and vibration. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the potentially affected receptors, their use and the benefit of the measures.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on the following routes: the A530 Griffiths Road/King Street/Nantwich Road; the A533 Bostock Road; the A556 Chester; the A559 Manchester Road; the A54 Chester Road/Middlewich Road/Saint Michael's Way/Holmes Chapel Road/Kinderton Street; the B5309 King Street/Centurion Way; Birches Lane; Clive Green Lane; Clive Lane; Davenham Road; London Road; Lostock Hollow; Lostock Green; Road One; Station Road (Lostock Gralam); and Whatcroft Lane. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Construction of the Proposed Scheme is expected to result in temporary highway closures and diversions on the A533 Bostock Road; the A54 Middlewich Road; the A556 Chester Road (Winnington Belt to Rudheath Roundabout); Bell Lane; Clive Green Lane; and Whatcroft Lane.

Construction of the Proposed Scheme is expected to result in temporary diversion of bus routes 37 and X81.

Construction of the Proposed Scheme has the potential to temporarily suspend parking spaces at Morrisons distribution centre in Gadbrook.

Construction of Proposed Scheme is expected to include works that would require possessions of Network Rail infrastructure for short periods.

Construction of the Proposed Scheme is expected to result in the temporary diversion of Davenham Footpath 6 and Stanthorne Footpath 3.

Construction of the Proposed Scheme could affect users of the Shropshire Union Canal (Middlewich Branch) and the Trent and Mersey Canal, including their towpaths.

Operation

Operation of the Proposed Scheme would require the permanent diversion of: the A54 Middlewich Road; the A533 Bostock Road; the A556 Chester Road; Birches Lane; Clive Green Lane; and Penny's Lane. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Operation of the Proposed Scheme is expected to result in permanent loss of parking spaces at Morrisons Distribution centre at Gadbrook.

Operation of the Proposed Scheme would result in the permanent diversion of four public rights of way: Wimboldsley Footpath 1; Winsford Footpath 37/Stanthorne Footpath 1; Rudheath Footpath 3/Lach Dennis Footpath 3X and Lostock Gralam Footpath 1.

8.4 Pickmere to Agden and Hulseheath (MA03)

Overview

The Pickmere to Agden and Hulseheath area (MA03) is approximately 10km in length, comprising a section of the HS2 main line and a section of the HS2 Manchester spur. The HS2 main line would extend north from the east of Pickmere to east of Broomeedge on the southern boundary of Broomeedge to Glazebrook (MA04). The HS2 Manchester spur would extend from the east of High Legh to the boundary with the Hulseheath to Manchester Airport area (MA06). The Pickmere to Agden and Hulseheath area (MA03) falls within the local authority areas of Cheshire West and Chester Council and Cheshire East Council (see Figure 18).

The area is predominantly rural in character, with agriculture being the main land use. The area includes the town of Knutsford, which is located to the south-east, as well as hamlets and villages throughout the area including Mere, High Legh and Little Bollington.

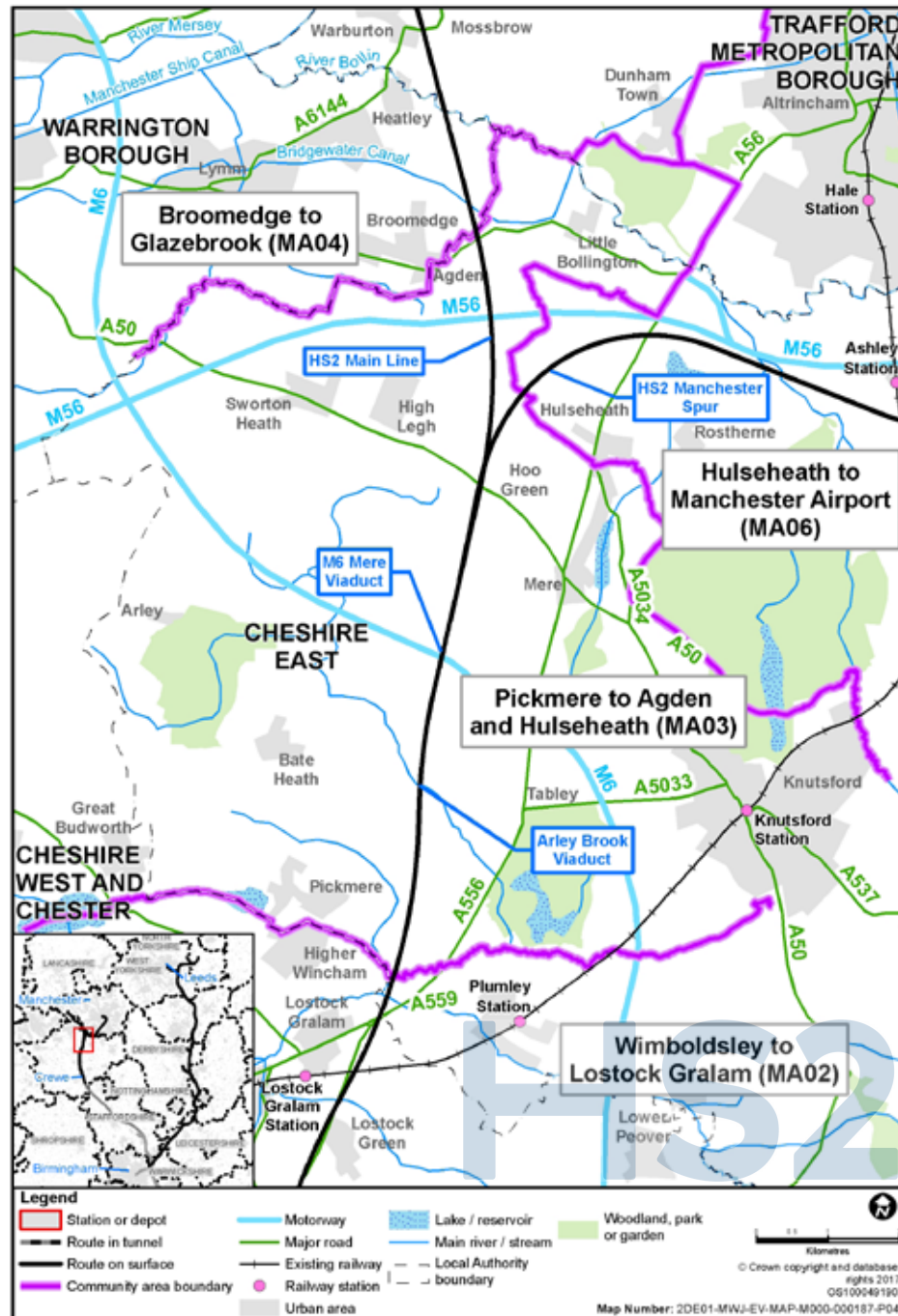


Figure 18: Pickmere to Agden and Hulseheath area (MA03) context map

The Proposed Scheme

The route would continue north from the Wimboldsley to Lostock Gralam area (MA02), running on embankment before crossing Arley Brook on viaduct and continuing on embankment to the south of the M6. The route would then continue northwards on viaduct and embankment before crossing the M6 on viaduct. The route would then run on embankment before passing into a cutting. The route would then split into the HS2 main line and HS2 Manchester spur.

The HS2 main line would continue into a box structure and cuttings. It would then cross under the M56 in a box structure before running in cutting and on embankment into the Broomedge to Glazebrook area (MA04).

The HS2 Manchester Spur would pass on embankment and then in cutting eastwards towards Hulseheath and into the Hulseheath to Manchester area (MA06) to ultimately terminate at Manchester Piccadilly High Speed station.

In this area, the Proposed Scheme would require the demolition of 14 residential properties and six commercial/business properties. There

would be permanent closure, realignment or diversion of eight roads. The Proposed Scheme would result in the permanent realignment or diversion of seven public rights of way. Seven watercourses would be permanently realigned or diverted. One main construction compound and 12 satellite construction compounds would be required.

Residual effects

This section provides a summary of the likely significant residual environmental effects identified for the Pickmere to Agden and Hulseheath area at this stage of the design and assessment.

Agriculture, forestry and soils

Construction

It is currently expected that approximately 233ha of agricultural land would be required for construction of the Proposed Scheme in this area, of which approximately 93ha is likely to be high quality agricultural land. Some of this land would be restored following construction, with approximately 126ha permanently required, 50ha of which is high quality agricultural land.

The quality of the land is currently based on publicly available information and will be confirmed in the formal ES once agricultural land surveys are complete, as will the extent of land required for the Proposed Scheme.

To avoid or reduce environmental impacts, soils from the areas required temporarily and permanently for the Proposed Scheme would be stripped and stored. This would enable agricultural land that is required temporarily for construction to be returned to agricultural use. It would also enable soils to be put to other uses, such as to support landscape planting.

Construction of the Proposed Scheme would be likely to result in significant effects at 15 farm holdings in this area due to the proportion of land required during construction. Of the 15 holdings temporarily affected, 13 holdings would also be permanently affected. Land required temporarily would, in accordance with a restoration scheme agreed with the landowner and the relevant planning authority, be returned to the farm holding following the completion of construction.

Community

Construction

Approximately 4ha of Heyrose Golf Club would be permanently lost due to the construction the Proposed Scheme, equivalent to 10% of the total course.

Approximately 14ha of land at the Cheshire Showground would be permanently lost due to the construction the Proposed Scheme, leaving approximately 105ha available for use.

Ecology and biodiversity

Construction

Construction of the Proposed Scheme would result in the temporary adverse effect on site integrity due to potential pollution impacts at Tabley Mere Site of Special Scientific Interest.

Construction of the Proposed Scheme would result in the permanent habitat loss and severance of approximately: 0.1ha (1%) of Leonard's and Smoker's Wood Local Wildlife Site and Ancient Woodland Inventory Site; 0.1ha (6%) of Arley and Waterless Brook Local Wildlife

Site; and loss and severance of habitats at Tableypipe Wood Local Wildlife Site.

It is currently expected that there would be a permanent loss of approximately 0.8ha of broadleaved woodland in addition to ancient and veteran trees, 68 ponds, and part of the hedgerow network. The removal and fragmentation of these habitat types has the potential to affect their conservation status as well as potentially resulting in significant effects on bats, polecat, great crested newts, birds, terrestrial invertebrates and reptiles.

Significant effects are likely to be experienced by otter and water vole in watercourses affected by the Proposed Scheme, as a result of the loss and fragmentation of water-margin habitat. Similarly white-clawed crayfish, aquatic invertebrates, and fish may be significantly affected as a result of construction disturbance.

Operation

During operation of the Proposed Scheme, bats and barn owls would be at risk of mortality caused by passing trains.

Health

Construction

The Proposed Scheme would impact on a range of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health effects, judgements have been made as to the level and type of impact that could potentially affect population health.

The combination of construction noise, visual and traffic impacts would change the character of neighbourhoods, and may impact on residents' quality of life. For rural communities dependent on shops and services in nearby towns, temporary closures and diversions of local roads may reduce the accessibility of key services. In addition, levels of physical activity could potentially be affected by disruption to roads and public rights of way that may be used as active travel routes.

The temporary construction workforce is likely to comprise a mixture of local people and workers from further afield. This could mean that local communities see temporary changes to the local population size and demographics.

Operation

The presence of rail infrastructure and noise from passing trains may change the character of surrounding neighbourhoods, and may reduce the quality of life for residents.

Historic environment

Construction

The Proposed Scheme is being designed to reduce impacts on heritage assets as far as reasonably practicable. The construction of the Proposed Scheme would be likely to require the permanent removal of some non-designated heritage assets at: Flittogate Farm, Flittogate Lane; Bar Hill, Pickmere Lane; Heyrose Farm, Heyrose Lane; Holly House Farm, Warrington Road; Bowden View Farm, Bowden View Lane; Four Acres (Burnside Farm), Lymm Road; and Gorse Cottage and Barn, Chapel Lane.

The construction of the Proposed Scheme would permanently affect the setting of the Grade II listed Mere Court Hotel and Ovenback Cottage. This would result in changes to the way that the buildings are experienced and understood.

Landscape and visual

Construction

The presence of construction works and changes to the existing landform and vegetation patterns would affect the character of the local landscape. Where possible, effects would be reduced by the measures incorporated into the design to reduce the visibility of the Proposed Scheme (for example, land shaping to link earthworks into their wider landscape context, compensatory woodland planting, and hedgerow replacement and restoration).

Construction activities would be visible from 31 viewpoints within the area, for example views from: Pickmere, Pickmere Lane, School Lane, farms in the landscape and public rights of way Pickmere Footpath 5 and Footpath 9; and from the residential properties on and close to Winterbottom Lane, from Bentleyhurst Farm and from public rights of way Mere Bridleway (BR)1 and RB2.

Operation

During operation, the significant effects of the Proposed Scheme on the character and appearance of the local landscape would

substantially reduce over time as mitigation planting grows and matures, however, effects may remain significant.

During operation, the Proposed Scheme would be visible from 23 viewpoints within the area, for example views from: Pickmere, Pickmere Lane, School Lane, farms in the landscape and public rights of way Pickmere Footpath 5 and Footpath 9; and from the residential properties on and close to Winterbottom Lane, from Bentleyhurst Farm and from public rights of way Mere Bridleway (BR)1 and RB2.

Socio-economics

Construction of the Proposed Scheme would result in a likely significant effect from the loss of land or buildings and the resulting loss or displacement of jobs from Mere Court Hotel, Conference Centre and associated restaurant. Any likely residual significant socio-economic effects will be assessed and reported in the formal ES.

Sound, noise and vibration

Construction

Noise from construction could result in significant effects on residential communities closest to the construction works at Pickmere near the junction of Pickmere Lane and Hall Lane; Tabley around Budworth Road; Winterbottom; Hoo Green; Hulseheath; Millington near Thowler Lane; the junction of Agden Lane and Moss Lane; and Agden near Agden Lane (north of Agden Brow).

Noise from construction could result in significant effects on non-residential properties at Premier Inn Knutsford Mere in Hoo Green; and Mere Court Hotel and Conference Centre.

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works.

Further work is currently being undertaken to confirm the likely residual significant construction noise and vibration effects, including any temporary effects from construction traffic. This assessment will be reported in the formal ES.

Operation

Operational noise would be reduced at source through the effective design and specification of the trains and track. A number of measures have also been incorporated into the design of the Proposed Scheme to mitigate noise effects during operation. These include noise barriers in the form of landscape earthworks and/or noise fence barriers.

Operation of the railway would potentially result in noise effects on occupants of residential properties, due to potential noise increases above recognised thresholds, and hence change in the existing acoustic character around those properties closest to the Proposed Scheme in the following areas: Pickmere (Pickmere Lane); Winterbottom (Winterbottom Lane); Hulseheath (Chapel Lane); and Millington (Thowler Lane).

During operation of the railway noise insulation would be offered to avoid significant effects at individual residential properties that satisfy the applicable qualifying criteria. At this stage this is anticipated to be at Broom Manor on Peacock Lane; Ovenback Cottage on Agden Lane; Winterbottom Farm on Winterbottom Lane; and Daisybank Farm on Winterbottom Lane.

Further assessment work is currently being undertaken to confirm the likely significant effects due to operational noise and vibration, especially at non-residential locations and quiet areas and in terms of establishing existing baseline conditions. This will be reported in the formal ES.

HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid likely significant effects due to noise and vibration. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the potentially affected receptors, their use and the benefit of the measures.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on the following routes: the A556 (south of M6 junction 19); the A556 Chester Road; the A50; the A56 Lymm Road; the B5159 West Lane; the B5391 Pickmere Lane; the B5569 Chester Road; Agden Lane; Bowden View Lane; Budworth Road; Back Lane; Chapel

Lane; Flittogate Lane; Frog Lane; Peacock Lane; School Lane; and Thowler Lane. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Construction of the Proposed Scheme is expected to result in short term closure of the A50; the A56 Lymn Road and Back Lane. This may result in a diversion of traffic and other users of the route, resulting in an increased travel distance.

Construction of the Proposed Scheme is expected to result in some temporary suspension of parking spaces at Mere Court Hotel and Conference Centre.

Construction of the Proposed Scheme is expected to lead to a diversion of bus routes 289 and 47.

Temporary closure of Mere Bridleway 1 could result in increased journey times for non-motorised users.

Operation

Operation of the Proposed Scheme would require the permanent diversion of: the B5391 Pickmere Lane; Agden Lane; Bowden View Lane; Budworth Road; Flittogate Lane; Hoo Green Lane; Peacock Lane; and Thowler Lane. Increases in traffic could also result in traffic severance for non-motorised users (i.e. pedestrians, cyclists and horse riders) of these routes.

Operation of the Proposed Scheme is expected to result in permanent loss of parking spaces at Mere Court Hotel and Conference Centre.

Operation of the Proposed Scheme would require the permanent diversion or closure of the following seven public rights of way: Tabley Inferior Footpath 4; Tabley Superior Restricted Bridleway 4; Tabley Inferior Footpath 2/Tabley Inferior Footpath 3; Pickmere Footpath 5; Agden Footpath 4; Agden Footpath 1 and Agden Footpath 2.

Water resources and flood risk

Construction

Six potential springs would be significantly affected during construction resulting from reduced groundwater levels through dewatering of a cutting. This will be confirmed by further site survey and the assessment will be reported in the formal ES.

Construction of the Proposed Scheme would result in a significant effect due to the permanent loss of a potential spring feature located adjacent to the M6, 160m north of Hollowood Farm, Over Tabley.

The downstream section of a watercourse linked to two potential spring features would be permanently lost due to construction of a cutting, making the artificial re-establishment of these springs impossible.

8.5 Broomedge to Glazebrook (MA04)

Overview

The Broomedge to Glazebrook area (MA04) is approximately 7km in length and would extend northwards from the east of Broomedge to the east of Risley on the southern boundary of the Risley to Bamfurlong (MA05) area. The area falls within the local authority areas of Warrington Borough Council and Trafford Metropolitan Borough Council (see Figure 19).

The area is a predominantly rural in character with agriculture being the main land use. At the southern end of the area are the settlements of Broomedge and Heatley with the larger village of Lymm and the town of Warrington to the west. Towards the north of the area are the settlements of Hollins Green and Glazebrook with the towns of Partington and Cadishead to the east.

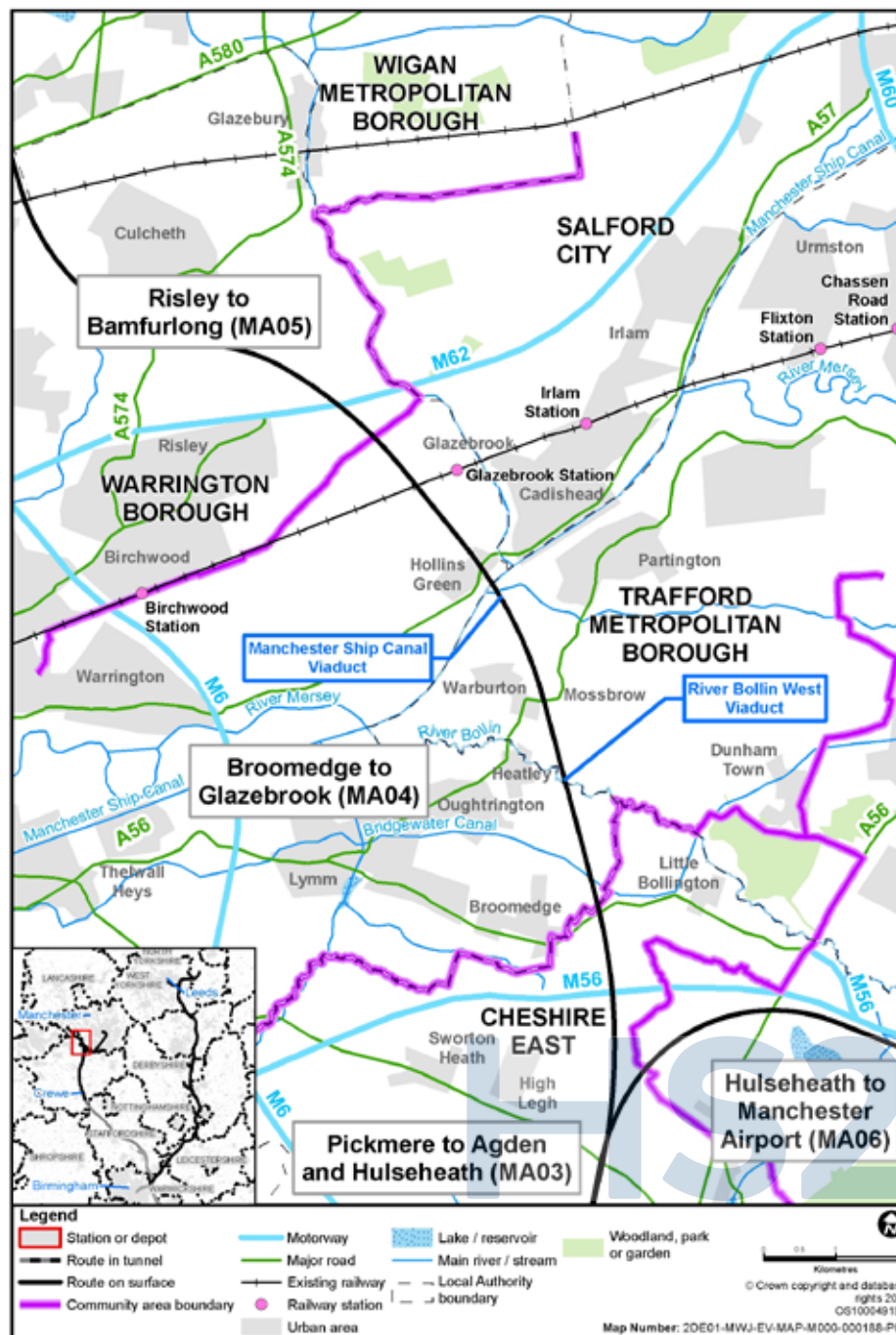


Figure 19: Broomedge to Glazebrook area (MA04) context map

The Proposed Scheme

The route would continue north from the Pickmere to Agden and Hulseheath area (MA03) on embankment before crossing the River Bollin on viaduct. The route would continue northwards on embankment before moving into cutting and then reverting back to embankment towards the Manchester Ship Canal. The route would cross the Manchester Ship Canal on viaduct and continue on embankment to the west of Glazebrook into the Risley to Bamfurlong area (MA05).

In this area, the Proposed Scheme would require the demolition of five residential properties. There would be permanent closure, realignment or diversion of three roads. The Proposed Scheme would result in the permanent realignment or diversion of four public rights of way. Two watercourses would be permanently realigned. One main construction compound and 13 satellite construction compounds would be required.

Residual effects

This section provides a summary of the likely significant residual environmental effects

identified for the Broomedge to Glazebrook area at this stage of the design and assessment.

Agriculture, forestry and soils

Construction

It is currently expected that approximately 131ha of agricultural land would be required for construction of the Proposed Scheme in this area, of which approximately 92ha is likely to be high quality agricultural land. Some of the land would be restored following construction, with approximately 63ha permanently required, 44ha of which is high quality agricultural land. The quality of the land is currently based on publicly available information and will be confirmed in the formal ES once agricultural land surveys are complete, as will the extent of land required for the Proposed Scheme.

To avoid or reduce environmental impacts, soils from the areas required temporarily and permanently for the Proposed Scheme would be stripped and stored. This would enable agricultural land that is required temporarily for construction to be returned to agricultural use. It would also enable soils to be put to other uses, such as supporting landscape planting.

Construction of the Proposed Scheme would likely result in significant effects on 11 farm holdings in this area due to the proportion of land required during construction. Of the 11 holdings temporarily affected, nine holdings would also be permanently affected. Land required temporarily would, in accordance with a restoration scheme agreed with the landowner and the relevant planning authority, be returned to the farm holding following the completion of construction.

Community

Construction

The land required to construct the Proposed Scheme would likely result in the temporary use of: 22 of the 34 car parking spaces, part of the outdoor space and play area at The Black Swan public house in Hollins Green; and 14 mooring spaces at the Agden mooring site of the Lymm Cruising Club on the outskirts of Broomedge.

Construction of the Proposed Scheme would lead to a significant community effect due to the demolition of four residential properties on Wet Gate Lane at Little Heatley. The loss of these properties represents a high proportion of this small community of nine residential properties.

Ecology and biodiversity

Construction

Construction of the Proposed Scheme would result in the temporary adverse effect on Rixton Clay Site of Special Scientific Interest from construction activities and traffic movements.

Construction of the Proposed Scheme would result in permanent habitat loss of approximately 0.4ha (7%) of Coroner's Wood Ancient Woodland Inventory Site.

It is currently expected that there would be a permanent loss of approximately 1.7ha of broadleaved deciduous woodland, in addition to loss of hedgerows and ancient and veteran trees. The removal and fragmentation of these habitat types has the potential to affect their conservation status as well as potentially resulting in significant effects on bats, polecat, great crested newts, breeding and wintering birds, terrestrial invertebrates, and reptiles.

Significant effects are likely to be experienced by otter and water vole in watercourses affected by the Proposed Scheme, as a result of the loss and fragmentation of water-margin habitat. Similarly, white-clawed crayfish, aquatic

invertebrates, and fish may be significantly affected as a result of construction disturbance.

Operation

During operation of the Proposed Scheme, bats and barn owls would be at risk of mortality caused by passing trains.

Health

Construction

The Proposed Scheme would impact a range of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health effects, judgements have been made as to the level and type of impact that could potentially affect population health.

Construction of the Proposed Scheme would result in the permanent loss of four residential properties in Little Heatley. The loss of these residential properties represents a sizeable proportion of the community and has the potential to reduce beneficial health effects that are gained through social contact and support.

The combination of construction noise, visual and traffic impacts would change the character of neighbourhoods, and may impact on residents' quality of life. For rural communities dependent on shops and services in nearby towns, temporary closures and diversions of local roads may reduce the accessibility of key services. In addition, levels of physical activity could potentially be affected by disruption to roads and public rights of way that may be used as active travel routes.

The temporary construction workforce is likely to comprise a mixture of local people and workers from further afield. This could mean that local communities see temporary changes to the local population size and demographics.

Operation

The presence of rail infrastructure and noise from passing trains would change the character of surrounding neighbourhoods, and may reduce the quality of life for residents.

Historic environment

Construction

The Proposed Scheme is being designed to reduce impacts on heritage assets as far as reasonably practicable. Construction of the Proposed Scheme would permanently physically affect the following four heritage assets: the site of a post-medieval house and garden on Bent Lane; the site of a possible Bronze Age burial mound in Warburton Park; Warburton Park itself; and the site of a post-medieval brick yard, east of Millbank Hall.

Construction of the Proposed Scheme would permanently affect the setting of two Grade II listed buildings (The School and Post Office House, both in Warburton) and Warburton Conservation Area. Alterations to their settings would result in changes to the way that these assets are experienced and understood.

Landscape and visual

Construction

The presence of construction works and changes to the existing landform and vegetation patterns would affect the character of the

local landscape. Where possible, effects would be reduced by the measures incorporated into the design to reduce the visibility of the Proposed Scheme (for example, land shaping to link earthworks into their wider landscape context, compensatory woodland planting, and hedgerow replacement and restoration).

Construction activities would be visible from 24 viewpoints within the area, for example views from: residential properties in Mossbrow, on Bent Lane, the A6144 Warburton Lane and the B5212 Glazebrook Lane, Moss Farm and Church Farm; and the Trans Pennine Trail (National Cycle Network Route 62), BW footpath 2 along the Manchester Ship Canal towpath and public right of way Warburton Footpath 3 (north of Lower Carr Green Farm).

Operation

During operation, the significant effects of the Proposed Scheme on the character and appearance of the local landscape would substantially reduce over time as mitigation planting grows and matures, however, effects may remain significant.

During operation, the Proposed Scheme would be visible from 24 viewpoints within the area,

for example views from: residential properties in Mossbrow, on Bent Lane and the A6144 Warburton Lane, Moss Farm and Church Farm; and the Trans Pennine Trail (National Cycle Network Route 62) and public right of way Warburton Footpath 3 (north of Lower Carr Green Farm).

Socio-economics

Construction of the Proposed Scheme would result in a likely significant effect from the loss of land or buildings and resulting loss or displacement of jobs from the Hollins Green public house, restaurant and hotel. Any likely significant residual effects will be assessed and reported in the formal ES.

Sound, noise and vibration

Construction

Noise from construction could result in significant effects on residential communities closest to the construction works at: Agden; Little Heatley; Heatley; Mossbrow; Warburton; Hollins Green; and Glazebrook.

Noise from construction could result in significant effects on the following non-

residential properties: St Werburg's New Church in Warburton; St Helen's Church of England Primary School in Hollins Green; St Helen's Church in Hollins Green; Hollinfare Cemetery; Rixton-with-Glazebrook Community Hall in Hollins Green; Rixton Methodist Church in Rixton; and Glazebrook Methodist Church.

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works.

Further work is currently being undertaken to assess the likely residual significant construction noise and vibration effects, including any temporary effects from construction traffic. This assessment will be reported in the formal ES.

Operation

Operational noise would be reduced at source through the effective design and specification of the trains and track. A number of measures have also been incorporated into the design of the Proposed Scheme to mitigate noise effects during operation. These include noise barriers in the form of landscape earthworks and/or noise fence barriers.

Operation of the railway would potentially result in noise effects on occupants of residential properties, due to potential noise increases above recognised thresholds, and hence change in the existing acoustic character around those properties closest to the Proposed Scheme in the following areas: Agden (Spring Lane, Warrington Lane and Agden Lane); Little Heatley (Wet Gate Lane); Hollins Green (Dam Lane, Manchester Road, School Lane and The Weint); and Glazebrook (Bank Street). Further assessment work is being carried out and will be reported in the formal ES.

Operation of the railway would potentially result in noise effects, due to potential noise increases above recognised thresholds, and hence change in the existing acoustic character around the following non-residential properties closest to the Proposed Scheme: St Helen's Church of England Church in Hollins Green; Hollinfare Cemetery; Glazebrook Methodist Church; and St Helen's Church of England Primary School in Hollins Green.

Further assessment work is currently being undertaken to assess the likely significant effects due to operational noise and vibration,

especially at non-residential locations and quiet areas and in terms of establishing existing baseline conditions. This will be reported in the formal ES.

HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid likely significant effects due to noise and vibration. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the potentially affected receptors, their use and the benefit of the measures.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on the following routes: the A57 Manchester Road/Cadishead Way; the A6144 Mill Lane/Bent Lane/Paddock Lane/Warburton Lane/Manchester Road/Carrington Lane; the B5159 Mill Lane; the B5212 Glazebrook Lane; Agden Lane; Bradshaw Lane; Dam Head Lane; Dam Lane; Manchester Road (Hollins Green) and Manchester Road (Partington). Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists

and horse riders) in terms of the ease with which they can cross these routes.

Construction of the Proposed Scheme is expected to result in diversion of bus routes 5 and 100. This would result in increased journey distance and journey times for the users of these services.

Temporary diversion of eight public rights of way could result in increased journey times for non-motorised users on Agden Footpath 9/2; National Cycle Route 62 (Trans Pennine Trail); Partington Footpath 6; Rixton-with-Glazebrook Footpath 8; Rixton-with-Glazebrook Footpath 9; Lymm Footpath 43/Cheshire Ring Canal Walk; Warburton Footpath 4 and Manchester Ship Canal towpath (including a section of Bollin Valley Way).

Construction of the Proposed Scheme would require temporary possessions of the Liverpool to Manchester (via Warrington Central) railway line, which would affect its rail freight services.

Construction of the Proposed Scheme could affect users of the Manchester Ship Canal and Bridgewater Canal, including their towpaths.

Operation

Operation of the Proposed Scheme would require the permanent diversion of the A6144 Paddock Lane/Warburton Lane; Dam Head Lane and Wet Gate Lane. Increases in traffic could also result in traffic severance for non-motorised users (i.e. pedestrians, cyclists and horse riders) of these routes.

Operation of the Proposed Scheme is expected to require the permanent diversion or closure of: Dunham Footpath 8; Warburton Footpath 3; Warburton Footpath 11 and Rixton-with-Glazebrook Footpath 14.

Water resources and flood risk

Construction

Construction of the Proposed Scheme would result in the permanent loss of two springs to the south and south-west of Church Farm (due to the disruption of groundwater flow feeding these springs) and one spring to the north-east of Fox Covert.

8.6 Risley to Bamfurlong (MA05)

Overview

The Risley to Bamfurlong area (MA05) is approximately 13km in length extending north-west from the east of Risley to the south of Bamfurlong. The area falls within the local authority areas of Warrington Borough Council and Wigan Metropolitan Borough Council (see Figure 20).

The area is predominantly rural in character with agriculture being the main land use. The area is interspersed with woodland, villages and towns including Risley and Culcheth at the southern end of the area. Towards the north of the area are the towns of Golborne, Lowton and the suburbs of Wigan.

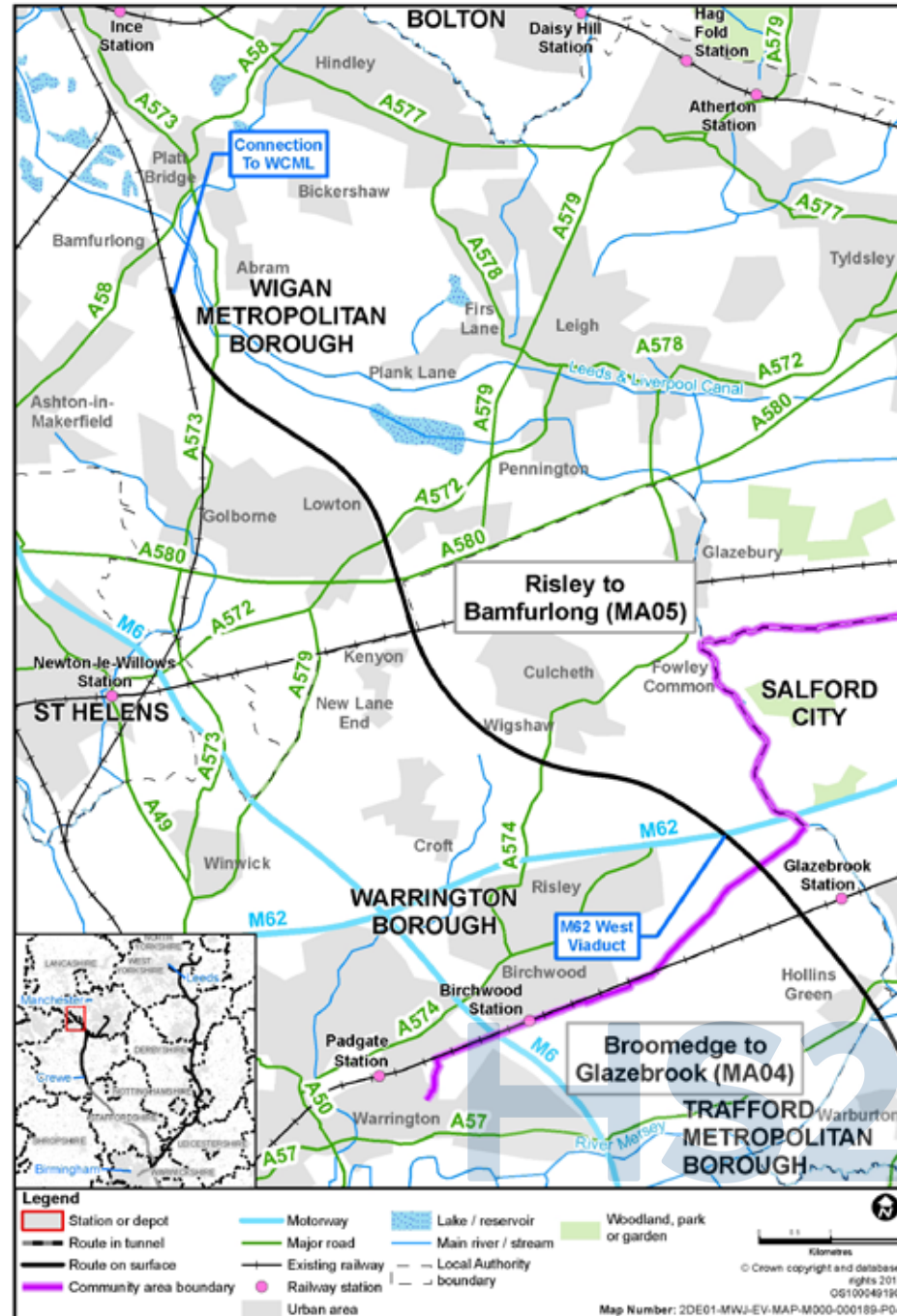


Figure 20: Risley to Bamfurlong area (MA05) context map

The Proposed Scheme

The route would continue north-west from the Broomedge to Glazebrook area (MA04) on embankment before crossing the M62 on viaduct. The route would continue on embankment passing into a cutting to the south of Culcheth and the A574 Warrington Road. The route would continue in cutting west of Culcheth before reverting to embankment and crossing the Liverpool to Manchester (Chat Moss) railway line. Continuing north in cutting towards Lowton the route would revert to embankment north of Golborne and connect with the West Coast Main Line south of Bamfurlong. A section of the existing West Coast Main Line would be modified where it would connect with the route.

In this area, the Proposed Scheme would require the demolition of 19 residential properties and 19 commercial/business properties. There would be permanent closure, realignment or diversion of eight roads. The Proposed Scheme would result in the permanent closure, realignment or diversion of 15 public rights of way. Fourteen watercourses would be permanently diverted or realigned. One main construction compound and 14 satellite construction compounds would be required.

Residual effects

This section provides a summary of the likely significant residual environmental effects identified for the Risley to Bamfurlong area at this stage of the design and assessment.

Agriculture, forestry and soils

Construction

It is currently expected that approximately 239ha of agricultural land would be required for construction of the Proposed Scheme in this area, of which approximately 96ha is likely to be high quality land. Some of this land would be restored following construction, with approximately 151ha permanently required, 60ha of which is likely to be high quality agricultural land. The quality of the land is currently based on publicly available information and will be confirmed in the formal ES once agricultural land surveys are complete, as will the extent of land required for the Proposed Scheme.

To avoid or reduce environmental impacts, soils from the areas required temporarily and permanently for the Proposed Scheme would be stripped and stored. This would enable

agricultural land that is required temporarily for construction to be returned to agricultural use. It would also enable soils to be put to other uses, such as to support landscape planting.

Construction of the Proposed Scheme would be likely to result in temporary significant effects at 21 farm holdings in this area due to the proportion of land required for the Proposed Scheme. Twenty two farm holdings would be permanently affected in this area due to the proportion of land required for the Proposed Scheme and demolition of farm buildings. Land required temporarily would, in accordance with a restoration scheme agreed with the landowner and the relevant planning authority, be returned to the farm holding following the completion of construction.

Community

Construction

Land required to construct the Proposed Scheme would result in temporary loss of access to the northern half of Culcheth Linear Park for approximately one year and nine months.

Construction of the Proposed Scheme would lead to a significant community effect due to

the demolition of eight residential properties on Newton Road, Lowton. The loss of these properties represents a high proportion of this community.

Construction of the Proposed Scheme would result in the permanent loss of GymEtc (a gym in Lowton), Partridge Lakes Fishery (a fishing facility comprising 15 course fishing lakes across 28ha in Wigshaw) and Hesketh Meadows playing field. In addition, 1ha of The Oaks playing field (which covers approximately 4.5ha) and 4ha of Bryrom Hall Woods (which covers approximately 27ha) would also be lost.

Ecology and biodiversity

Construction

Construction of the Proposed Scheme would result in temporary adverse effects to site integrity of Abram Flashes Site of Special Scientific Interest, Bryn Marsh and Ince Moss Site of Special Scientific Interest and Wigan Flashes Local Nature Reserve due to disturbance from nearby construction activities and traffic movements.

Land required for construction of the Proposed Scheme would result in permanent habitat loss

of approximately: 13ha (67%) of Silver Lane Ponds Local Wildlife Site; 0.3ha (7%) of Gorse Covert Mounds Local Wildlife Site; and 6ha (50%) of Ponds near Lightshaw Lane Site of Biological Importance.

It is currently expected that there would be a permanent loss of woodland potentially classifiable as ancient woodland, ancient and veteran trees hedgerows and 41 ponds. The removal and fragmentation of these habitat types has the potential to affect their conservation status as well as potentially resulting in a significant effects on bats, polecat, breeding and wintering birds and terrestrial invertebrates.

Significant effects are likely to be experienced by otter, water vole, great crested newt, white-clawed crayfish, aquatic invertebrates and fish in watercourses affected by the Proposed Scheme, as a result of the loss and fragmentation of habitat.

Operation

During operation of the Proposed Scheme, bats and barn owls would be at risk of mortality caused by passing trains.

Health

Construction

The Proposed Scheme would impact on a range of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health effects, judgements have been made as to the level and type of impact that could potentially affect population health.

Construction of the Proposed Scheme would temporarily restrict access to the northern half of Culcheth Linear Park, a 2.5km linear walking route. In addition, 1ha of The Oaks playing field and 4ha of Byrom Hall Woods would be permanently lost. These spaces provide a positive contribution to the wellbeing of local communities and their loss would have an adverse effect on health and wellbeing.

The combination of construction noise, visual and traffic impacts would potentially change the character of neighbourhoods, and may impact on residents' quality of life. For rural communities dependent on shops and services in nearby towns, temporary closures and diversions of local roads may reduce the

accessibility of key services. In addition, levels of physical activity could potentially be affected by disruption to roads and public rights of way that may be used as active travel routes.

The temporary construction workforce is likely to comprise a mixture of local people and workers from further afield. This could mean that local communities see temporary changes to the local population size and demographics.

Operation

The presence of rail infrastructure and noise from passing trains may change the character of surrounding neighbourhoods, and may reduce the quality of life for residents.

Historic environment

Construction

The Proposed Scheme is being designed to reduce impacts on heritage assets as far as reasonably practicable. Construction of the Proposed Scheme would result in the removal of two non-designated heritage assets: the buried remains of Lowton Hall; and the surviving earthworks and buried archaeological remains of the Edge Green Colliery railway and sidings.

Construction of the Proposed Scheme would also permanently affect the setting of the Grade II* listed building, Lightshaw Hall, and three Grade II listed buildings: Barrow Farmhouse; Wigshaw House; and Byrom Hall. This would result in changes to the way that these buildings are experienced and understood.

Operation

The sound and movement of trains during operation of the Proposed Scheme would further affect the setting of the Grade II* listed Lightshaw Hall. This would add to the effect identified as a result of construction of the Proposed Scheme.

Landscape and visual

Construction

The presence of construction works and changes to the existing landform and vegetation patterns would affect the character of the local landscape. Where possible, effects would be reduced by the measures incorporated into the design to reduce the visibility of the Proposed Scheme (for example, land shaping to link earthworks into their wider landscape context,

compensatory woodland planting and hedgerow replacement and restoration).

Construction activities would be visible from 24 viewpoints within the area, for example views from: residential properties on the A574 Warrington Road, Wigshaw Lane, Hesketh Meadow Lane, Newton Gardens and Cheetham Fold, Brancaster Drive and Stradbroke Close; Ashton-in-Makerfield 22 footpath; St John's Church, Abram; and the A573 Wigan Road.

Operation

During operation, the significant effects of the Proposed Scheme on the character and appearance of the local landscape would substantially reduce over time as mitigation planting grows and matures, however, effects may remain significant.

During operation, the Proposed Scheme would be visible from 23 viewpoints within the area, for example views from: residential properties in Gorse Covert, Hoyle's Moss Farm, New Hall Farm and on Beech Avenue; and Golborne Footpath 79 and Golborne Footpath 72.

Socio-economics

Construction

Construction of the Proposed Scheme would result in a likely significant effect from the loss of land or buildings and resulting loss or displacement of jobs from the following businesses in the area: a group of five businesses at The Warehouse Studios; and a group of over 20 businesses at Lowton Business Park and Pocket Nook Lane. Any likely significant residual effects will be assessed and reported in the formal ES.

Sound, noise and vibration

Construction

Noise from construction could result in significant effects on residential communities closest to the construction works at: Culcheth and Wigshaw; Lowton (Lowton St Mary's and Wash End); and Abram and Bamfurlong.

Noise from construction could result in significant effects on the following non-residential properties: Newchurch Community Primary School; St Lewis Roman Catholic

Primary School; Lowton Junior and Infant School; Lowton Social Club; Lowton St Mary's Church of England Primary School; St Mary's Church, Lowton Common; Independent Methodist Church in Lowton; and Abram Bryn Gates Primary School.

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works. Further work is currently being undertaken to confirm the likely significant construction noise and vibration effects, including any temporary effects from construction traffic. This assessment will be reported in the formal ES.

Operation

Operational noise would be reduced at source through the effective design and specification of the trains and track. A number of measures have also been incorporated into the design of the Proposed Scheme to mitigate noise effects during operation. These include noise barriers in the form of landscape earthworks and/or noise fence barriers.

Operation of the railway would potentially result in noise effects on occupants of residential properties, due to potential noise increases above recognised thresholds, and hence change in the existing acoustic character around those properties closest to the Proposed Scheme in the following areas: Wigshaw and Croft (Wigshaw Lane, Robins Lane and Mustard Lane); Wilton Grange (Kenyon Lane); Lowton St Mary's (Horncastle Close and Hesketh Meadow Lane); Lowton (Brancaster Drive, Stradbroke Close, Carr Lane, Linbeck Grove and residential streets off Lane Head Avenue, Slag Lane and Byrom Lane). Further assessment work is being carried out and will be reported in the formal ES.

During operation of the railway noise insulation would be offered to avoid significant effects at residential properties that satisfy the applicable qualifying criteria. At this stage this is anticipated to be in the vicinity of Wilton Lane.

Operation of the railway would potentially result in noise effects, due to potential noise increases above recognised thresholds, and hence change in the existing acoustic character around those non-residential properties closest to the Proposed Scheme at Lowton Junior and Infant School.

Further assessment work is currently being undertaken to confirm the likely significant effects due to operational noise and vibration, especially at non-residential locations and quiet areas and in terms of establishing existing baseline conditions. This will be reported in the formal ES.

HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid likely significant effects due to noise and vibration. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the potentially affected receptors, their use and the benefit of the measures.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on the following routes: the A49 Roman Road; the A49 Warrington Lane/Lodge Road; the A573 Aye Bridge Road; the A572 Newton Road; the A573 Warrington Road/Wigan

Road/Church Street/High Street/Bridge Street; the A574/Birchwood Way/A574 Birchwood Park Avenue/Warrington Way; the A58 Lily Lane; the A58 Liverpool Road/Gerard Street/Bolton Road; the A580 East Lancashire Road; the B5207 Wilton Lane; Byrom Lane; Church Lane; Glaziers Lane; Sandy Lane; Slag Lane; Warrington Road; and Wigshaw Lane. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Construction of the Proposed Scheme is expected to lead to diversion of bus routes: 590; 34; 602; 600; 601; 603; X34; 360; 588; 589; 28; and 28E.

Construction of the Proposed Scheme is expected to require the temporary suspension of parking spaces at businesses centres off the A572 Newton Road/Pocket Nook Lane.

Construction of the Proposed Scheme is expected to temporarily close or divert Croft Footpath 08, Golborne Footpath 30 and Ashton-in-Makerfield Footpath 22.

Operation

Operation of the Proposed Scheme would require the permanent diversion of: the A572 Newton Road; the A573 Wigan Road; the A574 Warrington Road; the B5207 Wilton Lane; Glaziers Lane; New Hall Lane (northern access to Taylors Business Park); Slag Lane and Wigshaw Lane. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Operation of the Proposed Scheme is expected to permanently remove parking spaces at business centres off the A572 Newton Road/Pocket Nook Lane.

Operation of the Proposed Scheme is expected to permanently divert: Croft footpaths 13, 27, 15, 19, 8, 108 and 28; Golborne footpaths 63, 37, 39, 33, 30, 27 and 35; and Abram footpath 02/10.

8.7 Hulseheath to Manchester Airport (MA06)

Overview

The Hulseheath to Manchester Airport area (MA06) is approximately 12km in length extending east from the north of Hulseheath to the north-east of Davenport Green. The area falls within the local authority areas of Cheshire East Council, Trafford Metropolitan Borough Council and Manchester City Council (see Figure 21).

The area is a mix of rural and urban character with agricultural and recreational land use to the south of the Proposed Scheme. Urban land use dominates the north-west part of the area. Manchester Airport is located to the south-east of the Proposed Scheme.

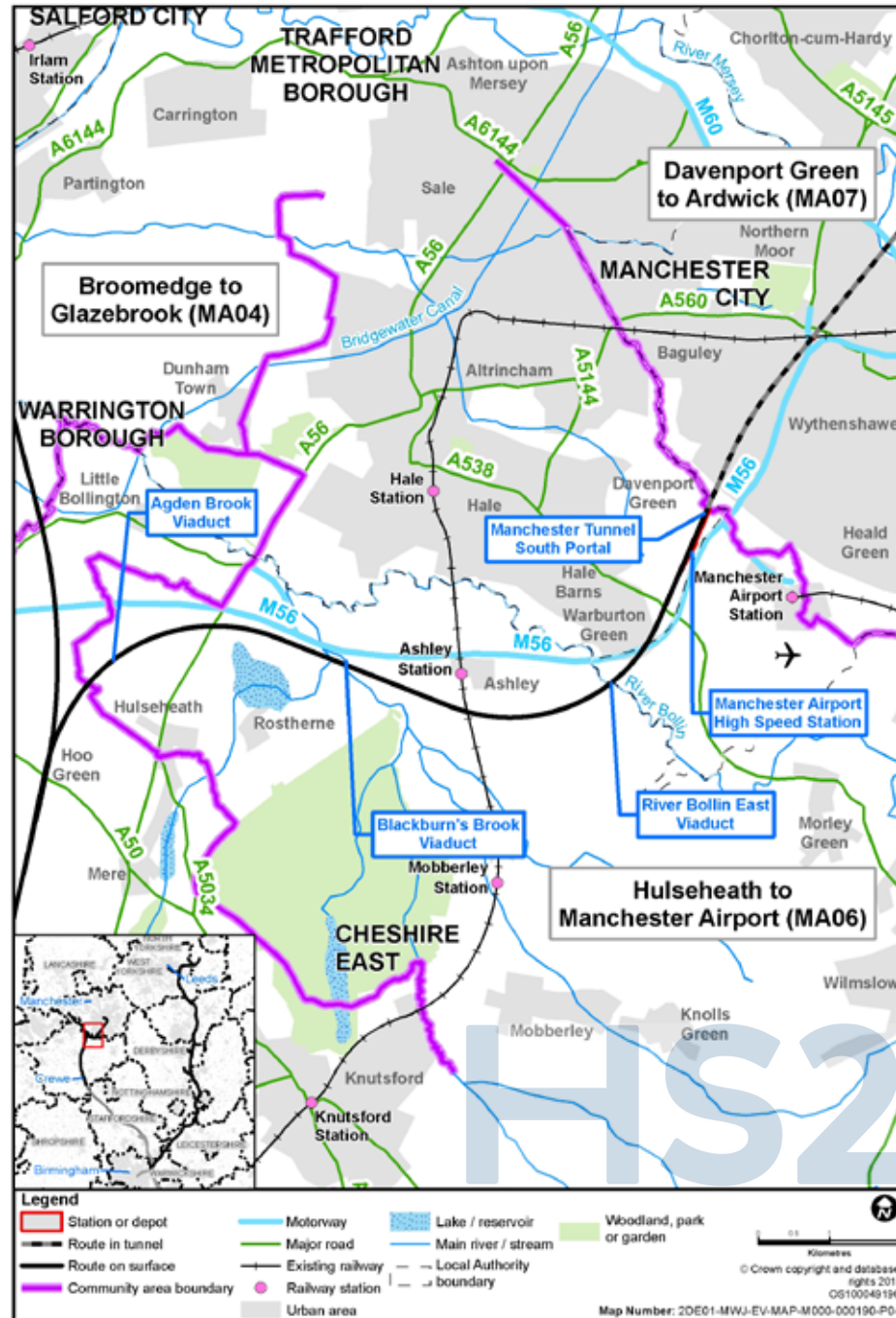


Figure 21: Hulseheath to Manchester Airport area (MA06) context map

The Proposed Scheme

The route would continue east from the Pickmere to Agden and Hulseheath area (MA03) on embankment before passing over Agden Brook on viaduct. The route would then enter cutting before transitioning onto embankment and crossing the A556 Chester Road. The route would continue onto viaduct, to the south of the M56, before entering a series of cutting and embankments.

The route would continue northwards from the River Bollin on embankment and viaduct before entering cutting. The Manchester Airport High Speed station would be located in this area.

The proposed Manchester Airport High Speed station site would be located between junctions 5 and 6 of the M56. The station would have up to four platforms and be an interchange serving HS2, Metrolink, cars, buses, coaches and taxis. A multi-storey station car park would be provided south of the station concourse, as well as drop off and pick up bays and bus and coach parking bays.

In this area, the Proposed Scheme would require the demolition of 21 residential properties and six commercial/business properties. There

would be permanent diversion of 11 roads. The Proposed Scheme would result in the permanent diversion or closure of 18 public rights of way. Three watercourses would be permanently realigned. Two main construction compound and 15 satellite construction compounds would be required.

Residual effects

This section provides a summary of the likely significant residual environmental effects identified for the Hulseheath to Manchester Airport area at this stage of the design and assessment.

Agriculture, forestry and soils

Construction

It is currently expected that approximately 189ha of agricultural land would be required for construction of the Proposed Scheme in this area, of which approximately 76ha is likely to be high quality agricultural land. Some of this land will be restored following construction, with approximately 100ha permanently required, 40ha of which is high quality land. The quality of the land is currently based on publicly available

information and will be confirmed in the formal ES once agricultural land surveys are complete, as will the extent of land required permanently for the Proposed Scheme.

To avoid or reduce environmental impacts, soils from the areas required temporarily and permanently for the Proposed Scheme would be stripped and stored. This would enable agricultural land that is required temporarily for construction to be returned to agricultural use. It would also enable soils to be put to other uses, such as to support landscape planting.

Construction of the Proposed Scheme would be likely to result in significant effects at 22 farm holdings in this area due to the proportion of land required. Of the 22 holdings temporarily affected, 21 holdings would also be permanently affected. Land required temporarily during construction would, in accordance with a restoration scheme agreed with the landowner and the relevant planning authority, be returned to the farm holding following the completion of construction.

Community

Construction

Construction of the Proposed Scheme would temporarily require land currently used as a car park servicing the Children's Adventure Farm Trust at Booth Bank Farm on Reddy Lane, Millington.

Construction of the Proposed Scheme would lead to significant community effects due to the demolition of: five residential properties on Castle Mill Lane at Thorns Green; five on Sunbank Lane, Hale Bank; seven on Hasty Lane and Hale Road; and three on Yarwoodheath Lane. The loss of these properties represents a high proportion of each of these small communities.

The land required to construct the Proposed Scheme would result in the permanent loss of: Higher Thorns Green Farm on Castle Mill Lane in Thorns Green; and Cliffemount Community Care Home on Hale Road in Hale Barns.

Ecology and biodiversity

Construction

Airborne pollution from construction traffic

during construction of the Proposed Scheme would result in temporary effects on the integrity of Cotterill Clough Site of Special Scientific Interest. Construction of the Proposed Scheme would also result in a permanent effect on the integrity of Sunbank Wood Ponds Site of Biological Interest and Sunbank Wood Ancient Woodland Inventory Site due to the reduction in groundwater flow and levels.

Construction of the Proposed Scheme would result in a permanent loss of approximately: 1.1ha (81%) of Hancock's Bank South Local Wildlife Site and Hancock's Bank Ancient Woodland Inventory Site; 100m² (0.3%) of Ryecroft Covert Local Wildlife Site; 300m² (1.2%) of woodland near Arden House Local Wildlife Site and Arden House Wood Ancient Woodland Inventory Site; 1.5ha (62%) of Erlam's Meadow Local Wildlife Site; 0.8ha (27%) of Ecclesfield Wood Local Wildlife Site; 100m² (0.4%) of Brickhill Wood Local Wildlife Site; 100m² (0.1%) of woodland near Chapel Lane Site of Biological Interest; 0.3ha (1%) of Sunbank Wood and Ponds Site of Biological Interest; and 1.8ha (50%) of Davenport Green Wood Site of Biological Interest and woodland identified as ancient woodland by Natural England but not yet included on the Ancient Woodland

Site Inventory. The loss of land would result in significant effects on the integrity of the designated sites.

It is currently expected that there would be a loss of approximately 4.8ha of broadleaved woodland and 37 ponds, in addition to hedgerows and ancient and veteran trees. The removal and fragmentation of these habitat types has the potential to affect their conservation status as well as potentially resulting in significant effects on bat, polecat, birds, terrestrial invertebrate and reptile populations.

Significant effects are likely to be experienced by otter and water vole in watercourses affected by the Proposed Scheme, as a result of the loss and fragmentation of habitat. Similarly great crested newt, white-clawed crayfish, aquatic invertebrates and fish may be affected as a result of construction disturbance.

Operation

During operation of the Proposed Scheme, bats and barn owls would be at risk of mortality caused by passing trains.

Health

Construction

The Proposed Scheme would impact on a range of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health effects, judgements have been made as to the level and type of impact that could potentially affect population health.

Construction of the Proposed Scheme would result in the permanent loss of five residential properties in the village of Thorns Green, and five residential properties in the village of Hale Bank. This has the potential to reduce beneficial health effects that are gained through social contact and support.

Construction of the Proposed Scheme would result in the permanent loss of Higher Thorns Green Farm, which supports a social and educational programme for children and adults receiving care, and Cliffemount Community Care, which provides accommodation for younger adults with learning disabilities. The loss of these two facilities would result in adverse health effects for their users.

The combination of construction noise, visual and traffic impacts would change the character of neighbourhoods, and may impact on residents' quality of life. For rural communities dependent on shops and services in nearby towns, temporary closures and diversions of local roads may reduce the accessibility of key services. In addition, levels of physical activity could potentially be affected by disruption to roads and public rights of way that may be used as active travel routes.

The temporary construction workforce is likely to comprise a mixture of local people and workers from further afield. This could mean that local communities see temporary changes to the local population size and demographics.

Operation

The presence of rail infrastructure and noise from passing trains may change the character of surrounding neighbourhoods, and may reduce the quality of life for residents.

Historic environment

Construction

The Proposed Scheme is being designed to reduce impacts on heritage assets as far as reasonably practicable. However, construction of the Proposed Scheme would result in permanent physical impacts on heritage assets including: the Grade II listed Buckhall at the Manchester Airport Marriott Hotel, and the demolition of seven non-designated heritage assets, including: Cherry Tree Farm, Cherry Tree Lane; Bowden View Farm, Tom Lane, Rostherne; Bowden View Cottage and Pembroke House; Higher Thorns Green Farm, Thorns Green; Pigley Stair cottages; 56 Sunbank Lane, Halebank; and Fern Cottage, Hale Road, Hale Barns.

Construction of the Proposed Scheme would permanently affect the setting of six Grade II listed buildings: Mere Court Cottage; Sycamore Cottage; The Church of St Elizabeth; Hough Green Farmhouse; Lower House Farmhouse; and Yewtree Farmhouse. This would result in changes to the way that these buildings are experienced and understood.

Landscape and visual

Construction

The presence of construction works and changes to the existing landform and vegetation patterns would affect the character and appearance of the local landscape. Where possible, effects would be reduced by the measures incorporated into the design to reduce the visibility of the Proposed Scheme (for example, design of earthworks into their wider landscape context, compensatory woodland planting, and hedgerow replacement and restoration).

Construction activities would be visible from 33 viewpoints within the area, for example views from: residential properties at Sunbank Lane and the southern boundary of Warburton Green and Hale Barns; Millington Hall, Booth Bank and Millington Footpaths 2/1, 4/1 and 5/1; Briddon Weir Farm, Birkin House and Rostherne Footpath 5/1 and Ashley Footpath 3/1.

Operation

During operation, the significant effects of the Proposed Scheme on the character and appearance of the local landscape would be substantially reduced over time as mitigation

planting grows and matures, however, effects may remain significant.

During operation, the Proposed Scheme would be visible from 28 viewpoints within the area, for example views from: Ashley Road, Ashley, Arden House, Lower House Farm, Back Lane, Brickhill Lane, and Castle Mill Lane, Thorns Green.

Socio-economics

Construction of the Proposed Scheme would result in likely significant effects from the loss of land or buildings and the resulting loss or displacement of jobs from the following businesses in the area: Higher Thorns Green Farm (providing farm based activities for young people with Autism and those with learning disabilities); and Manchester Airport Marriott Hotel, with associated restaurant and bar, hair boutique and spa businesses on-site. Any likely significant residual effects will be assessed and reported in the formal ES.

Sound, noise and vibration

Construction

Noise from construction could result in significant effects on residential communities

closest to the construction works at Hulseheath; Booth Bank; Thorns Green; Halebank; Warburton Green; Hale Barns; and Davenport Green.

Noise from construction could result in significant effects on non-residential community facilities closest to the construction works including The Children's Adventure Farm Trust, Millington.

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works.

Further work is currently being undertaken to confirm the likely significant construction noise and vibration effects, including any temporary effects from construction traffic. This assessment will be reported in the formal ES.

Operation

Operational noise would be reduced at source through the effective design and specification of the trains and track. A number of measures have also been incorporated into the design of

the Proposed Scheme to mitigate noise effects during operation. These include noise barriers in the form of landscape earthworks and/or noise fence barriers.

Operation of the railway would potentially result in noise effects on occupants of residential properties, due to potential noise increases above recognised thresholds, and hence change in the existing acoustic character around those properties closest to the Proposed Scheme in the following areas: Hulseheath (Chapel Lane); and Millington (Thowler Lane). Further assessment work is being carried out and will be reported in the formal ES.

During operation of the railway noise insulation would be offered to avoid significant effects at residential properties that satisfy the applicable qualifying criteria. At this stage this is anticipated to be at: Moss House Farm on Thowler Lane; and North Arden Lodge on Lamb Lane.

Further assessment work is currently being undertaken to confirm the likely significant effects due to operational noise and vibration, especially at non-residential locations and quiet areas and in terms of establishing existing

baseline conditions. This will be reported in the formal ES.

HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid likely significant effects due to noise and vibration. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the potentially affected receptors, their use and the benefit of the measures.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on a number of the following routes: the A538 Hale Road/Wilmslow Road; the B5569 Chester Road; Ashley Road; Birkinheath Lane; Brickhill Lane; Castle Mill Lane; Cherry Tree Lane; Chapel Lane; Dirty Lane; Hasty Lane; Lamb Lane; Mill Lane; Millington Lane; Mobberley Road; Rostherne Lane; Sunbank Lane; Runger Lane; and Thorley Lane. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Construction of the Proposed Scheme is expected to result in temporary closure/realignment or diversions of: the A538 Hale Road (in the vicinity of Hasty Lane/the M56 junction 6); Ashley Road; Castle Mill Lane; Mill Lane; Millington Lane; Mobberley Road; Sunbank Lane; and Thorley Lane.

Construction of the Proposed Scheme has the potential to lead to the diversion of bus routes 88 and 288 due to the potential closure or diversion of the A538 Hale Road. This may result in a diversion of traffic, resulting in an increased travel distance and could result in increased traffic severance for motorised users of the route.

Temporary closure or diversion of three public rights of way could result in increased journey times for non-motorised users at: Rostherne Footpath 5/1; Ashley Footpath 6/5; and Ashley Footpath 8/1.

Construction of the Proposed Scheme is expected to require rail possessions and closures, which would result in disruption of services and increased traffic severance for users of public transport services.

Operation

Manchester Airport High Speed station would provide direct and fast access to Manchester Airport from Birmingham, London and beyond. The station would also provide interchange opportunities with Metrolink, which would further enhance the connectivity of the region.

Operation of the Proposed Scheme would require the permanent diversion of a number of roads: the M56 junction 6 (including alterations to the junction layout to accommodate access to Manchester Airport High Speed station); Ashley Road; Castle Mill Lane; Mobberley Road; Sunbank Lane; and Thorley Lane. Increases in traffic could also result in traffic severance for non-motorised users (i.e. pedestrians, cyclists and horse riders) of these routes.

The permanent realignment, diversion or closure of 18 public rights of way may also result in significant effects including at: Ashley Footpaths 3/1, 7/1, and 6/5; Agden Footpaths 1/2 and 2/4; Hale Road Footpath 16; Millington Footpaths 3/1, 4/1, 5/2, 8/1 and 7/2; Ringway Footpaths 12 and 11; Rostherne Footpaths 13/1 and 4/1; and Ringway Footpaths 9, 8 and 7.

Water resources and flood risk

Construction

Construction of the Manchester Airport High Speed station and Manchester tunnel south portal would result in the permanent loss of a spring (assumed high value) at the hotel on Hasty Lane.

8.8 Davenport Green to Ardwick (MA07)

Overview

The Davenport Green to Ardwick area (MA07) is approximately 13km in length and falls within the local authority areas of Trafford Metropolitan Borough Council and Manchester City Council. The route would extend from Davenport Green to north of Ardwick Station (see Figure 22).

The area is predominantly suburban in character, becoming more urban as it continues north, with residential, recreational and commercial land use. The area is interspersed with parkland and woodland, and includes a section of the River Mersey.

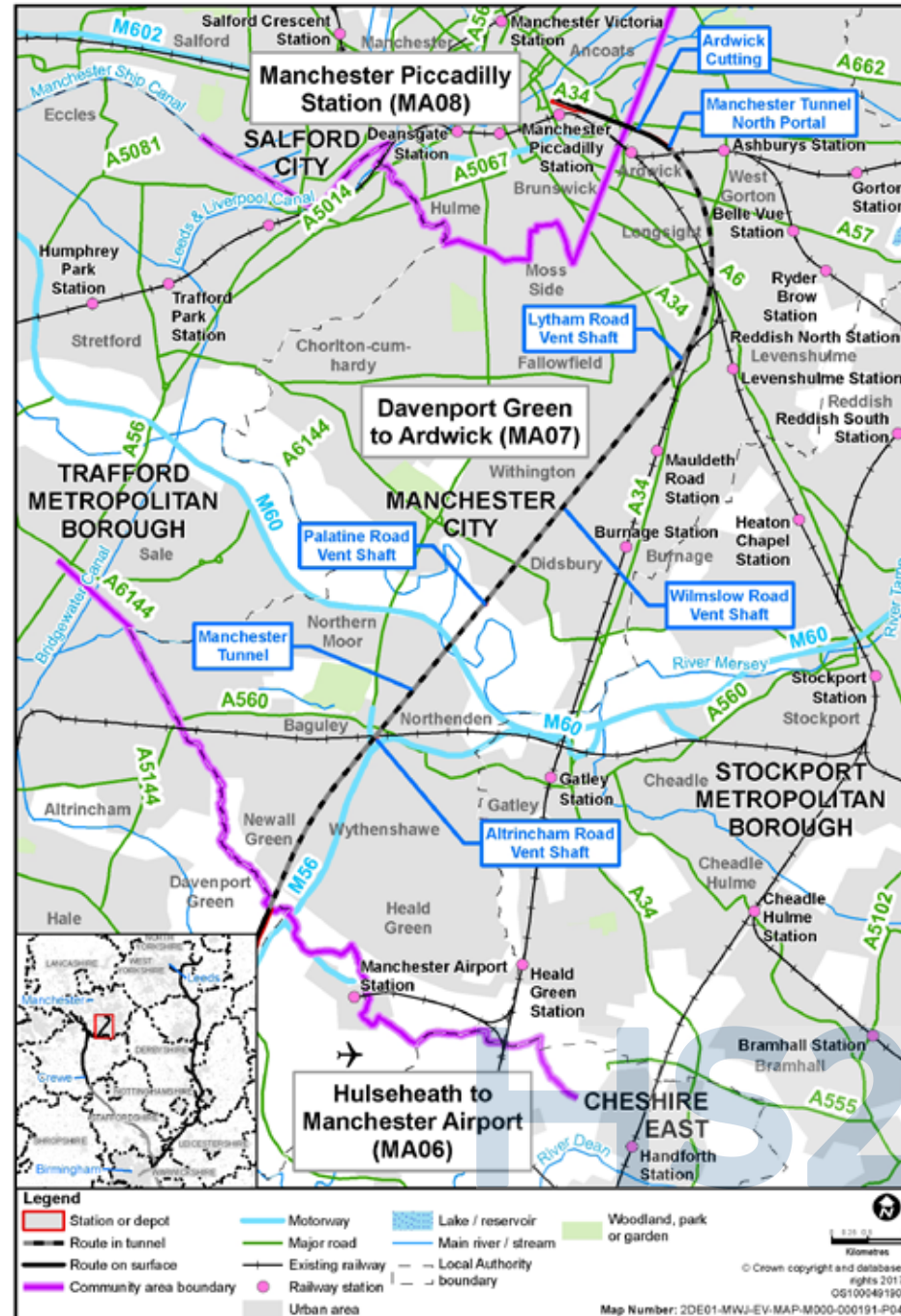


Figure 22: Davenport Green to Ardwick area (MA07) context map

The Proposed Scheme

The route would continue north-east from the Hulseheath to Manchester Airport area (MAo6) in a tunnel towards Ardwick Depot. Vent shafts and headhouses would be required along the route of the tunnel. The route would then emerge from the tunnel and continue in a cutting north-west towards central Manchester where the route would continue into the Manchester Piccadilly Station area (MAo8). There would be works to the existing Ardwick Depot.

In this area, the Proposed Scheme would require the demolition of three residential properties and 28 commercial/business properties. Three roads would be permanently closed and diverted. One main construction compound and four satellite construction compounds would be required.

Residual effects

This section provides a summary of the likely significant residual environmental effects identified for the Davenport Green to Ardwick area at this stage of the design and assessment.

Community

Construction

Land required for the construction of the Proposed Scheme would require the temporary use of the Christie Hospital Car Park D (135 car parking spaces); 0.5ha (16%) of land at the Manchester Enterprise Academy; and 2.5ha of land at Withington Golf Club (which covers 30ha).

Construction of the Proposed Scheme would result in the permanent loss of 100 of the 135 car parking spaces at the Christie Hospital Car Park D; 0.2ha (6%) of land at the Manchester Enterprise Academy; and the Eglise En Mission Church on the A665 Midland Street.

Ecology and biodiversity

Construction

It is currently expected that construction of the Proposed Scheme would result in a permanent loss and severance of approximately 0.1ha (4.5%) of Wrengate Wood Local Wildlife Site and approximately 7ha of open mosaic habitat. The removal and fragmentation of this habitat type

has the potential to affect their conservation status as well as potentially resulting in significant effects on bat, breeding, nesting and foraging bird and terrestrial invertebrate populations.

Health

Construction

The Proposed Scheme would impact on a range of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health effects, judgements have been made as to the level and type of impact that could potentially affect population health.

The combination of construction noise, visual and traffic impacts would change the character of the urban area, and may impact on residents' quality of life. Road closures and diversions would have the potential to reduce community connectivity by increasing journey times, particularly on heavily used commuter routes. Opportunities for physical activity may be reduced by the presence of heavy goods vehicles on local roads.

Construction of the Proposed Scheme would temporarily require the use of the Christie Hospital Car Park D (135 car parking spaces). Of the 135 car parking spaces, 100 would be permanently required. The loss of car parking spaces at Christie Hospital Car Park D has the potential to result in an adverse health effect. In addition, the Eglise En Mission Church on Midland Street would be permanently lost. The church provides a service in supporting wellbeing and therefore this demolition has the potential to result in an adverse health effect.

Historic environment

Construction

The Proposed Scheme is being designed to reduce impacts on heritage assets as far as reasonably practicable. Construction of the Proposed Scheme would result in the removal of six non-designated heritage assets: St Silas' Church and graveyard; the site of a brick field from the post-medieval industrial period; the site of Ancoats Branch Railway Cutting; the site of North Ardwick Primary School; the site of terraced housing on Hope Street; and the site of Higher Ardwick School.

Landscape and visual

Construction

The presence of construction works and changes to the existing landform and vegetation patterns would affect the character of the local landscape. Where possible, effects would be reduced by the measures incorporated into the design to reduce the visibility of the Proposed Scheme (for example, planting and use of well-maintained hoardings and fencing).

Construction activities would be visible from seven viewpoints within the area, for example views from: residential properties on Parkville Road, Ferndene Road, and Lynway Drive; Manchester Enterprise Academy and Birchfields Primary School; and Withington Golf Course.

Operation

During operation, the significant effects of the Proposed Scheme (vent shafts and headhouses where the route is in tunnel) on the character and appearance of the local landscape would substantially reduce over time as mitigation planting grows and matures, however, effects may remain significant.

During operation, the Proposed Scheme would be visible from four viewpoints within the area, for example views from: residential properties on the B5167 Palatine Road and at Ashfield Lodge; Manchester Enterprise Academy and Birchfields Primary School; and from Withington Golf Course.

Socio-economics

Construction of the Proposed Scheme would result in a likely significant effect from the loss of land or buildings and the resulting loss or displacement of jobs from the following businesses in the area: a secondary school on Lytham Road; the Siemens Ardwick Traincare Facility; a metal supplier and management business on Rondin Road; and a demolition and dismantling company on Rondin Road. Any likely significant residual effects will be assessed and reported in the formal ES.

Sound, noise and vibration

Construction

Noise from construction could result in significant effects on residential communities closest to the construction works at: Newall

Green (Rowarth Road, Burbage Road and Shepton Drive); Wythenshawe (Greenwood Road, the A560 Altrincham Road and Neath Avenue); Didsbury (the B5167 Palatine Road, Hayescroft Gardens, Adamson Gardens, Winchester Park and Dene Park); Withington (the B5093 Wilmslow Road and side streets between Mayville Drive and Rathen Road); Levenshulme (within the area bounded by the A34 Birchfields Road to the west, the A5079 Slade Lane to the east, the A5079 Kingsway to the south and the A6144 Old Hall Lane to the north); West Gorton (Anthony Close, Wigley Street, Hayfield Close and Bennett Street); Beswick (Bell Crescent, Holly Street, Lloyd Wright Avenue and adjoining streets, Viaduct Street, Byrcland Close, Ashlar Drive and Aden Close).

Noise from construction could result in significant effects on the following non-residential properties: The Open University on Altrincham Road in Wythenshawe; The Church Of Jesus Christ Of Latter-Day Saints on Altrincham Road in Wythenshawe; Britannia Country House Hotel on Paletine Road in West Didsbury; Nazarene Theological College on Dene Road in West Didsbury; Christie Hospital on Wilmslow Road in Withington;

Birchfields Primary School on Lytham Road in Levenshulme; and Manchester Enterprise Academy on Lytham Road in Levenshulme.

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works.

Further work is currently being undertaken to confirm the likely significant construction noise and vibration effects, including any temporary effects from construction traffic. This assessment will be reported in the formal ES.

Operation

Operational noise would be reduced at source through the effective design and specification of the trains and track. A number of measures have also been incorporated into the design of the Proposed Scheme to mitigate noise effects during operation. These include noise barriers in the form of noise fence barriers.

Operation of the railway would potentially result in noise effects, due to potential noise increases above recognised thresholds, and hence change in the existing acoustic character around those

properties closest to the Proposed Scheme. At this stage of the design, the initial assessment has not identified any effects with the potential to be considered significant on a community basis due to increased noise levels.

Further assessment work is currently being undertaken to confirm the likely significant effects due to operational noise and vibration, especially at non-residential locations and quiet areas and in terms of establishing existing baseline conditions. This will be reported in the formal ES.

HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid likely significant effects due to noise and vibration. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the potentially affected receptors, their use and the benefit of the measures.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on the following routes: the M56 junction 3a; the M60 junction 24; the

A34 Kingsway; the A5103 Princess Parkway; the A5145 Barlow Moor Road; the A560 Altrincham Road; the A57 Hyde Road; the A6010 Pottery Lane; the A635 Ashton Old Road; the A665 Midland Street; the B5093 Wilmslow Road/ Moseley Road; the B5167 Palatine Road; Birchfields Road; Chapman Street; Gorton Road; Hooper Street; and Rondin Road. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Construction of the Proposed Scheme is expected to temporarily suspend parking spaces at: The Christie Hospital Car Park D; the A665 Chancellor Lane; the Siemens Traincare Facility; the Manchester Enterprise Academy; and Hooper Street.

Construction of the Proposed Scheme is expected to require temporary possessions on the existing railway network as a result of the works to the existing Ardwick Depot.

Operation

Rail users would benefit from improved journey times between major cities in the North, the Midlands and the South as a result of the

introduction of HS2 services at Manchester Piccadilly Station and Manchester Airport High Speed station, together with increased capacity and additional journey opportunities on conventional rail services.

Operation of the Proposed Scheme would require the permanent closure and diversion of: the A665 Midland Street; Hooper Street; and Rondin Road. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Operation of the Proposed Scheme has the potential for permanent loss of parking at: the Christie Hospital Car Park D; the A665 Chancellor Lane; the Siemens Traincare Facility; the Manchester Enterprise Academy; and Hooper Street.

8.9 Manchester Piccadilly Station (MAo8)

Overview

The Manchester Piccadilly Station area (MAo8) is approximately 1km in length and falls within the local authority area of Manchester City Council. The route would extend from Ardwick in the east and travel north-west towards Manchester city centre, before terminating at the proposed Manchester Piccadilly High Speed station, north of the existing Manchester Piccadilly Station (see Figure 23).

The area is entirely urban, with land use comprising light industrial and commercial infrastructure. The River Medlock runs through the southern part of the area. Piccadilly and the city centre are the nearest main residential areas, with the University of Manchester’s Sackville Street campus to the south-west. The existing Manchester Piccadilly Station, railway and associated facilities are key elements of the area.

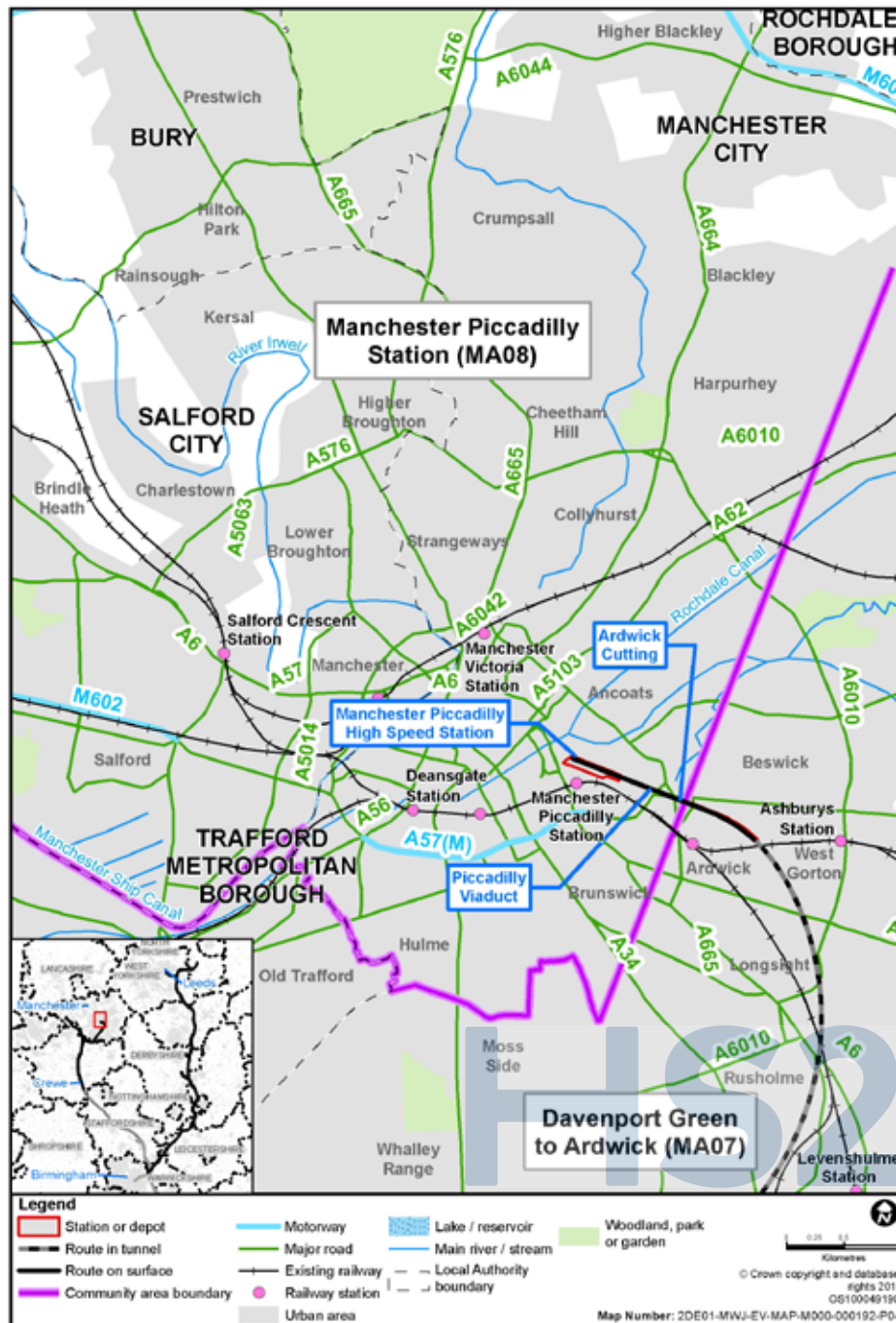


Figure 23: Manchester Piccadilly Station area (MAo8) context map

The Proposed Scheme

The route of the Proposed Scheme would continue from the Davenport Green to Ardwick area (MA07) in a north-westerly direction in a cutting, then continue onto viaduct before terminating at the proposed Manchester Piccadilly High Speed station. The station would be located immediately to the north-east of the existing Manchester Piccadilly Station and would include: four platforms and eastern and western concourses separated by the Metrolink line. In addition, multi-storey car parking, drop-off and pick-up areas, bus stops and taxi rank, and public realm improvements would be provided.

In this area, the Proposed Scheme would require the demolition of 64 commercial/business properties. There would be permanent closure, realignment or diversion of 12 roads. One main construction compounds and four satellite construction compounds would be required.

Residual effects

This section provides a summary of the likely significant residual environmental effects identified for the Manchester Piccadilly Station area at this stage of the design and assessment.

Community

Construction

The land required to construct the Proposed Scheme would result in the permanent loss of: True Jesus Church on St. Andrews Street; SOL Christian Academy on the B6469 Fairfield Street; The Men's Room on the B6469 Fairfield Street; Manchester Action on Street Health on the B6469 Fairfield Street; Manchester Offenders: Diversion Liaison Service on the B6469 Fairfield Street; and Straight Blast Gym Manchester on Sheffield Street.

Ecology and biodiversity

Construction

The permanent loss of nesting and foraging habitats has the potential to result in significant effects on a range of breeding and wintering birds. The permanent removal of vegetation, resulting in a loss of foraging areas and the demolition of buildings potentially used for roosts, has the potential to result in significant effects on bat populations.

Health

Construction

The Proposed Scheme would impact on a range of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health effects, judgements have been made as to the level and type of impact that could potentially affect population health.

Construction of the Proposed Scheme would require the permanent loss of six community facilities in this area, including: True Jesus Church on St Andrews Street; SOL Christian Academy on the B6469 Fairfield Street; Manchester Action on Street Health on the B6469 Fairfield Street; Manchester Offenders: Diversion Liaison Service on the B6469 Fairfield Street; Straight Blast Gym; and The Men's Room on the B6469 Fairfield Street, which would result in the loss of access to these services. The loss of these facilities would result in an adverse health effect due to the lack of alternative facilities/services in the locality.

The combination of construction noise, visual and traffic impacts would change the character of the urban area, and may impact on residents' quality of life. Road closures and diversions would have the potential to reduce community connectivity by increasing journey times, particularly on heavily used commuter routes. Opportunities for physical activity may be reduced by the presence of heavy goods vehicles on local roads.

Historic environment

Construction

The Proposed Scheme is being designed to avoid and reduce impacts on heritage assets as far as reasonably practicable.

Construction of the Proposed Scheme would permanently physically affect the Grade II listed Train Shed Building at Piccadilly Station; and result in the removal of 31 non-designated heritage assets including the site of the Church of St. Andrew's and disused graveyard; the site of the Victoria Brewery, Starch Works and terraced housing; and the site of the Swann Inn, terraced housing and back-to-back workers housing. The below-ground archaeological remains associated with the 31 non-designated

heritage assets would also be physically impacted by construction of the Proposed Scheme.

Landscape and visual

Construction

The presence of construction works would be seen in the context of the surrounding existing industrial and infrastructure uses. However, the scale of the construction works, including the demolition of existing buildings, would temporarily alter the character of the area.

Construction activities would be visible from 13 viewpoints within the area, for example views from: residential properties on Great Ancoats Street, Great Street, Every Street, Adair Street, Chapeltown Street and Sparkle Street and the Thomas Telford Basin within Piccadilly Village; the A665 Pin Mill Brow and National Cycle Route 86 in the Medlock Valley.

Operation

The introduction of prominent new features into the area, including the Piccadilly viaduct and multi-story car parks, would result in a substantial change to the character of the area

due to their height and massing. New public realm associated with the proposed Manchester Piccadilly High Speed station and tree planting along New Sheffield Street would result in a significant beneficial effect on the character of the area.

During operation, the Proposed Scheme would be visible from seven viewpoints within the area, for example views from: residential properties on Chapeltown Street, Sparkle Street, Thomas Telford Basin within Piccadilly Village, Jutland Street and Ducie Street, and the A665 Pin Mill Brow and National Cycle Route 86 in the Medlock Valley.

Socio-economics

Construction of the Proposed Scheme would result a likely significant effect from the demolition of buildings and the resulting loss or displacement of jobs from the following businesses in the area: premises occupied by Network Rail Ltd at Square One; Royal Mail vehicle depot on Gidding Street; and four car rental companies connected to Manchester Piccadilly station car park. Any likely significant residual effects will be assessed and reported in the formal ES.

Sound, noise and vibration

Construction

Noise from construction could result in significant effects on residential communities closest to the construction works at: Ancoats, bounded by the A665 Great Ancoats Street to the south and west, the A662 Pollard Street to the north, Palmerston Street to the east and Ancoats Grove and Snell Street to the north-east; in central Manchester, on and between the A665 Great Ancoats Street, Store Street and Chapeltown Street; in central Manchester, bounded by Tariff Street, the A62 Newton Street, the A6 Aytoun Street and Ducie Street; in central Manchester, around the junction of the B6469 Whitworth Street and the A6 Aytoun Street and on the B6469 Fairfield Street and Granby Row; in central Manchester, on Baring Street, Buxton Street and Berry Street; and Ardwick on Cotter Street, Brydon Avenue, Paddock Street and St Gregorys Drive.

Noise from construction could result in significant effects on non-residential facilities closest to the construction works including: Monroes Bar Hotel and Motel One, on the A6 London Road; Staycity Picadilly and Abode

Hotel, on the A6 Picadilly; DoubleTree by Hilton Hotel on Auburn Street; The Place Aparthotel and La Reserva Aparthotel, on Ducie Street; and Premier Inn, on Dale Street.

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works.

Further work is currently being undertaken to confirm the likely significant construction noise and vibration effects including any temporary effects from construction traffic. This assessment will be reported in the formal ES.

Operation

Operation of the railway would potentially result in noise effects. Operational noise would be reduced at source through the effective design and specification of the trains and track. A number of measures will be incorporated into the design of the Proposed Scheme to mitigate noise effects during operation.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on a number of routes including: A635 Ashton Road; A665 Pin Mill Brow/Great Ancoats Street; A57(M)/A635 Mancunian Way; the B6469 Whitworth Street; B5218 Chorlton Road; Helmet Street; Store Street. Increases in traffic could also result in increased traffic severance for non-motorised users (i.e. pedestrians and cyclists) of the routes.

Construction of the Proposed Scheme is expected to result in temporary closures and diversions of the A635 Mancunian Way; the A665 Chancellor Lane/Midland Street; Adair Street; Blakett Street; Coronation Square; Chapeltown Street; Crane Street; Elbe Street; Heyrod Street; Mill Green Street; Portugal Street East; Raven Street and Union Street.

Construction of the Proposed Scheme is expected to temporarily divert bus routes 147, 219, 220 and 221. Diversion of bus routes may increase the travel time for public transport users and result in increased traffic severance for users of the routes.

Construction of the Proposed Scheme has the potential to temporarily suspend parking spaces at: Manchester Piccadilly Station; Gateway House; and parking spaces off Sheffield Street.

Construction of the Proposed Scheme is expected to include works that require possessions on the existing conventional rail network for short periods, which could affect the users of the existing Manchester Piccadilly Station.

Construction of the Proposed Scheme is expected to require some diversion or re-routing of pedestrians using the footbridge over London Road and footways on local roads including: Ducie Street; Fairfield Street; Station Approach; Store Street; and Travis Street.

Operation

Rail users would benefit from improved journey times between major cities in the North, the Midlands and the South and released capacity on conventional rail services operating from Manchester Piccadilly Station.

Operation of the Proposed Scheme would require permanent changes to: the A635 Mancunian Way; the A665 Chancellor Lane; the A665 Pin Mill Brow; Adair Street; Helmet Street; St Andrew Street; Sparkle Street; Baird Street; Boad Street; Sheffield Street; Travis Street; and William Street.

Operation of the Proposed Scheme would require the permanent diversion of bus route 147 off Travis Street. An increased journey distance for this route may result in increased traffic delays to users of the bus route.

Although the Proposed Scheme will include substantial replacement car parking, operation of the Proposed Scheme could require the permanent loss or change of access for parking spaces in the Manchester Piccadilly area.

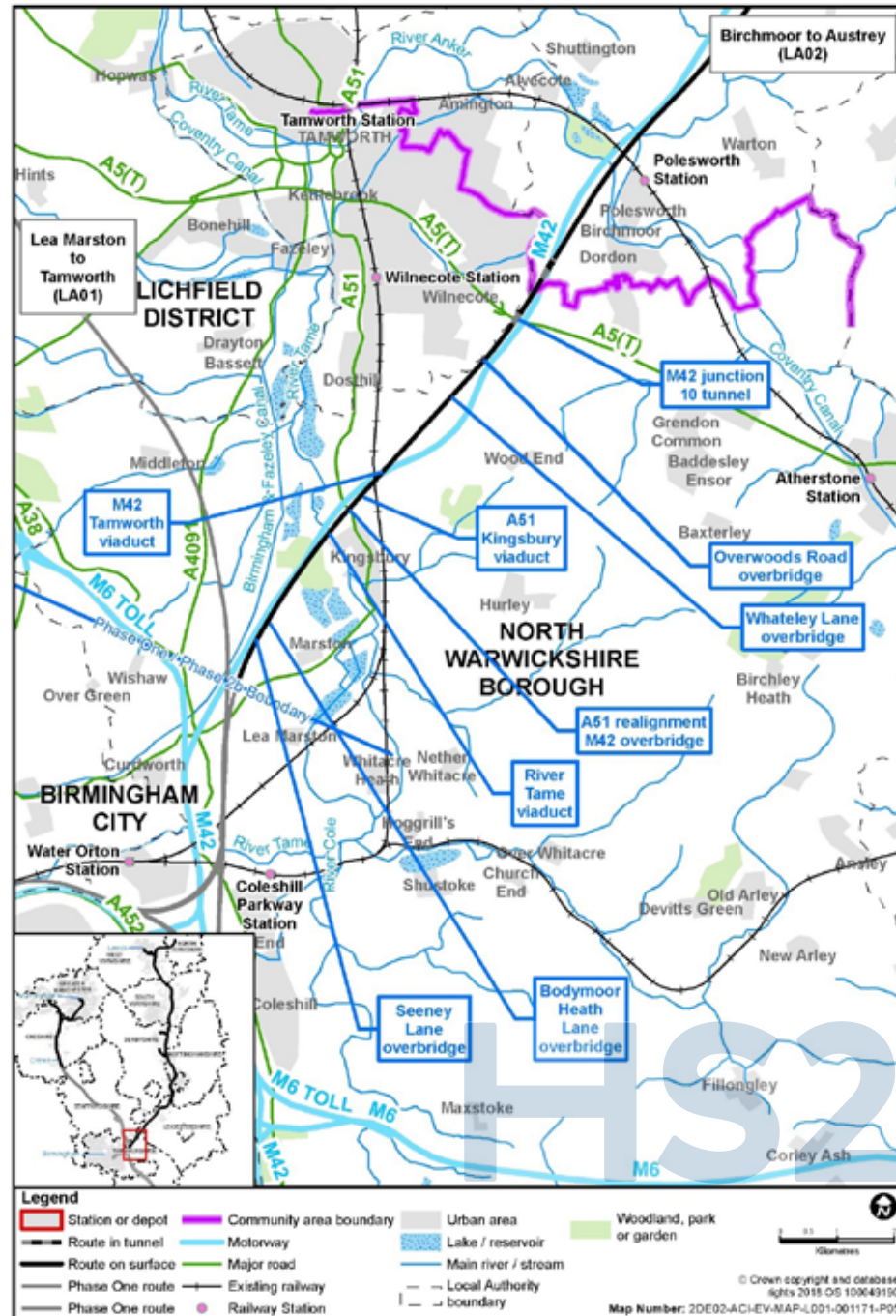
8.10 Lea Marston to Tamworth (LA01)

Overview

The Lea Marston to Tamworth area (LA01) is approximately 9km in length, extending north-east from Marston at the boundary between HS2 Phase One and Phase 2b, to south of Stoneydelph. The area falls within the local authority areas of North Warwickshire Borough Council, Tamworth Borough Council, Warwickshire County Council and Staffordshire County Council (see Figure 24).

The area is predominantly rural in character, with agriculture being the main land use. Bodymoor Heath, Marston and Lea Marston are in the south of the area. Kingsbury village lies north of the River Tame, east of the M42 and west of the Birmingham to Derby Railway. Piccadilly and Freasley lie to the east. The urban area of Tamworth, including Hockley and Wilnecote, comprises residential, commercial and industrial land uses including distribution warehouses, business units, offices and the Tamworth Services motorway service area. Stoneydelph and Birchmoor are in the north of the area.

Figure 24: Lea Marston to Tamworth area (LA01) context map



The Proposed Scheme

The route would connect to the HS2 Phase One scheme at Lea Marston and run in a cutting in a north-east direction, following the route of the M42 throughout the Lea Marston to Tamworth area (LA01). The route would pass onto embankment and viaduct to cross the River Tame to the east of the M42. The route would continue on viaduct to cross the M42 and the Birmingham to Derby Railway before passing onto embankment and into a cutting. The route would continue on embankment and in cutting before entering a tunnel under the M42 junction 10 towards Birchmoor. The route would then continue in a cutting into the Birchmoor to Austrey area (LA02).

In this area, the Proposed Scheme would require the demolition of 10 residential properties and 10 commercial/business properties. There would be permanent realignment or diversion of four roads. The Proposed Scheme would result in the permanent closure or diversion of eight public rights of way. Three watercourses would be permanently realigned. Two main construction compounds and five satellite construction compounds would be required.

Residual effects

This section provides a summary of the likely significant residual environmental effects identified for the Lea Marston to Tamworth area at this stage of the design and assessment.

Agriculture, forestry and soils

Construction

It is currently expected that approximately 150ha of agricultural land would be required for construction of the Proposed Scheme in this area, of which approximately 90ha is likely to be high quality agricultural land. Some of this land would be restored following construction, with approximately 100ha permanently required, 55ha of which is high quality agricultural land. The quality of the land is currently based on publicly available information and will be confirmed in the formal ES once agricultural land surveys are complete, as will the extent of land required for the Proposed Scheme.

To avoid or reduce environmental impacts, soils from the areas required temporarily and permanently for the Proposed Scheme would be stripped and stored. This would enable

agricultural land that is required temporarily for construction to be returned to agricultural use. It would also enable soils to be put to other uses, such as support landscape planting.

Construction of the Proposed Scheme would be likely to result in significant effects at five farm holdings in this area due to severance of land and/or the proportion of land required during construction. Of the five holdings temporarily affected, three holdings would also be permanently affected. Land required temporarily would, in accordance with a restoration scheme agreed with the landowner and the relevant planning authority, be returned to the farm holding following the completion of construction.

Community

Construction

Land required to construct the Proposed Scheme would result in the temporary use of part of the Kingsbury Water Park, a country park used for walking and informal recreation, for approximately three years and three months.

Construction of the Proposed Scheme would lead to a significant community effect due to the demolition of seven residential properties on Whateley Lane in Whateley. The loss of these properties represents a high proportion of this community.

Land required for the construction of the Proposed Scheme would result in the permanent loss of Echills Wood Railway within Kingsbury Water Park.

Ecology and biodiversity

Construction

Construction of the Proposed Scheme would result in permanent habitat loss and severance of approximately 6.7ha (11%) of Kettle Brook Local Nature Reserve; and 3.3ha (15%) of Kettle Brook Biodiversity Alert Site.

It is currently expected that there would be a permanent loss of approximately 24ha of woodland, 31.6ha of semi-improved grassland, 11km of hedgerows, and six ponds, in addition to the loss of ancient and veteran trees. The removal and fragmentation of these habitat types has the potential to affect their conservation status as well as potentially

resulting in significant effects on bats, polecat, great crested newt, birds, terrestrial invertebrates and reptiles.

Significant effects are likely to be experienced by otter and water vole in watercourses affected by the Proposed Scheme, as a result of the loss of water-margin habitat and realignment or diversions of watercourses. Similarly, white-clawed crayfish, aquatic invertebrates and fish may be affected as a result of construction disturbance.

Operation

During operation of the Proposed Scheme, bats, barn owls, and breeding and wintering birds would be at risk of mortality caused by passing trains.

Health

Construction

The Proposed Scheme would impact on a range of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health

effects, judgements have been made as to the level and type of impact that could potentially affect population health.

Construction of the Proposed Scheme would result in the permanent loss of seven residential properties in Whateley. The loss of these residential properties represents a sizeable proportion of the community and has the potential to reduce beneficial health effects that are gained through social contact and support.

Construction of the Proposed Scheme would result in the temporary loss of 5% of Kingsbury Water Park and 11% of Kettle Brook Local Nature Reserve. These spaces provide a positive contribution to the wellbeing of local communities and their temporary loss would have an adverse effect on health and wellbeing.

The combination of construction noise, visual and traffic impacts would change the character of neighbourhoods, and may impact on residents' quality of life. For rural communities dependent on shops and services in nearby towns, temporary closures and diversions of local roads may reduce the accessibility of key

services. In addition, levels of physical activity could potentially be affected by disruption to roads and public rights of way that may be used as active travel routes.

The temporary construction workforce is likely to comprise a mixture of local people and workers from further afield, giving rise to temporary changes to local population size and demographics.

Operation

The presence of rail infrastructure and noise from passing trains may change the character of surrounding neighbourhoods, and may reduce the quality of life for residents.

Historic environment

Construction

The Proposed Scheme is being designed to reduce impacts on heritage assets as far as reasonably practicable. Construction of the Proposed Scheme would permanently physically affect the following eight non-designated heritage assets: the site of the deserted medieval hamlet at Holt; the medieval hamlet

of Whateley; Bridge House south of Bodymoor Heath; nos. 1, 3, 29, 31 and 32 Whateley Lane; and Rathmore House on Whateley Lane.

Construction of the Proposed Scheme would permanently affect the setting of Holt Hall and attached walls, a Grade II listed farmhouse. This would result in changes to the way that this building is experienced and understood.

Landscape and visual

Construction

The presence of construction works and changes to the existing landform and vegetation patterns would affect the character of the local landscape. Where possible, effects would be reduced by the measures incorporated into the design to reduce the visibility of the Proposed Scheme (for example, land shaping to link earthworks into their wider landscape context, compensatory woodland planting, hedgerow replacement and restoration, and new wetland features to compensate for the loss of ponds).

Construction activities would be visible from 15 viewpoints within the area, for example views

from: the A4097 Kingsbury Road; residential properties along the A4097 Kingsbury Road, Marston; a recreational footpath adjacent to Canal Pool within Kingsbury Water Park; and residential properties along Cliff Hall Lane, Cliff.

Operation

During operation, the significant effects of the Proposed Scheme on the character and appearance of the local landscape would substantially reduce over time as mitigation planting grows and matures, however, effects may remain significant.

During operation, the Proposed Scheme would be visible from nine viewpoints within the area, for example views from: the public right of way along Seeney Lane; the Birmingham and Fazeley Canal, south-east of Marston Farm Hotel; residential properties near Marston Farm Hotel and Cheatles Farm Bridge; residential properties along Cliff Hall Lane, Cliff; and the public right of way accessed off Ottery.

Socio-economics

Construction of the Proposed Scheme would result in a likely significant effect from the demolition of buildings and the resulting loss or displacement of jobs from the following businesses in the area: Tamworth Services, Green Lane, Tamworth; Redrow offices at Kinsall Green in Dordon; Travelodge Tamworth M42 on Green Lane, Tamworth; and the DFS Distribution Centre at Centurion Park, Tamworth. Any likely significant residual effects will be assessed and reported in the formal ES.

Land quality

Construction

For historic mining sites in the area, the potential for significant adverse effects has been identified associated with the control of mine gas and mine water. Studies into how mine gas and mine water is controlled are ongoing and any mitigation required will be identified in consultation with the relevant statutory bodies and reported in the formal ES.

Beneficial effects would occur where remediation is carried out on sites identified

within the land required for the construction of the Proposed Scheme, including: the former Cocksparrow Farm landfill and engineering, sewage and former iron and concrete works around the Birmingham to Derby Railway.

Sound, noise and vibration

Construction

Noise from construction could result in significant effects on residential communities closest to the construction works at Kingsbury; Whateley; Freasley; and Tamworth (around Wilnecote and Stoneydelph).

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works.

Further work is currently being undertaken to confirm the likely significant residual construction noise and vibration effects, including any temporary effects from construction traffic. This assessment will be reported in the formal ES.

Operation

Operational noise would be reduced at source through the effective design and specification of the trains and track. A number of measures have also been incorporated into the design of the Proposed Scheme to mitigate noise effects during operation. These include noise barriers in the form of landscape earthworks and/or noise fence barriers.

Operation of the railway would potentially result in noise effects on occupants of residential properties, due to potential noise increases above recognised thresholds, and hence change in the existing acoustic character around those properties closest to the Proposed Scheme in the following areas: Kingsbury (in the vicinity of The Laurels, Maple Drive, Fircroft, Sorrel Drive, Hazlcroft and The Aspens); and Tamworth (in the vicinity of Swallowhurst, Teign, Tamar Road, Ottery, Torridge and Stour). Further assessment work is being carried out and will be reported in the formal ES.

During operation of the railway noise insulation would be offered to avoid significant effects at individual residential properties that satisfy the applicable qualifying criteria. At this stage this

is anticipated to be at Bodymoor Heath (in the vicinity of Bodymoor Heath Lane); Holt Hall House in Whateley, Tamworth (in the vicinity of Trinity Road); and Hockley in Tamworth (in the vicinity of Overwoods Road).

Further assessment work is currently being undertaken to confirm the likely significant residual effects due to operational noise and vibration, especially at non-residential locations and quiet areas and in terms of establishing existing baseline conditions. This will be reported in the formal ES.

HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid likely significant effects due to noise and vibration. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the potentially affected receptors, their use and the benefit of the measures.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on the following

routes: the M42 between junctions 9 and 10; the M42 junction 10; the A5 west of the M42 junction 10; the A4097 Kingsbury Road; the A51 Coventry Road/Tamworth Road; the B5080 Pennine Way; Coton Road/Bodymoor Heath Road; Trinity Road; Whateley Lane; Overwoods Road; Centurion Way; Green Lane; and Relay Drive. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Construction of the Proposed Scheme would result in temporary highway closures, diversions or realignments. These are expected to affect: the M42; M42 junction 10; the A5 west of the M42 junction 10; Green Lane; and Relay Drive.

Bus services 15, 16, x16, 16A, 16S, 115, 118, 119, 216, 223, 228, 766 and 767 would be affected by temporary diversions.

Rail possessions would be required on the Birmingham to Derby Railway with potential disruption to services.

Construction of the Proposed Scheme is expected to result in the temporary diversion of Warwickshire Bridleway M23a and Warwickshire

Footpath T25 (also known as the Heart of England Way).

Operation

Operation of the Proposed Scheme would require the permanent diversion or realignment of Bodymoor Heath Road; the A51 Tamworth Road; Whateley Lane; and Overwoods Road.

Seven public rights of way, including Warwickshire Footpath M22; Warwickshire Bridleway T67p; Warwickshire Footpath T70; Warwickshire Footpath AE203; Warwickshire Footpath T77; Warwickshire Footpath T170; and Staffordshire Bridleway Tamworth 79 would be permanently diverted. One public right of way, Warwickshire Bridleway AE56, would be diverted along the proposed diversion of Staffordshire Bridleway Tamworth 79.

8.11 Birchmoor to Austrey (LA02)

Overview

The Birchmoor to Austrey area (LA02) is approximately 9km in length extending north-east from Birchmoor to the east of No Man’s Heath. The area falls within the local authority areas of North Warwickshire Borough Council and Warwickshire County Council (see Figure 25).

The area is predominantly rural in character, with agriculture being the main land use. The area is interspersed with woodland, farmsteads, commercial land uses and residential areas, including Stoneydelph, Birchmoor, Polesworth, Warton and Austrey. The M42 runs through the Birchmoor to Austrey area from south to north, providing an urban influence, with open views both to and from the motorway.

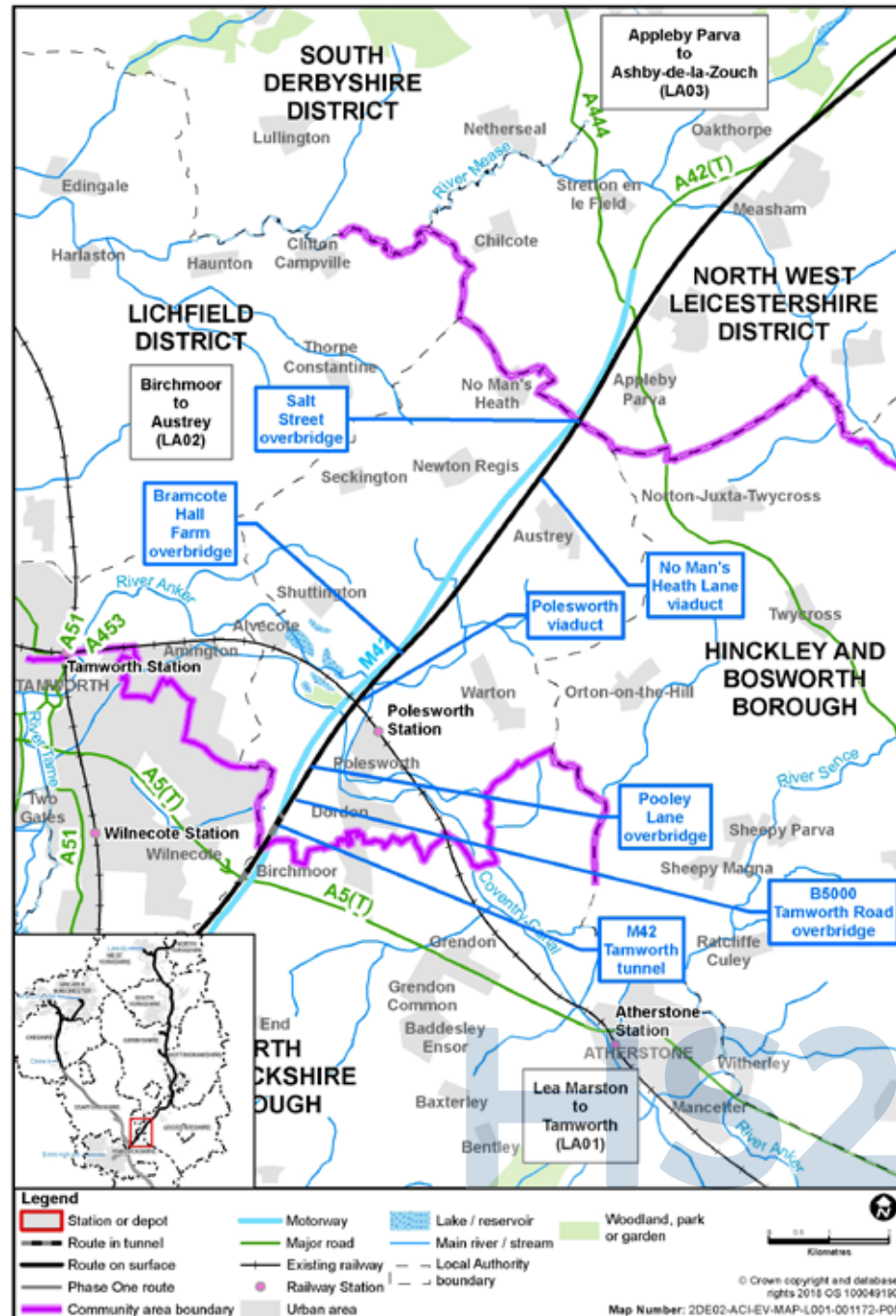


Figure 25: Birchmoor to Austrey area (LA02) context map

The Proposed Scheme

The route would continue from the Lea Marston to Tamworth area (LA01) in a north-easterly direction, following the route of the M42 throughout the area. The route would run in a cutting then enter a tunnel to pass under Green Lane (Birchmoor) and the M42. It would emerge and continue in cutting towards Pooley Country Park then transition onto embankment. The route would then cross the Coventry Canal, Pooley Country Park, the West Coast Main Line, the River Anker and Linden Lane on viaduct and continue on embankment. The route would then run in cutting and on embankment to the west of Austrey before passing onto a viaduct. The route would then continue on embankment before entering into a cutting to continue into the Appleby Parva to Ashby-de-la-Zouch area (LA03).

In this area, the Proposed Scheme would require the demolition of 18 residential properties and 12 commercial/business properties. There would be permanent realignment or diversion of six roads. The Proposed Scheme would result in the permanent realignment or diversion of six public rights of way. Three watercourses would be permanently realigned or diverted. Two

main construction compounds and six satellite construction compounds would be required.

Residual effects

This section provides a summary of the likely significant residual environmental effects identified for the Birchmoor to Austrey at this stage of the design and assessment.

Agriculture, forestry and soils

Construction

It is currently expected that approximately 250ha of agricultural land would be required for construction of the Proposed Scheme in this area, of which approximately 150ha is likely to be high quality agricultural land. Some of this land would be restored following construction, with approximately 110ha permanently required, 70ha of which is high quality agricultural land. The quality of the land is currently based on publicly available information and will be confirmed in the formal ES once agricultural land surveys are complete, as will the extent of land required permanently for the Proposed Scheme.

To avoid or reduce environmental impacts,

soils from the areas required temporarily and permanently for the Proposed Scheme would be stripped and stored. This would enable agricultural land that is required temporarily for construction to be returned to agricultural use. It would also enable soils to be put to other uses, such as support landscape planting.

Construction of the Proposed Scheme would be likely to result in significant effects at seven farm holdings in this area due to the severance of land and/or the proportion of land required during construction. Of the seven holdings temporarily affected, seven holdings would also be permanently affected. Land required temporarily would, in accordance with a restoration scheme agreed with the landowner and the relevant planning authority, be returned to the farm holding following the completion of construction.

Community

Construction

Land required for construction of the Proposed Scheme is likely to result in temporary effects on the Polesworth (Abbey) Scout Group activity centre, Pooley Country Park and the woodland adjacent to Austrey Playing Fields.

Construction of the Proposed Scheme would lead to significant community effects due to the demolition of: seven residential properties on Green Lane and Westfields, in Birchmoor, and six on Hermitage Lane, Birchmoor Lane and the B5000 Tamworth Road. The loss of these properties represents a high proportion of each of these small communities.

Land required for the Proposed Scheme is likely to result in the permanent loss of the Meet Your Miracle Studio Tamworth in Polesworth and children's play area at Austrey Playing Fields in Austrey.

Land required for the Proposed Scheme is likely to result in the permanent loss of 2.5ha of open space land (4% of this resource) at Pooley Country Park in Polesworth; 0.06ha (5.5% of the resource) of the Austrey Playing Fields in Austrey; and the loss of 0.01ha (1% of the resource) of the woodland adjacent to the Austrey Playing Fields in Austrey.

Ecology and biodiversity

Construction

Construction of the Proposed Scheme would result in the loss of farmland habitats and

temporary disturbance of birds that are interest features of the Alvecote Pools Site of Special Scientific Interest.

It is currently expected that there would be a permanent loss of approximately 11.8ha of broadleaved woodland, 22.8ha of semi-improved grassland, 8km of hedgerows, and nine ponds, in addition to ancient and veteran trees. The removal and fragmentation of these habitat types has the potential to affect their conservation status as well as potentially resulting in significant effects on bats, polecat, great crested newt, birds, terrestrial invertebrates and reptiles.

Significant effects are likely to be experienced by otter and water vole in watercourses affected by the Proposed Scheme, as a result of the loss of water-margin habitat and realignment or diversions of watercourses. Similarly, white-clawed crayfish, aquatic invertebrates and fish may be affected as a result of construction disturbance.

Operation

During operation of the Proposed Scheme, bats and barn owls would be at risk of mortality caused by passing trains.

Health

Construction

The Proposed Scheme would impact on a range of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health effects, judgements have been made as to the level and type of impact that could potentially affect population health.

Construction of the Proposed Scheme would result in the permanent loss of three residential properties in Birchmoor. This has the potential to reduce beneficial effects that are gained through social contact and support.

Construction of the Proposed Scheme would result in the temporary loss of 36% of Pooley Country Park and land used by the Polesworth (Abbey) Scout Group activity centre for its outdoor pursuits, which would have an adverse effect on health and wellbeing of users. Land required for the construction of the Proposed Scheme would also result in the permanent loss of 6% of one of the two playing fields and permanent loss of the children's play area at Austrey playing fields. These spaces provide a

positive contribution to the wellbeing of the local communities and their loss would have an adverse effect on health and wellbeing.

The combination of construction noise, visual and traffic impacts would change the character of neighbourhoods, and may impact on residents' quality of life. For rural communities dependent on shops and services in nearby towns, temporary closures and diversions of local roads may reduce the accessibility of key services. In addition, levels of physical activity could potentially be affected by disruption to roads and public rights of way that may be used as active travel routes.

The temporary construction workforce is likely to comprise a mixture of local people and workers from further afield. This could mean that local communities see temporary changes to the local population size and demographics.

Operation

The presence of rail infrastructure and noise from passing trains may change the character of surrounding neighbourhoods, and may reduce the quality of life for residents.

Historic environment

Construction

The Proposed Scheme is being designed to reduce impacts on heritage assets as far as reasonably practicable. Construction of the Proposed Scheme would require the non-designated World War I war memorial on Pooley Lane to be temporarily relocated during the construction period. In addition, permanent physical effects would occur on eight non-designated heritage assets: The Hermitage; Birch Coppice Colliery Number 1; Pooley Hall Colliery; the Pithead Baths building at Pooley Hall Colliery; Pooley Hall Colliery Wharf; the canal basin north of Pooley Hall Colliery; and the World War II Nissen hut on Pooley Lane. The cropmark of an enclosure on No Man's Heath is partially within this community area, but impacts to this asset are assessed in the Appleby Parva to Ashby-de-le-Zouch area (LA03).

Construction of the Proposed Scheme would permanently affect the setting of the non-designated colliery tramway at Birch Coppice Colliery. This would result in changes to the way that this asset is experienced and understood.

Landscape and visual

Construction

The presence of construction works and changes to the existing landform and vegetation patterns would affect the character of the local landscape. Where possible, effects would be reduced by the measures incorporated into the design to reduce the visibility of the Proposed Scheme (for example, land shaping to link earthworks into their wider landscape context, compensatory woodland planting, hedgerow replacement and restoration, and new wetland features to compensate for the loss of ponds).

Construction activities would be visible from 12 viewpoints within the area, for example views from: Green Lane, Birchmoor; Birchmoor Road, Birchmoor; the Coventry Canal towpath; Pooley Country Park, Polesworth; and Warwickshire Footpath AE4, Warton.

Operation

During operation, the significant effects of the Proposed Scheme on the character and appearance of the local landscape would substantially reduce over time as mitigation

planting grows and matures, however, effects may remain significant.

During operation, the Proposed Scheme would be visible from eight viewpoints within the area, for example views from: Green Lane, Birchmoor; the Coventry Canal towpath; Pooley Country Park, Polesworth; and Warwickshire Footpath AE4, Warton.

Land quality

Construction

For historic mining sites in the area, the potential for significant adverse effects has been identified associated with the control of mine gas and mine water. Studies into how mine gas and mine water is controlled are ongoing and any mitigation required will be identified in consultation with the relevant statutory bodies and reported in the formal ES.

Beneficial effects would occur where remediation is carried out on sites identified within the land required for the construction of the Proposed Scheme, including the former Pooley Hall Colliery.

Sound, noise and vibration

Construction

Noise from construction could result in significant effects on residential communities closest to the construction works at Birchmoor; Polesworth; and Austrey.

Noise from construction could result in significant effects on non-residential properties including at Polesworth (Abbey) Scout Group activity centre.

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works.

Further work is currently being undertaken to confirm the likely significant residual construction noise and vibration effects, including any temporary effects from construction traffic. This assessment will be reported in the formal ES.

Operation

Operational noise would be reduced at source through the effective design and specification

of the trains and track. A number of measures have also been incorporated into the design of the Proposed Scheme to mitigate noise effects during operation. These include noise barriers in the form of landscape earthworks and/or noise fence barriers.

Operation of the railway would potentially result in noise effects on occupants of residential properties, due to potential noise increases above recognised thresholds, and hence change in the existing acoustic character around those properties closest to the Proposed Scheme in the following areas: Polesworth (in the vicinity of Kiln Way and the B5000 Tamworth Road, and in the vicinity of Rowland Avenue and Pooley View); and Austrey (in the vicinity of No Man's Heath Lane and Appleby Hill). Further assessment work is being carried out and will be reported in the formal ES.

Operational noise could result in a significant effect on the non-residential Polesworth (Abbey) Scout Group activity centre.

Further assessment work is currently being undertaken to confirm the likely significant residual effects due to operational noise and vibration, especially at non-residential locations

and quiet areas and in terms of establishing existing baseline conditions. This will be reported in the formal ES.

HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid likely significant effects due to noise and vibration. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the potentially affected receptors, their use and the benefit of the measures.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on the following routes: the M42 junctions 10 and 11; the B5080 Pennine Way; the B5000 Tamworth Road; the B5493; Hermitage Lane; Pooley Lane; Austrey Road; Warton Lane; Bishops Cleeve; Main Road; Newton Lane; No Man's Heath Lane; Austrey Lane and Appleby Hill. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Construction of the Proposed Scheme is expected to result in temporary highway closures or realignments. These are expected to include the M42, Green Lane (Birchmoor) and Linden Lane resulting in a diversion for traffic and other users of these routes and an increased travel distance.

Bus services 65, 219, 766/767, 785 and 786 would be affected by temporary diversions.

Rail possessions would be required on the West Coast Main Line with potential disruption to services. This could result in significant effects on rail operations.

One public right of way, Leicestershire Byway Q4a/3, would be temporarily closed for the duration of the construction period.

The Coventry Canal would be affected during the construction period, affecting both users of the waterway and towpath.

Operation

Operation of the Proposed Scheme would require the permanent diversion or realignment of: the B5000 Tamworth Road; Hermitage Lane;

Pooley Lane; Newton Lane; No Man's Heath Lane and Salt Street. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Operation of the Proposed Scheme would result in the permanent realignment or diversion of six public rights of way: Warwickshire Footpath AE17; Warwickshire Footpath AE16; Warwickshire Bridleway AE3; Warwickshire Footpath AE4; Warwickshire Footpath T140 and Leicestershire Byway Q4a/3.

8.12 Appleby Parva to Ashby-de-la-Zouch (LA03)

Overview

The Appleby Parva to Ashby-de-la-Zouch area (LA03) is approximately 13km in length, extending north-east from Appleby Parva towards Measham and then to the east of Ashby-de-la-Zouch. The area falls within the local authority areas of North West Leicestershire District Council and Leicestershire County Council (see Figure 26).

The area is rural in character, with agriculture being the main land use. Agricultural land is interspersed with woodland and villages and a scattering of isolated residential properties and farmsteads.

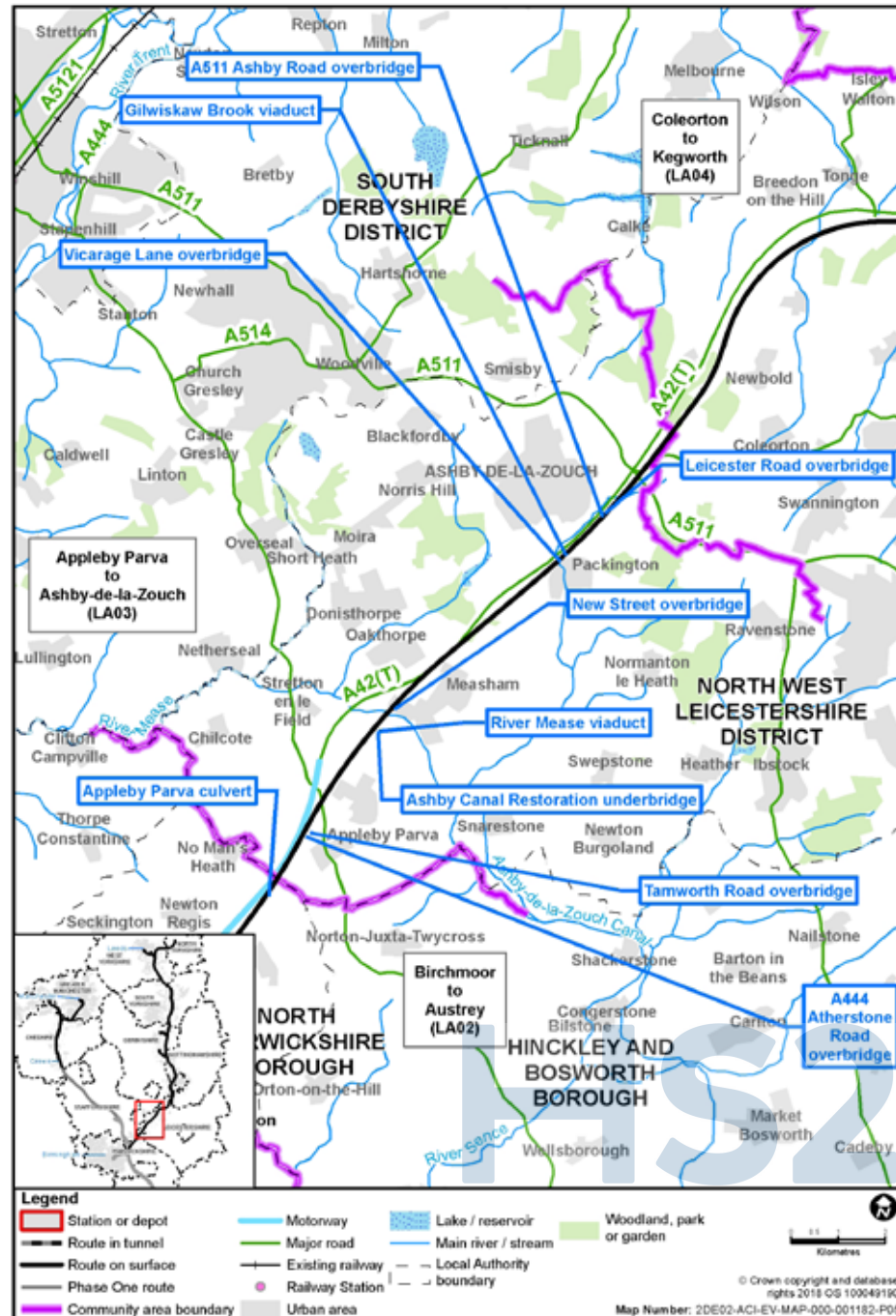


Figure 26: Appleby Parva to Ashby-de-la-Zouch area (LA03) context map

The Proposed Scheme

The route would continue from the Birchmoor to Austrey area (LA02) in a north-easterly direction towards Appleby Parva in cutting and then on embankment. The route would pass to the west of Appleby Magna and to the east of the M42 in cutting and then on embankment. The route would continue north-east towards Measham transitioning back onto embankment, before crossing the River Mease on viaduct. The route would then continue north-east towards Packington and Ashby-de-la-Zouch.

The route would then follow the A42 in cutting and on embankment, and then transitioning onto viaduct to the west of Packington. The route would continue northwards to the east of Ashby-de-la-Zouch in cutting and on embankment. The route would then continue north-eastwards towards Coleorton in cutting before entering the Coleorton to Kegworth area (LA04).

In this area, the Proposed Scheme would require the demolition of 41 residential properties and 20 commercial/properties properties. There would be permanent realignment or diversion of eight roads. The Proposed Scheme would

result in the permanent realignment, diversion or closure of 21 public rights of way. Two watercourse realignments would be required. Three main construction compounds and 11 satellite construction compounds would be required in this area.

Residual effects

This section provides a summary of the likely significant residual environmental effects identified for the Appleby Parva to Ashby-de-la-Zouch area at this stage of the design and assessment.

Agriculture, forestry and soils

Construction

It is currently expected that approximately 200ha of agricultural land would be required for construction of the Proposed Scheme in this area, of which approximately 140ha is likely to be high quality agricultural land. Some of this land will be restored following construction, with approximately 110ha permanently required, 80ha of which is high quality land. The quality of land is currently based on publicly available information and will be confirmed in the formal

ES once agricultural land surveys are complete, as will the extent of land required permanently for the Proposed Scheme.

To avoid or reduce environmental impacts, soils from the areas required temporarily and permanently for the Proposed Scheme would be stripped and stored. This would enable agricultural land that is required temporarily for construction to be returned to agricultural use. It would also enable soils to be put to other uses, such as to support landscape planting.

Construction of the Proposed Scheme would be likely to result in significant effects at nine farm holdings in this area, largely due to the proportion of land required during construction. Of the nine holdings temporarily affected, all would also be permanently affected. Land required temporarily during construction would, in accordance with a restoration scheme agreed with the landowner and the relevant planning authority, be returned to farm holdings following the completion of construction.

Community

Construction

Approximately 25ha of Fiveways Wood would also be temporarily required for construction (of which 8ha would be permanently required).

Construction of the Proposed Scheme would lead to significant community effects due to the demolition of: 27 residential properties on Amersham Way in Measham; and eight on Willesley Wood Side, between Measham and Packington. The loss of these properties represents a high proportion of each of these communities.

Ecology and biodiversity

Construction

Construction of the Proposed Scheme would result in the permanent loss of all 0.5ha (100%) of the Park Farm Woodland Local Wildlife Site.

It is currently expected that there would be a permanent loss of approximately 14ha of broadleaved woodland and 24km of hedgerows, in addition to ancient and veteran trees, and loss of sections of watercourses. The removal and fragmentation of these habitat types has the

potential to affect their conservation status as well as potentially resulting in significant effects on bat, polecat, bird, terrestrial invertebrate and reptile populations.

Significant effects are likely to be experienced by otter and water vole in watercourses affected by the Proposed Scheme, as a result of the loss of water-margin habitat. Similarly, water shrew, great crested newt, white clawed crayfish, aquatic invertebrates and fish may be affected as a result of loss of habitat and construction disturbance.

Operation

During operation of the Proposed Scheme, bats and barn owls would be at risk of mortality caused by passing trains.

Health

Construction

The Proposed Scheme would impact on a range of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health effects, judgements have been made as to the level and type of impact that could potentially affect population health.

Construction of the Proposed Scheme would result in the demolition of 27 residential properties on Amersham Way in Measham and eight on Willesley Wood Side. The loss of these properties has the potential to reduce beneficial health effects that are gained through social contact and support.

Construction of the Proposed Scheme would result in the temporary loss of approximately 70% and permanent loss of approximately 20% of Fiveways Wood. Land required for the diversion of Rectory Lane would result in the temporary loss of both vehicular and pedestrian access points to the Rectory Lane allotment gardens, used by Appleby Magna Allotment Society and the permanent loss of approximately 5% of the allotment gardens. These spaces provide positive contributions to the wellbeing of the local community and their loss would have an adverse effect on health and wellbeing.

The combination of construction noise, visual and traffic impacts would change the character of neighbourhoods, and may impact on residents' quality of life. For rural communities dependent on shops and services in nearby towns, temporary closures and diversions of

local roads may reduce the accessibility of key services. In addition, levels of physical activity could potentially be affected by disruption to roads and public rights of way that may be used as active travel routes.

The temporary construction workforce is likely to comprise a mixture of local people and workers from further afield. This could mean that local communities see temporary changes to the local population size and demographics.

Operation

The presence of rail infrastructure and noise from passing trains may change the character of surrounding neighbourhoods, and may reduce the quality of life for residents.

Historic environment

Construction

The Proposed Scheme is being designed to avoid and reduce impacts on heritage assets as far as reasonably practicable. Construction of the Proposed Scheme would result in the permanent physical impacts on three Grade II listed buildings comprising: The Old Rectory; the Coach House and Stables at The Old Rectory;

and 4 and 5 Park Farm. Permanent physical impacts would also affect 11 non-designated heritage assets, including: Roman site north-west of The Old Rectory; possible cremation burials from east of Heath Lodge; possible cropmark south-east of Chapmans Meadows; and Dingle Farm (on first edition OS map).

Construction of the Proposed Scheme would result in a permanent impact on the setting of the Grade II listed Side Hallows Farmhouse and on the Packington Conservation Area. This would result in changes to the way that these assets are experienced and understood.

Land quality

Construction

For historic mining sites in the area, the potential for significant adverse effects has been identified associated with the control of mine gas and mine water. Studies into how mine gas and mine water is controlled are ongoing and any mitigation required will be identified in consultation with the relevant statutory bodies and reported in the formal ES.

Beneficial effects would occur where remediation is carried out on sites identified

within the land required for the construction of the Proposed Scheme, including: the Canal Tip at Measham Landfill; and petrol stations and garages at Westminster Industrial Estate, along with areas of railway land and collieries.

Landscape and visual

Construction

The presence of construction works and changes to the existing landform and vegetation patterns would affect the character of the local landscape. Where possible, effects would be reduced by the measures incorporated into the design to reduce the visibility of the Proposed Scheme (for example, land shaping to link earthworks into their wider landscape context, compensatory woodland planting and hedgerow replacement and restoration).

Construction activities would be visible from 15 viewpoints within the area, for example views from: residential properties on Leicester Road, New Packington and Dysons Close, Chapel Street and High Street, Measham; and Dingle Lane (Leicestershire Bridleway Q19/3), Appleby Parva.

Operation

During operation, the significant effects of the Proposed Scheme on the character and appearance of the local landscape would substantially reduce over time as mitigation planting grows and matures, however, effects may remain significant.

During operation, the Proposed Scheme would be visible from four viewpoints within the area, for example views from: residential properties on Dysons Close, Chapel Street and High Street, Measham; and Dingle Lane (Leicestershire Bridleway Q19/3), Appleby Parva.

Socio-economic

Construction of the Proposed Scheme would result in a likely significant effect from the loss of land or buildings and resulting loss or displacement of jobs from Westminster Industrial Estate. Any likely significant residual effects will be assessed and reported in the formal ES.

Sound, noise and vibration

Construction

Noise from construction could result in significant effects on residential communities closest to the construction works at: Appleby Parva; Appleby Magna; Measham; Oakthorpe; Packington; Ashby-de-la-Zouch and New Packington.

Noise from construction could result in significant effects on non-residential properties closest to the construction works at: Appleby Park Hotel on the M42 junction 11; Oakthorpe Primary School in Oakthorpe; and Bethany Ministries in Packington.

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works.

Further work is currently being undertaken to confirm the likely significant construction noise and vibration effects, including any temporary effects from construction traffic. This assessment will be reported in the formal ES.

Operation

Operational noise would be reduced at source through the effective design and specification of the trains and track. A number of measures have also been incorporated into the design of the Proposed Scheme to mitigate noise effects during operation. These include noise barriers in the form of landscape earthworks and/or noise fence barriers.

Operation of the railway would potentially result in noise effects on occupants of residential properties, due to potential noise increases above recognised thresholds, and hence change in the existing acoustic character around those properties closest to the Proposed Scheme in the following areas: Measham (in the vicinity of Burton Road, Dysons Close, The Croft, Amersham Way, Kelso Close, Rosebank View, Hart Drive, Orchard Way, Blackthorn Way, Hill Rise, Lime Avenue and New Street); Oakthorpe (in the vicinity of Measham Road and School Street); Packington (in the vicinity of Ashby Road, Mill Street, Hall Lane, Vicarage Lane, Home Croft Drive, High Street and Normanton Road); Ashby-de-la-Zouch (in the vicinity of Ashby Road, Chapmans Meadows, Upper

Packington Road, The Gables, Rydal Gardens, Loweswater Grove, Ulleswater Crescent, Thirlmere Gardens, Windermere Avenue, Derwent Gardens, Hastings Way, Windmill Close, Coniston Gardens, Ennerdale Gardens, Leicester Road and The Croft); and New Packington (Leicester Road). Further assessment work is being carried out and will be reported in the formal ES.

During operation of the railway, noise insulation would be offered to avoid significant effects at residential properties that satisfy the applicable qualifying criteria. At this stage this is anticipated to be at: Beech House in Packington; and New Packington in the vicinity of Leicester Road. Further assessment work is being carried out and will be reported in the formal ES.

Operation of the railway would potentially result in noise effects, due to potential noise increases above recognised thresholds, and hence change in the existing acoustic character around those non-residential properties closest to the Proposed Scheme including Appleby Park Hotel on the M42 junction 11.

Further assessment work is currently being undertaken to confirm the likely significant effects due to operational noise and vibration,

including at non-residential locations and quiet areas and in terms of establishing existing baseline conditions. This will be reported in the formal ES.

HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid likely significant effects due to noise. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the potentially affected receptor, its use and the benefit of the measures.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on the following routes: the M42 junction 11; the A42; the A444 Atherstone Road; the A511 Ashby Road; the B4116 from A42 junction 12 to Measham Road; the B5493 south west of M42 junction 11; Tamworth Road; Huntingdon Way; Burton Road/ Measham Road; Measham Road/Bridge Street/ Heather Lane; Normanton Road/Coleorton Lane; Corkscrew Lane; Vicarage Lane and Leicester Road. Increases in traffic could also affect non-motorised users (i.e. pedestrians,

cyclists and horse riders) in terms of the ease with which they can cross these routes.

Construction of the Proposed Scheme is expected to result in temporary highway closures and diversions or realignments for the following roads: the A511 Ashby Road; the B4116 Measham Road; Huntingdon Way; Burton Road/ Measham Road; Ashby Road; and Leicester Road.

Operation

Operation of the Proposed Scheme would require the permanent diversion or realignment of: the A42; the A444 Atherstone Road; the A511 Ashby Road; Rectory Lane; Tamworth Road; New Street; Willesley Wood Side; and Vicarage Lane.

The permanent diversion/realignment of 17 public rights of way (BW 19/3; FP Q12/1; FP Q13/1; FP Q3/1; FP Q3/2; FP P81/1, FP P75/6; FP P69/4; FP P1/1; FP O68/4; BW O70/1; FP O71/2; FP O74/2; FP O72/1; BW P20/1; FP M60/3; and FP M30/1) and the closure of four public rights of way (FP75/5, FP67/5, FP8/1 and FP60/2) would be required.

8.13 Coleorton to Kegworth (LA04)

Overview

The Coleorton to Kegworth area (LA04) is approximately 15km in length, extending north-east from Coleorton towards Kegworth. The area falls within the local authority areas of North West Leicestershire District Council and Leicestershire County Council (see Figure 27).

The area is predominantly rural in character, with agriculture being the main land use, interspersed with woodland (including ancient woodland), villages and a scattering of residential properties and farmsteads.

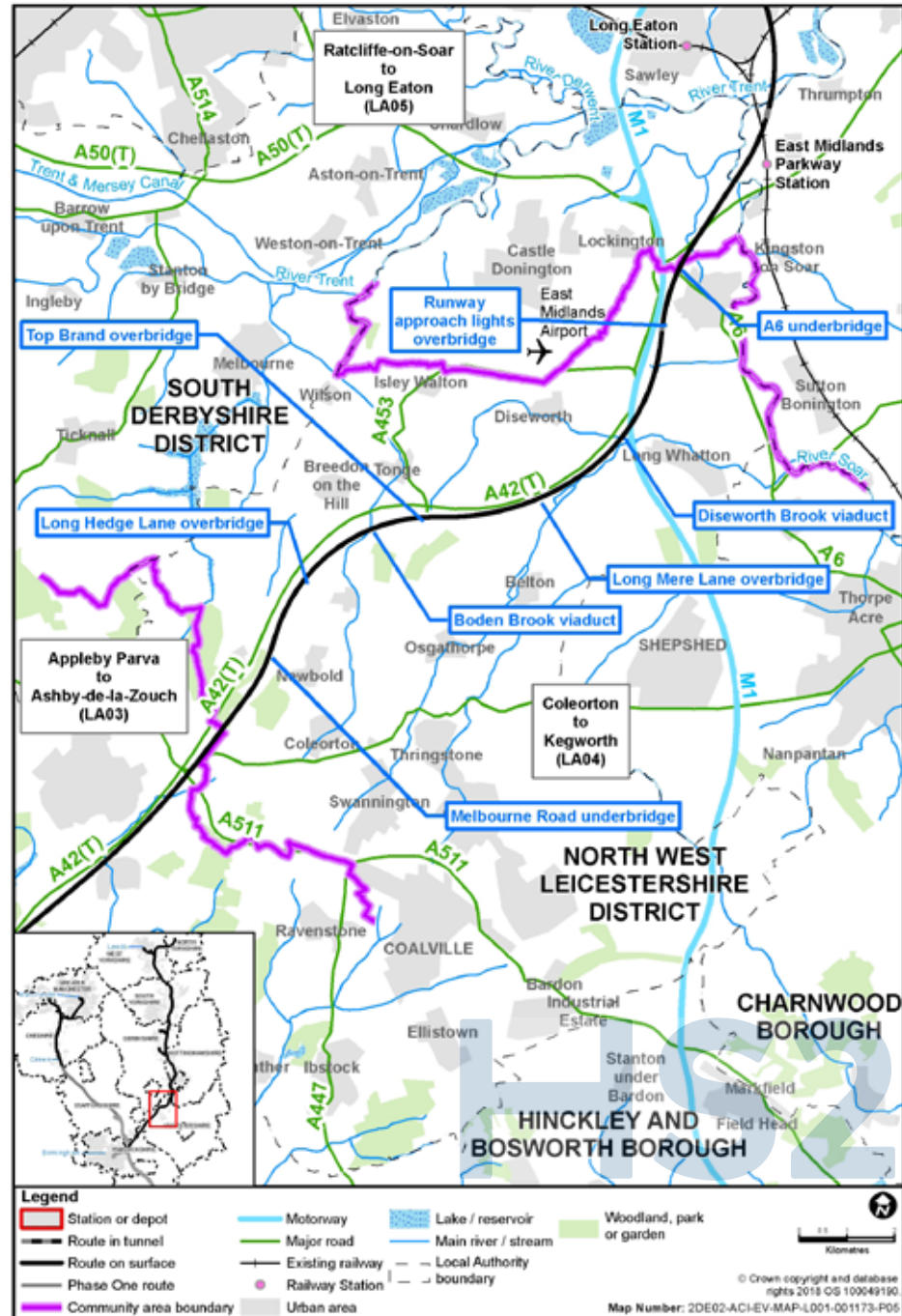


Figure 27: Coleorton to Kegworth area (LA04) context map

The Proposed Scheme

The route would continue from the Appleby Parva to Ashby-de-la-Zouch area (LA03) in a northerly direction towards Worthington in a cutting. The route would then continue to the west of Newbold on embankment and pass to the west of Worthington in a cutting. The route would continue north of Worthington in a north-east direction on embankment before crossing Boden Brook on viaduct. The route would then transition onto an embankment and into a cutting to the north of Pasture Wood and continue on embankment before crossing Diseworth Brook on viaduct. The route would continue north towards Kegworth, passing to the east of East Midlands Airport in a cutting and on an embankment. The route would then pass west of Kegworth running on embankment before continuing into the Ratcliffe-on-Soar to Long Eaton area (LA05).

In this area, the Proposed Scheme would require the demolition of nine residential properties and one commercial/business property. There would be permanent realignment or diversion of eight roads. The Proposed Scheme would result in the permanent realignment or diversion of eight public rights of way. Two main construction

compounds and 10 satellite construction compounds would be required.

Residual effects

This section provides a summary of the likely significant residual environmental effects identified for the Coleorton to Kegworth area at this stage of the design and assessment.

Agriculture, forestry and soils

Construction

It is currently expected that approximately 600ha of agricultural land would be required for construction of the Proposed Scheme in this area, of which approximately 270ha is likely to be high quality land. Some of this land would be restored following construction, with approximately 380ha permanently required, 140ha of which is high quality land. The quality of the land is currently based on publicly available information and will be confirmed in the formal ES once agricultural land surveys are complete, as will the extent of land required for the Proposed Scheme.

To avoid or reduce environmental impacts, soils from the areas required temporarily and

permanently for the Proposed Scheme would be stripped and stored. This would enable agricultural land that is required temporarily for construction to be returned to agricultural use. It would also enable soils to be put to other uses, such as to support landscape planting.

Construction of the Proposed Scheme would be likely to result in significant effects at 13 farm holdings in this area due to the proportion of land required for the Proposed Scheme, both temporarily and permanently. Land required temporarily would, in accordance with a restoration scheme agreed with the landowner and the relevant planning authority, be returned to the farm holding following the completion of construction.

Community

Construction

The land required to construct the Proposed Scheme would result in the temporary use of approximately 26ha (25%) of Rough Park and Birch Coppice near Newbold Coleorton. The site would be partially inaccessible to the public for approximately three years and five months.

Ecology and biodiversity

Construction

Construction of the Proposed Scheme would result in the permanent loss of approximately 22ha of broadleaved woodland, 4ha of grassland, 4.4km of hedgerows and 16 ponds, in addition to sections of small watercourses and ancient and veteran trees. The removal and fragmentation of these habitat types has the potential to affect their conservation status as well as potentially resulting in significant effects on bat, polecat, birds, terrestrial invertebrate and reptile populations.

Significant effects are likely to be experienced by otter and water vole in watercourses affected by the Proposed Scheme, as a result of the loss and fragmentation of habitat. Similarly, great crested newt, white-clawed crayfish, aquatic invertebrates and fish may be affected as a result of habitat loss and construction disturbance in watercourses and water bodies.

Operation

During operation of the Proposed Scheme, bats and barn owls would be at risk of mortality caused by passing trains.

Health

Construction

The Proposed Scheme would impact on a range of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health effects, judgements have been made as to the level and type of impact that could potentially affect population health.

Land required for construction of the Proposed Scheme would result in the temporary loss of approximately 25% of Rough Park and Birch Coppice, of which 17% would be permanently lost. This space provides a positive contribution to the wellbeing of the local community and the loss would have an adverse effect on health and wellbeing.

The combination of construction noise, visual and traffic impacts would change the character of neighbourhoods, and may impact on residents' quality of life. For rural communities dependent on shops and services in nearby towns, temporary closures and diversions of local roads may reduce the accessibility of key services. In addition, levels of physical activity

could potentially be affected by disruption to roads and public rights of way that may be used as active travel routes.

The temporary construction workforce is likely to comprise a mixture of local people and workers from further afield. This could mean that local communities see temporary changes to the local population size and demographics.

Operation

The presence of rail infrastructure and noise from passing trains may change the character of surrounding neighbourhoods, and may reduce the quality of life for residents.

Historic environment

Construction

The Proposed Scheme is being designed to reduce impacts on heritage assets as far as reasonably practicable. Construction of the Proposed Scheme would permanently physically affect 18 non-designated heritage assets, including: Breedon Park and a moated site at High Woods in Diseworth.

Construction of the Proposed Scheme would also permanently affect the setting of: the Grade I listed Church of St Mary and St Hardulph at Breedon Hill; the Grade II listed Breedon Lodge Farmhouse and Cottage; and the non-designated earthwork moat at Breedon Lodge. This would result in changes to the way that these assets are experienced and understood.

Landscape and visual

Construction

The presence of construction works and changes to the existing landform and vegetation patterns would affect the character of the local landscape. Where possible, effects would be reduced by the measures incorporated into the design to reduce the visibility of the Proposed Scheme (for example, land shaping to link earthworks into their wider landscape context, compensatory woodland planting and hedgerow replacement and restoration).

Construction activities would be visible from nine viewpoints within the area, for example views from: residential properties on Ashby Road, Kegworth and West End, and The Green near Wood Nook Farm; and Leicestershire M36/1 Bridleway.

Operation

During operation, the significant effects of the Proposed Scheme on the character and appearance of the local landscape would substantially reduce over time as mitigation planting grows and matures, however, effects may remain significant.

During operation, the Proposed Scheme would be visible from six viewpoints within the area, for example views from: residential properties on Ashby Road, Kegworth and West End, and The Green near Wood Nook Farm; and Leicestershire M36/1 Bridleway.

Land quality

Construction

For historic mining sites in the area, the potential for significant adverse effects has been identified associated with the control of mine gas and mine water. Studies into how mine gas and mine water is controlled are ongoing and any mitigation required will be identified in consultation with the relevant statutory bodies and reported in the formal ES.

Beneficial effects would occur where remediation is carried out on sites identified within the land required for the construction of the Proposed Scheme, including: Cotts Beverage Factory and Lount Recycling Centre.

Socio-economics

Construction of the Proposed Scheme would result in a likely significant effect from the demolition of buildings and resulting loss or displacement of jobs from Breedon Cloud Hill Quarry. Any likely significant residual effects will be assessed and reported in the formal ES.

Sound, noise and vibration

Construction

Noise from construction could result in significant effects on residential communities closest to the construction works along the B587 Nottingham Road in Lount; the B5324 Rempstone Road from Church Town, passing along Gelsmoor, and Griffydam; Bull Hill (continuing towards Main Street to the south, then towards Newbold Lane and Breedon Lane in Worthington); and The Green in Diseworth (up to West End in Long Whatton).

Noise from construction could result in significant effects on non-residential properties including at the Community Education Enterprise Projects at Hall Farm on the A511 Ashby Road.

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works.

Further work is currently being undertaken to confirm the likely significant construction noise and vibration effects, including any temporary effects from construction traffic. This assessment will be reported in the formal ES.

Operation

Operational noise would be reduced at source through the effective design and specification of the trains and track. A number of measures have also been incorporated into the design of the Proposed Scheme to mitigate noise effects during operation. These include noise barriers in the form of landscape earthworks and/or noise fence barriers.

Operation of the railway would potentially result in noise effects, due to potential noise increases above recognised thresholds, and hence change in the existing acoustic character at Community Education Enterprise Projects at Hall Farm on the A511 Ashby Road.

Further assessment work is currently being undertaken to confirm the likely significant effects due to operational noise and vibration, especially at non-residential locations and quiet areas and in terms of establishing existing baseline conditions. This will be reported in the formal ES.

HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid likely significant effects due to noise and vibration. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the potentially affected receptors, their use and the benefit of the measures.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and

delays for road users on the following routes: the M1 junctions 23a and 24; the A42; the A453 Ashby Road; the A6 Derby Road; the B587 Nottingham Road; the B5324 Rempstone Road; Melbourne Road; Bull Hill/Manor Road/Main Street/Newbold Lane; Breedon Lane; Top Brand; Stocking Lane; Gelscoe Lane; Mill Lane (both western and eastern branches); Long Mere Lane; and The Green. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Construction of the Proposed Scheme is expected to result in temporary highway closures, diversions or realignments. These are expected to affect: the M1 (east of Diseworth and south of M1 junction 23a which would be subject to temporary traffic management measures); the A6 Kegworth Bypass; the A6 Derby Road; Stocking Lane; and The Green.

Operation

Operation of the Proposed Scheme would require the permanent diversion of: Melbourne Road; Breedon Lane; Mill Lane (western and eastern branches); Long Hedge Lane; Top Brand;

Ashby Road west of Kegworth; and Long Mere Lane. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Operation of the Proposed Scheme would result in the permanent diversion or realignment on eight public rights of way: Leicestershire Footpaths M56/1, M35/1, M21/6, M17/1, L32/1, L50/4 and L45a/1; and Leicestershire Bridleway L31/1.

8.14 Ratcliffe-on-Soar to Long Eaton (LA05)

Overview

The Ratcliffe-on-Soar to Long Eaton area (LA05) is approximately 9km in length, extending north from Kegworth to east of Risley. The area falls within the local authority areas of Leicestershire County Council, Derbyshire County Council, Nottinghamshire County Council, North West Leicestershire District Council, Rushcliffe Borough Council, Erewash Borough Council and Broxtowe Borough Council (see Figure 28).

The area comprises a mix of rural and urban land uses. The southern section of the area is predominately rural in character, with agriculture and recreation being the main land uses. This is interspersed with woodland, villages, marina facilities associated within the River Soar, and the Ratcliffe-on-Soar Power Station.

The northern section of the area is more urban from the point where the route would enter Long Eaton and continue towards Toton. Land uses include residential, commercial, light industrial and recreational uses associated with Long Eaton and the River Erewash.

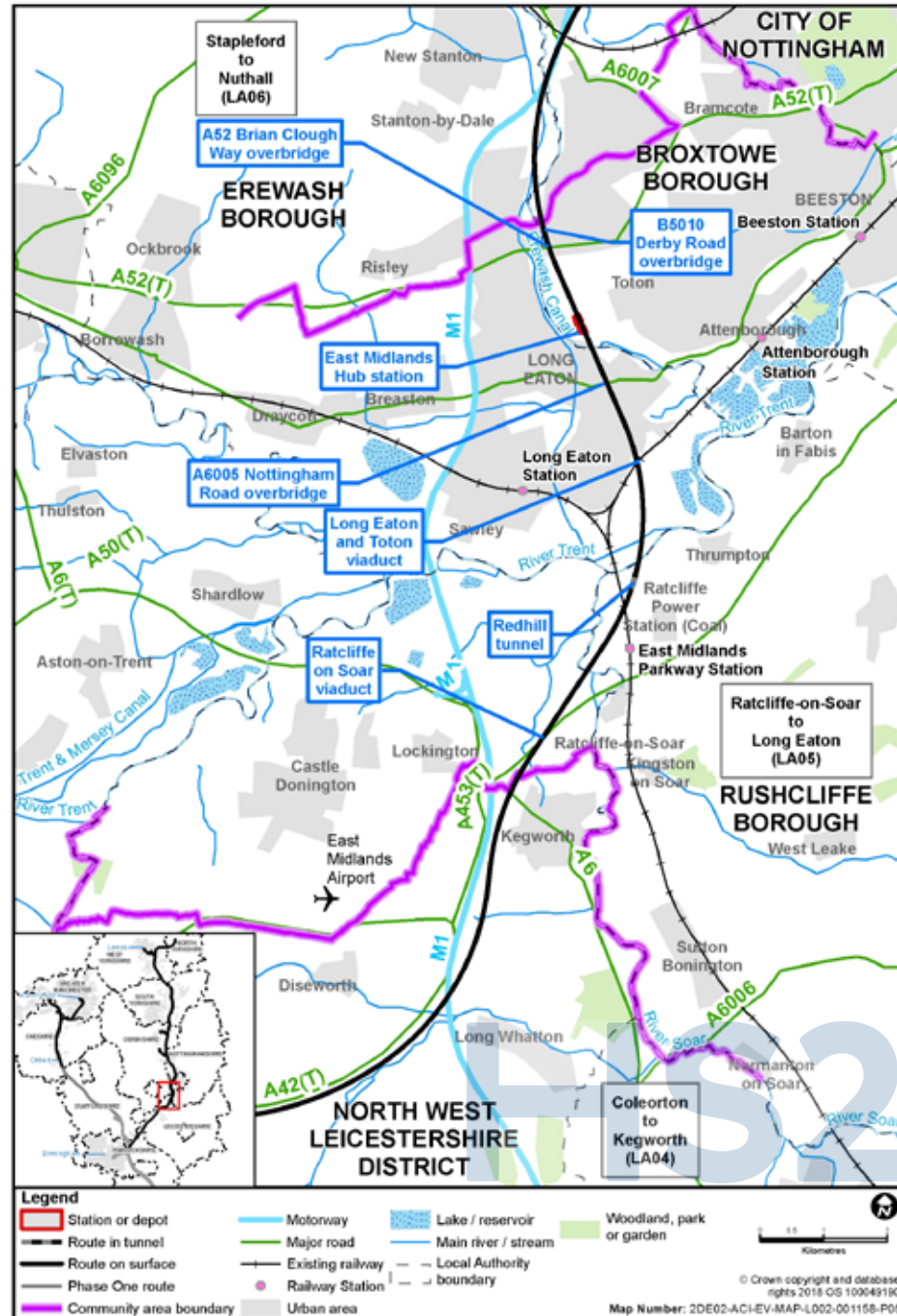


Figure 28: Ratcliffe-on-Soar to Long Eaton area (LA05) context map

The Proposed Scheme

The route would continue from the Coleorton to Kegworth area (LA04) on viaduct in a north-east direction towards Long Eaton, crossing the A453 Remembrance Way, the River Soar and the Midland Main Line. The route would then transition into a cutting east of the Midland Main Line before continuing through Wood Hill in a tunnel and crossing over the River Trent, Cranfleet Canal and West Lake on a viaduct. The route would then cross the Trent Junction and continue on viaduct passing the town of Long Eaton and over the A6005 Nottingham Road. The route would run parallel to the Erewash Canal on viaduct and connect with the East Midlands Hub station to the west of Toton. The route would continue north on embankment, before passing under the A52 Brian Clough Way and into the Stapleford to Nuthall area (LA06).

The Proposed Scheme would include the construction and operation of the East Midlands Hub station that would provide an interchange for passengers between high speed and conventional railway services. The East Midlands Hub station would comprise four high speed rail platforms, arranged into two island platforms, and four conventional line platforms,

also arranged into two island platforms. Two dedicated tracks would pass through the station between the two high speed platform tracks, to accommodate non-stopping high speed services. The station would include an entrance plaza concourse below the platforms with retail and social spaces. In addition, car parking with 4,000 spaces, drop-off and pick up areas, bus stops and taxi zone would be provided. There would be areas of public realm including cycle parking facilities and informal recreational space.

The Proposed Scheme would include modifications to the Erewash Valley Line and would also include new conventional lines into Toton Yard.

In this area, the Proposed Scheme would require the demolition of 183 residential properties and 52 commercial/business properties. There would be permanent realignment or diversion of three roads. The Proposed Scheme would result in the permanent realignment or diversion of seven public rights of way. One watercourse would be permanently realigned. Five main construction compounds and five satellite construction compounds would be required.

Residual effects

This section provides a summary of the likely significant residual environmental effects identified for the Ratcliffe-on-Soar to Long Eaton area at this stage of the design and assessment.

Agriculture, forestry and soils

Construction

It is currently expected that approximately 130ha of agricultural land would be required for construction of the Proposed Scheme in this area, of which approximately 15ha is likely to be high quality agricultural land. Some of this land would be restored following construction, with approximately 35ha permanently required, 5ha of which is high quality land. The quality of the land is currently based on publicly available information and will be confirmed in the formal ES once agricultural land surveys are complete, as will the extent of land required for the Proposed Scheme.

To avoid or reduce environmental impacts, soils from the areas required temporarily and permanently for the Proposed Scheme would be stripped and stored. This would enable

agricultural land that is required temporarily for construction to be returned to agricultural use. It would also enable soils to be put to other uses, such as supporting landscape planting.

Construction of the Proposed Scheme would be likely to result in temporary significant effects at three farm holdings in this area due to the proportion of land required for the Proposed Scheme. Of the three holdings temporarily affected, none of them would be permanently affected. Land required temporarily would, in accordance with a restoration scheme agreed with the landowner and the relevant planning authority, be returned to the farm holding following the completion of construction.

Community

Construction

Land required to construct the Proposed Scheme would have a temporary impact on access to West Lake and adjacent lakes situated south-east of Long Eaton used by Trent Windsurfing Club. During construction users would only be able to use East Lake, therefore, potentially impairing their experience. In addition, 6.1ha (37%) of land at Toton Fields

Local Nature Reserve would also be used temporarily during construction, which would impact a car park, a bridleway used by a local riding school and sever access between the north and south of the local nature reserve.

Construction of the Proposed Scheme would lead to significant community effects due to the demolition of: 23 residential properties on Newbery Avenue and Trent Cottages in Long Eaton; 150 on Bonsall Street, Bonsall Court, Station Road, New Tythe Street, Thornfield Square, Main Street and Meadow Lane in Long Eaton, and seven in Sandiacre, Stapleford. The loss of these properties represents a high proportion of each of these communities.

Land required to construct the Proposed Scheme would result in the permanent loss of the following community facilities: The Kingdom Hall of Jehovah's Witnesses in Long Eaton, the Greenwood Community Centre in Toton, the Midland Hotel in Stapleford and the West End public house in Stapleford. In addition, the Toton Sidings Local Wildlife Site would be permanently lost due to the construction of the East Midlands Hub station.

Ecology and biodiversity

Construction

Construction of the Proposed Scheme would result in indirect permanent effects on site integrity at Forbes Hole Local Nature Reserve/ Local Wildlife Site and Toton Sidings Pond Local Wildlife Site due to impacts on the water levels at these sites.

Construction of the Proposed Scheme would result in permanent habitat loss of approximately: 6ha (36%) of Toton Fields Local Nature Reserve; 11.7ha (14%) of Thrumpton Park Local Wildlife Site; the entirety of Meadow Lane Carr Local Wildlife Site; the entirety of Nottingham Road Carr Local Wildlife Site; 0.8ha (15%) of Toton Sidings Riverside Local Wildlife Site; 0.5ha (29%) of Toton Sidings Grassland and Scrub Local Wildlife Site; 12ha (91%) of Toton Sidings Local Wildlife Site; the entirety of Erewash Grassland, Stapleford Local Wildlife Site; and the entirety of Lock Lane Scrub, Sandiacre Local Wildlife Site.

It is currently expected that there would be a permanent loss of approximately 11.4ha of broadleaved woodland, 30.3ha of grassland,

7.5km of hedgerows and seven ponds, in addition to open mosaic habitat, and ancient and veteran trees. The removal and fragmentation of these habitat types has the potential to affect their conservation status as well as potentially resulting in significant effects on bat, polecat, bird, terrestrial invertebrate and reptile populations.

Significant effects are likely to be experienced by otter and water vole in watercourses affected by the Proposed Scheme, as a result of the loss of habitat. Similarly, great crested newt, white-clawed crayfish, aquatic invertebrates and fish may be affected as a result of habitat loss and construction disturbance in watercourses and water bodies.

Operation

During operation of the Proposed Scheme, bats and barn owls would be at risk of mortality caused by passing trains.

Health

Construction

The Proposed Scheme would impact on a range

of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health effects, judgements have been made as to the level and type of impact that could potentially affect population health.

Construction of the Proposed Scheme would result in the permanent loss of 183 residential properties within the Long Eaton area. This has the potential to reduce beneficial health effects that are gained through social contact and support.

Construction of the Proposed Scheme would result in the permanent loss of four community facilities in this area: The Kingdom Hall of Jehovah's Witnesses in Long Eaton; the Greenwood Community Centre in Toton; the Midland Hotel in Stapleford; and the West End public house in Stapleford. The loss of access to these services would result in an adverse health effect due to the lack of alternative facilities/ services in the locality.

Construction of the Proposed Scheme would have a temporary impact on the lakes south-east of Long Eaton used by Trent Windsurfing

Club, where users would only be able to use one of the two lakes. In addition, 37% of Toton Fields Local Nature Reserve (which is used by the local community as an area for recreation and relaxation and a local horse riding school) would also be used temporarily during construction. These spaces provide positive contributions to the wellbeing of the local community and their loss would have an adverse effect on health and wellbeing.

The combination of construction noise, visual and traffic impacts would change the character of neighbourhoods, and may impact on residents' quality of life. For rural communities dependent on shops and services in nearby towns, temporary closures and diversions of local roads may reduce the accessibility of key services. In addition, levels of physical activity could potentially be affected by disruption to roads and public rights of way that may be used as active travel routes.

The temporary construction workforce is likely to comprise a mixture of local people and workers from further afield. This could mean that local communities see temporary changes to the local population size and demographics.

Operation

The presence of rail infrastructure and noise from passing trains may change the character of surrounding neighbourhoods, and may reduce the quality of life for residents.

Historic environment

Construction

The Proposed Scheme is being designed to reduce impacts on heritage assets as far as reasonably practicable. Construction of the Proposed Scheme would permanently physically affect the Roman site scheduled monument on Red Hill due to the construction of the viaduct piers requiring the removal of nationally important archaeological remains. Part of the scheduled monument would be physically affected. In addition, 10 non-designated heritage assets would be permanently physically affected: 54 and 56 New Tythe Street, Trent Cottages and Station House on Trent Lane, The Cottage on Meadow Lane, Former Foundry and Former Lace Workshop on New Tythe Street; Albion Mills, Phonix Mills on Nottingham Road, Nottingham Road Mills; and Bush's Factory, Nottingham Road.

Construction of the Proposed Scheme would also permanently affect two scheduled monuments (the Roman site on Red Hill and the Roman villa and enclosures north of Ratcliffe Lane), and a Grade II listed Canal Bridge through alterations to their settings that would result in changes to the way that these assets are experienced and understood.

Landscape and visual

Construction

The presence of construction works and changes to the existing landform and vegetation patterns would affect the character of the local landscape. Where possible, effects would be reduced by the measures incorporated into the design to reduce the visibility of the Proposed Scheme (for example, land shaping to link earthworks into their wider landscape context, compensatory woodland planting, hedgerow replacement and use of simple and coherent materials to help structures fit in the landscape).

Construction activities would be visible from 19 viewpoints within the area, for example views from: residential properties on Newbery Avenue; the Trent Valley Way (Long Eaton Footpath 12) adjacent to Cranfleet Canal, and on

Waverley Street at the junction with the A6005 Nottingham Road.

Operation

During operation, the significant effect of the Proposed Scheme on the character and appearance of the local landscape would substantially reduce over time as mitigation planting grows and matures, however, effects may remain significant.

During operation, the Proposed Scheme would be visible from nine viewpoints within the area, for example views from: residential properties near the junction of Albion Road and Bonsall Street, Ratcliffe-on-Soar Footpath 7 adjacent to Redhill Marina, the Nutbrook Trail adjacent to the junction with Long Eaton Footpath 4 and Midland Street.

Land quality

Construction

For historic mining sites in the area, the potential for significant adverse effects has been identified associated with the control of mine gas and mine water. Studies into how mine gas and mine water is controlled are ongoing and

any mitigation required will be identified in consultation with the relevant statutory bodies and reported in the formal ES.

Beneficial effects would occur where remediation is carried out on sites identified within the land required for the construction of the Proposed Scheme, including Ratcliffe-on-Soar Power Station and Toton Yard.

Socio-economics

Construction of the Proposed Scheme would result in a likely significant effect from the demolition of buildings and the resulting loss or displacement of jobs from the following businesses in the area: five units in Meadow Brook Business Park in Long Eaton, the New Media Centre in Long Eaton, TecQuipment buildings in Long Eaton, a Balfour Beatty rail yard, and the UPS Customer Care facility in Stapleford. Any likely significant residual effects will be assessed and reported in the formal ES.

Sound, noise and vibration

Construction

Noise from construction could result in significant effects on residential communities

closest to the construction works at Long Eaton, Toton and Stapleford. In addition, noise from construction could result in significant effects at Long Eaton Baptist Church and Trinity Methodist Church.

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works. Further work is currently being undertaken to confirm the likely significant construction noise and vibration effects, including any temporary effects from construction traffic. This assessment will be reported in the formal ES.

Operation

Operational noise would be reduced at source through the effective design and specification of the trains and track. A number of measures have also been incorporated into the design of the Proposed Scheme to mitigate noise effects during operation. These include noise barriers in the form of landscape earthworks and/or noise fence barriers.

Operation of the railway would potentially result in noise effects on occupants of residential

properties, due to potential noise increases above applicable thresholds, and hence change in the existing acoustic character around those properties closest to the Proposed Scheme in the following areas: Long Eaton (Newbery Avenue, Owen Avenue, Main Street, Station Street, Nottingham Road, Willow Avenue, Hemlock Avenue and Royal Avenue), Toton (Lonsdale Drive and Banks Road) and Stapleford (Bessell Lane, Kelvin Close and Midland Avenue). Further assessment work is being carried out and will be reported in the formal ES.

During operation of the railway noise insulation would be offered to avoid significant effects at individual residential properties that satisfy the applicable qualifying criteria. At this stage this is anticipated to be in the vicinity of Bessel Road, Stapleford.

HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid likely significant effects due to noise and vibration. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the potentially affected receptor, its use and the benefit of the measures.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on the following routes: the M1 junctions 24 and 25; the A453 Remembrance Way between the M1 junction 24 and the Ratcliffe-on-Soar Power Station; the A52 Brian Clough Way between the M1 junction 25 and Bramcote roundabout; the A6065 Derby Road; the B5010 Derby Road; the B6002 Wilsthorpe Road/Petersham Road/Longmoor Road; Midland Street; Fields Farm Road; Meadow Lane; Main Street; Trent Lane; and Bostock's Lane. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Construction of the Proposed Scheme is expected to result in temporary highway closures and diversions or realignments. These are expected to affect: the A52 Brian Clough Way between the M1 junction 25 and the B6003 Toton Lane Bardills roundabout; and the B5010 Derby Road and Long Lane.

There could be impacts on on-street parking in Long Eaton during construction of the Proposed Scheme.

Construction of the Proposed Scheme would lead to the diversion of the following bus routes: 12; 12A; 14; 15; 29; 111; 460; 865; i4; Indigo; MP1; MP2X; MP3; my15; Railink; Skylink; and Y5.

Construction of the Proposed Scheme is expected to result in the temporary diversion/realignment of: Leicestershire Footpath 61; Leicestershire Bridleway 101; Ratcliffe-on-Soar Footpath 7; and Long Eaton Footpaths 12, 6 and 123.

Construction of the Proposed Scheme has the potential to result in temporary closures to waterways or towpaths at the River Soar, River Trent and Cranfleet Canal.

Rail possessions would be required on the Midland Main Line and the Erewash Valley Line running through Long Eaton and Toton Yard.

Operation

Rail users would benefit from improved journey times between East Midlands Hub station and major cities in the North, the Midlands and the South as a result of the introduction of HS2

services and increased capacity and journey opportunities on conventional rail services in the Greater Nottingham and Derby area.

Operation of the Proposed Scheme would require the permanent diversion or realignment of: the A52 Brian Clough Way; the B5010 Derby Road; and Long Lane.

Operation of the Proposed Scheme would result in changes to traffic and the potential for increased delays due to passengers and staff accessing the East Midlands Hub station. This could result in changes at: the M1 junction 25; the A52 Brian Clough Way; the B6003 Toton Lane; and the B5010 Derby Road. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes. There could also be an impact on parking in the residential areas surrounding East Midlands Hub station.

Operation of the Proposed Scheme would result in the permanent realignment or diversion of: Leicestershire Footpath 60; Long Eaton Footpaths 72 and 4; and Beeston Bridleways 125, 126, 127 and 128.

8.15 Stapleford to Nuthall (LAo6)

Overview

The Stapleford to Nuthall area (LAo6) is approximately 11km in length extending north from Stanton-by-Dale to the north-east of Watnall. It falls within the local authority areas of Broxtowe Borough Council, Erewash Borough Council, Nottinghamshire County Council, Derbyshire County Council and Nottingham City Council (see Figure 29).

The area is generally rural in character, with agriculture being the main land use. The area is interspersed with woodland, including ancient woodland, small villages and a scattering of isolated residential properties and farmsteads.

The south of the area includes residential properties, light industrial and manufacturing uses. At the northern end of the Stapleford to Nuthall area, the landscape is predominantly rural in character, with agriculture being the main land use between Trowell and Nuthall.

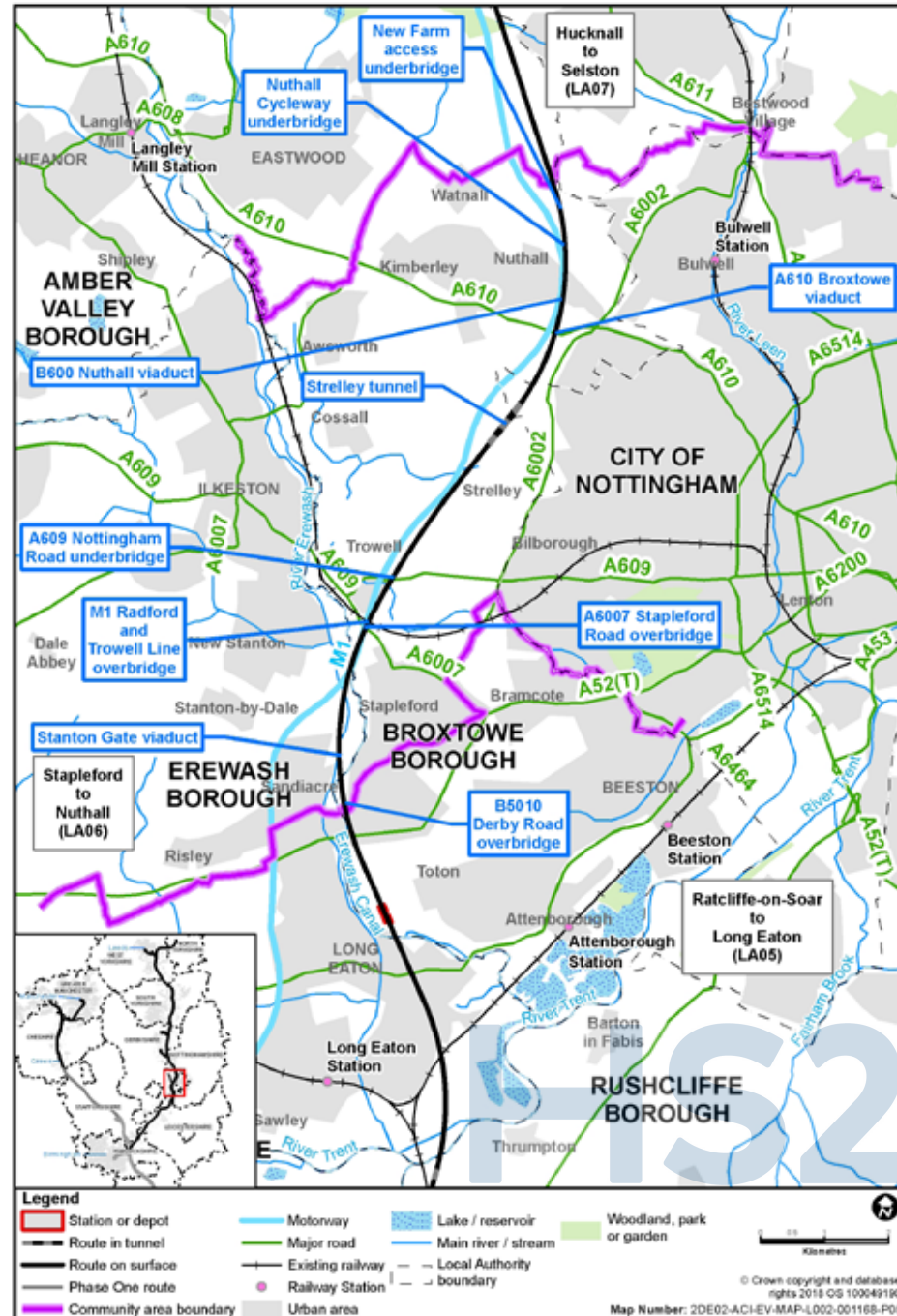


Figure 29: Stapleford to Nuthall area (LAo6) context map

The Proposed Scheme

The route would continue from the Ratcliffe-on-Soar to Long Eaton area (LA05) heading in a north-easterly direction towards Stapleford. The route would pass underneath the realigned B5010 Derby Road and continue on viaduct over the River Erewash, Erewash Valley Line and Erewash Canal at Stanton Gate. The route would proceed north-eastwards towards Broxtowe on viaduct crossing the A6007 Stapleford Road.

The route would continue north on viaduct then pass onto embankment before continuing to the east of the M1 and crossing the realigned Waterloo Lane. The route would transition into a cutting before passing into a tunnel under Strelley. The route would emerge onto embankment, then cross the A610 Nuthall Road on viaduct before passing on a series of embankments and cuttings and continuing into the Hucknall to Selston area (LA07).

In this area, the Proposed Scheme would require the demolition of 34 residential properties and 38 commercial/business properties. There would be permanent realignment or diversion of five roads. The Proposed Scheme would result in the permanent realignment or diversion of ten

public rights of way. Two watercourses would be permanently realigned. Three main construction compounds and six satellite construction compounds would be required.

Residual effects

This section provides a summary of the likely significant residual environmental effects identified for the Stapleford to Nuthall area at this stage of the design and assessment.

Agriculture, forestry and soils

Construction

It is currently expected that approximately 180ha of agricultural land would be required for construction of the Proposed Scheme in this area, of which approximately 110ha is likely to be high quality agricultural land. Some of this land will be restored following construction, with approximately 120ha permanently required, 80ha of which is high quality land. The quality of the land is currently based on publicly available information and will be confirmed in the formal ES once agricultural land surveys are complete, as will the extent of land required permanently for the Proposed Scheme.

To avoid or reduce environmental impacts, soils from the areas required temporarily and permanently for the Proposed Scheme would be stripped and stored. This would enable agricultural land that is required temporarily for construction to be returned to agricultural use. It would also enable soils to be put to other uses, such as to support landscape planting.

Construction of the Proposed Scheme would be likely to result in significant effects at 12 farm holdings in this area due to the proportion of land required and from severance (where the Proposed Scheme causes areas of land to become 'cut off' from the rest of the farm). Of the 12 holdings temporarily affected, 10 holdings would also be permanently affected. Land required temporarily would, in accordance with a restoration scheme agreed with the landowner and the relevant planning authority, be returned to the farm holding following the completion of construction.

Community

Construction

The land required for the construction of the Proposed Scheme would temporarily affect the playing fields associated with Nuthall Parish

Council Temple Centre, the Moo-Haven animal rescue centre in Stanton Gate, Stanton Gate Local Nature Reserve and New Farm Wood in Nuthall.

Construction of the Proposed Scheme would lead to significant community effects due to the demolition of: five residential properties on Bessell Road; and 20 on the B5010 Derby Road, Station Road and Rutland Grove. These demolitions would occur at the border between the Ratcliffe-on-Soar to Long Eaton area (LA05) and the Stapleford to Nuthall area (LA06) and is reported in both the Volume 2 LA05 Ratcliffe-on-Soar to Long Eaton and Volume 2 LA06 Stapleford to Nuthall reports. Of the 25 residential properties that would be demolished, 18 are in the Stapleford to Nuthall area. In addition, nine residential properties on the B600 Nottingham Road would also be permanently lost. The loss of these properties represents a high proportion of each of these communities.

The permanent loss of 23% of New Farm Wood Ancient Woodland and approximately 6% of the Moo-Haven animal rescue centre in Stanton Gate would be required, both of which are valued by the local community. Land required for the construction of the Proposed Scheme

would result in the permanent loss of the Nottinghamshire Police Motorway Patrol Unit in Trowell Motorway Services and the CARE fertility clinic in Nottingham Business Park.

Ecology and biodiversity

Construction

Construction of the Proposed Scheme would result in a permanent significant effect on the integrity of the Bulwell Wood Site of Special Scientific Interest, Blenheim Farm Local Wildlife Site and Blenheim Lane Ponds Local Wildlife Site due to changes in surrounding hydrology.

Construction of the Proposed Scheme would result in a permanent loss of habitat of approximately: 0.5ha (74%) of Stanton Gate Local Nature Reserve and Local Wildlife Site; 0.4ha (3%) of Bulwell Wood and Pond Local Wildlife Site; 0.4ha of Nottingham Canal Local Nature Reserve (2%) and Local Wildlife Site (5%); 0.6ha (10%) of Moorbridge Lane Wetland North Local Wildlife Site; 1.1ha (26%) of West Hallam Towpath Scrub Local Wildlife Site; all of Sandiacre Marsh Local Wildlife Site; 0.5ha (10%) of Nuthall Cutting Local Wildlife Site; 1.8ha of New Farm Wood Local Wildlife Site (30%) and Ancient Woodland Inventory Site (33%);

0.2ha (14%) of Blenheim Disused Railway Local Wildlife Site; and 4ha (5%) of Hucknall Airfield Local Wildlife Site (approximately 4ha).

It is currently expected that there would be a permanent loss of approximately 11ha of non-ancient woodland outside designated sites, 24ha of semi-improved grassland, 11 ponds and approximately 7km of hedgerows, in addition to ancient and veteran trees. The removal and fragmentation of these habitat types has the potential to affect their conservation status as well as potentially resulting in significant effects on bat, polecat, bird, terrestrial invertebrate and reptile populations.

Significant effects are likely to be experienced by otter and water vole in watercourses affected by the Proposed Scheme, as a result of the loss of habitat. Similarly, great crested newt, white-clawed crayfish, aquatic invertebrates and fish may be affected as a result of habitat loss and construction disturbance.

Operation

During operation of the Proposed Scheme, bats and barn owls would be at risk of mortality caused by passing trains.

Health

Construction

The Proposed Scheme would impact on a range of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health effects, judgements have been made as to the level and type of impact that could potentially affect population health.

Construction of the Proposed Scheme would result in the permanent loss of 27 residential properties in this area. This has the potential to reduce beneficial health effects that are gained through social contact and support.

During construction changes to access and temporary loss of green space, including the playing field associated with the Nuthall Parish Council Temple Centre and Stanton Gate Local Nature Reserve. Construction of the Proposed Scheme would result in the temporary and permanent loss of areas of New Farm Wood. These spaces provide a positive contribution to the wellbeing of local communities and their loss would have an adverse effect on health and wellbeing.

The combination of construction noise, visual and traffic impacts would change the character of neighbourhoods, and may impact on residents' quality of life. For rural communities dependent on shops and services in nearby towns, temporary closures and diversions of local roads may reduce the accessibility of key services. In addition, levels of physical activity could potentially be affected by disruption to roads and public rights of way that may be used as active travel routes.

The temporary construction workforce is likely to comprise a mixture of local people and workers from further afield, giving rise to temporary changes to local population size and demographics.

Operation

The presence of rail infrastructure and noise from passing trains may change the character of surrounding neighbourhoods, and may reduce the quality of life for residents.

Historic environment

Construction

The Proposed Scheme is being designed to

avoid and reduce impacts on heritage assets as far as reasonably practicable. Construction of the Proposed Scheme would permanently affect the setting of the Grade I listed Church of St Giles in Sandiacre. This would result in changes to the way that this building is experienced and understood.

Land quality

Construction

For historic mining sites in the area, the potential for significant adverse effects has been identified associated with the control of mine gas and mine water. Studies into how mine gas and mine water is controlled are ongoing and any mitigation required will be identified in consultation with the relevant statutory bodies and reported in the formal ES.

Beneficial effects would occur where remediation is carried out on sites identified within the land required for the construction of the Proposed Scheme, including: the former Stanton Iron Works and areas of railway land.

Landscape and visual

Construction

The presence of construction works and changes to the existing landform and vegetation patterns would affect the character of the local landscape. Where possible, effects would be reduced by the measures incorporated into the design to reduce the visibility of the Proposed Scheme (for example, land shaping to link earthworks into their wider landscape context, compensatory woodland planting and hedgerow replacement and restoration).

Construction activities would be visible from 14 viewpoints within the area, for example views from: residential properties at Stanton Gate and the B600 Nottingham Road; Sandiacre Road public right of way, a public right of way close to Cloud House, Erewash Canal and public right of way in Stapleford, Moorbridge Lane public right of way; and Nuthall Temple Centre.

Operation

During operation, the significant effects of the Proposed Scheme on the character and appearance of the local landscape would be

substantially reduced over time as mitigation planting grows and matures, however, effects may remain significant.

During operation, the Proposed Scheme would be visible from 11 viewpoints within the area, for example views from: residential properties at Stanton Gate and B600 Nottingham Road; Sandiacre Road public right of way, a public right of way close to Cloud House, Erewash Canal in Stapleford, Moorbridge Lane; and Nuthall Temple Centre.

Socio-economics

Construction of the Proposed Scheme would result in likely significant effects from the loss of land or buildings and the resulting loss or displacement of jobs from the following businesses in the area: Nottingham Business Park: Units D1, C1, C2 and B2 at Orchard Place and John Webster House (including a private fertility clinic); and Eric Belfield House on Lawrence Drive. Any likely significant residual effects will be assessed and reported in the formal ES.

Sound, noise and vibration

Construction

Noise from construction could result in significant effects on residential communities closest to the construction works at Sandiacre; Stanton Gate; Stapleford; Trowell; Strelley; and Nuthall.

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works.

Further work is currently being undertaken to confirm the likely significant construction noise and vibration effects, including any temporary effects from construction traffic. This assessment will be reported in the formal ES.

Operation

Operational noise would be reduced at source through the effective design and specification of the trains and track. A number of measures have also been incorporated into the design of the Proposed Scheme to mitigate noise effects during operation. These include noise barriers in

the form of landscape earthworks and/or noise fence barriers.

Operation of the railway would potentially result in noise effects on occupants of residential properties, due to potential noise increases above recognised thresholds, and hence change in the existing acoustic character around those properties closest to the Proposed Scheme in the following areas: Stapleford (in the vicinity of Derby Road); Sandiacre (in the vicinity of Rutland Grove, Regent Street and Ilkeston Road); Stanton Gate (in the vicinity of Stanton Gate and Moorbridge Lane); and Trowell (in the vicinity of Trowell Park Drive). Further assessment work is being carried out and will be reported in the formal ES.

During operation of the railway, noise insulation would be offered to avoid significant effects at residential properties that satisfy the applicable qualifying criteria. At this stage this is anticipated to be at individual properties closest to the Proposed Scheme in the vicinity of West End Street, Sandiacre.

Further assessment work is currently being undertaken to confirm the likely significant effects due to operational noise and vibration,

especially at non-residential locations and quiet areas and in terms of establishing existing baseline conditions. This will be reported in the formal ES.

HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid likely significant effects due to noise and vibration. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the potentially affected receptors, their use and the benefit of the measures.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on a number of routes, including: the M1 junctions 25 and 26; the A609 Nottingham Road between the A6007 Stapleford Road and the A6002 Coventry Lane; the A610 east of M1 junction 26; the A6002 Woodhouse Way and Main Street; the A6007 Stapleford Road; the B5010 Derby Road and Bostock's Lane to the M1 junction 25; the B600 Nottingham Road; the B6003 Toton Lane; Stanton Gate/Moorbridge Lane; and Ilkeston

Road/Lenton Street/Town Street in Sandiacre. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Construction of the Proposed Scheme is expected to result in temporary highway closures and diversions or realignments on: the M1, which would be subject to temporary traffic management measures, the B5010 Derby Road and Lawrence Drive.

Bus services 'the two' along the A609 Nottingham Road, i4, 111 and my15 along the B5010 Derby Road would be affected by temporary diversions.

Rail possessions would be required on the Erewash Valley Line and on the Radford and Trowell Line to undertake localised works.

The following public rights of way would be temporarily diverted: Sandiacre Footpaths 19, 7, 5, 24 and 6; and Stanton-by-Dale Footpath 21.

Construction of the Proposed Scheme could have an effect upon the Erewash Canal, both on users of the waterway and towpath.

Operation

HS2 would generate significant benefits for rail passengers in the Stapleford to Nuthall area. This would include improved journey times to major cities in the North of England, Midlands and to London via East Midlands Hub station and increases in rail capacity.

Operation of the Proposed Scheme would require the permanent diversion or realignment of: the M1 in Sandiacre; the A609 Nottingham Road to the east of Trowell; Waterloo Lane in the vicinity of the M1 Trowell South Motorway Services; Lawrence Drive in Broxtowe; and the B5010 Derby Road where it crosses over the Erewash Valley Line. Increases in traffic, including from the East Midlands Hub station, could also result in increased traffic severance for non-motorised users of the routes. Any significant effects of these will be reported in the formal ES.

The following public rights of way would be permanently diverted or realigned: Stapleford Footpath 13; Trowell Footpaths 5, 6, 23, 24 and 10; Trowell Bridleways 13 and 14; Nuthall Footpath 8; and Greasley Footpath 18.

8.16 Hucknall to Selston (LA07)

Overview

The Hucknall to Selston area (LA07) is approximately 11km in length extending north from Nuthall to Pinxton. It falls within the local authority areas of Broxtowe Borough Council, Ashfield District Council and Nottingham County Council (see Figure 30).

The area is predominantly rural in character, with agriculture being the main land use. The area also includes a number of woodlands, including High Park Wood and Park Forest. Hucknall and the villages of Beauville and Westville lie in the southern end of area. Continuing north, there are a number of residential properties and businesses, including farms and industrial estates such as Sherwood Business Park, south of Annesley Woodhouse. Selston lies near the northern boundary of the Hucknall to Selston area.

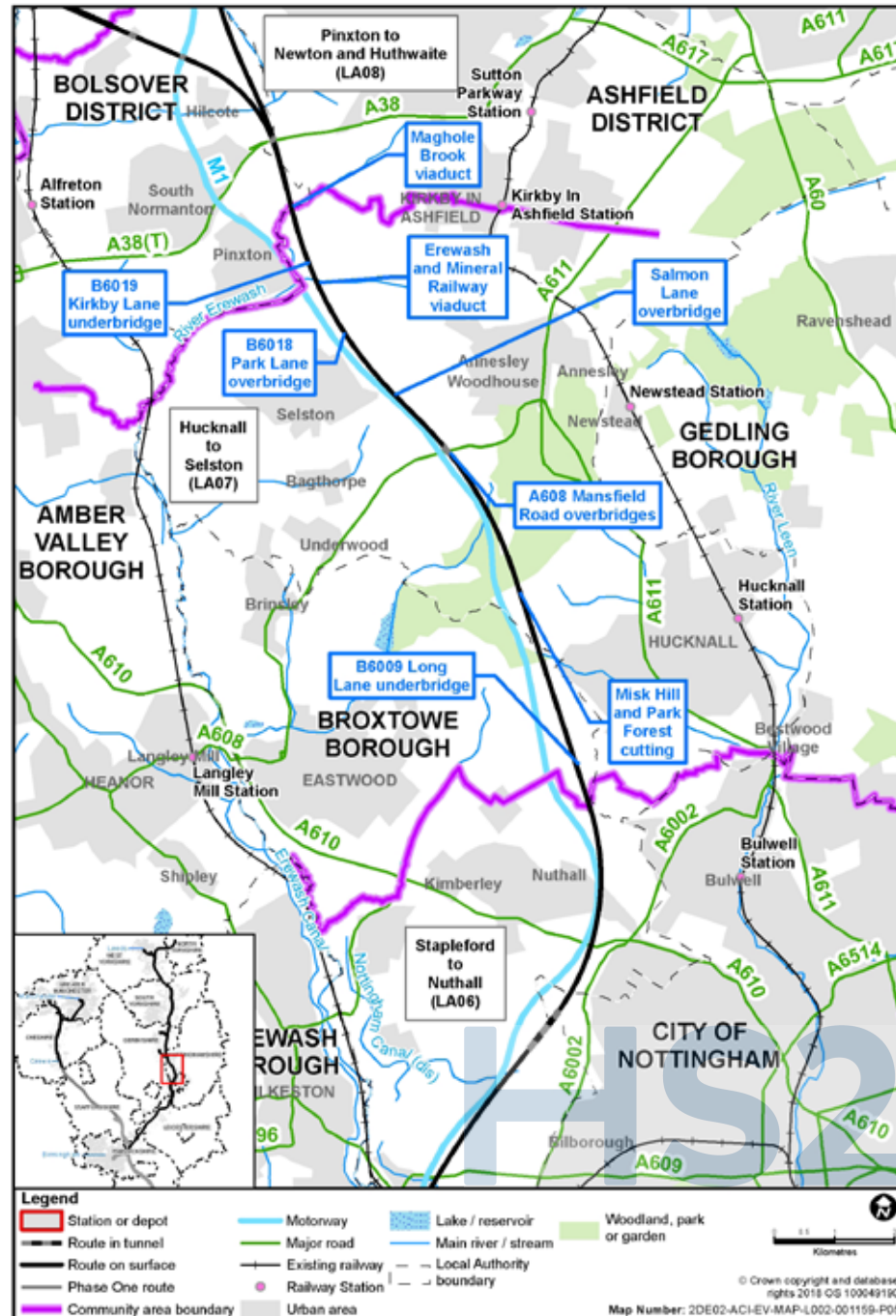


Figure 30: Hucknall to Selston area (LA07) context map

The Proposed Scheme

The route would continue from the Stapleford to Nuthall area (LAo6) in a north-west direction towards Park Forest on embankment. The route would then enter into a cutting at Park Forest and continue running north on embankment. The route would enter a cutting before transitioning onto embankment before passing through Audrey Wood on viaduct. The route would then run on embankment towards the A608 Mansfield Road, where it would enter into a cutting. After crossing the A608 Mansfield Road, the route would run on a series of embankments and cuttings to the east of Selston. The route would then cross the River Erewash and continue into the Pinxton to Newton and Huthwaite area (LAo8) on viaduct.

In this area, the Proposed Scheme would require the demolition of 10 residential properties and two commercial/business properties. There would be permanent realignment or diversion of five roads. The Proposed Scheme would result in the permanent realignment, diversion or closure of 12 public rights of way. One main construction compound and nine satellite construction compounds would be required in this area.

Residual effects

This section provides a summary of the likely significant residual environmental effects identified for the Hucknall to Selston area at this stage of the design and assessment.

Agriculture, forestry and soils

Construction

It is currently expected that approximately 360ha of agricultural land would be required for construction of the Proposed Scheme in this area, of which approximately 110ha is likely to be high quality agricultural land. Some of this land would be restored following construction, with approximately 210ha permanently required, 100ha of which is high agricultural quality land. The quality of the land is currently based on publicly available information and will be confirmed in the formal ES once agricultural land surveys are complete, as will the extent of land required permanently for the Proposed Scheme.

To avoid or reduce environmental impacts, soils from the areas required temporarily and permanently for the Proposed Scheme would

be stripped and stored. This would enable agricultural land that is required temporarily for construction to be returned to agricultural use. It would also enable soils to be put to other uses, such as to support landscape planting.

Construction of the Proposed Scheme would be likely to result in significant effects at 10 farm holdings in this area due to the proportion of land required during construction. Of the 10 holdings temporarily affected, nine holdings would also be permanently affected. Land required temporarily would, in accordance with a restoration scheme agreed with the landowner and the relevant planning authority, be returned to the farm holding following the completion of construction.

Community

Construction

The land required to construct the Proposed Scheme would result in the temporary use of approximately 16.8ha (approximately 15%) of Park Forest. The temporarily lost area potentially includes a network of footpaths and trails.

Construction of the Proposed Scheme would lead significant community effects due to the demolition of six residential properties on Annesley Lane in Selston; and three on Salmon Lane in Selston. The loss of these properties represents a high proportion of this community.

Ecology and biodiversity

Construction

Construction of the Proposed Scheme would result in a permanent significant effect on the site integrity of the Bulwell Wood Site of Special Scientific Interest, and Annesley Woodhouse Quarries Site of Special Scientific Interest due to changes in groundwater and surface flows.

Construction of the Proposed Scheme would result in a permanent significant effect to Bogs Farm Quarry Site of Special Scientific Interest due to the loss of 0.1ha (2%) of habitat and also changes in surface water flow within the site.

Construction of the Proposed Scheme would result in a permanent loss of approximately: 0.5ha (3%) of Bulwell Wood and Pond Local Wildlife Site; 4ha (5%) of Hucknall Airfield Local Wildlife Site; 5ha (100%) of Weaver's Lane

Grassland Local Wildlife Site; 2ha (100%) of Langton Marshy Grassland Local Wildlife Site; 2ha (100%) of Kirkby Bentinck Erewash Meadow Local Wildlife Site; 1ha (52%) of Langton Meadow Local Wildlife Site; 5ha (33%) of Watnall Brickyard Local Wildlife Site; 3ha (27%) of Watnall Coppice East Local Wildlife Site; 17 ha (14%) of Park Forest, Annesley Local Wildlife Site; 0.4ha (100%) of Annesley Track Verge Local Wildlife Site; 3ha (54%) of Annesley Woodland II Local Wildlife Site; 0.1ha (1.6%) of Bogs Farm Quarry Local Wildlife Site; Bentinck Void Local Wildlife Site; 1ha (7%) of Maghole Brook and Ashfield District Dumble Local Wildlife Site; and 3ha (33%) of Watnall Coppice Ancient Woodland Inventory Site.

It is currently expected that there would be a permanent loss of approximately 7ha of broadleaved woodland, approximately 23km of hedgerows, and eight ponds, in addition to the loss of ancient and veteran trees. The removal and fragmentation of these habitat types has the potential to affect their conservation status as well as potentially resulting in significant effects on bats, polecat, great crested newt, birds, terrestrial invertebrate and reptiles.

Significant effects are likely to be experienced by otter and water vole in watercourses affected by the Proposed Scheme, as a result of the loss of water-margin habitat. Similarly, white-clawed crayfish, aquatic invertebrates and fish may be significantly affected as a result of construction disturbance.

Operation

During operation of the Proposed Scheme, bats and barn owls would be at risk of mortality caused by passing trains.

Health

Construction

The Proposed Scheme would impact on a range of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health effects, judgements have been made as to the level and type of impact that could potentially affect population health.

Approximately 15% of Park Forest would be lost temporarily as a result of construction. This space provides a positive contribution to the wellbeing of the local community and the

temporary loss would have an adverse effect on health and wellbeing during construction.

The combination of construction noise, visual and traffic impacts would change the character of neighbourhoods, and may impact on residents' quality of life. For rural communities dependent on shops and services in nearby towns, temporary closures and diversions of local roads may reduce the accessibility of key services. In addition, levels of physical activity could potentially be affected by disruption to roads and public rights of way that may be used as active travel routes.

The temporary construction workforce is likely to comprise a mixture of local people and workers from further afield, giving rise to temporary changes to local population size and demographics.

Operation

The presence of rail infrastructure and noise from passing trains may change the character of surrounding neighbourhoods, and may reduce the quality of life for residents.

Historic environment

Construction

The Proposed Scheme is being designed to reduce impacts on heritage assets as far as reasonably practicable. Construction of the Proposed Scheme would result in the removal of the following three non-designated heritage assets: a potential Romano-British near Misk Farmsettlement; Two Dales Farm and associated outbuildings; and the archaeological remains which are likely to comprise the foundations of a windmill and associated engine in the Kirkby-in-Ashfield parish, situated south of the B6018 Park Lane.

Construction of the Proposed Scheme would permanently affect the setting of the Grade II* listed Registered Park and Garden at Annesley Hall. This would result in changes to the way that the registered park is experienced and understood.

Landscape and visual

Construction

The presence of construction works changes to the existing landform and vegetation

patterns would affect the character of the local landscape. Where possible, effects would be reduced by the measures incorporated into the design to reduce the visibility of the Proposed Scheme (for example, land shaping to link earthworks into their wider landscape context, compensatory woodland planting, hedgerow replacement and restoration, and new wetland features to compensate for the loss of ponds).

Construction activities would be visible from 18 viewpoints within the area, for example views from: residential properties near Misk Farm and Kennels Farm; Kirkby Bridleway 12, Hucknall Footpath 35, Annesley Footpath 9 and Annesley Bridleway 1.

Operation

During operation, the significant effects of the Proposed Scheme on the character and appearance of the local landscape would substantially reduce over time as mitigation planting grows and matures, however, effects may remain significant.

During operation, the Proposed Scheme would be visible from 13 viewpoints within the area, for example views from: residential properties near

Misk Farm and Kennels Farm; Kirkby Bridleway 12, Hucknall Footpath 35, Annesley Footpath 9 and Annesley Footpath 2.

Land quality

Construction

Beneficial effects would occur where remediation is carried out on sites identified within the land required for the construction of the Proposed Scheme, including: Annesley Bentinck and Langton Hall collieries; and Hucknall Airfield and Eel Hole Farm.

Sound, noise and vibration

Construction

Noise from construction could result in significant effects on residential communities closest to the construction works at: Westville in Hucknall; Selston; and Pinxton, to the east of the M1 in the vicinity of the B6019 Kirkby Lane.

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works.

Further work is currently being undertaken to confirm the likely significant residual construction noise and vibration effects, including any temporary effects from construction traffic. This assessment will be reported in the formal ES.

Operation

Operational noise would be reduced at source through the effective design and specification of the trains and track. A number of measures have also been incorporated into the design of the Proposed Scheme to mitigate noise effects during operation. These include noise barriers in the form of landscape earthworks and/or noise fence barriers.

During operation of the railway noise insulation would be offered to avoid significant effects at individual residential properties that satisfy the applicable qualifying criteria. At this stage this is anticipated to be at Langton Lodge (in the vicinity of the B6019 Kirkby Lane); and York Lodge (in the vicinity of the B6019 Kirkby Lane).

Further assessment work is currently being undertaken to confirm the likely significant residual effects due to operational noise and

vibration, especially at non-residential locations and quiet areas and in terms of establishing existing baseline conditions. This will be reported in the formal ES.

HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid likely significant effects due to noise and vibration. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the potentially affected receptors, their use and the benefit of the measures.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on the following routes: the M1 junctions 27 and 28; the A608 Mansfield Road; the A611 Annesley Road/Derby Road; the B6009 Long Lane/Watnall Road; the B6018 Mansfield Road/Park Lane; the B6019 Kirkby Lane; Wood Lane; Whyburn Lane; Common Lane; Forest Road; and Salmon Lane. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in

terms of the ease with which they can cross these routes.

Construction of the Proposed Scheme is expected to result in temporary highway closure, diversion or realignment for the following roads: the M1 north of junction 27; the A608 Mansfield Road; the B6018 Park Lane; and Salmon Lane.

Construction of the Proposed Scheme is likely to affect parking at the lay-bys on the A608 Mansfield Road east of the M1.

Bus services, the Amberline, the Selston Shopper, the Underwood Shopper and the Jacksdale Shopper would be affected by temporary diversions.

Temporary rail possession on the Sutton Junction to Pye Bridge Railway would be required for construction works.

A number of public rights of way could also be subject to temporary closure or diversion/realignment: Greasley Bridleways 15 and 21; Greasley Footpath 20; Hucknall Footpath 35; Annesley Footpaths 2 and 8; Annesley Bridleway 1; and Kirkby Footpaths 20, 17 and 13.

Operation

Operation of the Proposed Scheme would require permanent changes to: the M1 junction 27 and the diversion of the B6009 Long Lane; the B6018 Park Lane; the B6019 Kirkby Lane; and Salmon Lane. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Operation of the Proposed Scheme is expected to permanently remove parking capacity at the lay-by adjacent to the eastbound carriageway of the A608 Mansfield Road, east of the M1 junction 27.

Operation of the Proposed Scheme would result in the permanent realignment or diversion of 11 public rights of way: Greasley Bridleways 15, 19 and 21; Greasley Footpath 20; Hucknall Footpath 35; Annesley Footpaths 2 and 8; and Kirkby Footpaths 12, 20, 18 and 13. Greasley Footpath 22 would be closed.

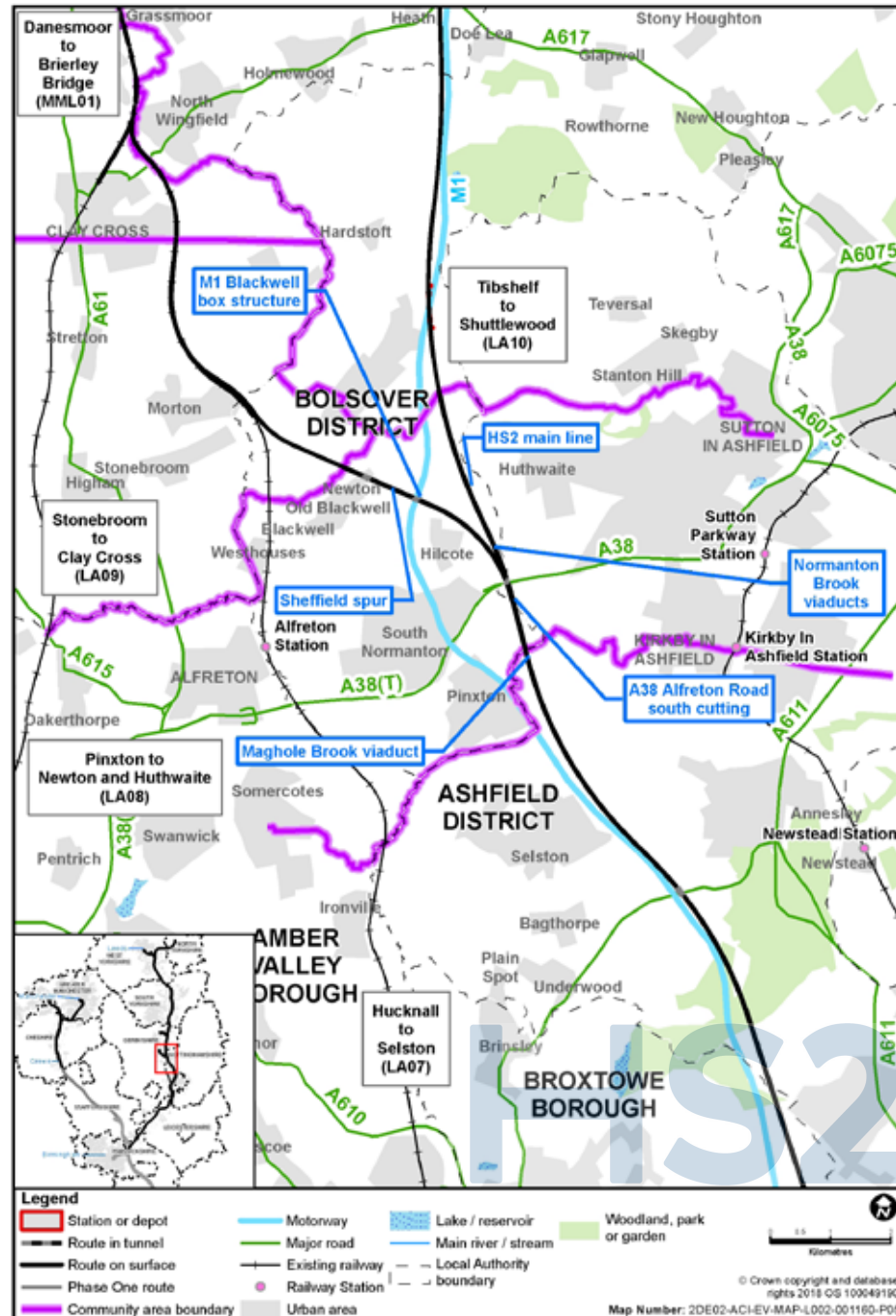
8.17 Pinxton to Newton and Huthwaite (LAo8)

Overview

The Pinxton to Newton and Huthwaite area (LAo8) is approximately 8km in length, extending north from Pinxton to Newton and Huthwaite and comprising an approximate 4.5km section of the HS2 main line and an approximate 3km section of the Sheffield spur. It falls within the local authority areas of Bolsover District Council, Ashfield District Council, Nottingham County Council and Derbyshire County Council (see Figure 31).

The area is a mix of urban and rural character, with agriculture, large commercial warehousing and industrial estates being the main land uses. The main residential areas include Pinxton, South Normanton, Sutton-in-Ashfield and Huthwaite. There are also villages and a number of isolated residential properties and farmsteads. The area to the east of South Normanton, and to the west of Sutton-in-Ashfield, is more rural with woodland, hedgerows, grassland and reclaimed coal mine areas.

Figure 31: Pinxton to Newton and Huthwaite area (LAo8) context map



The Proposed Scheme

The route would continue from the Hucknall to Selston area (LA07) on viaduct heading north towards Hilcote, crossing Maghole Brook. The route would then run on embankment and then in a cutting to cross the A38 Alfreton Road. The route would then diverge, forming two routes: the HS2 main line and the Sheffield spur. The HS2 main line would continue north towards the Tibshelf to Shuttlewood area (LA10) and the Sheffield spur would continue north-west towards the Stonebroom to Clay Cross area (LA09).

The HS2 main line would run on embankment, passing into cutting and continuing on an embankment before transitioning onto viaduct to cross Normanton Brook. The HS2 main line would then run on embankment and enter a cutting to the west of Huthwaite and continue into the Tibshelf to Shuttlewood area (LA10).

The Sheffield spur, comprising two lines, one northbound and one southbound, would diverge from the HS2 main line and run on embankment and the two spur lines would cross Normanton Brook and the Blackwell Trail on viaducts. The Sheffield spur would then continue on embankment to the north of Hilcote and

continue into a cutting, crossing under the M1 in a box structure. It would then continue on embankment into the Stonebroom to Clay Cross area (LA09).

In this area, the Proposed Scheme would require the demolition of 29 residential properties and four commercial/business properties. There would be permanent realignment or diversion of six roads. The Proposed Scheme would result in the permanent realignment or diversion of 16 public rights of way. One watercourse would be permanently realigned. Two main construction compounds and six satellite construction compounds would be required in this area.

Residual effects

This section provides a summary of the likely significant residual environmental effects identified for the Pinxton to Newton and Huthwaite area at this stage of the design and assessment.

Agriculture, forestry and soils

Construction

It is currently expected that approximately 220ha of agricultural land would be required

for construction of the Proposed Scheme in this area, of which approximately 60ha is likely to be high quality land. Some of this land would be restored following construction, with approximately 100ha permanently required, 30ha of which is high quality land. The quality of the land is currently based on publicly available information and will be confirmed in the formal ES once agricultural land surveys are complete, as will the extent of land required for the Proposed Scheme.

To avoid or reduce environmental impacts, soils from the areas required temporarily and permanently for the Proposed Scheme would be stripped and stored. This would enable agricultural land that is required temporarily for construction to be returned to agricultural use. It would also enable soils to be put to other uses, such as support landscape planting.

Construction of the Proposed Scheme would be likely to result in significant effects at 13 farm holdings in this area, both temporarily and permanently, due to the proportion of land required for the Proposed Scheme. Land that is only required temporarily would, in accordance with a restoration scheme agreed with the landowner and the relevant planning authority,

be returned to the farm holding following the completion of construction.

Community

Construction

The land required to construct the Proposed Scheme would require the temporary use of approximately 1.1ha (35%) of Hilcote Royal Oak Meadow and Woodlands. During construction, the site would not be useable by the public or Hilcote Environmental Leisure Project (a community group run by residents of the village of Hilcote with input from Derbyshire Wildlife Trust).

Construction of the Proposed Scheme would lead to a significant community effect due to the demolition of 18 residential properties on Alfreton Road in Newton. The loss of these properties represents a high proportion of this community.

Ecology and biodiversity

Construction

Construction of the Proposed Scheme would result in permanent effects on site integrity due

to changes to water flows and approximately 1ha (7%) of habitat loss at Maghole Brook and Ashfield District Dumble Local Wildlife Site.

Construction of the Proposed Scheme would result in permanent habitat loss of approximately: 7.3ha (73%) of Hucknall Disused Railways Local Wildlife Site; 2.8ha (95%) of New Hucknall Sidings Grasslands Local Wildlife Site; and the entirety (0.5ha) of Spring Farm Pasture, Huthwaite Local Wildlife Site.

It is currently expected that there would be a permanent loss of approximately 7ha of woodland, 9ha of woodland pasture, 8ha of grassland, 20km of hedgerows and 13 ponds, in addition to sections of small watercourses and ancient and veteran trees. The removal and fragmentation of these habitat types has the potential to affect their conservation status as well as potentially resulting in significant effects on bat, polecat, bird, terrestrial invertebrate and reptile populations.

Significant effects are likely to be experienced by otter and water vole in watercourses affected by the Proposed Scheme, as a result of the loss and fragmentation of habitat. Similarly, great crested newt, white-clawed crayfish, aquatic

invertebrates and fish may be significantly affected as a result of habitat loss and construction disturbance to watercourses and water bodies.

Operation

During operation of the Proposed Scheme, bats and barn owls would be at risk of mortality caused by passing trains.

Health

Construction

The Proposed Scheme would impact a range of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health effects, judgements have been made as to the level and type of impact that could potentially affect population health.

Construction of the Proposed Scheme would result in the permanent loss of 18 residential properties in Newton. The loss of these residential properties represents a sizeable proportion of the community and has the potential to reduce beneficial health effects that are gained through social contact and support.

Construction of the Proposed Scheme would result in the temporary loss of: approximately 1.1ha (35%) of Hilcote Royal Oak Meadow and Woodlands; and 20% of a playing field off South Street, situated off Alfreton Road, between Blackwell and Newton. These spaces provide a positive contribution to the wellbeing of local communities and their temporary loss would have an adverse effect on health and wellbeing.

The combination of construction noise, visual and traffic impacts would change the character of neighbourhoods, and may impact on residents' quality of life. For rural communities dependent on shops and services in nearby towns, temporary closures and diversions of local roads may reduce the accessibility of key services. In addition, levels of physical activity could potentially be affected by disruption to roads and public rights of way that may be used as active travel routes.

The temporary construction workforce is likely to comprise a mixture of local people and workers from further afield. This could mean that local communities see temporary changes to the local population size and demographics.

Operation

The presence of rail infrastructure and noise from passing trains may change the character of surrounding neighbourhoods, and may reduce the quality of life for residents.

Historic environment

Construction

The Proposed Scheme is being designed to reduce impacts on heritage assets as far as reasonably practicable. Construction of the Proposed Scheme would permanently physically affect non-designated parkland at Brookhill Hall, which contributes to the setting of the Grade II listed buildings of Brookhill Hall and Stableblock at Brookhill Hall. Twenty non-designated heritage assets would also be permanently physically affected, including: Brookhill Hall Farm; Longside Cottage Farm; and buildings in the Old Blackwell Conservation Area.

Construction of the Proposed Scheme would also permanently affect the setting of four Grade II listed buildings: Brookhill Hall; the Stable block at Brookhill Hall; Old Farm Cottage; and Three Lane End Farmhouse. The setting

of the Old Blackwell Conservation Area would also be permanently affected. This would result in changes to the way that these assets are experienced and understood.

Landscape and visual

Construction

Construction of the Proposed Scheme and changes to the existing landform and vegetation patterns would affect the character of the local landscape. Where possible, effects would be reduced by the measures incorporated into the design to reduce the visibility of the Proposed Scheme (for example, land shaping to link earthworks into their wider landscape context, compensatory woodland planting and hedgerow replacement and restoration).

Construction activities would be visible from 14 viewpoints within the area, for example views from: residential properties on the B6026 Huthwaite Lane and at Longside Cottage Farm, and from Blackwell Footpath B3/6/2 and Sutton-in-Ashfield Bridleway 30.

Operation

During operation, the significant effects of the Proposed Scheme on the character and appearance of the local landscape would be substantially reduce over time as mitigation planting grows and matures, however, effects may remain significant.

During operation, the Proposed Scheme would be visible from 12 viewpoints within the area, for example views from: residential properties on the B6406 New Lane in Hilcote and Alfreton Road in Newton and from the Blackwell Trail.

Land quality

Construction

For historic mining sites in the area, the potential for significant adverse effects has been identified associated with the control of mine gas and mine water. Studies into how mine gas and mine water is controlled are ongoing and any mitigation required will be identified in consultation with the relevant statutory bodies and reported in the formal ES.

Beneficial effects would occur where remediation is carried out on sites identified within the land required for the construction

of the Proposed Scheme, including Tibshelf Motorway Service area and former quarry, soil heaps and opencast workings.

Sound, noise and vibration

Construction

Noise from construction could result in significant effects on residential communities closest to the construction works at: South Normanton (north-east of the M1 junction 28), Hilcote, Old Blackwell, Blackwell and Newton.

Noise from construction could result in a significant effect on the non-residential St Werbergh's Church in Old Blackwell.

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works.

Further work is currently being undertaken to confirm the likely significant construction noise and vibration effects, including any temporary effects from construction traffic. This assessment will be reported in the formal ES.

Operation

Operational noise would be reduced at source through the effective design and specification of the trains and track. A number of measures have also been incorporated into the design of the Proposed Scheme to mitigate noise effects during operation. These include noise barriers in the form of landscape earthworks and/or noise fence barriers.

Operation of the railway would potentially result in noise effects, due to potential noise increases above recognised thresholds, and hence change in the existing acoustic character around those properties closest to the Proposed Scheme. At this stage of the design, the initial assessment has not identified any effects with the potential to be considered significant on a community basis due to increased noise levels.

Further assessment work is currently being undertaken to confirm the likely significant effects due to operational noise and vibration, especially at non-residential locations and quiet areas and in terms of establishing existing baseline conditions. This will be reported in the formal ES.

HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid likely significant effects due to noise and vibration. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the potentially affected receptors, their use and the benefit of the measures.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on the following routes: the M1 junction 28; the A38 Trunk Road and the A38 Alfreton Road; the B6019 Pinxton Green/Town Street/Alfreton Road/Pinxton Lane/Mansfield Road; the B6027 Common Road; the B6406 Berristow Lane; the B6026 Huthwaite Lane; the B6026 Cragg Lane; Beaufit Lane; Station Road; Brookhill Lane; Pinxton Lane; Farmwell Lane; Export Drive; and Nunn Brook Road. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Construction of the Proposed Scheme is expected to result in temporary highway closures and diversions or realignments on: the M1, with temporary traffic management measures between junction 28 and junction 29; and Alfreton Road in Newton.

Construction of the Proposed Scheme has the potential to lead to diversion of bus routes 1, 56, X56, 140, 149 and 422.

Temporary closure or diversion/realignment of nine public rights of way could result in increased journey times for non-motorised users on: Sutton-in-Ashfield Footpath 59; Pinxton Footpath B8-1/1; the Blackwell Trail; Sutton-in-Ashfield Bridleway 30; Blackwell Footpaths B3-36/2, B3-10/5, B3-11/2 and B3-12/2; and the Silverhill Trail (a short section of which forms part of the National Cycle Network Route 67).

Operation

Operation of the Proposed Scheme would require the permanent diversion or realignment of: the B6406 New Lane; the B6026 Huthwaite Lane (east of the M1); the B6026 Huthwaite Lane/Cragg Lane west of the M1; Brookhill

Lane; Farmwell Lane; and Newtonwood Lane. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Operation of the Proposed Scheme would result in the permanent realignment or diversion of 16 public rights of way: Sutton-in-Ashfield Bridleways 60 and 30 and Footpaths 59 and 41; Pinxton Footpath B8-1/1; Blackwell Footpaths B3-6/1, B3-8/1, B3-36/2, B3-10/5, B3-10/6, B3-11/1, B3-11/2, B3-12/2 and B3-13/1; the Silverhill Trail; and Tibshelf Footpath B13-46/1.

8.18 Stonebroom to Clay Cross (LA09)

Overview

The Stonebroom to Clay Cross area (LA09) is approximately 5km in length extending north-west from Blackwell to Clay Cross. The route forms the Sheffield Southern spur, and connects with the Erewash Valley Line in this area. It falls within the local authority areas of Bolsover District Council and North East Derbyshire District Council, both of which are in the Derbyshire County Council area (see Figure 32).

The area is predominantly semi-rural in character, with agriculture being the main land use. This is interspersed with woodland, and commercial land uses, as well as areas of former industrial areas, including areas that have been restored to agriculture from former open cast coal mines. Stonebroom, Morton and Clay Cross lie to the west and Pilsley lies to the north-east. There are also scattered individual properties in the area.

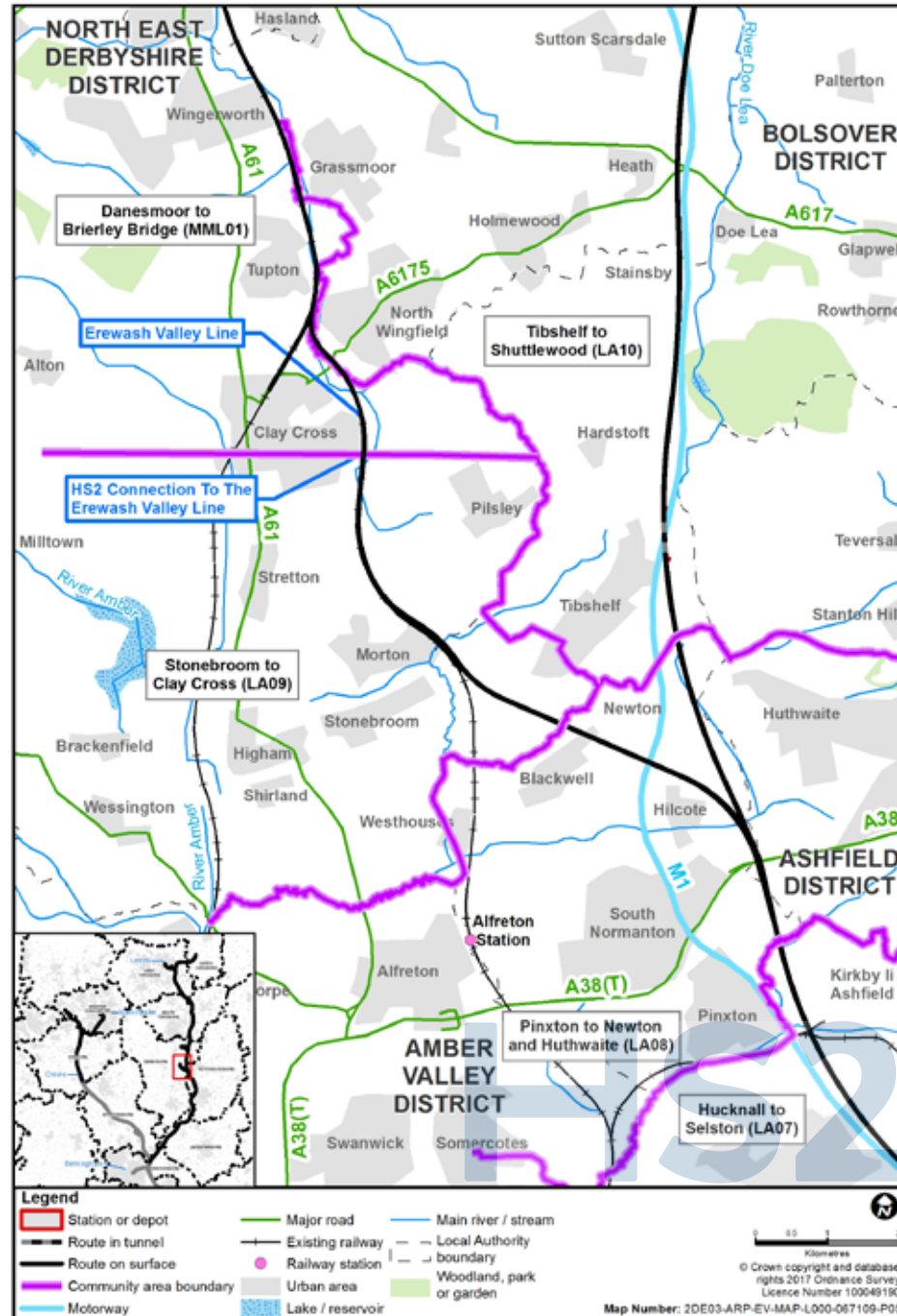


Figure 32: Stonebroom to Clay Cross area (LA09) context map

The Proposed Scheme

The route would continue from the Pinxton to Newton and Huthwaite area (LAo8) in a north-west direction towards Morton on embankment. The route would enter into a cutting to the south of Tibshelf then pass onto embankment and then into a cutting to the east of Stonebroom. The route would continue on embankment within the Doe Hill Community Park then enter into a cutting to run parallel with, and then in a shared corridor, with the Erewash Valley Line until the route of the Sheffield Southern spur ends to the south-east of Clay Cross where a connection would be formed between Sheffield Southern spur and the existing Erewash Valley Line.

Modifications would be required to the existing conventional rail infrastructure in the Derbyshire and South Yorkshire areas to facilitate the connection of the Proposed Scheme to the Erewash Valley Line.

In this area, the Proposed Scheme would require the demolition of four residential properties and two commercial/business properties. There would be permanent realignment of three roads. The Proposed Scheme would result in the permanent realignment, diversion of four public

rights of way. Three watercourses would be permanently diverted or realigned. Four satellite construction compounds would be required in this area.

Residual effects

This section provides a summary of the likely significant residual environmental effects identified for the Stonebroom to Clay Cross area at this stage of the design and assessment.

Agriculture, forestry and soils

Construction

It is currently expected that approximately 50ha of agricultural land would be required for construction of the Proposed Scheme in this area, of which approximately 5ha is likely to be high quality agricultural land. Some of this land would be restored following construction, with approximately 17ha permanently required, 4ha of which is high quality agricultural land. The quality of the land is currently based on publicly available information and will be confirmed in the formal ES once agricultural land surveys are complete, as will the extent of land required permanently for the Proposed Scheme.

To avoid or reduce environmental impacts, soils from the areas required temporarily and permanently for the Proposed Scheme would be stripped and stored. This would enable agricultural land that is required temporarily for construction to be returned to agricultural use. It would also enable soils to be put to other uses, such as support landscape planting.

Construction of the Proposed Scheme would be likely to result in significant effects at 15 farm holdings in this area due to the proportion of land required during construction. Of the 15 holdings temporarily affected, eight holdings would also be permanently affected. Land required temporarily would, in accordance with a restoration scheme agreed with the landowner and the relevant planning authority, be returned to the farm holding following the completion of construction.

Community

Construction

The land required to construct the Proposed Scheme would result in the temporary use of approximately 35% of the land of Doe Hill Community Park, which would limit the local

community from using the resource for walking and horse riding. Approximately 25% of the land of Doe Hill Community Park would be permanently required, which would sever the park into two parts and limit space for existing activities.

Ecology and biodiversity

Construction

Construction of the Proposed Scheme would result in permanent habitat loss and severance of approximately: 1.5ha (23.3%) of Newton Disused Railway Local Wildlife Site; 28.3ha (80%) of Morton Railway Local Wildlife Site; 0.4ha (4%) of Morton Colliery Local Wildlife Site; 9ha (90%) of Padley Wood Local Wildlife Site; 0.3ha (4.3%) of Padley Wood Poultry Farm Local Wildlife Site; 0.2ha (6.3%) of Station House Grassland Local Wildlife Site; 0.2ha (5.6%) of Station Road, Morton Local Wildlife Site; and 2.1ha of Padley Wood Ancient Woodland Inventory Site.

It is currently expected that construction of the Proposed Scheme would result in the permanent loss of approximately 5.7ha of deciduous woodland, in addition to the loss of hedgerows,

and ancient and veteran trees. The removal and fragmentation of these habitat types has the potential to affect their conservation status as well as potentially resulting in significant effects on bats, great crested newt, birds, terrestrial invertebrates and reptiles.

Significant effects are likely to be experienced by otter and water vole in watercourses affected by the Proposed Scheme, as a result of the loss of water-margin habitat and the diversion of the River Rother. Similarly, white-clawed crayfish, aquatic invertebrates and fish may be significantly affected as a result of habitat loss and construction disturbance.

Operation

During operation of the Proposed Scheme, bats and barn owls would be at risk of mortality caused by passing trains.

Health

Construction

The Proposed Scheme would impact on a range of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health

effects, judgements have been made as to the level and type of impact that could potentially affect population health.

Construction of the Proposed Scheme would temporarily require approximately 35% of the land within the Doe Hill Community Park and 25% would be required permanently. This space provides a positive contribution to the wellbeing of the local community and the loss would have an adverse effect on health and wellbeing.

The combination of construction noise, visual and traffic impacts would change the character of neighbourhoods, and may impact on residents' quality of life. For rural communities dependent on shops and services in nearby towns, temporary closures and diversions of local roads may reduce the accessibility of key services. In addition, levels of physical activity could potentially be affected by disruption to roads and public rights of way that may be used as active travel routes.

The temporary construction workforce is likely to comprise a mixture of local people and workers from further afield, giving rise to temporary changes to local population size and demographics.

Operation

The presence of rail infrastructure and noise from passing trains may change the character of surrounding neighbourhoods, and may reduce the quality of life for residents.

Landscape and visual

Construction

The presence of construction works and changes to the existing landform and vegetation patterns would affect the character of the local landscape. Where possible, effects would be reduced by the measures incorporated into the design to reduce the visibility of the Proposed Scheme (for example, land shaping to link earthworks into their wider landscape context, compensatory woodland planting, and hedgerow replacement and restoration).

Construction activities would be visible from 12 viewpoints within the area, for example views from: residential properties (and road users) in Tibshelf, at Doe Hill House Farm, Sitwell Grange Farm and Morton Lodge; and footpaths near Bushypark Farm (Pilsely Footpath 2) and in Doe Hill Community Park.

Operation

During operation, the significant effects of the Proposed Scheme on the character and appearance of the local landscape would substantially reduce over time as mitigation planting grows and matures, however, effects may remain significant.

During operation, the Proposed Scheme would be visible from five viewpoints within the area, for example views from: residential properties at Morton Lodge and recreational users of footpaths Tibshelf Bridleway 5, in Doe Hill Community Park; Shirland and Higham Footpath 11 and Morton Bridleway.

Sound, noise and vibration

Construction

Noise from construction could result in significant effects on residential communities closest to the construction works at Stonebroom and Morton.

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works.

Further work is currently being undertaken to confirm the likely significant residual construction noise and vibration effects, including any temporary effects from construction traffic. This assessment will be reported in the formal ES.

Operation

Operational noise would be reduced at source through the effective design and specification of the trains and track. A number of measures have also been incorporated into the design of the Proposed Scheme to mitigate noise effects during operation. These include noise barriers in the form of landscape earthworks and/or noise fence barriers.

Operation of the railway would potentially result in noise effects, due to potential noise increases above recognised thresholds, and hence change in the existing acoustic character around those properties closest to the Proposed Scheme. At this stage of the design, the initial assessment has not identified any effects with the potential to be considered significant on a community basis due to increased noise levels.

Further assessment work is currently being undertaken to confirm the likely significant effects due to operational noise and vibration, especially at non-residential locations and quiet areas and in terms of establishing existing baseline conditions. This will be reported in the formal ES.

HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid likely significant effects due to noise and vibration. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the potentially affected receptors, their use and the benefit of the measures.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on the following routes: the A61 Main Road/Stretton Road/High Street; the A6175 Market Street; the B6014 Doe Hill Lane/Station Road/Main Road/Stretton Road/Morton Road; the B6025 Alfreton Road; the B6026 Newton Road; Love Lane; Stonebroom Lane; Evershill Lane; Pilsley Road (south of Pilsley); Pewit Lane; Morton Road; Station Road

(North Wingfield); Hardstoft Road; Lime Tree Grove; Beech Way; Cemetery Road; Pilsley Road (Danesmoor); Coney Green Road; Harris Way; Bridge Street; and Furnace Hill Road. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Construction of the Proposed Scheme is also likely to result in the temporary closures, diversion or realignments of: the B6025 Alfreton Road; the B6014 Doe Hill Lane/Station Road; Stonebroom Lane; and Pilsley Road (south of Pilsley). Construction of the Proposed Scheme would also require the diversion of bus routes 149 and SP1.

Construction of the Proposed Scheme has the potential to result in delays to passengers and freight services on the Erewash Valley Line as a result of temporary rail possessions.

Temporary closure or diversion/realignment of four public rights of way could result in increased journey times for non-motorised users on: the Silverhill Trail; Doe Hill Community Park footpath; Morton Bridleway 8; and Pilsley Footpath 7.

Operation

Rail users would benefit from improved journey times between Chesterfield, the Midlands and London as a result of the introduction of HS2 services and released capacity on conventional rail services operating from Chesterfield Station.

Operation of the Proposed Scheme would require the permanent realignment of: the B6014 Doe Hill Lane; the B6025 Alfreton Road; and Stonebroom Lane. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Operation of the Proposed Scheme would result in the permanent realignment or diversion of three public rights of way and one non-motorised user route: Tibshelf Bridleway 5; Morton Bridleway 8; Pilsley Footpath 7; and Doe Hill Community Park footpath.

8.19 Tibshelf to Shuttlewood (LA10)

Overview

The Tibshelf to Shuttlewood area (LA10) is approximately 14km in length extending from east of Tibshelf in the south, travelling northwards towards Heath and on to Bolsover and Shuttlewood. The route continues from the HS2 main line in the Pinxton to Newton and Huthwaite area (LA08). It falls within the local authority areas of Bolsover District Council and North East Derbyshire District Council, both of which are in the Derbyshire County Council area (see Figure 33).

The area is predominantly semi-rural, with agriculture being the main land use. This is interspersed with areas of industrial and commercial land use and settlements including Tibshelf, Heath, Bolsover, Astwith, Stainsby, Doe Lea, Palterton and Shuttlewood. There are areas that have been restored to agriculture from former open cast coal mines. The National Trust property of Hardwick Hall and its extensive park lie within this area, east of the M1, to which the route of the Proposed Scheme would run parallel.

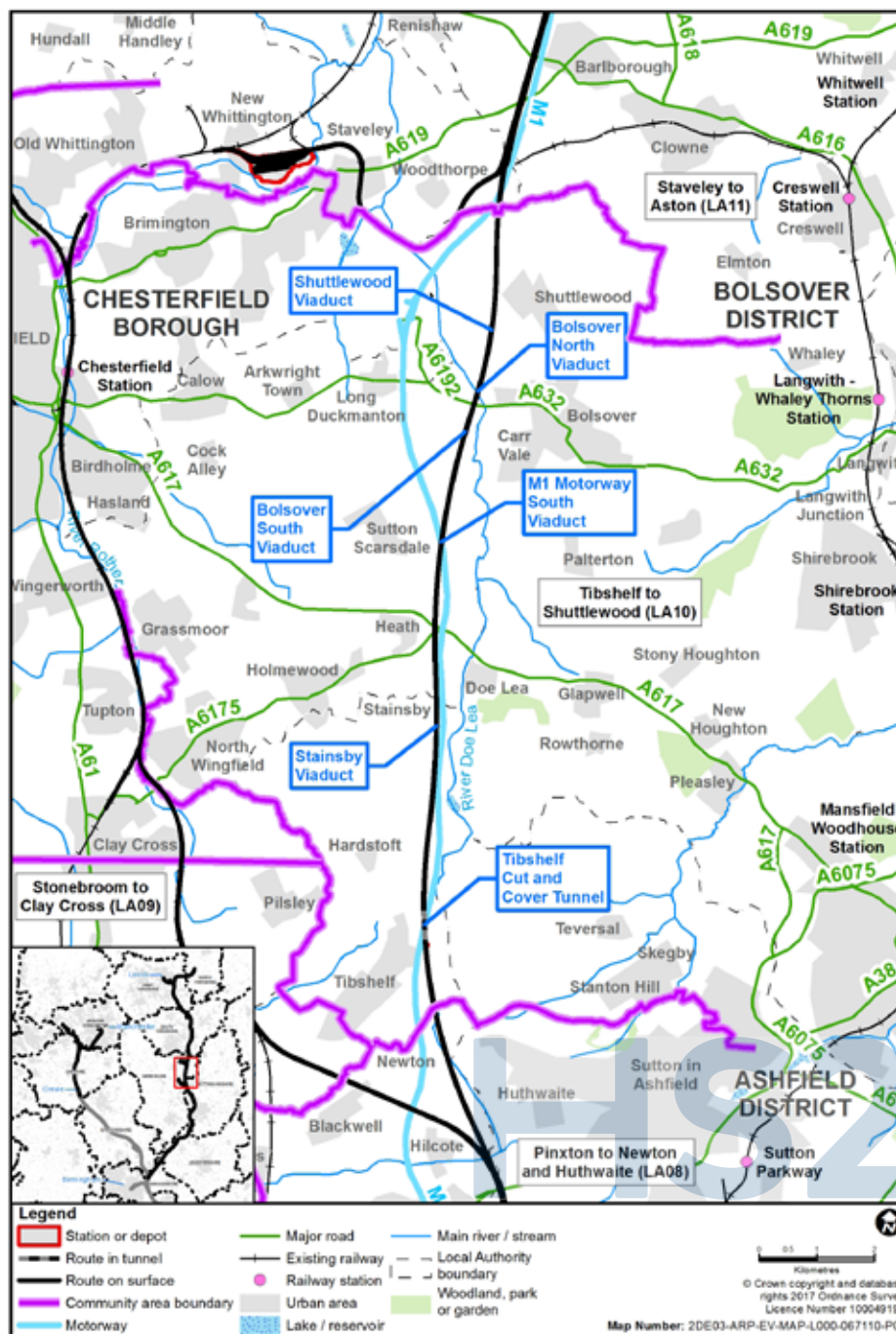


Figure 33: Tibshelf to Shuttlewood area (LA10) context map

The Proposed Scheme

The route would continue from the Pinxton to Newton and Huthwaite area (LA08), adjacent to the M1, in cutting before crossing under the M1 in a cut and cover tunnel. The route would continue to the west of the M1 in a cutting before transitioning onto embankment to the south of Hardstoft. The route would then continue to the east of Hardstoft west of the M1 in cuttings and on embankments before running on viaduct to the east of Holmewood and continue north on embankment and in cutting towards Heath. The route would continue in cutting passing to the west of the M1, transition onto embankment, before passing over the M1 on viaduct.

The route would then continue to the east of the M1 and Bolsover on embankment and viaduct. The route would then run north on embankment before passing over the River Doe Lea on viaduct and transitioning back on to embankment before continuing into cutting to the south of Shuttlewood. The route would continue on embankment and viaduct to the west of Shuttlewood, before continuing on embankment into the Staveley to Aston area (LA11).

In this area, the Proposed Scheme would require the demolition of 11 residential properties and 18 commercial/business properties. There would be permanent closure, realignment or diversion of eight roads. The Proposed Scheme would result in the permanent realignment, diversion or closure of 15 public rights of way. Nine watercourses would be permanently realigned or diverted. One main construction compound and nine satellite construction compounds would be required in this area.

Residual effects

This section provides a summary of the likely significant residual environmental effects identified for the Tibshelf to Shuttlewood area at this stage of the design and assessment.

Agriculture, forestry and soils

Construction

It is currently expected that approximately 390ha of agricultural land would be required for construction of the Proposed Scheme in this area, of which approximately 14ha is likely to be high quality agricultural land. Some of this land would be restored following construction, with

approximately 220ha permanently required, 14ha of which is high quality agricultural land. The quality of the land is currently based on publicly available information and will be confirmed in the formal ES once agricultural land surveys are complete, as will the extent of land required permanently for the Proposed Scheme.

To avoid or reduce environmental impacts, soils from the areas required temporarily and permanently for the Proposed Scheme would be stripped and stored. This would enable agricultural land that is required temporarily for construction to be returned to agricultural use. It would also enable soils to be put to other uses, such as support landscape planting.

Construction of the Proposed Scheme would be likely to result in significant effects at 19 farm holdings in this area due to the proportion of land required for the Proposed Scheme. Of the 19 holdings temporarily affected, 15 would also be permanently affected. Land required temporarily would, in accordance with a restoration scheme agreed with the landowner and the relevant planning authority, be returned to the farm holding following the completion of construction.

Community

Construction

Construction of the Proposed Scheme would lead to a significant community effect due to the demolition of six residential properties on Chesterfield Road and Woodthorpe Road in Shuttlewood. The loss of these properties represents a high proportion of this community.

Land occupied by the ruins of the Heath Old Church and burial ground required by the Proposed Scheme would be permanently lost.

Land required for the construction of the Proposed Scheme would result in the permanent loss of Snipe Bog nature reserve.

Ecology and biodiversity

Construction

Construction of the Proposed Scheme would result in a permanent loss of habitat of approximately: 0.09ha (0.5%) of Astwith Dumbles Local Wildlife Site; 0.04ha (4.4%) of Heath Hedges Local Wildlife Site; 0.12ha (1.3%) of Owlcotes Wood Local Wildlife Site; 0.28ha (4.7%) of Wrang Plantation Local Wildlife Site; 1ha (7.9%) of Carr Vale Flash Local Wildlife

Site; 1.9ha (17.7%) of Peter Fidler Reserve and The Goit Railway (west) Local Wildlife Site; 1ha (100%) of Bolsover Collier Marsh Local Wildlife Site; 6.1ha (100%) of Markham Colliery Reedbed Local Wildlife Site; 0.6ha (100%) of Woodside Field Slope and Stream Local Wildlife Site; 0.8ha (61.8%) of Poolsbrook Flash Local Wildlife Site; and 0.1ha (2.1%) of Owlcotes Wood Ancient Woodland Inventory Site.

It is currently expected that there would be a permanent loss of approximately 25.3ha of deciduous woodland, approximately 0.3ha of floodplain grazing marsh grassland, and the loss of hedgerows and ancient and veteran trees. The removal and fragmentation of these habitat types has the potential to affect their conservation status as well as potentially resulting in significant effects on bats, great crested newts, birds, terrestrial invertebrates and reptiles.

Significant effects are likely to be experienced by otter and water vole in watercourses affected by the Proposed Scheme, as a result of the loss of water-margin habitat. Similarly, white-clawed crayfish, aquatic invertebrates and fish may be significantly affected as a result of habitat loss and construction disturbance.

Operation

During operation of the Proposed Scheme, bats and barn owls would be at risk of mortality caused by passing trains.

Health

Construction

The Proposed Scheme would impact on a range of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health effects, judgements have been made as to the level and type of impact that could potentially affect population health.

Construction of the Proposed Scheme would result in the permanent loss of 11 residential properties in the Tibshelf to Shuttlewood area. This has the potential to reduce beneficial health effects that are gained through social contact and support.

Construction of the Proposed Scheme would result in the permanent loss of Snipe Bog nature reserve. This space provides a positive contribution to the wellbeing of the local community and the loss would have an adverse effect on health and wellbeing.

The combination of construction noise, visual and traffic impacts would change the character of neighbourhoods, and may impact on residents' quality of life. For rural communities dependent on shops and services in nearby towns, temporary closures and diversions of local roads may reduce the accessibility of key services. In addition, levels of physical activity could potentially be affected by disruption to roads and public rights of way that may be used as active travel routes.

The temporary construction workforce is likely to comprise a mixture of local people and workers from further afield. This could mean that local communities see temporary changes to the local population size and demographics.

Operation

The presence of rail infrastructure and noise from passing trains may change the character of surrounding neighbourhoods, and may reduce the quality of life for residents.

Historic environment

Construction

The Proposed Scheme is being designed to reduce impacts on heritage assets as far as reasonably practicable. Construction of the Proposed Scheme would require land from within the Hardwick and Rowthorne and Stainsby Conservation Areas, whilst the Grade II listed ruins of Old Heath Church and Woodhouse Farm would be removed. In addition, the non-designated site of a medieval village in Heath and earthworks in the orchard of Woodhouse Farm would be removed.

Construction of the Proposed Scheme would also affect Hardwick Hall (Grade I listed building and registered park and garden), Hardwick Old Hall (scheduled monument and Grade I listed building), Stainsby defended manorial complex (scheduled monument), Sutton Scarsdale Hall (scheduled monument and Grade I listed building), and Bolsover Castle (Grade I listed building, scheduled monument and registered park and garden). Permanent alterations to their settings would result in changes to the way that these assets are experienced and understood.

Landscape and visual

Construction

The presence of construction works and changes to the existing landform and vegetation patterns would affect the character of the local landscape. Where possible, effects would be reduced by the measures incorporated into the design to reduce the visibility of the Proposed Scheme (for example, land shaping to link earthworks into their wider landscape context, compensatory woodland planting and hedgerow replacement and restoration).

Construction activities would be visible from 41 viewpoints within the area, for example views from: residential properties north of Tibshelf and Hardstoft, the east and north of Stainsby and Heath, Sutton Scarsdale, Chesterfield Road, Bolsover and Shuttlewood; Carr Vale Nature Reserve; and public rights of way to the east of The Hurst, in and around the Hardwick Estate and in and around Bolsover and Shuttlewood.

Operation

During operation, the significant effects of the Proposed Scheme on the character and appearance of the local landscape would substantially reduce over time as mitigation planting grows and matures, however, effects may remain significant.

During operation, the Proposed Scheme would be visible from 27 viewpoints within the area, for example views from: residential properties north of Tibshelf, the east and north of Stainsby and Heath, Sutton Scarsdale, Chesterfield Road, Bolsover and Shuttlewood; Carr Vale Nature Reserve; and public rights of way to the east of The Hurst, in and around the Hardwick Estate and in and around Bolsover and Shuttlewood.

Socio-economics

Construction of the Proposed Scheme would result in a likely significant effect from the loss of land or buildings and the resulting loss or displacement of jobs from 10 units on the Saw Pit Lane Industrial Estate. Any likely significant residual effects will be assessed and reported in the formal ES.

Sound, noise and vibration

Construction

Noise from construction could result in significant effects on residential communities closest to the construction works at: Tibshelf; Stainsby; Doe Lea; Heath; Carr Vale; Shuttlewood; Poolsbrook; and Staveley. Noise from construction could result in significant effects on the non-residential property All Saints church in Heath.

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works.

Further work is currently being undertaken to confirm the likely significant residual construction noise and vibration effects, including any temporary effects from construction traffic. This assessment will be reported in the formal ES.

Operation

Operational noise would be reduced at source through the effective design and specification of the trains and track. A number of measures have also been incorporated into the design of the Proposed Scheme to mitigate noise effects during operation. These include noise barriers in the form of landscape earthworks and/or noise fence barriers.

Operation of the railway would potentially result in noise effects on occupants of residential properties, due to potential noise increases above recognised thresholds, and hence change in the existing acoustic character around those properties closest to the Proposed Scheme in the following community areas: Carr Vale (Sutton Hall Road, Pearson Gardens, Charlesworth Street and North View Street); Bolsover Woodhouse (Chesterfield Road); and Shuttlewood (the B6418 Buttermilk Lane/ Chesterfield Road, the B6419 Bolsover Road, Chesterfield Road, Adin Avenue and Pretoria Street). Further assessment work is being carried out and will be reported in the formal ES.

During operation of the railway noise insulation would be offered to avoid significant effects at individual residential properties that satisfy the applicable qualifying criteria. At this stage this is anticipated to be at: Stainsby (in the vicinity of Hawking Lane); Deepdale Farm (in the vicinity of Palterton Lane); Bolsover (in the vicinity of the A632 Chesterfield Road); Shuttlewood (in the vicinity of the B6418 Buttermilk Lane/Chesterfield Road); Woodside Farm (in the vicinity of Woodthorpe Road); and Lodge Farm (in the vicinity of Woodthorpe Road).

Further assessment work is currently being undertaken to confirm the likely significant residual effects due to operational noise and vibration, especially at non-residential locations and quiet areas and in terms of establishing existing baseline conditions. This will be reported in the formal ES.

HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid likely significant effects due to noise and vibration. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the potentially affected receptors, their use and the benefit of the measures.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on the following routes: the M1 (junctions 29 and 29a); the A617/Mansfield Road; the A619 Duke Street/Market Street/Chesterfield Road; the A632 Chesterfield Road/Station Road; the A6175 Heath Road/Williamthorpe Road/St Lawrence Road; the A6192 Markham Lane/Erin Road; the B6014 Mansfield Road/High Street; the B6039 Chesterfield Road/Tibshelf Road; the B6418 Chesterfield Road/Buttermilk Lane; the B6419 Bolsover Road; the B6425 Hassocky Lane; Deep Lane; Hawking Lane; Hardstoft Road; Astwith Lane; Station Road; Mill Lane (near Stainsby); Mansfield Road; Sutton Lane; Palterton Lane; Woodhouse Lane; Mill Lane (near Shuttlewood); and Troughbrook Road. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Construction of the Proposed Scheme is also likely to result in the temporary closure, diversion or realignment of the following: the M1 (local realignment between junctions 28 and 29 and junctions 29 and 29a); the A617; the A6175 Heath Road; the B6014 Mansfield Road; the B6419 Bolsover Road; Deep Lane; Astwith Lane; and Woodhouse Lane.

Construction of the Proposed Scheme would also require the diversion of bus routes 1, 49 and 81.

Temporary closure and diversion or realignment of the following 13 public rights of way could result in increased journey times for non-motorised users: Tibshelf Footpath 46, 35, 33 and 32; Ault Hucknall Footpath 18, 17 and 16; Sutton-cum-Duckmanton Footpath 14, 19, 18; and Bolsover Footpath 34, 27 and 35.

Operation

Rail users would benefit from improved journey times between Chesterfield, the Midlands and London as a result of the introduction of HS2 services and released capacity on conventional rail services operating from Chesterfield Station.

Operation of the Proposed Scheme would require the permanent diversion or realignment of sections of: Hawking Lane; Mill Lane (near Stainsby); the M1 junction 29; Church Lane; the M1 (north of junction 29); the A632 Chesterfield Road; Woodhouse Lane; and the B6418 Chesterfield Road, and the closure of sections of: Hawking Lane; Mill Lane (near Stainsby); Church Lane; and the A632 Chesterfield Road. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Operation of the Proposed Scheme would require the permanent closure or diversion/realignment of 18 public rights of way, including: Tibshelf Footpath 46, 35, 33 and 32; Tibshelf Bridleways 21 and 31; Saw Pit Lane; Ault Hucknall Bridleway 35; Ault Hucknall Footpaths 17, 18, 16 and 37; Heath and Holmewood Footpaths 25 and 1; Sutton-cum-Duckmanton Footpaths 19 and 18; and Bolsover Footpaths 34 and 35.

8.20 Staveley to Aston (LA11)

Overview

The Staveley to Aston area (LA11) is approximately 13km in length extending from Woodthorpe to east of Aston and comprising a 13km section of the HS2 main line, the 8.5km long Staveley spur and the Staveley Infrastructure Maintenance Depot. It falls within the local authority areas of Rotherham Metropolitan Borough Council, Bolsover District Council, Chesterfield Borough Council and North East Derbyshire District Council (see Figure 34).

The area is predominantly rural in character, with agriculture being the main land use. There are areas of open moorland and woodland, as well as areas of industrial or commercial land use. The town of Staveley and the villages of Barlborough, Wales and Aston lie in the area. Along the Staveley spur, the area includes the Markham Vale North industrial site and land associated with the former Staveley Chemical Works and landfills.

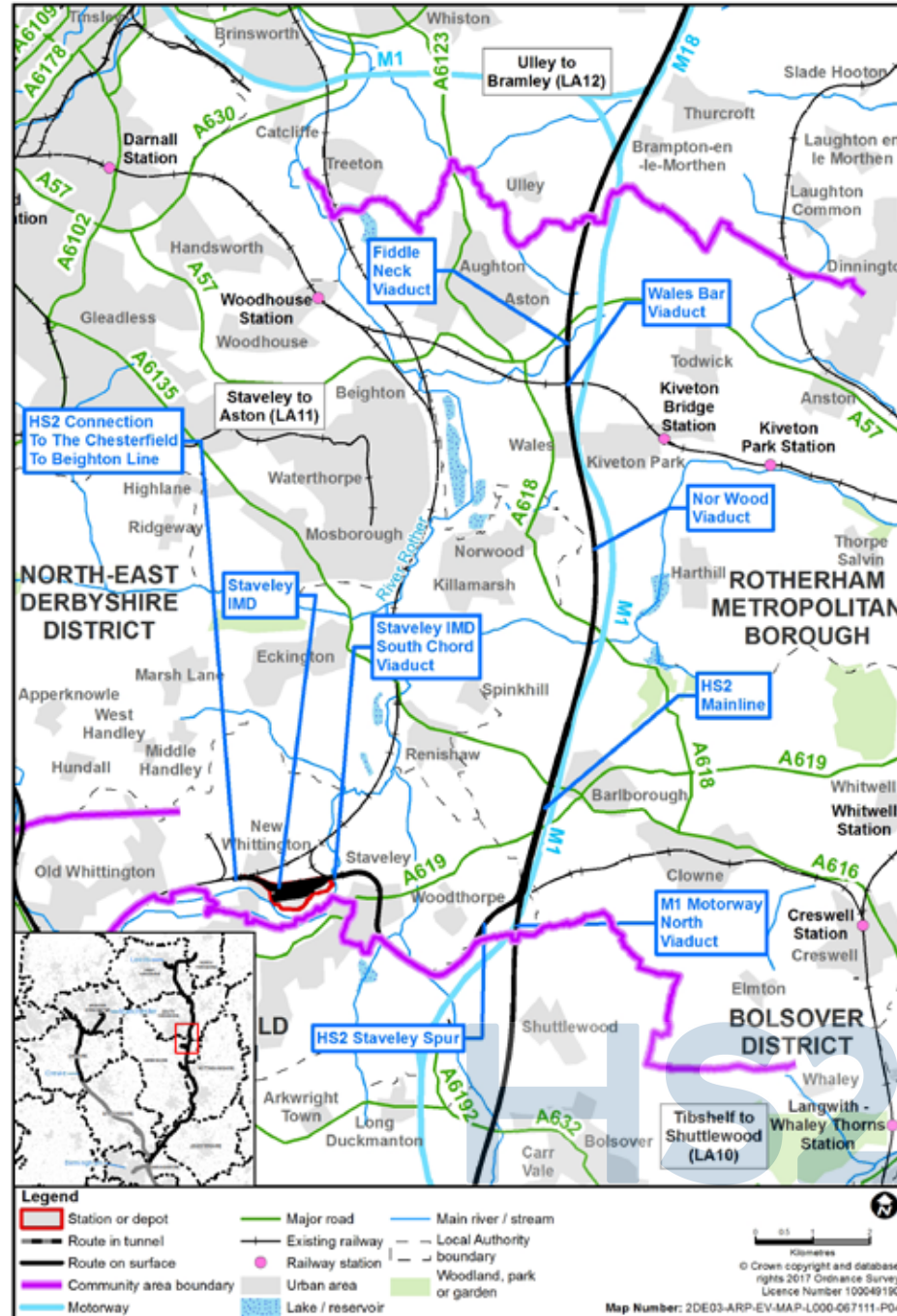


Figure 34: Staveley to Aston area (LA11) context map

The Proposed Scheme

The route would continue from the Tibshelf to Shuttlewood area (LA10) on viaduct and cross over the M1. The route would then diverge, forming two routes: the HS2 main line and the Staveley spur.

The HS2 main line would continue north from Woodthorpe on embankment and pass to the west of Barlborough in cutting and on embankment. It would then enter into a cutting to pass under the A6135 Sheffield Road and transition onto embankment before continuing to the west of the M1 in a cutting. The HS2 main line would continue north on embankment and in cutting before crossing under Killamarsh Lane and onto viaduct, passing to the east of Norwood. It would then continue north on embankment and in cutting to the west of Wales before running on viaduct. The route would pass onto embankment and then run on viaduct to the east of Aston. The HS2 main line would continue and enter a cutting, then transition onto embankment before continuing into the Ulley to Bramley area (LA12).

The Staveley spur would diverge from the HS2 main line at a point near the A619 Chesterfield Road in Barlborough. The route would run south

of Woodthorpe towards Staveley in a cutting, following the route of an existing disused mineral railway, and then on embankment to the Staveley Infrastructure Maintenance Depot. The spur would continue south-westwards to join the Chesterfield to Beighton Railway at Barrow Hill.

Staveley Infrastructure Maintenance Depot would operate as a base for maintenance for the HS2 railway infrastructure along the eastern leg of Phase 2b. The depot would be 1.1km long and 440m wide and would be located to the north-west of Staveley and the south of Barrow Hill, between Hall Lane and Works Road on the former Staveley Chemical Works site. The Staveley Infrastructure Maintenance Depot would include sidings, a compound area, a covered maintenance shed, a main workshop, storage/laydown area, an office building and car parking spaces.

In this area, the Proposed Scheme would require the demolition of 21 residential properties and eight commercial/business properties. In this area, there would be permanent diversion of seven roads. The Proposed Scheme would result in the permanent realignment or diversion of 32

public rights of way. Seven watercourses would be permanently diverted or realigned. One main construction compound and 14 satellite construction compounds would be required in this area, as well as a railhead at Staveley to manage construction works, which would be located on the site of the proposed Staveley Infrastructure Maintenance Depot.

Residual effects

This section provides a summary of the likely significant residual environmental effects identified for the Staveley to Aston area at this stage of the design and assessment.

Agriculture, forestry and soils

Construction

It is currently expected that approximately 350ha of agricultural land would be required for construction of the Proposed Scheme in this area, of which approximately 15ha is likely to be high quality land. Some of this land would be restored following construction, with approximately 250ha permanently required, 11ha of which is high quality land. The quality of the land is currently based on publicly available

information and will be confirmed in the formal ES once agricultural land surveys are complete, as will the extent of land required for the Proposed Scheme.

To avoid or reduce environmental impacts, soils from the areas required temporarily and permanently for the Proposed Scheme would be stripped and stored. This would enable agricultural land that is required temporarily for construction to be returned to agricultural use. It would also enable soils to be put to other uses, such as support landscape planting.

Construction of the Proposed Scheme would be likely to result in temporary significant effects at 22 farm holdings in this area due to the proportion of land required for the Proposed Scheme, with permanent significant effects likely at 20 farm holdings. Land required temporarily would, in accordance with a restoration scheme agreed with the landowner and the relevant planning authority, be returned to the farm holding following the completion of construction.

Community

Construction

The temporary use of open space from 19 residential properties in Staveley (on Bellhouse Lane, the A619 Lowgates Road, Fan Road, Wharf Lane, Netherthorpe and Milton Place, and shared space of 21 flats on Pullman Close) and 15 residential properties in Wales (on the B6059 School Road and Cherry Tree Road) would result in a significant effect on the communities. In addition, land at the following locations would be required temporarily during construction: 25% of the amenity green and common land off Hall Lane in Barrow Hill; 20% of Poolsbrook Country Park in Staveley; 15% of High Wood in Barlborough; 30% of Nor Wood and Woodall Pond; and 40% of Aston Park and Engine House Plantation in Aston.

Construction of the Proposed Scheme would lead to a significant community effect due to the demolition of five residential properties on the A619 Chesterfield Road. The loss of these properties represents a high proportion of this community.

Land required for the construction of the Proposed Scheme would result in the permanent loss of Parklands Equestrian Centre in Aston and approximately 30% of publicly accessible land at Aston Park.

Ecology and biodiversity

Construction

Construction of the Proposed Scheme would result in the permanent loss of: the entire Doe Lea Flash Local Wildlife Site and the entire Poolsbrook Flash Local Wildlife Site; of 0.4ha (19%) of Robinson's Lumb Local Wildlife Site; 0.4ha (7%) of Westfield Railway Local Wildlife Site; 0.6ha (20%) of Beighton Fields Plantation, Alder Carr and Meadows Local Wildlife Site; 1ha of High Wood and Thompson's Holt Local Wildlife Site (9%) and High Wood Ancient Woodland Inventory Site (10%); 18ha of Nor Wood and Locks Local Wildlife Site (32%) and Nor Wood Ancient Woodland Inventory Site (13%); and 0.7ha of Nicker Wood and Ponds Local Wildlife Site (7%) and Nicker Wood Ancient Woodland Inventory Site (15%). There would also be temporary indirect effects on ancient woodland at Robinson's Lumb Ancient Woodland Inventory Site during construction.

It is currently expected that there would be a permanent loss of approximately 30ha of woodland, 5.7ha of grassland, 26 ponds and 57ha of open mosaic habitat on previously developed land, in addition to ancient and veteran trees and hedgerows. The removal and fragmentation of these habitat types has the potential to affect their conservation status as well as potentially resulting in significant effects on bat, bird, terrestrial invertebrate and reptile populations.

Significant effects are likely to be experienced by otter and water vole in watercourses affected by the Proposed Scheme, as a result of the loss of habitat. Similarly, great crested newt, white-clawed crayfish, aquatic invertebrates and fish may be affected as a result of habitat loss and construction disturbance to watercourses and water bodies.

Operation

During operation of the Proposed Scheme, bats and barn owls would be at risk of mortality caused by passing trains.

Health

Construction

The Proposed Scheme would impact a range of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health effects, judgements have been made as to the level and type of impact that could potentially affect population health.

Construction of the Proposed Scheme would result in the permanent loss of 21 residential properties in this area. The loss of these residential properties represents a sizeable proportion of the community and has the potential to reduce beneficial health effects that are gained through social contact and support.

Construction of the Proposed Scheme would result in the temporary loss of: 25% of the open space off Hall Lane in Barrow Hill; 20% of the open space within Poolsbrook Country Park; 15% of publicly accessible land within High Wood; 30% of open space within Nor Wood and Woodall Pond; and 40% of publicly accessible land within Aston Park. There would be a permanent loss of approximately 30% of publicly accessible open space at Aston Park. Parklands

Equestrian Centre would be demolished. These spaces provide a positive contribution to the wellbeing of local communities and their temporary loss would have an adverse effect on health and wellbeing.

The combination of construction noise, visual and traffic impacts would change the character of neighbourhoods, and may impact on residents' quality of life. For rural communities dependent on shops and services in nearby towns, temporary closures and diversions of local roads may reduce the accessibility of key services. In addition, levels of physical activity could potentially be affected by disruption to roads and public rights of way that may be used as active travel routes.

The temporary construction workforce is likely to comprise a mixture of local people and workers from further afield, giving rise to temporary changes to local population size and demographics.

Operation

The presence of rail infrastructure and noise from passing trains may change the character of surrounding neighbourhoods, and may reduce the quality of life for residents.

Historic environment

Construction

The Proposed Scheme is being designed to reduce impacts on heritage assets as far as reasonably practicable. Construction of the Proposed Scheme would permanently physically affect two Grade II listed buildings (Nickerwood Farmhouse; and The Farmbuilding, 40m north-east of Nickerwood Farmhouse) and three non-designated heritage assets (Longford medieval deer park; Woodhouse Lane Colliery; and Aston Park).

The construction of the Proposed Scheme would permanently affect the setting of the Grade II* listed Aughton Court (also known as Aston Hall). This would result in changes to the way that the building is experienced and understood.

Land quality

Construction

Redevelopment of land at the site of the proposed Staveley Infrastructure Maintenance Depot would result in a beneficial effect. The site could be contaminated, and through land

remediation during redevelopment, risks to people and property from gas and vapours in the ground would be removed.

Landscape and visual

Construction

Construction of the Proposed Scheme and changes to the existing landform and vegetation patterns would affect the character of the local landscape. Where possible, effects would be reduced by the measures incorporated into the design to reduce the visibility of the Proposed Scheme (for example, land shaping to link earthworks into their wider landscape context, compensatory woodland planting, hedgerow replacement and restoration, and new areas of public realm near the Staveley spur and the Staveley Infrastructure Maintenance Depot).

Construction activities would be visible from 25 viewpoints within the area, for example views from: residential properties at Woodthorpe Hall Farm, Norbridggs Cottages and on the south-eastern edge of Woodthorpe village; residential properties and pedestrians on Worksop Road; and users of the Cuckoo Way.

Operation

During operation, the significant effects of the Proposed Scheme on the character and appearance of the local landscape would substantially reduce over time as mitigation planting grows and matures, however, effects may remain significant.

During operation, the Proposed Scheme would be visible from 18 viewpoints within the area, for example: views from residential properties and for pedestrians on Worksop Road; views from residential properties on the eastern edge of Aston and views for recreational users of Aston Park; Aston Footpath 26 and Todwick Footpath 15; and from Clowne Footpath 23 to the west of Romely Farm.

Sound, noise and vibration

Construction

Noise from construction could result in significant effects on residential communities closest to the construction works at: Barrow Hill; Staveley; Netherthorpe; Woodthorpe; Mastin Moor; Barlborough; Woodall; Wales; and Aston.

Noise from construction could result in significant effects on the following non-residential properties: Barrow Hill Primary School; St Andrew's Church in Barrow Hill; Aston Hall Hotel; Barrow Hill Methodist Church; Barlborough Hall School; and All Saints Church Aston.

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works.

Further work is currently being undertaken to confirm the likely significant construction noise and vibration effects, including any temporary effects from construction traffic. This assessment will be reported in the formal ES.

Operation

Operational noise would be reduced at source through the effective design and specification of the trains and track. A number of measures have also been incorporated into the design of the Proposed Scheme to mitigate noise effects during operation. These include noise barriers in the form of landscape earthworks and/or noise fence barriers.

Operation of the railway would potentially result in noise effects on occupants of residential properties, due to potential noise increases above recognised thresholds, and hence change in the existing acoustic character around those properties closest to the Proposed Scheme in the following areas: Barlborough (Sheffield Road); and Aston (the B6067 Worksop Road).

During operation of the railway, noise insulation would be offered to avoid significant effects at residential properties that satisfy the applicable qualifying criteria. At this stage this is anticipated to be at: Bank House Farm (in the vicinity of the B6419 Bolsover Road); Barlborough (near the A619 Chesterfield Road, Westfield Lane and the A6135 Sheffield Road); Killamarsh (near the A618 Mansfield Road); Wales (near Cherry Tree Road and the B6059 School Road); Lawton Lodge on Cricket Field Lane; and Aston (in the vicinity of the B6067 Worksop Road).

Further assessment work is currently being undertaken to confirm the likely significant effects due to operational noise and vibration, especially at non-residential locations and quiet areas and in terms of establishing existing baseline conditions. This will be reported in the formal ES.

HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid likely significant effects due to noise and vibration. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the potentially affected receptors, their use and the benefit of the measures.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on the following routes: the M1 junctions 30 and 31; the A57 Worksop Road; the A616; the A618 Rotherham Road/Mansfield Road; the A619 Lowgates/Worksop Road/Chesterfield Road; the A6135 Sheffield Road; the A6192 Fan Road; the B6052 Springwell Hill; the B6053 Eckington Road; the B6059 School Road/Wales Road/Station Road; the B6067 Worksop Road; the B6419 Bolsover Road; the B6419 Renishaw Road; the B6463 Todwick Road; Woodthorpe Road; Seymour Link Road; Ireland Close; Barbers Row; Hall Lane; Works Road; Whittington Road; Parkgate Lane; Staveley Lane; Westfield Lane; Sheffield Road/West End/High Street/Church Street;

Ruthyn Avenue; Ward Lane; Woodall Road/ Killamarsh Lane; Hard Lane; Waleswood Road; and Common Road. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Construction of the Proposed Scheme is also likely to result in the temporary closure, diversion or realignment of the following: the A618 Rotherham Road; the A619 Worksop Road; the A619 Lowgates; and the A6135 Sheffield Road.

Construction of the Proposed Scheme could have temporary impacts on parking and loading in the Staveley and Woodthorpe areas.

Temporary diversion or realignment of 22 public rights of way could result in increased journey times for non-motorised users on the following: Staveley Footpath 29, 27, 14, 38, 11, 4, 1 and 50; Staveley Bridleway 47; Barlborough Bridleway 12 (Woodhouse Lane); Barlborough Footpaths 6, 28 and 25; Killamarsh Footpath 47; Harthill Footpaths 18 and 16a; Wales Footpaths 15, 17, 14 and 1; and Todwick Footpaths 15 (Fiddle Neck Lane) and 1.

Construction of the Proposed Scheme has the potential to result in delays to rail services and passengers on the Sheffield to Worksop Line and Chesterfield to Beighton Line as a result of rail possessions.

Operation

Users of Chesterfield Station would benefit from increased rail capacity, improved journey times and released capacity on the existing rail network.

Operation of the Proposed Scheme would require the permanent diversion of: the M1 (northbound carriageway at Woodthorpe); the A57; the B6067 Worksop Road; the B6419 Bolsover Road; Hall Lane; Sheffield Road; and Westfield Lane. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Operation of the Proposed Scheme would result in the permanent realignment or diversion of 32 public rights of way: Barlborough Bridleway 12 (Woodhouse Lane); Barlborough Footpaths 36 (Westfield Lane), 6, 28 and 25; Killamarsh Footpath 47; Harthill Bridleway 16a; Harthill Footpath 18; Wales Footpaths 14, 15, 13, 12 and 17; Todwick Footpaths 15 (Fiddle Neck Lane) and 1; Aston Footpaths 13, 20 (Piper Lane) and 16 (Piper Lane); Staveley Footpaths 14, 38, 11, 1 (Trans Pennine Trail and Cuckoo Way), 50 (Trans Pennine Trail), 66, 37, 30, 35, 29 and 28; Staveley Bridleways 48 (Trans Pennine Trail) and 47 (Trans Pennine Trail); and Bolsover Footpath 64.

8.21 Ulley to Bramley (LA12)

Overview

The Ulley to Bramley area (LA12) is approximately 8km in length, extending from Brampton-en-le-Morthern in the south to the north-west of Bramley in the north. The area falls within the local authority area of Rotherham Metropolitan Borough Council (see Figure 35).

The area is predominantly rural in character, with agriculture being the main land use. This is interspersed with areas of open moorland, farmland, occasional areas of woodland and settlements including Thurcroft, Bramley and Ravenfield.

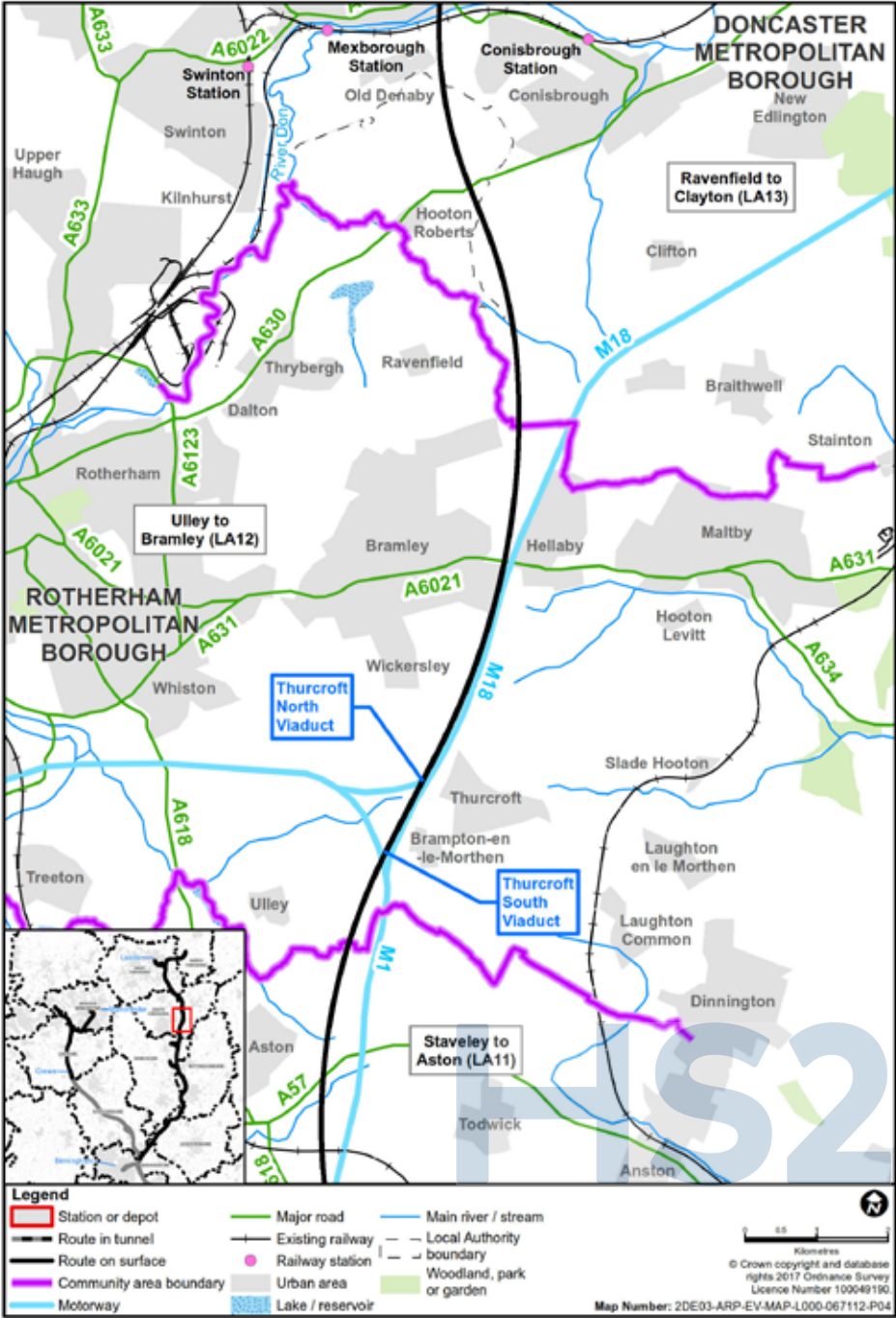


Figure 35: Ulley to Bramley area (LA12) context map

The Proposed Scheme

The route would continue from the Staveley to Aston area (LA11) north-east of Aston, to the west of the M1. The Proposed Scheme would travel north over the M1/M18 junction, where it would cross the M1 on viaduct, before transferring onto an embankment located inside the island area created by the M1/M18 junction. The route would continue on embankment, following the M18 corridor, before passing onto a viaduct. The route would then transition onto embankment and then into cutting, through a section of Moat Wood, before passing to the east of King's Pond Plantation on embankment.

The route would continue northwards to the west of the M18 into cutting, crossing Sandy Lane and passing between Bramley and the M18, before entering the Ravenfield to Clayton area (LA13).

In this area, the Proposed Scheme would require the demolition of two commercial/business properties. In this area, there would be permanent diversion of six roads. The Proposed Scheme would result in the permanent closure, realignment or diversion of six public rights of way. Permanent realignment of one watercourse

would be required. One main construction compound and six satellite construction compounds would be required in this area.

Residual effects

This section provides a summary of the likely significant residual environmental effects identified for the Ulley to Bramley area at this stage of the design and assessment.

Agriculture, forestry and soils

Construction

It is currently expected that approximately 165ha of agricultural land would be required for construction of the Proposed Scheme in this area, of which approximately 32ha is likely to be high quality agricultural land. Some of this land will be restored following construction, with approximately 98ha permanently required, 12ha of which is high quality land. The quality of the land is currently based on publicly available information and will be confirmed in the formal ES once agricultural land surveys are complete, as will the extent of land required permanently for the Proposed Scheme.

To avoid or reduce environmental impacts, soils from the areas required temporarily and permanently for the Proposed Scheme would be stripped and stored. This would enable agricultural land that is required temporarily for construction to be returned to agricultural use. It would also enable soils to be put to other uses, such as to support landscape planting.

Construction of the Proposed Scheme would be likely to result in significant effects at 13 farm holdings in this area largely due to the proportion of land required for construction. Of the 13 holdings temporarily affected, 11 would be permanently affected. Land required temporarily during construction would, in accordance with a restoration scheme agreed with the landowner and the relevant planning authority, be returned to farm holdings following the completion of construction.

Community

Construction

Land required for the construction of the Proposed Scheme would result in the permanent loss of allotments on Brampton Road, Thurscroft and associated greenspace.

Ecology and biodiversity

Construction

Construction of the Proposed Scheme would result in a permanent loss of habitat of approximately 0.1ha (2%) within King's Pond Plantation Local Wildlife Site. Indirect impacts from noise and dust would affect Pea Carr Ancient Woodland Inventory Site.

It is currently expected that there would be a permanent loss of approximately 7ha of broadleaved woodland, 1.6ha of marshy grassland and seven ponds, in addition to hedgerows, ancient and veteran trees and sections of small watercourses. The removal and fragmentation of these habitat types has the potential to affect their conservation status as well as potentially resulting in significant effects on bat, bird, terrestrial invertebrate and reptile populations.

Significant effects are likely to be experienced by otter and water vole in watercourses affected by the Proposed Scheme, as a result of the loss of habitat. Similarly great crested newt, white-clawed crayfish, aquatic invertebrates and fish may be affected as a result of habitat loss and construction disturbance.

Operation

During operation of the Proposed Scheme, bats and barn owls would be at risk of mortality caused by passing trains.

Health

Construction

The Proposed Scheme would impact on a range of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health effects, judgements have been made as to the level and type of impact that could potentially affect population health.

Land required for the construction of the Proposed Scheme would result in the permanent loss of approximately 50% of the allotments located off Brampton Road, Thurcroft. This space provides a positive contribution to the wellbeing of the local community and its loss would have an adverse effect on health and wellbeing.

The combination of construction noise, visual and traffic impacts would change the character of neighbourhoods, and may impact on residents' quality of life. For rural communities

dependent on shops and services in nearby towns, temporary closures and diversions of local roads may reduce the accessibility of key services. In addition, levels of physical activity could potentially be affected by disruption to roads and public rights of way that may be used as active travel routes.

The temporary construction workforce is likely to comprise a mixture of local people and workers from further afield. This could mean that local communities see temporary changes to the local population size and demographics.

Operation

The presence of rail infrastructure and noise from passing trains may change the character of surrounding neighbourhoods, and may reduce the quality of life for residents.

Historic environment

Construction

The Proposed Scheme is being designed to avoid and reduce impacts on heritage assets as far as reasonably practicable. Construction of the Proposed Scheme would permanently physically affect three non-designated heritage

assets: the Iron Age or Roman-British Enclosure and Field System at Slacks Farm in Bramley; the Iron Age or Roman-British Field System at Sandy Lane; and the Iron Age to Roman-British enclosures and field boundaries at Braithwell Common.

Landscape and visual

Construction

The presence of construction works and changes to the existing landform and vegetation patterns would affect the character of the local landscape. Where possible, effects would be reduced by the measures incorporated into the design to reduce the visibility of the Proposed Scheme (for example, land shaping to link earthworks into their wider landscape context, compensatory woodland planting and hedgerow replacement and restoration).

Construction activities would be visible from 25 viewpoints within the area, for example views from: residential properties and public rights of way at Ravenfield, north-east of Sunnyside and Ulley; and residential properties north-east of Bramley and on Woodhouse Green/Brampton Road, Thurcroft.

Operation

During operation, the significant effect of the Proposed Scheme on the character and appearance of the local landscape would substantially reduce over time as mitigation planting grows and matures, however, effects may remain significant.

During operation, the Proposed Scheme would be visible from 11 viewpoints within the area, for example views from: residential properties north-east of Sunnyside, north-east of Bramley and on Woodhouse Green/Brampton Road; and from public rights of way around Kingsford Field.

Sound, noise and vibration

Construction

Noise from construction could result in significant effects on residential communities closest to the construction works at Brampton-en-Le-Morthen; Thurcroft; Bramley; Hellaby; and Ravenfield Common.

Noise from construction could result in significant effects on non-residential properties closest to the construction works including Best Western Consort Hotel in Thurcroft;

Restover Lodge Hotel in Hellaby; and Hotel Ibis Rotherham East in Bramley.

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works.

Further work is currently being undertaken to confirm the likely significant construction noise and vibration effects, including any temporary effects from construction traffic. This assessment will be reported in the formal ES.

Operation

Operational noise would be reduced at source through the effective design and specification of the trains and track. A number of measures have also been incorporated into the design of the Proposed Scheme to mitigate noise effects during operation. These include noise barriers in the form of landscape earthworks and/or noise fence barriers.

Operation of the railway would potentially result in noise effects on residential communities, due to potential noise increases above recognised thresholds, and hence change in the existing

acoustic character around those properties closest to the Proposed Scheme in the following areas: Bramley (Westerton Drive, Nascot Close and Sherbourne Avenue); and Ravenfield Common (Common Lane, Braithwell Road, Gorse Close, Parkin Close and Bridgewater Way). Further assessment work is being carried out and will be reported in the formal ES.

Operation of the railway would potentially result in ground-borne noise and vibration effects on a community basis for occupants of residential properties on Westerton Drive and Sherbourne Avenue in Bramley. Further assessment work is being carried out and will be reported in the formal ES.

During operation of the railway noise insulation would be offered to avoid significant effects at residential properties that satisfy the applicable qualifying criteria. At this stage this is anticipated to be at: Wickersley (in the vicinity of the B6060 Morthen Road and Green Lane); Slacks Farm (in the vicinity of Slacks Lane); and Bramley (in the vicinity of Sandy Lane/the M18).

Further assessment work is currently being undertaken to confirm the likely significant effects due to operational noise and vibration,

especially at non-residential locations and quiet areas and in terms of establishing existing baseline conditions. This will be reported in the formal ES.

HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid likely significant effects due to noise and vibration. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the potentially affected receptors, their use and the benefit of the measures.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on the following routes: the M18 junction 1; the A631 Bawtry Road; the B6060 Morthen Road/Woodhouse Green/Green Arbour Road; Long Road; Penny Hill Lane; Brampton Lane; Katherine Road; Brampton Road; Kingsforth Lane; Cumwell Lane; Sandy Lane; Broadlands; Westerton Drive; Woods Fields; Finch Garden; Flash Lane; Denaby Way; Hellaby Lane; Lidget Lane; Bramley Lane; and Common Lane. Increases in traffic could also affect non-motorised users (i.e. pedestrians,

cyclists and horse riders) in terms of the ease with which they can cross these routes.

Construction of the Proposed Scheme is also likely to result in the temporary closures and diversions or realignments of the following: the M18 southbound off-slip/M1 northbound on-slip; the M1 northbound off-slip/M18 northbound on-slip; the A631 Bawtry Road; Brampton Lane; Sandy Lane; Lidget Lane; and Common Lane.

Construction of the Proposed Scheme would also require the temporary diversion of bus routes 1, 18 and 37 and the relocations of bus stops associated with these routes. This could result in significant adverse effects on users of bus services.

It is currently expected that construction of the Proposed Scheme could have temporary impacts on parking and loading.

Temporary closure or diversion/realignment of three public rights of way could result in increased journey times for non-motorised users (i.e. pedestrians, cyclists and horse riders) at Thurcroft Bridleway 7, Wickersley Footpath 8b and Wickersley Footpath 9.

Operation

Operation of the Proposed Scheme would require the permanent diversion of: the M18 junction 1; the B6060 Morthen Road/Woodhouse Green; Woodhouse Green; Sandy Lane; Lidget Lane; and Common Lane. Increases in traffic could also result in traffic severance for non-motorised users.

It is currently expected that there would be a permanent loss of car parking and loading at locations along the route of the Proposed Scheme in this area.

The permanent closure or diversion/realignment of six public rights of way may also result in significant effects at: Moat Lane; Carr Lane; Thurcroft Bridleway 7; Wickersley Footpath 8B; Wickersley Footpath 9; and Bramley Footpath 7.

8.22 Ravenfield to Clayton (LA13)

Overview

The Ravenfield to Clayton area (LA13) is approximately 18km in length, extending from east of Ravenfield to South Kirkby and comprise a section of the HS2 main line and the Sheffield Northern spur. The area falls within the local authority areas of Rotherham Metropolitan Borough Council, Doncaster Metropolitan Borough Council and Barnsley Metropolitan Borough Council (see Figure 36).

The area is predominantly rural in character, with agriculture being the main land use. There are areas of parkland and woodland, industrial estates, as well as historic coal mining and landfill areas. The residential areas are mainly in the towns of Conisbrough, Mexborough, and Thurnscoe. Within the wider rural area there are a number of villages and hamlets including, Ravenfield, Old Denaby, Harlington, Barnburgh, Clayton, and Hooton Pagnell.

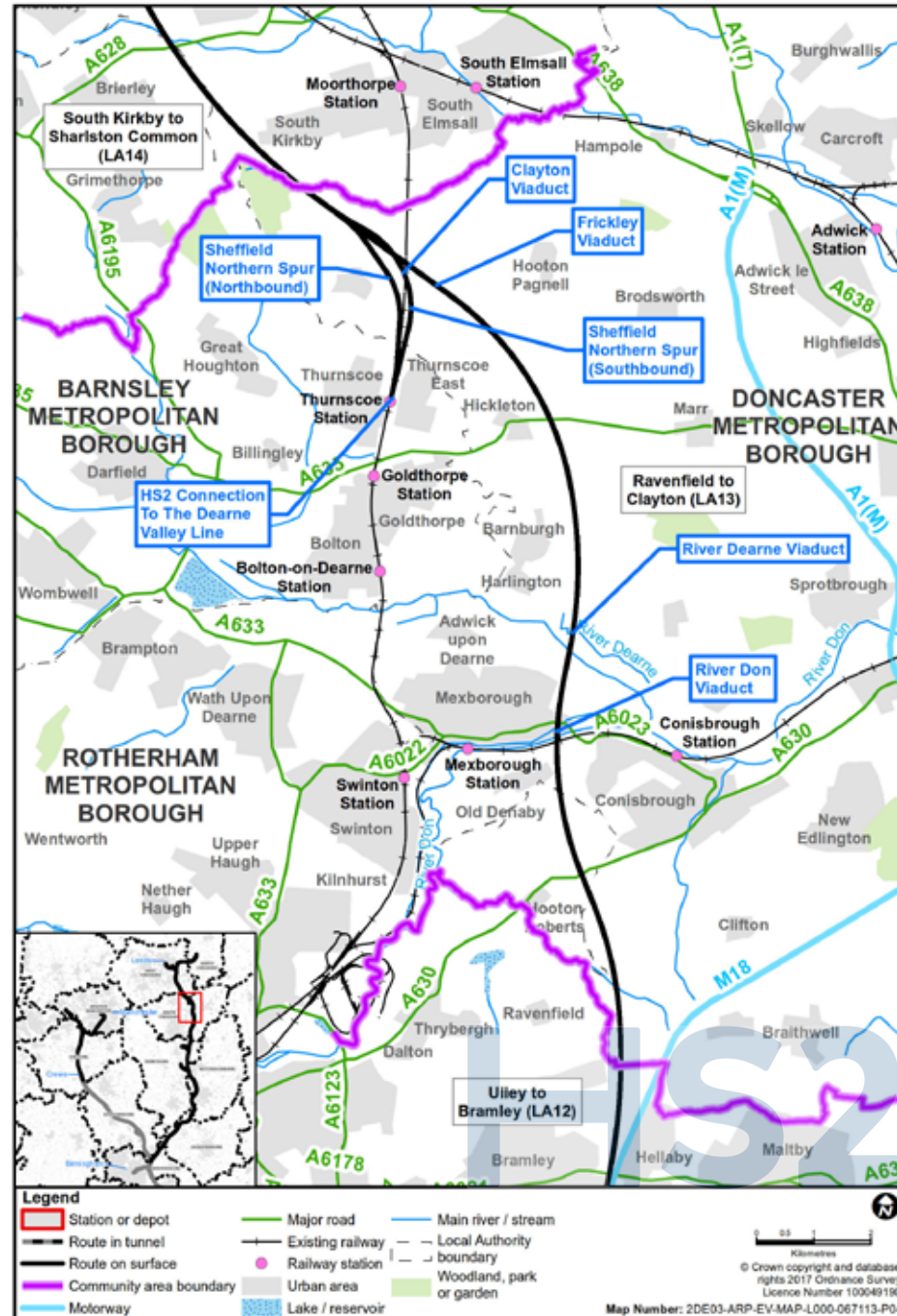


Figure 36: Ravenfield to Clayton area (LA13) context map

The Proposed Scheme

The Proposed Scheme within the Ravenfield to Clayton area has two main components: the HS2 main line from the northern boundary of the Ulley to Bramley area (LA12) and continuing northwards towards Clayton, and the South Kirkby to Sharlston Common area (LA14); and the Sheffield Northern spur, which would provide a link between the HS2 main line and the Dearne Valley Line existing railway.

The HS2 main line would continue northwards from the Ulley to Bramley area (LA12) in cutting and on embankment towards Hooton Roberts. The HS2 main line would run on embankments and in cuttings before transitioning on to a viaduct to cross the River Don. It would continue to the east of Mexborough in a cutting and then embankment before crossing over the River Dearne on viaduct. The HS2 main line would then continue north to Barnburgh on embankment and then north-west in a cutting towards Hickleton. It would then continue to the east of Hickleton on embankment and then viaduct to cross over Church Field Road. The HS2 main line would then continue on embankment north-west towards Clayton and enter into a cutting before continuing into the South

Kirkby to Sharlston Common area (LA14) on an embankment.

The Sheffield Northern Spur (southbound and northbound) would diverge from the HS2 main line on both sides of the route to the north of Clayton. The Sheffield Northern Spur (southbound) would continue on embankment and viaduct, crossing the HS2 main line, the Dearne Valley Line, and Church Field Road before entering a cutting. The Sheffield Northern Spur (northbound) would continue on embankment and into a cutting. The Sheffield Northern Spur would then connect with the Dearne Valley Line at Thurnscoe.

Modifications would be required to the existing conventional rail infrastructure in the Sheffield and South Yorkshire areas to facilitate the connection of the Proposed Scheme to the existing Dearne Valley Line.

In this area, the Proposed Scheme would require the demolition of 63 residential properties and nine commercial/business properties. In this area, there would be permanent closure, realignment or diversion of seven roads. The Proposed Scheme would result in the permanent realignment or diversion of 24 public rights of way. Sixteen watercourses would be

permanently realigned or diverted. Three main construction compounds and nine satellite construction compounds would be required in this area.

Residual effects

This section provides a summary of the likely significant residual environmental effects identified for the Ravenfield to Clayton area at this stage of the design and assessment.

Agriculture, forestry and soils

Construction

It is currently expected that approximately 560ha of agricultural land would be required for construction of the Proposed Scheme in this area, of which approximately 290ha is likely to be high quality agricultural land. Some of the land would be restored following construction, with approximately 320ha permanently required, 140ha of which is high quality agricultural land. The quality of the land is currently based on publicly available information and will be confirmed in the formal ES once agricultural land surveys are complete, as will the extent of land required for the Proposed Scheme.

To avoid or reduce environmental impacts, soils from the areas required temporarily and permanently for the Proposed Scheme would be stripped and stored. This would enable agricultural land that is required temporarily for construction to be returned to agricultural use. It would also enable soils to be put to other uses, such as support to landscape planting.

Construction of the Proposed Scheme would be likely to result in temporary significant effects at 19 farm holdings in this area due to the proportion of land required for the Proposed Scheme, with permanent effects likely at 14 farm holdings. Land possessed temporarily would, in accordance with a restoration scheme agreed with the landowner and the relevant planning authority, be returned to the farm holding following the completion of construction.

Community

Construction

The land required to construct the Proposed Scheme would result in: Pitman Road Woodland in Old Denaby becoming inaccessible for two years; approximately 5% of Hickleton Golf Course (encroaching on the 13th hole) being

required for three years and six months; and the entire area of Clayfield amenity green space becoming inaccessible for two years.

Construction of the Proposed Scheme would lead to significant community effects, including residential demolitions. As set out in Volume 1, as the design develops, it is likely that not all the properties reported as 'demolitions' within this assessment would need to be demolished, such as where not all of the land is required for permanent works. In this context, for example, at the current point of assessment it is considered that whilst 52 properties on Comelybank Drive are within the land required for construction of the Proposed Scheme, and so reported as demolitions, around 26 of these would need to be demolished. In addition eight residential properties on Doncaster Road, east of Mexborough, would be demolished. The loss of these properties represents a high proportion of each of these communities.

Land required for the construction of the Proposed Scheme would result in the permanent loss of approximately: 60% of Barnburgh Lakes located on Ludwell Hill; 25% of Clayfield amenity green space; 18% of Old Denaby Wetlands Local Nature Reserve on Denaby Lane; and 41% of Denaby Wood.

Ecology and biodiversity

Construction

Construction noise and dust emissions would result in temporary indirect impacts on woodland, grassland and open and running water habitats, including breeding bird and invertebrate populations, at of Denaby Ings Site of Special Scientific Interest.

Construction of the Proposed Scheme would result in permanent habitat loss and severance of approximately: 0.1ha (3%) of Firsby Reservoir Local Nature Reserve; 3.3ha (18%) of Old Denaby Wetland Local Nature Reserve; 0.1ha (1%) of Ravenfield Park and Firsby Reservoirs Local Wildlife Site; 0.4ha (31%) of Conisbrough Parks Hedgerows Local Wildlife Site; 0.6ha (8%) of Hooton Cliff Local Wildlife Site; 4.7ha (41%) of Denaby Wood Local Wildlife Site; 3.1ha (13%) of Old Denaby Area Local Wildlife Site; 7.3ha (70%) of Thunderhole Local Wildlife Site; 0.6ha (8%) of Barnburgh Cliff Local Wildlife Site; 0.2ha (1%) of Hickleton Park Local Wildlife Site; 0.5ha (1%) of Hickleton Golf Course Local Wildlife Site; 1.4ha (24%) of Bilham Park and Summer House Plantation Local Wildlife Site; 0.4ha (24%) of The Wilderness Local Wildlife Site; 0.6ha

(8%) of First, Second and Third Plantations Local Wildlife Site; 0.1ha (1%) of Hooton Cliff Ancient Woodland Inventory Site; 0.4ha (22%) of Unnamed Wood west of Barnburgh Cliff Ancient Woodland Inventory Site; and 0.1ha (2%) of Watchley Crag Wood Ancient Woodland Inventory Site.

In addition there would be a permanent loss of approximately 3.6ha of broadleaved woodland and 10.5ha of reedbed, in addition to ancient and veteran trees, grassland, ponds, hedgerows and sections of small watercourses. The removal and fragmentation of these habitat types has the potential to affect their conservation status as well as potentially resulting in significant effects on bat, bird, terrestrial invertebrate and reptile populations.

Significant effects are likely to be experienced by otter and water vole in watercourses affected by the Proposed Scheme, as a result of the loss of habitat. Similarly, great crested newts, white-clawed crayfish, aquatic invertebrates and fish may be affected as a result of habitat loss and construction disturbance.

Operation

During operation of the Proposed Scheme, bats and barn owls would be at risk of mortality caused by passing trains.

Health

Construction

The Proposed Scheme would impact a range of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health effects, judgements have been made as to the level and type of impact that could potentially affect population health.

Construction of the Proposed Scheme would result in the permanent loss of 63 residential properties in the Ravenfield to Clayton area. This has the potential to reduce beneficial effects that are gained through social contact and support.

Construction of the Proposed Scheme would result in the temporary loss of access to green space, recreation and physical activity at a number of locations in the area: Pitman Road

woodland on Denaby Lane; and Hickleton Golf Course. There would be permanent loss of access to green space, recreation and physical activity would at, amongst others: Barnburgh Lakes Fishery; Denaby Wood; and Clayfield amenity green space. These spaces provide a positive contribution to the wellbeing of the local communities and their loss would have an adverse effect on health and wellbeing.

The combination of construction noise, visual and traffic impacts would change the character of neighbourhoods, and may impact on residents' quality of life. For rural communities dependent on shops and services in nearby towns, temporary closures and diversions of local roads may reduce the accessibility of key services. In addition, levels of physical activity could potentially be affected by disruption to roads and public rights of way that may be used as active travel routes.

The temporary construction workforce is likely to comprise a mixture of local people and workers from further afield. This could mean that local communities see temporary changes to the local population size and demographics.

Operation

The presence of rail infrastructure and noise from passing trains may change the character of surrounding neighbourhoods, and may reduce the quality of life for residents.

Historic environment

Construction

The Proposed Scheme is being designed to reduce impacts on heritage assets as far as reasonably practicable. Construction of the Proposed Scheme would permanently physically affect 10 non-designated heritage assets, including: a large rectangular double-ditched enclosure to the south of Hilltop Farm in Conisbrough Parks; a cropmark complex to the west of Pastures Road and to the south of the River Dearne in Mexborough; a complex of enclosures, trackways, field boundaries and pits at Barnburgh Cliff; and two enclosures and field boundaries south-east of Lodge Farm in Frickley with Clayton. Wink House in Clayton would be demolished for the construction of the Sheffield Northern spur.

Construction of the Proposed Scheme would permanently affect the setting of two scheduled monuments: the site of St Helen's Chapel; and

the Dovecote at Barnburgh Hall. The setting of the Grade II* listed Church of All Saints and the Grade II listed Bilham Belvedere Summer House would also be permanently affected. This would result in changes to the way that these assets are experienced and understood.

Landscape and visual

Construction

The presence of construction works and changes to the existing landform and vegetation patterns would affect the character of the local landscape. Where possible, effects would be reduced by the measures incorporated into the design to reduce the visibility of the Proposed Scheme (for example, land shaping to link earthworks into their wider landscape context, compensatory woodland planting, hedgerow replacement and restoration, and new wetland features to compensate for the loss of ponds).

Construction activities would be visible from 50 viewpoints within the area, for example views from: residential properties along the A630 Doncaster/Sheffield Road near Hooton Roberts, in Conisbrough, along Denaby Lane and on the edge of Clayton; and public rights of way on Beacon Hill, in farmland near Denaby Main, on

the eastern edge of Mexborough, near Bilham Lane and on the edge of Clayton.

Operation

During operation, the significant effect of the Proposed Scheme on the character and appearance of the local landscape would substantially reduce over time as mitigation planting grows and matures, however, effects may remain significant.

During operation, the Proposed Scheme would be visible from 28 viewpoints, for example views from: residential properties along Denaby Lane, on the eastern edge of Barnburgh and in Frickley; the eastern edge of Mexborough near Comelybank Drive; Hangman Stone Road; a public right of way on Beacon Hill; the Trans Pennine Trail on the River Dearne bridge at Denaby Ings; and the Trans Pennine Trail/Dearne Way and public right of way at Mill Lane in the Dearne valley.

Socio-economics

Construction of the Proposed Scheme would result in a likely significant effect from the demolition of buildings and the resulting loss or displacement of jobs from six business units or sites located in the western part of the Denaby

Main Industrial Estate. Any likely significant residual effects will be assessed and reported in the formal ES.

Sound, noise and vibration

Construction

Noise from construction could result in significant effects on residential communities closest to the construction works at: Old Denaby; Denaby Main; Mexborough; Barnburgh; Hickleton; and Clayton.

Noise from construction could result in significant effects on the non-residential receptor All Saints Church Frickley, south of Frickley.

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works.

Further work is currently being undertaken to confirm the likely significant construction noise and vibration effects, including any temporary effects from construction traffic.

This assessment will be reported in the formal ES.

Operation

Operational noise would be reduced at source through the effective design and specification of the trains and track. A number of measures have also been incorporated into the design of the Proposed Scheme to mitigate noise effects during operation. These include noise barriers in the form of landscape earthworks and/or noise fence barriers.

Operation of the railway would potentially result in noise effects on occupants of residential properties, due to potential noise increases above recognised thresholds, and hence change in the existing acoustic character around those properties closest to the Proposed Scheme in the following areas: Firsby Hall Farm in Ravenfield (Arbour Lane); Conisbrough (Hill Top Road); Mexborough (Comelybank Drive, Clayfield View, The Pastures, James Street, New Street, Church Street, Castle Hill Avenue, the A6023 Low Road/Doncaster Road, Pastures Court, Pastures Road, Kingfisher Drive, Wild Geese Way, Green Shank Drive, Dove Road, Mallory Drive, Oulton Rise, Donnington Road, Clayfield Avenue, Ullswater Road, Thirlmere Crescent, Clayfield View and Haddon Rise); and Frickley (Common Lane).

During operation of the railway noise insulation would be offered to avoid significant effects at individual residential properties that satisfy the applicable qualifying criteria. At this stage this is anticipated to be at Mexborough, in the vicinity of Comelybank Drive, Pastures Court, Mallory Drive, Church Field Road, Frickley Park Lane and Top Lane.

Operational noise could result in a significant effect on the non-residential receptor All Saints Church, Frickley.

HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid likely significant effects due to noise and vibration. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the potentially affected receptors, their use and the benefit of the measures.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on the following routes: the M18; the A1(M); the A630 Doncaster Road/Sheffield Road/High Road; the A6023 Low Road/

Doncaster Road; the A635 Barnsley Road; the A6195 Dearne Valley Parkway/Rotherham Road; the B6273 Rotherham Road; the B6411 Thurnscoe Lane/Houghton Road; Old Road; Hill Top Road; Denaby Lane; Coalpit Road; Eland Road; Comelybank Drive; Pastures Road; Ludwell Hill; Hangman Stone Road; Blacksmiths Lane; Red Hill Lane; Middlecliff Lane/Billingley Lane; School Street; Clayton Lane/Church Field Road; Hall Brig; Stotfold Road; Top Lane; and Common Lane. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Construction of the Proposed Scheme is also likely to result in the temporary closure, diversion or realignment of the following: the A630 Doncaster Road; the A6023 Doncaster Road; Pastures Road; Ludwell Hill; Church Field Road; and Top Lane.

It is currently expected that construction of the Proposed Scheme could have temporary impacts on parking and loading in Mexborough and Conisbrough.

Construction of the Proposed Scheme has the potential to result in delays to rail services and passengers on the Sheffield to Doncaster and the Dearne Valley lines as a result of temporary rail possessions.

Temporary closure or diversion/realignment of public rights of way could result in increased journey times for non-motorised users on: Conisbrough Parks Bridleway 14; Conisbrough Parks Footpath 3; Conisbrough Parks Bridleway 2 (Firsby Lane); Conisbrough Footpath 3 (Old Hall Lane); Mexborough Footpath 9; Mexborough Footpath 7; Barnburgh Footpath 5; Barnburgh Footpath 3; Hickleton Footpath 1; Hooton Pagnell Footpath 12; Clayton with Frickley Bridleway 11; Clayton with Frickley Footpath 1 (Common Lane); Clayton with Frickley Footpath 10; Clayton with Frickley Footpath 2; Clayton with Frickley Footpath 3; Clayton with Frickley Footpath 4; Clayton with Frickley Bridleway 5, Sheffield and South Yorkshire Navigation towpath; and the Trans Pennine Trail.

It is currently expected that the construction of the Proposed Scheme could have an effect on users of the Sheffield and South Yorkshire Navigation.

Operation

Operation of the Proposed Scheme would require the permanent realignment or diversion of: Common Lane; the A630 Doncaster Road; the A635 Barnsley Road; Ludwell Hill; Church Field Road; and Stotfold Road; and the permanent closure of Red Hill Lane. Increases in traffic could also affect non-motorised users in terms of the ease with which they can cross these routes.

It is currently expected that there would be a permanent loss of car parking or loading at locations along the route of the Proposed Scheme in this area.

Operation of the Proposed Scheme would require the permanent realignment or diversion of 24 public rights of way: Conisbrough Parks Bridleway 14 and 2 (Firsby Lane); Conisbrough Parks Footpaths 3, 3 (Old Hall Lane) and 1; Mexborough Footpath 9; Barnburgh Bridleway 4 and 2; Barnburgh Footpaths 7 and 3; Hickleton Bridleway 2; Hickleton Footpath 1; Hooton Pagnell Footpaths 13 and 12; Clayton with Frickley Bridleway 11; Clayton with Frickley Footpaths 1 (Common Lane), 2, 3, 4, 5 and 13; Dearne Footpaths 5 and 2; and Dearne Bridleway 4.

8.23 South Kirkby to Sharlston Common (LA14)

Overview

The South Kirkby to Sharlston Common area (LA14) is approximately 13km in length, extending from South Kirkby to Crofton and Sharlston Common. The area falls within the local authority areas of Wakefield Metropolitan District Council and Barnsley Metropolitan Borough Council (see Figure 37).

The area is predominantly rural in character, with agriculture being the main land use. Historical land uses in the area included coal mining and historical landfill areas. South Kirkby and Hemsworth lie in the south of the area, with New Crofton and Sharlston Common in the north. There are also a number of smaller villages, interspersed with occasional areas of woodland, isolated residential properties and farmsteads.

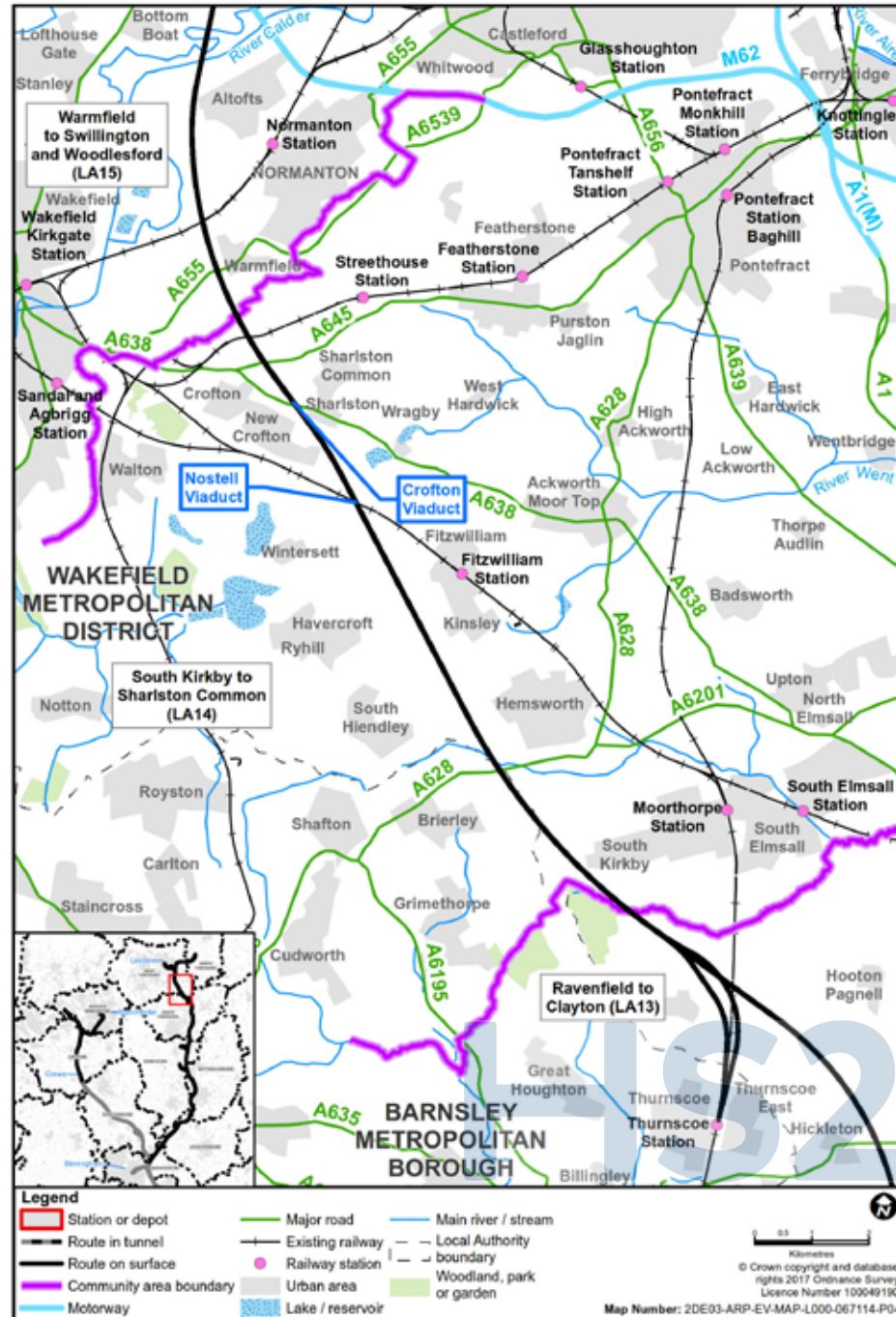


Figure 37: South Kirkby to Sharlston Common area (LA14) context map

The Proposed Scheme

The route would continue from the Ravenfield to Clayton area (LA13) north-west towards South Kirkby on embankment and then continue into cutting and onto embankment. The route would then pass into cutting under the realigned Barnsley Road, to the west of Hemsworth, before continuing on embankment towards Kinsley. The route would continue into a cutting, then run on embankment before crossing the Doncaster to Wakefield Line on viaduct. The route would continue on embankment to the south-east of New Crofton, transitioning onto viaduct to cross the Doncaster to Wakefield Line, before running on embankment and into a cutting to continue into the Warmfield to Swillington and Woodlesford area (LA15).

In this area, the Proposed Scheme would require the demolition of two residential properties and two commercial/business properties. In this area, there would be permanent closure, realignment or diversion of 12 roads. The Proposed Scheme would result in the permanent realignment or diversion of 13 public rights of way. Four watercourses would be permanently realigned or diverted. Two main construction

compounds and nine satellite construction compounds would be required in this area.

Residual effects

This section provides a summary of the likely significant residual environmental effects identified for the South Kirkby to Sharston Common area at this stage of the design and assessment.

Agriculture, forestry and soils

Construction

It is currently expected that approximately 380ha of agricultural land would be required for construction of the Proposed Scheme in this area, of which approximately 90ha is likely to be high quality agricultural land. Some of this land would be restored following construction, with approximately 220ha permanently required, 60ha of which is high quality agricultural land. The quality of the land is currently based on publicly available information and will be confirmed in the formal ES once agricultural land surveys are complete, as will the extent of land required for the Proposed Scheme.

To avoid or reduce environmental impacts, soils from the areas required temporarily and permanently for the Proposed Scheme would be stripped and stored. This would enable agricultural land that is required temporarily for construction to be returned to agricultural use. It would also enable soils to be put to other uses, such as support landscape planting.

Construction of the Proposed Scheme would be likely to result in significant effects at 17 farm holdings in this area due to the proportion of land required for the Proposed Scheme. Of the 17 holdings temporarily affected, ten would also be permanently affected. Land required temporarily would, in accordance with a restoration scheme agreed with the landowner and the relevant planning authority, be returned to the farm holding following the completion of construction.

Community

Construction

The land required to construct the Proposed Scheme would result in the permanent loss of the Crofton Riding and Livery Stables.

Ecology and biodiversity

Construction

Construction of the Proposed Scheme would result in permanent habitat loss of approximately 0.6ha (23.7%) of Manface Quarry Local Wildlife Site and approximately 600m² (0.2%) of Moorhouse Lane Ponds and Railway Local Wildlife Site.

It is currently expected that there would be a permanent loss of approximately 5.3ha of broadleaved woodland, in addition to the loss of hedgerows and ancient and veteran trees. The removal and fragmentation of these habitat types has the potential to affect their conservation status as well as potentially resulting in significant effects on bats, great crested newt, birds, terrestrial invertebrates and reptiles.

Significant effects are likely to be experienced by otter and water vole as a result of the loss of water-margin habitat. Similarly, white-clawed crayfish and aquatic invertebrates may be significantly affected as a result of habitat loss and construction disturbance.

Operation

During operation of the Proposed Scheme, bats and barn owls would be at risk of mortality caused by passing trains.

Health

Construction

The Proposed Scheme would impact on a range of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health effects, judgements have been made as to the level and type of impact that could potentially affect population health.

Construction of the Proposed Scheme would result in the permanent loss of access to green space, recreation and physical activity at Crofton Riding and Livery Stables. This would result in an adverse effect on health and wellbeing.

The route of the Proposed Scheme would pass adjacent to the eastern boundary of The Priory Centre Pupil Referral Unit's playing fields and pupils could be affected during construction. This educational facility is attended by

pupils who have been permanently excluded from mainstream school and are considered particularly sensitive to any impacts that might impinge on learning and educational activities.

The combination of construction noise, visual and traffic impacts would change the character of neighbourhoods, and may impact on residents' quality of life. For rural communities dependent on shops and services in nearby towns, temporary closures and diversions of local roads may reduce the accessibility of key services. In addition, levels of physical activity could potentially be affected by disruption to roads and public rights of way that may be used as active travel routes.

The temporary construction workforce is likely to comprise a mixture of local people and workers from further afield, giving rise to temporary changes to local population size and demographics.

Operation

The presence of rail infrastructure and noise from passing trains may change the character of surrounding neighbourhoods, and may reduce the quality of life for residents.

Historic environment

Construction

The Proposed Scheme is being designed to reduce impacts on heritage assets as far as reasonably practicable. Construction of the Proposed Scheme would permanently physically affect 21 non-designated heritage assets, including a large, multi-ditched enclosure at South Kirkby, prehistoric/Roman enclosures and trackway at Barnsley Road in Hemsworth and prehistoric/Roman enclosures, field boundaries and pits at Horncastle Farm in Hemsworth.

Construction of the Proposed Scheme would permanently affect the setting of the Kinsley moat and fishpond scheduled monument, the Grade II* listed Nostell Priory registered park and garden and the Grade II listed Vissitt Manor. This would result in changes to the way that the assets are experienced and understood.

Landscape and visual

Construction

The presence of construction works and changes to the existing landform and vegetation

would affect the character of the local landscape. Where possible, effects would be reduced by the measures incorporated into the design to reduce the visibility of the Proposed Scheme (for example, land shaping to link earthworks into their wider landscape context, compensatory woodland planting and hedgerow replacement and restoration).

Construction activities would be visible from 29 viewpoints within the area, for example views from: residential properties along Robin Lane and the edge of Hemsworth, Horncastle Farm, the edge of Kinsley and the B6378 Pontefract Road close to The Priory Centre Pupil Referral Unit; Crofton Community Centre; and public rights of way to the south of the A628 Hemsworth Bypass and west of Southmoor Road, on the western side of Nostell Priory and to the south of Sharlston Common and the Wakefield Wheel cycle route between New Crofton and Fitzwilliam.

Operation

During operation, the significant effects of the Proposed Scheme on the character and appearance of the local landscape would

substantially reduce over time as mitigation planting grows and matures, however, effects may remain significant.

During operation, the Proposed Scheme would be visible from eight viewpoints within the area, for example views from: residential properties along Robin Lane and the edge of Hemsworth, the edge of Kinsley and the B6378 Pontefract Road close to The Priory Centre Pupil Referral Unit; Crofton Community Centre; and a public right of way to the south of the A628 Hemsworth Bypass and west of Southmoor Road, on the western side of Nostell Priory and to the south of Sharlston Common and the Wakefield Wheel cycle route between New Crofton and Fitzwilliam.

Sound, noise and vibration

Construction

Noise from construction could result in significant effects on residential communities closest to the construction works at South Kirkby, Brierly, Hemsworth, Kinsley, Newstead, Fitzwilliam, New Crofton, Foulby, Crofton, Sharlston, Sharlston Common and New Sharlston.

Noise from construction could result in significant effects on non-residential properties including Burntwood Court Hotel in Brierley, Vissett Cottage Hotel in Hemsworth, Crofton Community Centre in New Crofton and The Priory Centre Pupil Referral Unit in Crofton.

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works.

Further work is currently being undertaken to confirm the likely significant residual construction noise and vibration effects, including any temporary effects from construction traffic.

Operation

Operational noise would be reduced at source through the effective design and specification of the trains and track. A number of measures have also been incorporated into the design of the Proposed Scheme to mitigate noise effects during operation. These include noise barriers in the form of landscape earthworks and/or noise fence barriers.

Operation of the railway would potentially result in noise effects on occupants of residential properties, due to potential noise increases above recognised thresholds, and hence change in the existing acoustic character around those properties closest to the Proposed Scheme in the following areas: South Kirkby (Common Road, Hilltop Estate and First Avenue); Hemsworth (Burntwood Bank, Greenfield Road, Willow Drive, Robin Lane and Barnsley Road); Kinsley (Tombridge Crescent, Chantry Croft, Common Road and Briar Bank); New Crofton (Greenside Park, Greenside Court, Greenview, Middle Lane and Beech Avenue); Crofton (Towers Lane, The Towers, Dovedale Close, Wentworth Drive, Springhill Drive, Springhill Grove, Pinfold Drive and the B6378 Pontefract Road); and Sharlston Common (Birkwood Avenue and Weeland Road).

During operation of the railway noise insulation would be offered to avoid significant effects at individual residential properties that satisfy the applicable qualifying criteria. At this stage this is anticipated to be at Hemsworth Gate (in the vicinity of the B6273 Southmoor Road); Vissitt Manor Farm (in the vicinity of Vissitt Lane); Kinsley Carr Farm (in the vicinity of Carr Lane); Station Cottages (in the vicinity of Swine Lane);

The Towers (in the vicinity of Towers Lane); and Crofton (in the vicinity of Towers Lane).

Further assessment work is currently being undertaken to confirm the likely significant residual effects due to operational noise and vibration, especially at non-residential locations and quiet areas and in terms of establishing existing baseline conditions.

HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid likely significant effects due to noise and vibration. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the potentially affected receptors, their use and the benefit of the measures.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on the following routes: the A1M/A1; the A628 Hemsworth Bypass; the A638 Doncaster Road/Wakefield Road; the A645 Weeland Road/Wakefield Road; the A6201 Sprockhovel Way/Wrangbrook Lane; the B6133 Common Side Lane; the B6134 Havertop

Lane; the B6273 Southmoor Road/Garmil Lane; the B6378 Pontefract Road; the B6428 Newstead Lane/Hemsworth Lane; Common Road; Barewell Hill/Barnsley Road; Swine Lane; and Common Side Lane/Sewerbridge Lane. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Construction of the Proposed Scheme is also likely to result in the temporary closure, diversion or realignment of the following: the A628 Hemsworth Bypass; the A638 Doncaster Road; the A645 Weeland Road; Common Road and Barnsley Road. Bus routes 28, 28C, 29, 29B, 30, 36, 39 and 195 would be temporarily diverted.

Rail possessions could result in disruption to rail passengers on the Doncaster to Wakefield Line and the Pontefract to Wakefield Line.

Temporary closure, or diversion/realignment of nine public rights of way could result in increased journey times for non-motorised users on: Hemsworth Footpath 23; Hemsworth Footpath 22; Hemsworth Footpath 5; Huntwick-with-Foulby and Nostell Footpath 1; Huntwick-

with-Foulby and Nostell Footpath 4; Crofton Footpath 11; Sharlston Footpath 12; Crofton Footpath 9; and Crofton Footpath 5.

Operation

Operation of the Proposed Scheme would require the permanent closure, diversion or realignment of: Robin Lane and Carr Lane, the permanent realignment of the B6273 Southmoor Road, the B6428 Newstead Lane and Swine Lane, and the permanent closure of Holmsley Lane, Towers Lane and the B6378 Pontefract Road. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Operation of the Proposed Scheme would result in the permanent realignment or diversion of 13 public rights of way: Hemsworth Footpath 24, 23, 22, 5, 7, 4; Hemsworth Bridleway 8; Huntwick-with-Foulby and Nostell Footpath 1; Sharlston Footpath 12; Crofton Footpath 11, 9, 5 and 6.

8.24 Warmfield to Swillington and Woodlesford (LA15)

Overview

The Warmfield to Swillington and Woodlesford area (LA15), extending approximately 14km in overall length, comprising a 14km section of the HS2 main line, which would continue to the north-east and connect with the East Coast Main Line at Colton Junction, and a 4km section of the Leeds spur, which would continue to the HS2 Leeds station. The HS2 main line continues north past Swillington whilst the Leeds spur continues west towards the north of Rothwell (see Figure 38).

The area is located within the semi-urban area, with larger settlements interspersed with smaller settlements, isolated residential properties and farmhouses. The area includes farmland and parkland, as well as historic coal mining, sand and gravel extraction and historic landfill areas.

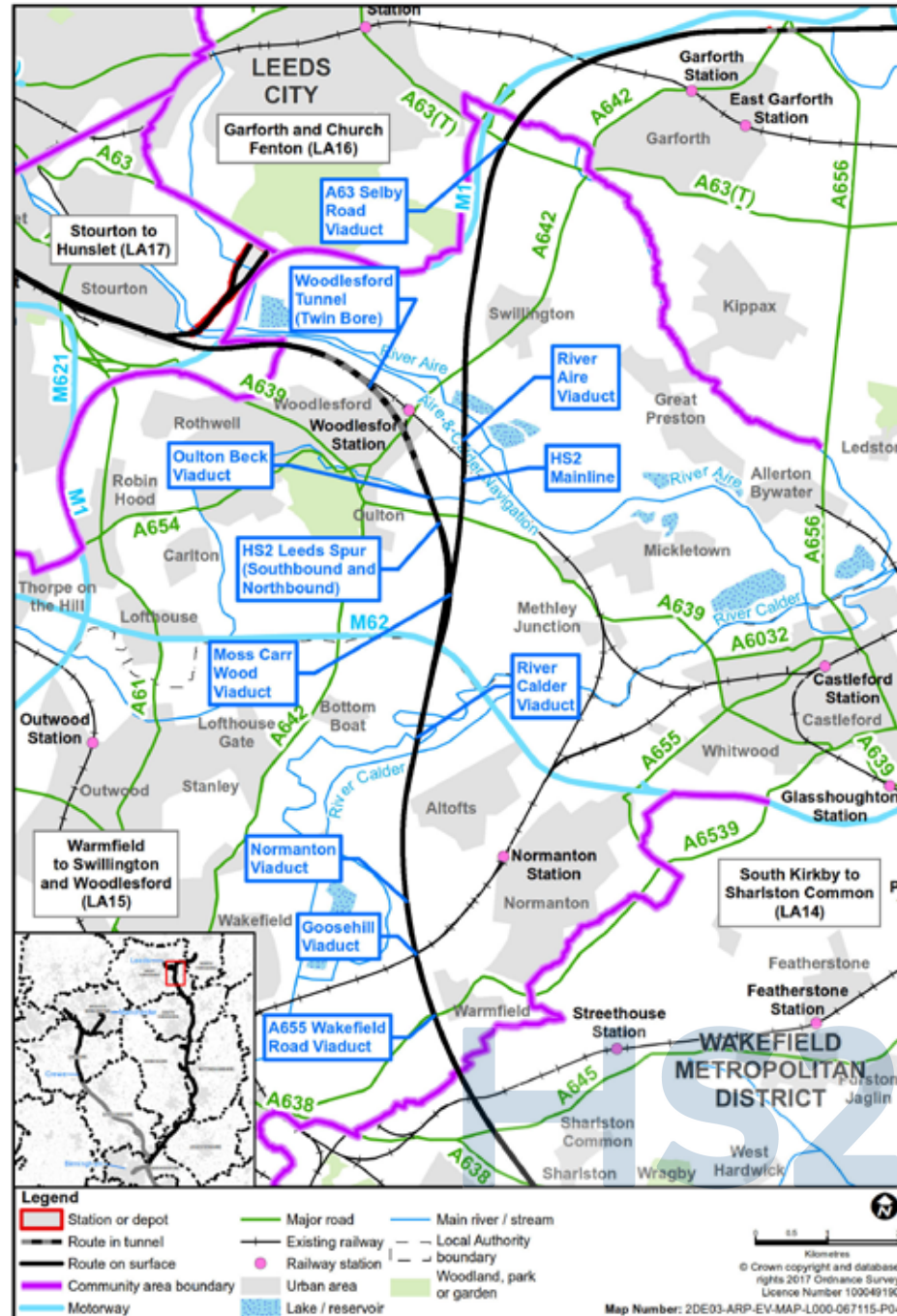


Figure 38: Warmfield to Swillington and Woodlesford area (LA15) context map

The Proposed Scheme

The route of the Proposed Scheme would continue northwards from the South Kirkby to Sharlston Common area (LA14) towards Kirkthorpe and Warmfield in a series of cuttings and on embankments. The route would transition onto viaduct before passing onto embankment and then cutting to the east of Wakefield. The route would then pass over a series of viaducts and embankments to pass Normanton and cross the Welbeck Landfill access road and flooded Brickworks.

The route would then pass Newland Hall on embankment before entering the cutting, to the west of Altofts. To the north of Altofts the route would enter embankment and then viaduct to cross over the River Calder, River Aire, Calder Navigation and the M62. At the northern end of the viaduct, north of the M62 crossing, the route would diverge, forming two routes: the HS2 main line and the Leeds spur.

The HS2 main line would continue on embankment and pass under a viaduct into cutting to the west of Methley. The route would then transition on to embankment, before crossing the River Aire Valley on viaduct, and then embankment to the west of Swillington.

The HS2 main line would then rise onto embankment, which continues northwards into the Garforth and Church Fenton area (LA16).

North of the M62, the Leeds spur would pass over the A639 Methley Lane and under Fleet Lane, before entering cutting to the east of Oulton. The spur would then pass under Woodlesford and the existing Network Rail line in tunnel before entering cutting and continuing into the Stourton to Hunslet area (LA17).

In this area, the Proposed Scheme would require the demolition of five residential properties and two commercial/business properties. There would be permanent closure, realignment or diversion of eight roads. The Proposed Scheme would result in the permanent realignment or diversion of 13 public rights of way. Four watercourses would be permanently diverted or realigned. One main construction compound and 17 satellite construction compounds would be required.

Residual effects

This section provides a summary of the likely significant residual environmental effects identified for the Warmfield to Swillington and Woodlesford area at this stage of the design and assessment.

Agriculture, forestry and soils

Construction

It is currently expected that approximately 457ha of agricultural land would be required for construction of the Proposed Scheme in this area, of which approximately 105ha is likely to be high quality agricultural land. Some of this land will be restored following construction, with approximately 331ha permanently required, 83ha of which is high quality land. The quality of the land is currently based on publicly available information and will be confirmed in the formal ES once agricultural land surveys are complete, as will the extent of land required permanently for the Proposed Scheme.

To avoid or reduce environmental impacts, soils from the areas required temporarily and permanently for the Proposed Scheme would be stripped and stored. This would enable agricultural land that is required temporarily for construction to be returned to agricultural use. It would also enable soils to be put to other uses, such as to support landscape planting.

Construction of the Proposed Scheme would be likely to result in significant effects at 38 farm holdings in this area due to the proportion of

land required for construction and severance of access to the surrounding land used by farm diversification enterprises. Of the 38 holdings temporarily affected, 27 would also be permanently affected. Land required temporarily would, in accordance with a restoration scheme agreed with the landowner and the relevant planning authority, be returned to the farm holding following the completion of construction.

Community

Construction

Land required to construct the Proposed Scheme would result in the temporary use of: Swillington Park Fishing Lakes; approximately 20% of the Water Haigh Woodland Park in Woodlesford; and approximately 10% of the Oulton Brickworks Allotments in Woodlesford.

Land required for the construction of the Proposed Scheme would result in the permanent loss of three fishing lakes at Yorkshire Fields Sports Ltd Fishing Lakes at Newland Hall.

Ecology and biodiversity

Construction

Construction of the Proposed Scheme would result in a permanent loss of habitat of approximately: 3.2ha (18%) of Hell Lane Railway Cutting Local Wildlife Site; 2.6ha (78%) of Former Newmarket Colliery Local Wildlife Site; 8ha (90%) of Altofts Ings Local Wildlife Site; 1.4ha (7%) of Swillington Park Lakes, Cockpit Round, Garforth and Rothwell Country Park Site of Ecological and Geological Importance; 3.2ha (6.8%) of Rothwell Country Park Leeds Nature Area; 1.6ha (68%) of Canalside Ponds Leeds Nature Area; 1.8ha (3.3%) of Leventhorpe Lagoon and Ings Leeds Nature Area; and 2.5ha (14%) of Moss Carr Leeds Nature Area. In addition, 70.5ha (73%) of Water Haigh Woodland Park would be permanently lost.

It is currently expected that there would be a permanent loss of 5.4ha of broadleaved woodland, in addition to grassland, hedgerows, sections of small watercourses and some ancient and veteran trees. The removal and fragmentation of these habitat types has the potential to affect their conservation status as

well as potentially resulting in significant effects on bat, bird, terrestrial invertebrate and reptile populations.

Significant effects are likely to be experienced by otter and water vole in watercourses affected by the Proposed Scheme, as a result of the loss of habitat. Similarly, great crested newt, white-clawed crayfish, aquatic invertebrates and fish may be affected as a result of habitat loss and construction disturbance.

Operation

During operation of the Proposed Scheme, bats and barn owls would be at risk of mortality caused by passing trains.

Health

Construction

The Proposed Scheme would impact on a range of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health effects, judgements have been made as to the level and type of impact that could potentially affect population health.

Construction of the Proposed Scheme would result in the temporary loss of access to green space, recreation and physical activity at: Swillington Park Fishing Lakes; approximately 50% of Water Haigh Woodland Park; and 10% of Oulton Brickworks Allotments in Woodlesford. The Yorkshire Field Sports Ltd fishing lake and 10% of Water Haigh Woodland Park would be permanently lost. These spaces provide a positive contribution to the wellbeing of local communities and their loss would have an adverse effect on health and wellbeing.

The combination of construction noise, visual and traffic impacts would change the character of neighbourhoods, and may impact on residents' quality of life. For rural communities dependent on shops and services in nearby towns, temporary closures and diversions of local roads may reduce the accessibility of key services. In addition, levels of physical activity could potentially be affected by disruption to roads and public rights of way that may be used as active travel routes.

The temporary construction workforce is likely to comprise a mixture of local people and workers from further afield. This could mean

that local communities see temporary changes to the local population size and demographics.

Operation

The presence of rail infrastructure and noise from passing trains may change the character of surrounding neighbourhoods, and may reduce the quality of life for residents.

Historic environment

Construction

The Proposed Scheme is being designed to reduce impacts on heritage assets as far as reasonably practicable. Construction of the Proposed Scheme would permanently physically affect 21 non-designated heritage assets, including: Iron Age/Roman enclosure complexes at Gled Hill at Warmfield, Bullerthorpe Medieval Settlement and The Smithy at Swillington.

Construction of the Proposed Scheme would also permanently affect the setting of the Henge on Birkwood Common scheduled monument, the Grade II* listed Gazebo approximately 100 metres north of Clumpcliffe Farmhouse, and two Grade II listed buildings; the Farm Buildings to Former Newland Hall, and Old Stables at

the site of Former Newland Hall. This would result in changes to the way that the assets are experienced and understood.

Landscape and visual

Construction

The presence of construction works and changes to the existing landform and vegetation patterns would affect the character of the local landscape. Where possible, effects would be reduced by the measures incorporated into the design to reduce the visibility of the Proposed Scheme (for example, land shaping to link earthworks into their wider landscape context, compensatory woodland planting and hedgerow replacement and restoration).

Construction activities would be visible from 67 viewpoints within the area, for example views from: residential properties at Warmfield, East Moor, Altofts, Stanley, Bottom Boat and Newmarket Lane, Methley; the Aire and Calder Navigation; the TransPennine Trail; Rothwell footpaths 35 and 38; residential properties and Warmfield-cum-Heath Bridleway 3 at Heath; and Hell Lane, Wakefield.

Operation

During operation, the significant effects of the Proposed Scheme on the character and appearance of the local landscape would be substantially reduced over time as mitigation planting grows and matures, however, effects may remain significant.

During operation, the Proposed Scheme would be visible from 40 viewpoints within the area, for example views from: residential properties at Warmfield, East Moor, Altofts, Stanley, Bottom Boat and Newmarket Lane, Methley; the Aire and Calder Navigation; the TransPennine Trail; residential properties and Warmfield-cum-Heath Bridleway 3 at Heath; and Hell Lane, Wakefield.

Sound, noise and vibration

Construction

Noise from construction could result in significant effects on residential communities closest to the construction works at: Warmfield; Kirkthorpe; Goosehill; Altofts; Methley Lanes; Scholey Hill; Oulton; Woodlesford; John O'Gaunts in Rothwell; Swillington; Hollinhorpe; and Swillington Common.

Noise from construction could result in significant effects on non-residential properties closest to the construction works, including The Bridge Farm Hotel, Woodlesford.

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works.

Further work is currently being undertaken to confirm the likely significant construction noise and vibration effects, including any temporary effects from construction traffic. This assessment will be reported in the formal ES.

Operation

Operational noise would be reduced at source through the effective design and specification of the trains and track. A number of measures have also been incorporated into the design of the Proposed Scheme to mitigate noise effects during operation. These include noise barriers in the form of landscape earthworks and/or noise fence barriers.

Operation of the railway would potentially result in noise effects on occupants of residential properties, due to potential noise increases above recognised thresholds, and hence change in the existing acoustic character around those properties closest to the Proposed Scheme in the following areas: Kirkthorpe (Park Avenue); Goosehill (Goosehill Lane); and Altofts (Birkwood Road). Further assessment work is being carried out and will be reported in the formal ES.

During operation of the railway noise insulation would be offered to avoid significant effects at residential properties that satisfy the applicable qualifying criteria. At this stage this is anticipated to be at Newland Hall and Newland Park, in the vicinity of Newland Lane.

Further assessment work is currently being undertaken to confirm the likely significant effects due to operational noise and vibration, especially at non-residential locations and quiet areas and in terms of establishing existing baseline conditions. This will be reported in the formal ES.

HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid likely significant effects due to noise and vibration. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the potentially affected receptors, their use and the benefit of the measures.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on a number of routes including: the M1 (junction 46); the M62; the A63 Selby Road; the A639 Methley Lane; the A642 Wakefield Road/Aberford Road; the A655 Wakefield Road; the B6135 Newmarket Lane; Hell Lane; Kirkthorpe Lane/Warmfield Lane; Croft Head Lane; Birkwood Road; Fleet Lane; Bullerthorpe Lane; Swillington Lane; and Leeds Lane. Increases in traffic during construction may make it more difficult for non-motorised users (i.e. pedestrians, cyclists and horse riders) to cross roads through this area.

Construction of the Proposed Scheme is also likely to result the temporary closures and diversions or realignments of the following: the M62; the A63 Selby Road; the A642 Wakefield Road; the A655 Wakefield Road; the B6135 Newmarket Lane; Hell Lane; Hungate Lane; Bottom Boat Road; and Jinny Moor Lane.

Construction of the Proposed Scheme has the potential to result in delays to passengers and freight services on the Hallam Line, as a result of rail possessions and closures.

Construction of the Proposed Scheme would require the temporary closure, diversion or realignment of the following public rights of way: Warmfield-cum-Heath Bridleways 14 (north of the A655 Wakefield Road) and 12; Newland with Woodhouse Moor Footpath 6; Normanton Footpaths 29, 1 and 4; Aire and Calder Navigation Wakefield Branch (navigable waterway and towpath); Rothwell Footpaths 39 and 41; Rothwell Footpath 24/Aire and Calder Navigation main line (navigable waterway and towpath); Definitive Footpath Rothwell 80; Bullough Lane; Swillington Bridleway 25; Definitive Footpaths Swillington 21, 20, 14, 11 and 1.

Operation

Operation of the Proposed Scheme would require the permanent diversion or closure of: Red Lane; Hell Lane; Kirkthorpe Lane; Warmfield Lane; Birkwood Road; the A639 Methley Lane; Fleet Lane; and Eshald Lane. Increases in traffic may make it more difficult for non-motorised users (i.e. pedestrians, cyclists and horse riders) to cross roads through this area.

Operation of the Proposed Scheme would require the permanent realignment or diversion of the following public rights of way: Warmfield-cum-Heath Bridleway 14; Newland with Woodhouse Moor Footpath 6; Normanton Footpath 29; Woodhouse Moor Footpath 5; Normanton Bridleway 2; Normanton Footpath 1; Definitive Footpath Rothwell 38; Rothwell Footpath 83; Swillington Footpaths 21, 20, 14, 11 and 1.

8.25 Garforth and Church Fenton (LA16)

Overview

The Garforth and Church Fenton area (LA16) is approximately 16km in length, extending from west of Garforth to Ulleskelf. The area is within the local authority areas of Leeds City Council, Selby District Council and North Yorkshire County Council (see Figure 39).

The area is predominantly rural with areas of open space, woodland and farmland, with areas of sand and gravel extraction, and historic mining and landfill activities. Larger residential areas include Garforth and Sherburn in Elmet. Micklefield, Barkston Ash, Church Fenton and Ulleskelf are villages that provide a smaller number of local facilities. The area is interspersed with isolated residential properties and farmsteads.

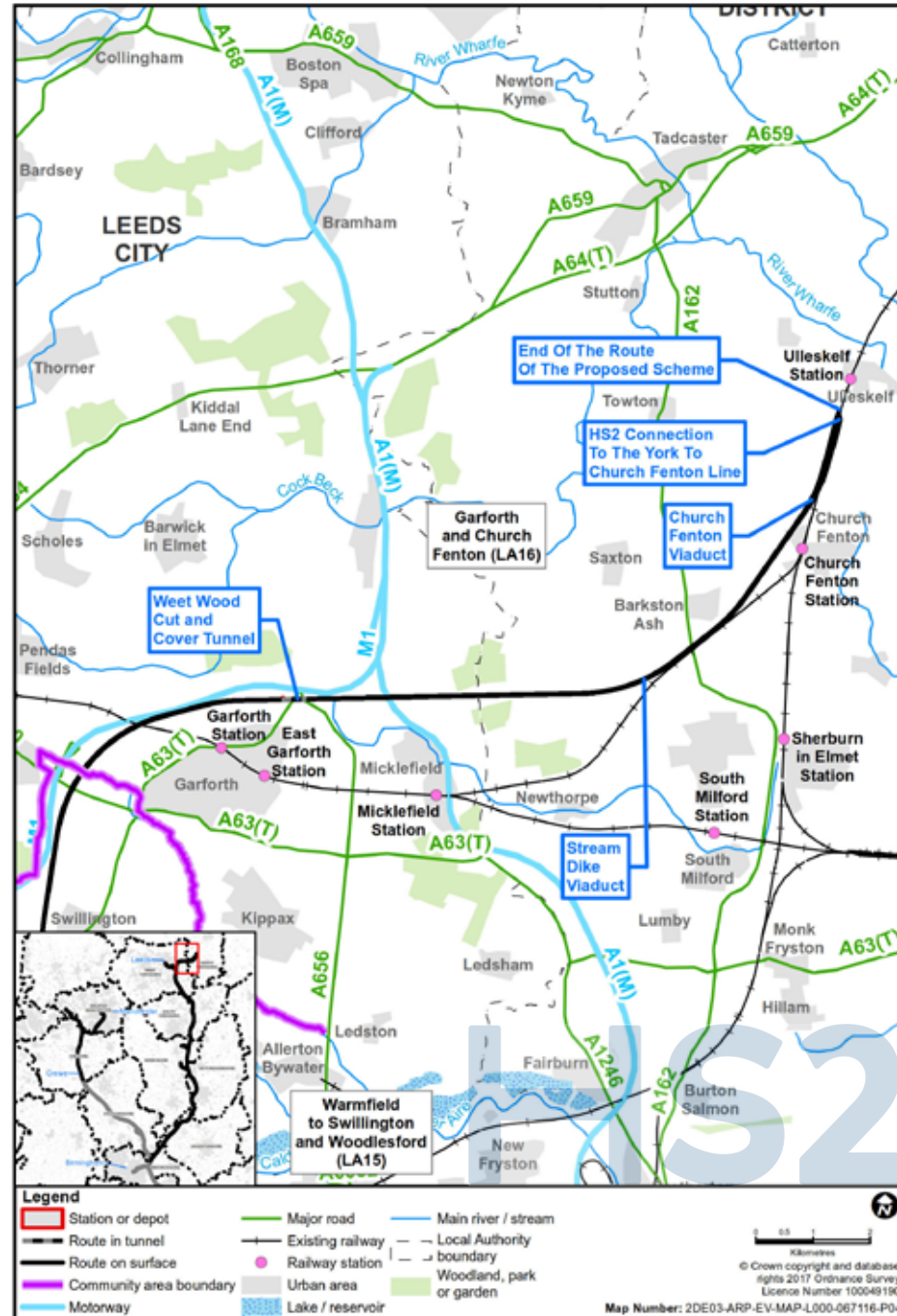


Figure 39: Garforth and Church Fenton area (LA16) context map

The Proposed Scheme

The route would continue from the Warmfield to Swillington and Woodlesford area (LA15) in a north-easterly direction on embankment and into a cutting and onto a bridge over the existing Leeds to Selby Line, before continuing past Garforth in cutting.

The route would then transition onto embankment and into cutting at Micklefield, before entering a tunnel to pass under the A642 Aberford Road and the A656 Ridge Road. From here the route would continue east in cutting, passing under the Great North Road and the A1(M). The route would then continue onto embankment before crossing Stream Dike on viaduct. The route would then continue north-east on embankment then onto viaduct and embankment, where the route would connect to the Leeds lines of the existing York to Church Fenton Line.

Modifications would be required to the existing York to Church Fenton Line Railway, to accommodate the connection of the Proposed Scheme with the existing conventional rail network.

In this area, the Proposed Scheme would require the demolition of five residential properties and five commercial/business properties. There would be permanent diversion of seven roads. The Proposed Scheme would result in the permanent closure, realignment or diversion of 12 public rights of way. Six watercourses would be permanently diverted or realigned. One main construction compound and 11 satellite construction compounds would be required.

Residual effects

This section provides a summary of the likely significant residual environmental effects identified for the Garforth and Church Fenton area at this stage of the design and assessment.

Agriculture, forestry and soils

Construction

It is currently expected that approximately 540ha of agricultural land would be required for construction of the Proposed Scheme in this area, of which approximately 350ha is likely to be high quality agricultural land. Some of this land would be restored following construction, with approximately 190ha permanently

required, 110ha of which is high quality agricultural land. The quality of the land is currently based on publicly available information and will be confirmed in the formal ES once agricultural land surveys are complete, as will the extent of land required permanently for the Proposed Scheme.

To avoid or reduce environmental impacts, soils from the areas required temporarily and permanently for the Proposed Scheme would be stripped and stored. This would enable agricultural land that is required temporarily for construction to be returned to agricultural use. It would also enable soils to be put to other uses, such as support landscape planting.

Construction of the Proposed Scheme would be likely to result in significant effects at 21 farm holdings in this area due to the proportion of land required for the Proposed Scheme. Of the 21 holdings temporarily affected, 12 would also be permanently affected. Land required temporarily would, in accordance with a restoration scheme agreed with the landowner and the relevant planning authority, be returned to the farm holding following the completion of construction.

Community

Construction

Construction of the Proposed Scheme would result in Sandwath Lake being temporarily unusable for its intended purpose of fishing.

Land required to construct the Proposed Scheme would result in the permanent loss of land (15%) from Hawk's Nest Wood in Garforth and land (15%) from Weet Wood in Micklefield, which are regularly used as an area of open space and publicly accessible land.

Ecology and biodiversity

Construction

Construction of the Proposed Scheme would result in temporary impacts on site integrity at Kirkby Wharfe Site of Special Scientific Interest, as it would be adjacent to land required for construction.

Construction of the Proposed Scheme would result in a permanent loss of approximately: 6.6ha (23%) of Hawk's Nest Wood Local Wildlife Site; 3.9ha (18%) of Coburn Hill Wood Local Wildlife Site; 0.4ha (8%) of Haigh's Grass Site

of Importance for Nature Conservation; and approximately 200m² (0.1%) of Patefield Wood Site of Importance for Nature Conservation and Ancient Woodland Inventory Site.

It is currently expected that there would be a permanent loss of approximately 12.5ha of deciduous woodland, 0.1ha of floodplain grazing marsh grassland, 17 ponds, in addition to loss of hedgerows and ancient and veteran trees. The removal and fragmentation of these habitat types has the potential to affect their conservation status as well as potentially resulting in significant effects on bats, great crested newt, birds, terrestrial invertebrates and reptiles.

Significant effects are likely to be experienced by otter and water vole as a result of the loss and fragmentation of water-margin habitats and river corridors. Similarly, white-clawed crayfish, fish and aquatic invertebrates may be significantly affected as a result of habitat loss and construction disturbance.

Operation

During operation of the Proposed Scheme, bats and barn owls would be at risk of mortality caused by passing trains.

Health

Construction

The Proposed Scheme would impact on a range of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health effects, judgements have been made as to the level and type of impact that could potentially affect population health.

Land required for construction of the Proposed Scheme would result in the temporary loss of 75% of Weet Wood, of which 25% would be permanently required for operation of the Proposed Scheme. Land required for the construction of the Proposed Scheme would also result in the loss of 30% of Hawk's Nest Wood, of which 15% would be permanently required for operation. These spaces provides a positive contribution to the wellbeing of the local community and the loss would have an adverse effect on health and wellbeing.

The combination of construction noise, visual and traffic impacts would change the character of neighbourhoods, and may impact on residents' quality of life. For rural communities dependent on shops and services in nearby

towns, temporary closures and diversions of local roads may reduce the accessibility of key services. In addition, levels of physical activity could potentially be affected by disruption to roads and public rights of way that may be used as active travel routes.

The temporary construction workforce is likely to comprise a mixture of local people and workers from further afield. This could mean that local communities see temporary changes to the local population size and demographics.

Operation

The presence of rail infrastructure and noise from passing trains may change the character of surrounding neighbourhoods, and may reduce the quality of life for residents.

Historic environment

Construction

The Proposed Scheme is being designed to reduce impacts on heritage assets as far as reasonably practicable. Construction of the Proposed Scheme would result in a permanent effect on the Grade II listed Barrowby Hall,

through removal of part of a listed wall; and 19 non-designated heritage assets.

Construction of the Proposed Scheme would also permanently affect the setting of the Grade II* listed Huddleston Hall and associated ancillary listed buildings, and the Grade II listed Barrowby Hall. This would result in changes to the way that the buildings are experienced and understood.

Landscape and visual

Construction

The presence of construction works and changes to the existing landform and vegetation patterns would affect the character of the local landscape. Where possible, effects would be reduced by the measures incorporated into the design to reduce the visibility of the Proposed Scheme (for example, land shaping to link earthworks into their wider landscape context, compensatory woodland planting, hedgerow replacement and restoration, and new wetland features to compensate for the loss of ponds).

Construction activities would be visible from 49 viewpoints within the area, for example views

from: residential properties on the north-west of Garforth, north-west of Mickleford, Common Road in Barkston Ash and Church Fenton; Garforth Footpath 5, Barwick Bridleway 12 north of the M1, Footpath 35.70/5/1 south-east of Ulleskelf and Footpath 35.70/4/2 near Outwood Lane south-east of Ulleskelf.

Operation

During operation, the significant effects of the Proposed Scheme on the character and appearance of the local landscape would be substantially reduced over time as mitigation planting grows and matures, however, effects may remain significant.

During operation, the Proposed Scheme would be visible from 22 viewpoints within the area, for example views from: residential properties on the north-west of Garforth, north-west of Mickleford, Common Road in Barkston Ash and Church Fenton; Barwick Bridleway 12 north of the M1 and Footpath 35.70/4/2 near Outwood Lane south-east of Ulleskelf.

Sound, noise and vibration

Construction

Noise from construction could result in significant effects on residential communities closest to the construction works at Garforth, East Garforth, Micklefield, Barkston Ash, Church Fenton and Ulleskelf and at the Rainbow Nursery School in Barkston Ash.

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works.

Further work is currently being undertaken to confirm the likely significant residual construction noise and vibration effects, including any temporary effects from construction traffic. This assessment will be reported in the formal ES.

Operation

Operational noise would be reduced at source through the effective design and specification of the trains and track. A number of measures have also been incorporated into the design of

the Proposed Scheme to mitigate noise effects during operation. These include noise barriers in the form of landscape earthworks and/or noise fence barriers.

Operation of the railway would potentially result in noise effects, due to potential noise increases above recognised thresholds, and hence change in the existing acoustic character around those residential properties closest to the Proposed Scheme on Common Lane and Sandwath Lane in Church Fenton. Further assessment work is being carried out and will be reported in the formal ES.

Further assessment work is currently being undertaken to confirm the likely significant residual effects due to operational noise and vibration, especially at non-residential locations and quiet areas and in terms of establishing existing baseline conditions. This will be reported in the formal ES.

HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid likely significant effects due to noise and vibration. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the potentially affected receptors, their use and the benefit of the measures.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on the following routes: the M1 (junction 47); the A1(M); the A63; the A162 London Road; the A642 Aberford Road; the A656 Ridge Road; the B1217 Aberford Road; the B1222 Bishopdyke Road; the B1223 Raw Lane/New Lane; Great North Road; Ridge Road; Fenton Lane/Ash Lane; and Common Lane. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Construction of the Proposed Scheme is also likely to require the temporary closure, diversion or realignment of the following: the A1(M) northbound; the A1(M) southbound; the A162 London Road; the A642 Aberford Road; the A656 Ridge Road; Great North Road and Saw Wells Lane.

Construction of the Proposed Scheme would require the temporary diversion of bus routes 402, 403, 492 and 494.

Construction activities would result in disruption to rail passengers on the Leeds to Selby Line and potentially rail passengers on the York to Church Fenton Line due to temporary rail possessions.

Temporary closure or diversion/realignment of 12 public rights of way could result in increased journey times for non-motorised users of: Leeds Bridleway 125 (part of the Leeds Country Way); Leeds Bridleway 123; Barwick Bridleway 10; Non-definitive Bridleway Barwick (Nanny Goat Lane); Non-definitive Parlington Bridleway (Bridleway 5); Sturton Grange Footpath 6; Church Fenton Footpath 35.22/1/1; Saxton-cum-Scarthingwell Footpath 35.55/16/1; Saxton-cum-Scarthingwell Footpath 35.55/14/2; Church Fenton Footpath 35.22/6/1; Ulleskelf Footpath 35.70/3/1 and Church Fenton Footpath 35.70/1/1.

Operation

Operation of the Proposed Scheme would require the permanent diversion of Barwick Road, Ridge Road, Coldhill Lane, Common Lane, and Sandwath Lane. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Rail users would benefit from increased rail capacity at the existing Leeds Station and the introduction of high speed services. There would also be released capacity on the existing conventional rail network.

Operation of the Proposed Scheme would result in the permanent closure of Leeds Footpath 122. In addition, operation of the Proposed Scheme would result in the permanent realignment or diversion of the following 11 public rights of way: Leeds Bridleway 125; Leeds Bridleway 123; Barwick Bridleway 10; Parlington Non-definitive Bridleway (Bridleway 5); Garforth Footpath 7a; Garforth Footpath 8; Sturton Grange Footpath 1; Sturton Grange Footpath 6; Micklefield Footpath 1; Micklefield Footpath 11 and Barkston Ash Footpath 35.4/5/2.

8.26 Stourton to Hunslet (LA17)

Overview

The Stourton to Hunslet area (LA17) is approximately 7km in length, extending from Rothwell to Hunslet and comprising a section of the HS2 Leeds spur and the Leeds East rolling stock depot. The area falls within the local authority area of Leeds City (see Figure 40).

The area is predominantly urban, with a mix of residential and industrial areas. To the north of Rothwell, and to the east of the M1, there are some areas of green space and agricultural land. West of the M1, the areas surrounding Stourton and Hunslet are more commercial, characterised by a number of industrial estates and retail parks. The area is dominated by road and rail infrastructure (such as the M1, the M621 and the existing Hallam Line).

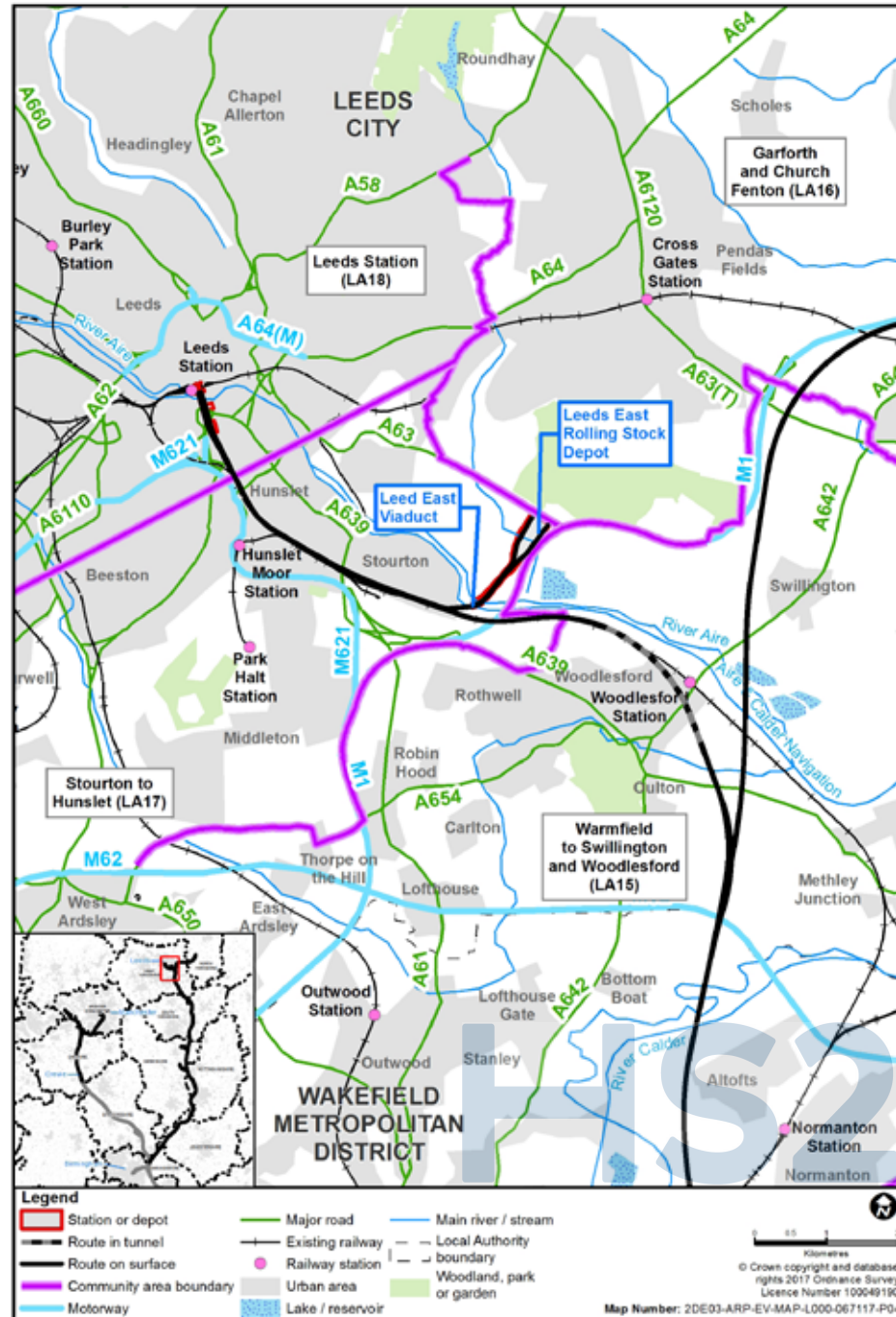


Figure 40: Stourton to Hunslet area (LA17) context map

The Proposed Scheme

The route would continue from the Warmfield to Swillington and Woodlesford area (LA15) westwards in a cutting to the north of Rothwell then cross under the M1 and onto embankment to the south of Stourton. The route would then continue in a cutting in a north-west direction into the Leeds Station area (LA18).

The Leeds East rolling stock depot would provide an operational and maintenance hub for the eastern leg of the Proposed Scheme. The Leeds East rolling stock depot would be 1.6km long and located south-west of the M1 junction 45, in an area between the A63 to the north, the M1 to the east, Yorkshire Water Treatment Works to the west and the River Aire to the south. The depot would include operational buildings; stabling yards; a maintenance shed; a power supply room and wheel lathe; a carriage washing machine and office buildings.

In this area, the Proposed Scheme would require the demolition of three residential properties and 25 commercial/business properties. There would be permanent closure, realignment or diversion of 11 roads. The Proposed Scheme

would result in the permanent diversion of one public right of way. One main construction compound and ten satellite construction compounds would be required.

Residual effects

This section provides a summary of the likely significant residual environmental effects identified for the Stourton to Hunslet area at this stage of the design and assessment.

Agriculture, forestry and soils

Construction

It is currently expected that approximately 27ha of agricultural land would be required for construction of the Proposed Scheme in this area, of which approximately 24ha is likely to be high quality agricultural land. Some of this land would be restored following construction, with approximately 14ha permanently required, all of which is high quality land. The quality of the land is currently based on publicly available information and will be confirmed in the formal ES once agricultural land surveys are complete, as will the extent of land required for the Proposed Scheme.

To avoid or reduce environmental impacts, soils from the areas required temporarily and permanently for the Proposed Scheme would be stripped and stored. This would enable agricultural land that is required temporarily for construction to be returned to agricultural use. It would also enable soils to be put to other uses, such as to support landscape planting.

Community

Construction

Land required to construct the Proposed Scheme would result in the permanent loss of: Leeds Specialist Autism Services and the Queens at Stourton public house on the A639 Wakefield Road; Mecca Bingo on Balm Road; Station Hotel public house on Hillidge Road; and one playing pitch and part of the outdoor space associated with the Hunslet Club on Hillidge Road.

Ecology and biodiversity

Construction

Construction of the Proposed Scheme would result in a permanent loss of approximately 3.5ha (7.5%) of Rothwell Colliery Leeds Nature

Area (known as Rothwell Country Park) in the Stourton to Hunslet area (LA17). Approximately 3.2ha (7%) of the site would also be permanently lost in the Warmfield to Swillington and Woodlesford area (LA15), making a total loss of 6.7ha (14.5%) of the Rothwell Colliery Leeds Nature Area.

It is currently expected that there would be a permanent loss of approximately 5.6ha of broadleaved woodland and 5.1ha of grassland, in addition to hedgerows, a section of the Aire and Calder Navigation, sections of small watercourses, and ancient and veteran trees. The removal and fragmentation of these habitat types has the potential to affect their conservation status as well as potentially resulting in significant effects on bat, bird, great crested newt, terrestrial invertebrate and reptile populations.

Significant effects are likely to be experienced by otter and water vole in watercourses affected by the Proposed Scheme, as a result of the loss of habitat. Similarly, white-clawed crayfish, aquatic invertebrates and fish may be affected as a result of habitat loss and construction disturbance at watercourses and water bodies.

Operation

During operation of the Proposed Scheme, bats and barn owls would be at risk of mortality caused by passing trains.

Health

Construction

The Proposed Scheme would impact a range of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health effects, judgements have been made as to the level and type of impact that could potentially affect population health.

Construction of the Proposed Scheme would result in the permanent loss of: the Leeds Specialist Autism Services at Junction 7 Business Park; one of the playing pitches and part of the outdoor space associated with the Hunslet Club on Hillidge Road; The Queens at Stourton public house; Mecca Bingo on Balm Road; and Station Hotel public house on Hillidge Road. The permanent loss of these facilities would have an adverse effect on health and well-being.

The combination of construction noise, visual and traffic impacts would change the character of the urban area, and may impact on residents' quality of life. Road closures and diversions would have the potential to reduce community connectivity by increasing journey times, particularly on heavily used commuter routes. Opportunities for physical activity may be reduced by the presence of heavy goods vehicles on local roads.

Historic environment

Construction

The Proposed Scheme is being designed to reduce impacts on heritage assets as far as reasonably practicable. Construction of the Proposed Scheme would permanently physically affect 13 non-designated heritage assets, including: the site of Thorpe Hall immediately south of Knowsthorpe Lane; The Queens at Stourton on the A639 Wakefield Road; Station Hotel on Hillidge Road; and the site of Hunslet Union Workhouse to the west of Hillidge Road.

Landscape and visual

Construction

The presence of construction works and changes to the existing landform and vegetation patterns would affect the character of the local landscape. Where possible, effects would be reduced by the measures incorporated into the design to reduce the visibility of the Proposed Scheme (for example, land shaping to link earthworks into their wider landscape context, compensatory woodland planting and hedgerow replacement and restoration).

Construction activities would be visible from 12 viewpoints within the area, for example views from: residential properties on Hillidge Road and Westbury Place North; Pontefract Road; and the Trans Pennine Trail and the Leeds Core Cycle Network 8 Rothwell to Leeds City centre.

Operation

During operation, the significant effects of the Proposed Scheme on the character and appearance of the local landscape would be substantially reduced over time as mitigation planting grows and matures, however, effects may remain significant.

During operation, the Proposed Scheme would be visible from two viewpoints within the area, for example views from: the Trans Pennine Trail, including St Bernard's Way, Paulinus Way and National Cycle Network National Route 67 and the Leeds Core Cycle Network 8 Rothwell to Leeds city centre.

Socio-economics

Construction of the Proposed Scheme would result in a likely significant effect from the loss of land or demolition of buildings and resulting loss or displacement of jobs from the following businesses in the area: a building materials manufacturer on Pontefract Road; and Freightliner Maintenance on Midland Road. Any likely significant residual effects will be assessed and reported in the formal ES.

Sound, noise and vibration

Construction

Noise from construction could result in significant effects on residential communities closest to the construction works at: Woodhouse Hill in Belle Isle, Leeds; and Hunslet and Hunslett Carr in Leeds.

Noise from construction could result in significant effects on the following non-residential properties closest to the construction works: Hunslet Methodist Church in Hunslet Carr; Hunslet St Mary's Church of England Primary School; St Mary the Virgin in Hunslet; and Copper Hill Care Home in Hunslet.

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works.

Further work is currently being undertaken to confirm the likely significant residual construction noise and vibration effects, including any temporary effects from construction traffic. This assessment will be reported in the formal ES.

Operation

Operational noise would be reduced at source through the effective design and specification of the trains and track. A number of measures have also been incorporated into the design of the Proposed Scheme to mitigate noise effects during operation. These include noise barriers in

the form of landscape earthworks and/or noise fence barriers.

Operation of the railway would potentially result in noise effects, due to potential noise increases above recognised thresholds, and hence change in the existing acoustic character around those properties closest to the Proposed Scheme. At this stage of the design, the initial assessment has not identified any effects with the potential to be considered significant on a community basis due to increased noise levels.

Further assessment work is currently being undertaken to confirm the likely significant effects due to operational noise and vibration, especially at non-residential locations and quiet areas and in terms of establishing existing baseline conditions. This will be reported in the formal ES.

HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid likely significant effects due to noise and vibration. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the potentially affected receptors, their use and the benefit of the measures.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on the following routes: the M1 junctions 44 and 45; the M621 Junctions 4, 5 and 7; the A61 Hunslet Distributor Road/Hunslet Distributor Road (south)/South Accommodation Road; the A63 Pontefract Lane; the A639 Leeds Road/Wakefield Road; the B6481 Pontefract Road; Queen Street; Pepper Road, Sussex Avenue; Middleton Road; Winrose Grove; Belle Isle Road; Balm Road; Moor Road; Beza Street; Church Street; and Hillidge Road. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

Construction of the Proposed Scheme is also likely to result in the temporary closure, diversion or realignment of the following: the M1 at junction 44; the M621 junction 4 southbound off-slip; the A61 Hunslet Distributor Road (south); the A61 Hunslet Distributor Road; the B6481 Pontefract Road; Balm Road; Pepper Road; Beza Street; and Hillidge Road.

Construction of the Proposed Scheme has the potential to lead to diversion of bus routes 12, 13/13A, 47, 48, 48A, 61, 74/74A, 86, 86A, 167, 168, 189 and 410.

Construction of the Proposed Scheme could have impacts on parking and loading on some roads that could be used as construction routes and have on-street parking.

Temporary diversion of 10 public rights of way/footpaths could result in increased journey times for non-motorised users on: Aire & Calder Navigation (Navigable Waterway and Towpath); Footpath 1 (Rothwell Bridleway 9) – Trans Pennine Trail; Non-definitive Footpaths Leeds City 9, 10, 4, 1, 2, 3 and 42; and Balm Road.

Temporary closures of the Aire & Calder Navigation, a navigable waterway, may be required during construction.

Operation

Rail users of Leeds Station would benefit from the introduction of HS2 services, with increased rail capacity and improved journey times and from released capacity on the existing rail network, as well as improvements in access to

the station, including by public transport and for drop-off/pick-up.

Operation of the Proposed Scheme would require the permanent diversion, realignment or closure of: the A639 Wakefield Road; Knowsthorpe Lane; Haigh Park Road; Westbury Place North; Queen Street; Pepper Road; Balm Road; Midland Road; Beza Street; Church Street; and Hillidge Road. Increases in traffic could also affect non-motorised users (i.e. pedestrians, cyclists and horse riders) in terms of the ease with which they can cross these routes.

The operation of the Proposed Scheme could result in impacts within this area due to increased traffic associated with increased use of Leeds station in the Leeds Station area.

Operation of the Proposed Scheme has the potential to result in permanent loss of car parking and loading at locations along the route of the Proposed Scheme in the Stourton to Hunslet area.

Operation of the Proposed Scheme would result in the permanent realignment of Rothwell Footpath 1.

8.27 Leeds Station (LA18)

Overview

The Leeds Station area (LA18) is approximately 1.5km in length and falls within the local authority area of Leeds City Council. The area extends from the north of the junction 4 of the M621 to the existing Network Rail Leeds Station, which forms the northern boundary of the area (see Figure 41).

The Leeds Station area (LA18) is entirely urban in character, with land use comprising industrial, commercial, residential, road and rail infrastructure.

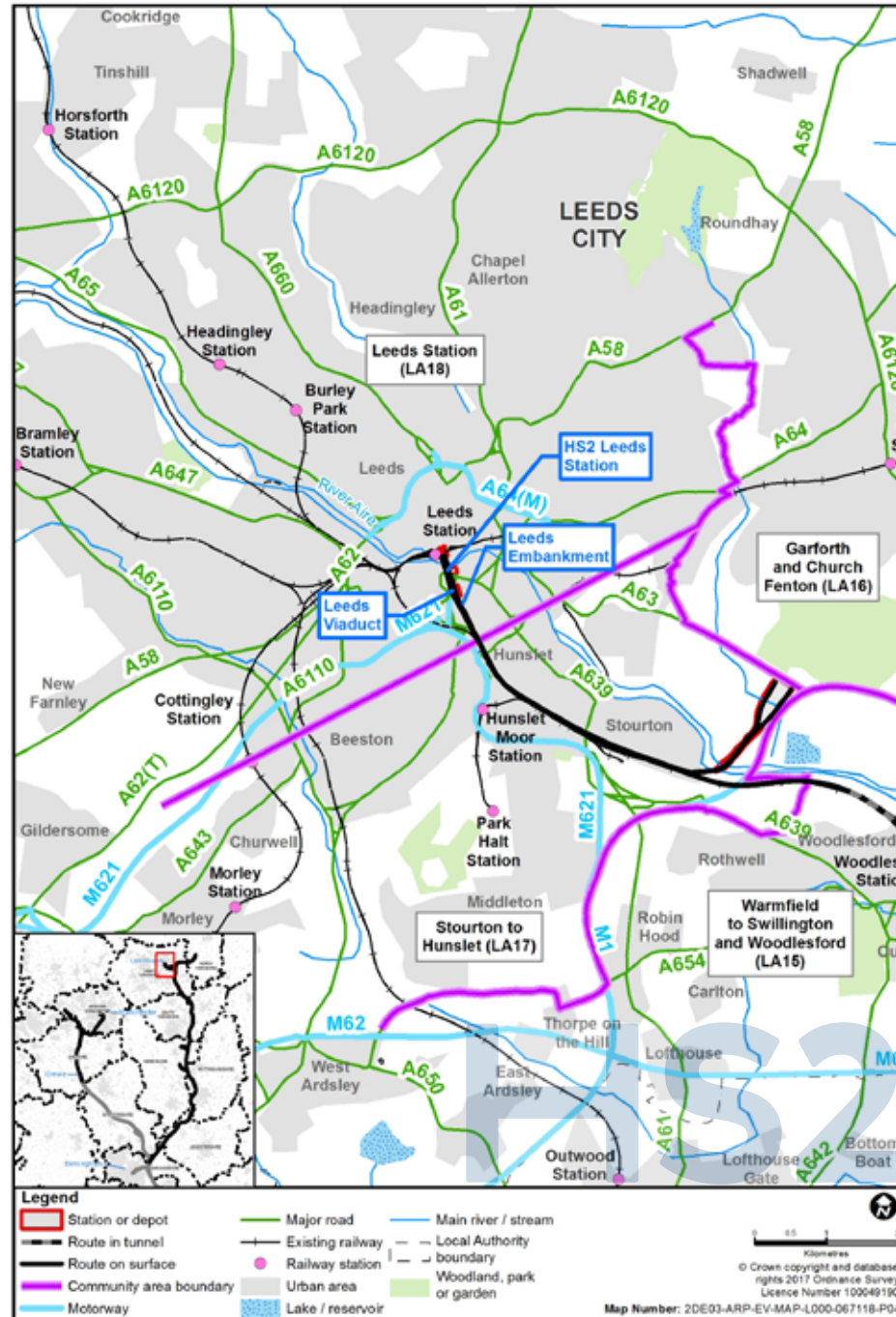


Figure 41: Leeds Station area (LA18) context map

The Proposed Scheme

The Proposed Scheme would continue from the Stourton to Hunslet area (LA17) in a north-westerly direction running on embankment before passing onto a viaduct and continuing to the proposed HS2 Leeds station, which would mark the terminus of the Leeds spur of the Proposed Scheme. The station would span the River Aire and join the southern part of the existing Leeds Station. The proposed HS2 Leeds station would include five platforms and a central and a northern station concourse. In addition, a pick up and drop off access point for cars and taxis, cycle parking, a multi-storey car park, a public walkway and public realm improvements would be provided.

In this area, the Proposed Scheme would require the demolition of 26 commercial/business properties. There would be permanent closure, realignment or diversion of 20 roads. One main construction compound and six satellite construction compounds would be required in this area.

Residual effects

This section provides a summary of the likely significant residual environmental effects

identified for the Leeds station area at this stage of the design and assessment.

Community

Construction

Construction of the Proposed Scheme would require the loss of the Gypsy and Traveller site on Kidacre Street.

Construction of the Proposed Scheme would require demolition of two community facilities and one recreational facility: the Leeds School of Motorcycling on Kidacre Street; Life Church Leeds on Dewsbury Road; and LivingWell Health Club within Hilton International Hotel on Neville Street.

Ecology and biodiversity

Construction

Construction of the Proposed Scheme could result in the permanent loss of ancient and veteran trees. The removal and fragmentation of this habitat types has the potential to affect their conservation status.

Construction of the Proposed Scheme could result in permanent significant effects on bat

due to the loss of roosts and foraging habitat; great crested newt from the loss of two ponds and terrestrial habitat; and bird populations due to loss of foraging and nesting opportunities.

Operation

During operation of the Proposed Scheme, bats would be at risk of mortality caused by passing trains.

Health

Construction

The Proposed Scheme would impact on a range of environmental and social factors that have the potential to affect health. Since there are no accepted criteria for defining 'significant' health effects, judgements have been made as to the level and type of impact that could potentially affect population health.

The permanent loss of community facilities in the area would result in direct impacts on access to recreation and physical activity. These include the loss of the Leeds Hub of Life Church Leeds within Hurley House on Dewsbury Road; the Leeds School of Motorcycling on Kidacre Street;

and the LivingWell Health Club located within the Hilton International Hotel on Neville Street.

The combination of construction noise, visual and traffic impacts would change the character of the urban area, and may impact on residents' quality of life. Road closures and diversions would have the potential to reduce community connectivity by increasing journey times, particularly on heavily used commuter routes. Opportunities for physical activity may be reduced by the presence of heavy goods vehicles on local roads.

Historic environment

Construction

The Proposed Scheme is being designed to reduce impacts on heritage assets as far as reasonably practicable. Construction of the Proposed Scheme would permanently physically affect the following eight non-designated heritage assets: The Wharf Building in the Canal Wharf Conservation Area; former industrial buildings at the junction of Leathley Road and Jack Lane; buildings associated with the former Union Foundry on the northern side of Holmes Street; the assumed route of Roman Road 712; possible remains associated with the former

Brandling's Coal Staith on Meadow Lane; possible remains associated with Camp Hall on Meadow Lane; former Friends Meeting House and its associated burial ground on Meadow Lane; and the site of a possible Anglo-Saxon grave excavated during the early 19th century, on Meadow Lane.

Construction of the Proposed Scheme would result in permanent adverse effects on the setting of two Grade II* listed buildings at Tower Works (the Boiler House Chimney and the Giotto Tower Dust Extraction Chimney) and two Grade II listed buildings (Victoria Bridge and Victoria Mills East and North East Ranges). This would result in changes to the way that the buildings are experienced and understood.

Construction of the Proposed Scheme would also affect the Leeds Canal Wharf Conservation Area, where removal of buildings that currently detract from the historic interest of the area would result in a permanent beneficial effect.

Landscape and visual

Construction

Construction in the area would be seen in the context of the surrounding existing industrial,

commercial and infrastructure uses. However, the scale of the construction works, including the demolition of existing buildings, would alter the character of the area.

Construction activities would be visible from 13 viewpoints within the area, for example view from: residential properties along, and recreational users of, the Leeds and Liverpool Canal and canal towpath; the canal bridge for users of the National Cycle Network Route 66 and for occupiers of residential apartments in Candle House and users of the Leeds and Liverpool Canal and canal towpath and guests of the DoubleTree Hilton hotel; and views west and south-west for recreational users of the Sovereign Square public space and workers in surrounding offices.

Operation

The introduction of prominent new features into the area, including the HS2 Leeds station, viaduct, multi-story car park embankment and associated retaining walls, would result in substantial changes to the character of the area.

During operation, the Proposed Scheme would be visible from nine viewpoints within the area, for example views from: office buildings on City

Walk; the A653 Meadow Road/Dewsbury Road footpath; residential apartments in Candle House and users of the Leeds and Liverpool Canal and canal towpath and guests of the DoubleTree Hilton hotel; and within Sovereign Square public space and workers in surrounding offices.

Socio-economics

Construction of the Proposed Scheme would result a likely significant effect from the loss of land or buildings and the resulting loss or displacement of jobs from the following businesses in the area: Hilton Leeds City Hotel; and Asda Head Office. Any likely significant residual effects will be assessed and reported in the formal ES.

Sound, noise and vibration

Construction

Noise from construction could result in significant effects on residential communities closest to the construction works in the Holbeck area in Leeds Southbank; the Granary Wharf area in Leeds Southbank; and the Brewery Wharf area in Leeds Southbank.

Noise from construction could result in significant effects on non-residential properties including Eiger Music Studios and Vox Exhibition Centre in the Pottery Field area in south Leeds; Clayton Hotel Leeds in the Holbeck area in Leeds Southbank; DoubleTree by Hilton hotel in the Granary Wharf area in Leeds Southbank; and Roomzzz Leeds City hotel in the Brewery Wharf area in Leeds Southbank.

A comprehensive set of mitigation measures, including those in the draft Code of Construction Practice, would be implemented to control noise and vibration throughout the construction works.

Further work is currently being undertaken to confirm the likely significant construction noise and vibration effects, including any temporary effects from construction traffic. This assessment will be reported in the formal ES.

Operation

Operational noise would be reduced at source through the effective design and specification of the trains and track. A number of measures have also been incorporated into the design of the Proposed Scheme to mitigate noise effects

during operation. These include noise barriers in the form of landscape earthworks and/or noise fence barriers.

Operation of the railway would potentially result in noise effects, due to potential noise increases above recognised thresholds, and hence change in the existing acoustic character around those properties closest to the Proposed Scheme. At this stage of the design, the initial assessment has not identified any effects with the potential to be considered significant on a community basis due to increased noise levels.

Further assessment work is currently being undertaken to confirm the likely significant effects due to operational noise and vibration, especially at non-residential locations and quiet areas and in terms of establishing existing baseline conditions. This will be reported in the formal ES.

HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid likely significant effects due to noise and vibration. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the potentially affected receptors, their use and the benefit of the measures.

Traffic and transport

Construction

Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on a number of routes including: the M621 junctions 2 and 3; the A58(M)/A58; the A61 Great Wilson Road/Hunslet Road; Neville Street; the A653 Dewsbury Road/Meadow Road/Meadow Lane/Victoria Road/Great Wilson Street; Sovereign Street; Meadow Lane (north of A61 Great Wilson Street); Swinegate; Jack Lane; Parkfield Street; Cross Myrtle Street; Kidacre Street; Junction Street; Leathley Road; Holmes Street; Wellington Street; Aire Street; Princes Square; Thirsk Row; and Northern Street. Increases in traffic could also affect non-motorised users (i.e. pedestrians and cyclists) in terms of the ease with which they can cross these routes.

Construction of the Proposed Scheme is also likely to result in the temporary closures and diversions or realignments of the following: the A653 Victoria Road; the A653 Meadow Lane; Neville Street; Sovereign Street; and Little Neville Street. These would affect all road users including pedestrians and cyclists.

Construction of the Proposed Scheme would also require the temporary diversion of 13 bus routes that operate along Neville Street, the A653 Victoria Road/Meadow Lane and the relocations of bus stops associated with these routes.

Temporary closure or diversion/realignment of one public right of way, the non-definitive Leeds City Footpath, and diversion of other roadside routes could result in increased journey times for non-motorised users.

Access to the existing Leeds Station would be impacted during construction of the Proposed Scheme, affecting pedestrians, and bus and taxi users.

Rail possessions would be required to undertake localised works within Leeds Station. This could potentially result in disruption to existing conventional rail services.

Operation

Rail users would benefit from improved journey times between major cities in the North, the Midlands and the South as a result of the introduction of HS2 services and released

capacity on conventional rail services operating from Leeds Station.

Operation of the Proposed Scheme would require permanent highway changes affecting all users including pedestrians and cyclists. These include the permanent closure of: Jack Lane; the A653 Great Wilson Street (between the A653 Victoria Road and the A653 Meadow Lane); and New Lane. Neville Street would be closed to vehicular traffic except for public transport (northbound only), servicing and emergency vehicles. Operation of the Proposed Scheme would also require the permanent diversion of: Myrtle Street; Leathley Road; Holmes Street; Kidacre Street; the A653 Victoria Road; the A653 Meadow Lane; City Walk; Manor Road; Water Lane; Little Neville Street; Sovereign Street and Pitt Row. Increases in traffic could also affect non-motorised users (i.e. pedestrians and cyclists) in terms of the ease with which they can cross these routes.

It is currently expected that there would be a permanent loss of car parking at locations along the route of the Proposed Scheme in this area. This would include New Lane and Holmes Street.

8.28 Danesmoor to Brierley Bridge (MML01)

Overview

The Danesmoor to Brierley Bridge area (MML01) is approximately 15km in length, extending from the Stonebroom to Clay Cross area (LA09) to the northern boundary of Chesterfield. The area falls within the local authority areas of North East Derbyshire District Council and Chesterfield Borough Council (see Figure 42).

The area comprises a mix of urban, suburban and rural areas. Around Clay Cross the area is predominantly rural, with a number of industrial estates to the east of Clay Cross. North of Clay Cross junction, the existing Midland Main Line railway passes through a predominantly rural area, occasionally passing close to residential houses and industrial sites on the edges of the urban areas of North Wingfield and Tupton.

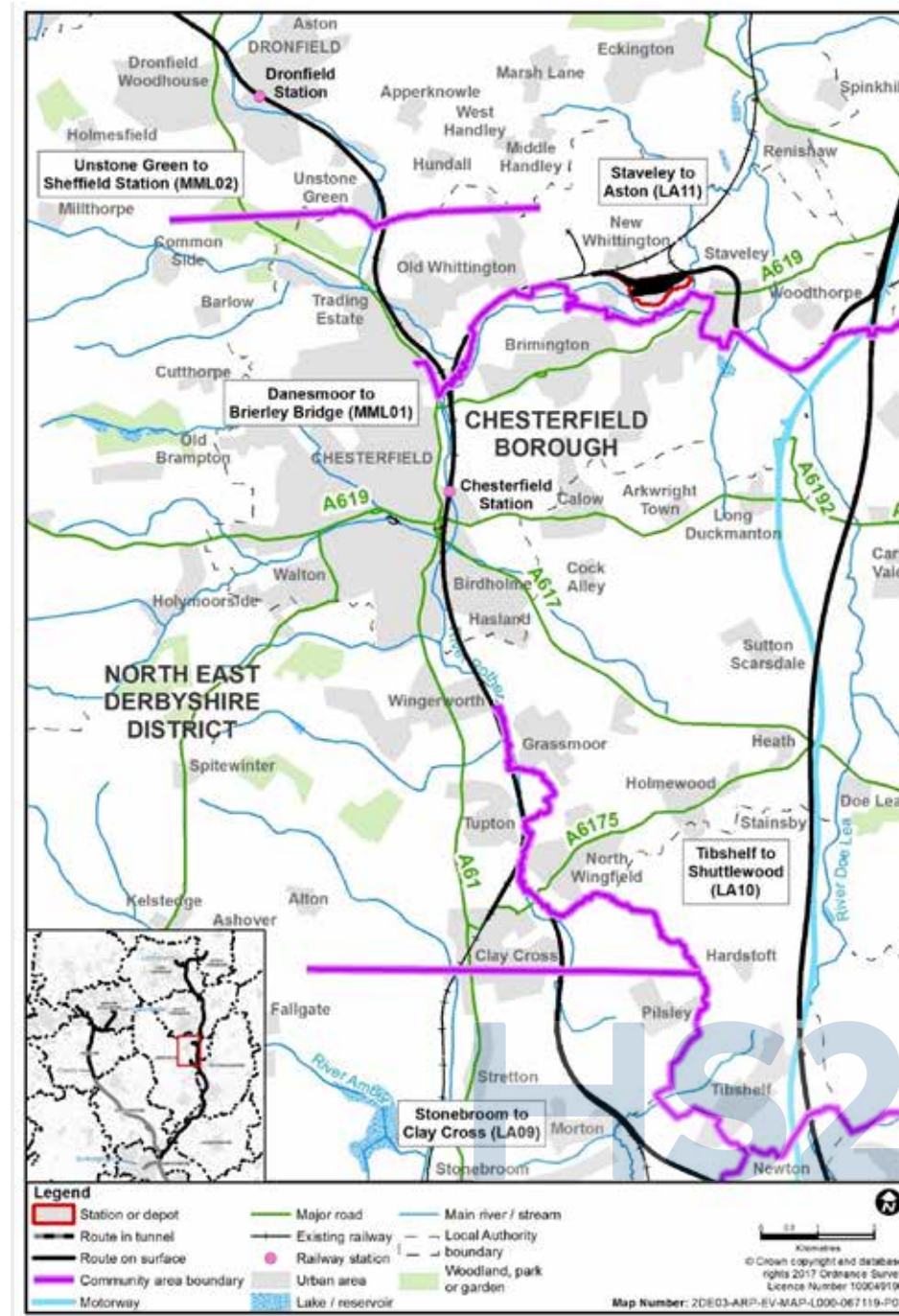


Figure 42: Danesmoor to Brierley Bridge area (MML01) context map

East of Wingerworth, the existing railway lies alongside the site of The Avenue former coking and chemical plant, before reaching the southern edge of Chesterfield. Through Chesterfield the existing railway runs close to residential, industrial and retail areas before passing through Chesterfield Station. The principal settlements are the villages of Clay Cross, North Wingfield, Tupton, Grassmoor and Wingerworth, and the town of Chesterfield.

The Proposed Scheme

The route of the Proposed Scheme would comprise the electrification of an approximate 14.7km section of the existing Midland Main Line and a short section of the Erewash Valley Line. The route of the Proposed Scheme would continue from the Stonebroom to Clay Cross area (LA09) and connect to the existing Erewash Valley Line at Danesmoor to the south east of Clay Cross. The Erewash Valley Line connects to the existing Midland Main Line at Clay Cross Junction to the north. The proposed sections of electrification of the existing Midland Main Line and the Erewash Valley Line form the route of the Proposed Scheme in the Danesmoor to Brierley Bridge area.

Electrification would require alterations to be made to the existing conventional railway, including: the installation of power supply infrastructure (e.g. auto-transformer feeder stations, overhead line equipment and electricity cables); the provision of appropriate clearance at bridges by either raising existing structures or lowering existing track levels; and modifications to existing utilities, public roads, public rights of way and access routes. The design of modifications to Chesterfield Station is ongoing and is being discussed with Network Rail.

Based on the current level of design development it is expected that the works would be largely undertaken within the existing rail corridor. However, there could be a number of locations along the route of the Proposed Scheme where the electrification works would extend beyond the existing rail corridor.

Residual effects

The design and environmental assessment process for the Danesmoor to Brierley Bridge area (MML01) and Unstone Green to Sheffield Station area (MML02) are at an earlier stage

than the other community areas, following the amendment of the route of the Proposed Scheme to include the electrification of a section of the Midland Main Line between Clay Cross and Sheffield Midland Station.

The environmental assessment for the Danesmoor to Brierley Bridge area (MML02) will be further developed as the design progresses. Any residual environmental effects identified will be reported in the formal ES and summarised in this section of the formal ES NTS.

8.29 Unstone Green to Sheffield Station (MMLo2)

Overview

The Unstone Green to Sheffield Station area (MMLo2) is approximately 14.6km in length, extending from Unstone Green to Sheffield Midland Station. The area falls within the local authority areas of North East Derbyshire District Council and Sheffield City Council (see Figure 43).

The southern end of the area is mix of suburban and rural and is interspersed with industrial estates, retail and residential housing. The existing railway enters the 1.8km Bradway Tunnel, under the village of Bradway, before exiting near Dore Junction. The northern end of the area is predominantly urban in character and is a mix of residential, industrial and retail areas with parks and sports grounds. The principal settlements are villages of Unstone Green, Unstone, Bradway and Dore, the town of Dronfield and the city of Sheffield.

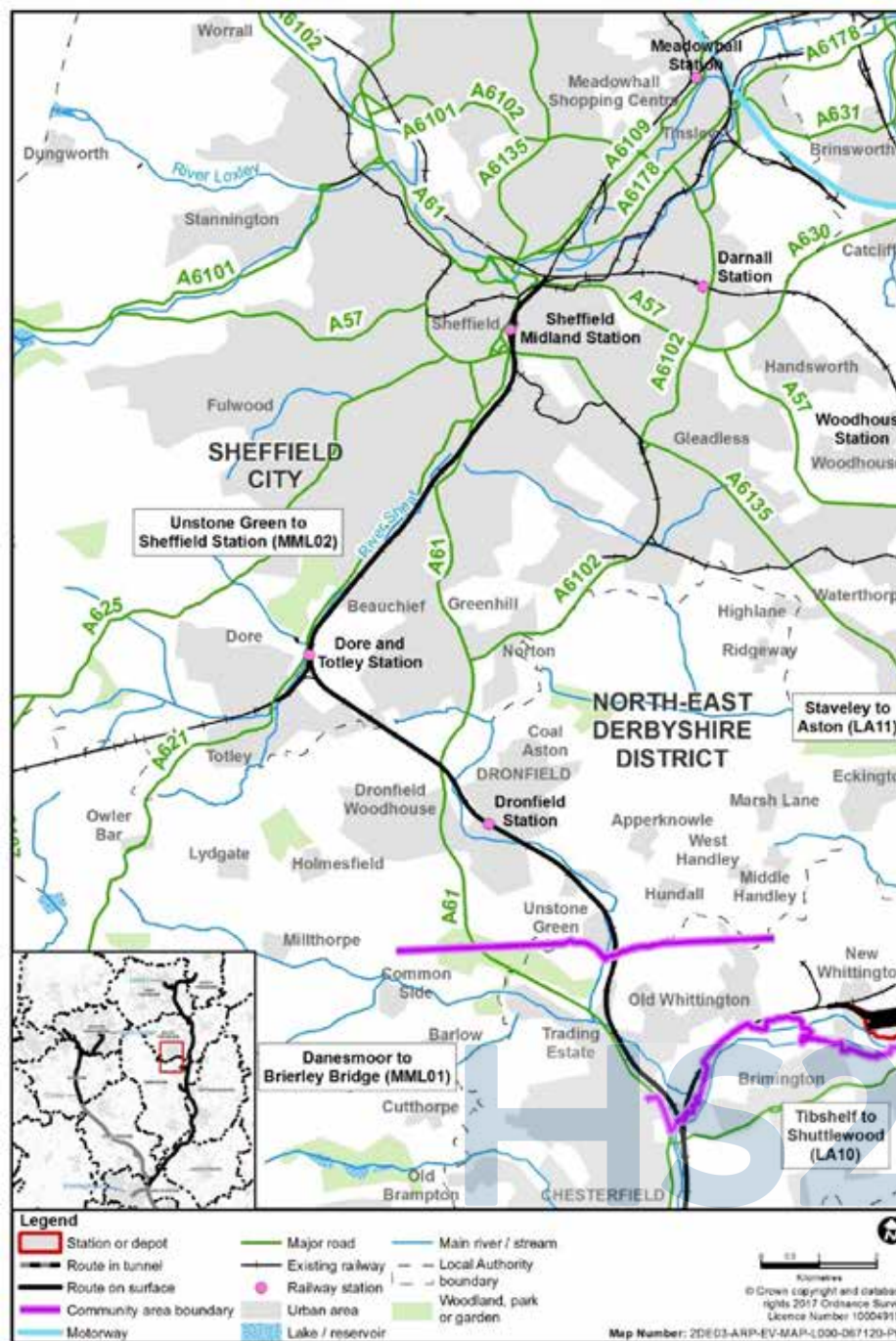


Figure 43: Unstone Green to Sheffield Station area (MMLo2) context map

The Proposed Scheme

The route of the Proposed Scheme would comprise the electrification of the existing Midland Main Line from the northern boundary of the Danesmoor to Brierley Bridge area (MMLo1), north of Chesterfield, and would travel northwards through Dronfield and into Sheffield Midland Station.

Electrification would require alterations to be made to the existing conventional railway, including: the installation of power supply infrastructure (e.g. auto-transformer feeder stations, overhead line equipment and electricity cables); the provision of appropriate clearance at tunnels and bridges by either raising existing structures or lowering existing track levels; and modifications to existing utilities, public roads, public rights of way and access routes. The design of modifications to Sheffield Midland Station is ongoing and is being discussed with Network Rail.

Based on the current level of design development it is expected that the works would be largely undertaken within the existing rail corridor. However, there could be a number of locations along the route of the Proposed Scheme where the electrification works would extend beyond the existing rail corridor.

Residual effects

The design and environmental assessment process for the Danesmoor to Brierley Bridge area (MMLo1) and Unstone Green to Sheffield Station area (MMLo2) are at an earlier stage than the other community areas, following the amendment of the route of the Proposed Scheme to include the electrification of a section of the Midland Main Line between Clay Cross and Sheffield Midland Station.

The environmental assessment for the Unstone Green to Sheffield Station area (MMLo2) will be further developed as the design progresses. Any residual environmental effects identified will be reported in the formal ES.

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9. Summary of route-wide effects

9.1 Introduction

This section of the NTS presents a summary of the likely residual significant environmental effects that have been identified on a route-wide basis. Route-wide effects are those that occur at a larger scale than that presented in the Volume 2: Community area reports and for which a route-wide assessment is therefore appropriate.

9.2 Agriculture, forestry and soils

Construction of the Proposed Scheme is likely to temporarily require approximately 6,214ha of agricultural land. Agricultural land required temporarily would be returned to agricultural use by following good practice guidance set out in the draft Code of Construction Practice. It is considered that there would not be a significant surplus of displaced soils from agricultural land arising from the Proposed Scheme.

Construction of the Proposed Scheme would permanently require approximately 3,536ha of agricultural land, of which approximately 1,296ha is of high quality.

It is currently anticipated that the likely temporary and permanent effects of the

Proposed Scheme on high quality agricultural land would be significant.

Commercial forestry land would be required for the Proposed Scheme. The total area of forestry land required by the Proposed Scheme and the associated effects will be assessed and reported in the formal ES.

Effects on soils to be disturbed will be reported in the formal ES.

The potential for significant effects on sensitive livestock receptors from noise will be assessed and reported in the formal ES.

9.3 Air quality

Measures in the draft Code of Construction Practice would be implemented to manage dust, air pollution and odour during construction. With the implementation of these control measures, it is not predicted that there would be significant air quality effects on a route-wide basis associated with construction of the Proposed Scheme at this stage of design development and assessment. Similarly, it is not predicted that there would be significant adverse route-wide air quality effects during operation.

9.4 Climate change

The greenhouse gas assessment will report on construction and operational emissions associated with the Proposed Scheme in the formal ES. The Proposed Scheme's overall greenhouse gas emissions will be contextualised against UK national greenhouse gas emissions and relevant sectors such as the construction and transport sectors.

A climate change resilience assessment is currently being undertaken to identify the potential risks of climate change on the Proposed Scheme, and to assess the extent to which the Proposed Scheme is resilient to those potential risks. An in-combination climate change impacts assessment that considers climate change impacts in combination with the impacts of the Proposed Scheme on environmental receptors is also being undertaken.

The greenhouse gas assessment, climate change resilience assessment and in-combination climate change impacts assessment will be undertaken at a route-wide level and reported in the formal ES.

9.5 Community

Community effects from the construction and operation of the Proposed Scheme are considered to be of local significance and are reported in the Volume 2: Community area reports. Construction worker impacts on community resources at a route-wide level will be assessed and reported in the formal ES.

9.6 Ecology and biodiversity

Ecology survey and assessment work is ongoing and baseline information regarding ecological features is limited at this stage. The assessment reported in the working draft ES is, therefore, provisional and has been undertaken on a precautionary basis. A fuller assessment of significant effects will be reported in the formal ES.

One site designated as being of international importance for nature conservation would be affected by the construction and/or operation of the Proposed Scheme. Habitats Regulations Screening Assessments undertaken by HS2 Ltd concluded that the Proposed Scheme would cause likely significant effects to the Manchester Mosses Special Area of Conservation, due to the proximity of the site to the Proposed Scheme

and the sensitivity of the site to hydrological changes. The Proposed Scheme would cause likely significant effects at 12 sites of special scientific interest, nine local nature reserves and 111 local wildlife sites.

On the basis of existing information, the land required for the construction of the Proposed Scheme would include the permanent loss of approximately 16.7ha of ancient woodland and 416 ponds. Loss of hedgerows on a route-wide basis will be reported in the formal ES. The design of the Proposed Scheme includes habitat creation in response to loss of habitats, and further areas of habitat creation will be identified and reported in the formal ES.

During operation, there is the potential for significant route-wide effects on some bat species and birds, such as barn owl, due to the risk of mortality due to passing trains. This will be considered further and the findings reported in the formal ES.

9.7 Health

The Proposed Scheme would impact on a range of environmental and socio-economic factors that have the potential to affect the health and wellbeing of the population across the route

as a whole, and also at the wider regional level. The health assessment has considered impacts during construction such as employment and income, housing, transport (traveller stress and road safety) and planning blight and uncertainty; and railway noise during operation.

The Proposed Scheme would result in the displacement of some existing businesses through land required for its construction. When assessed on a route-wide basis, the relocation and loss of jobs as a result of the displacement of businesses is not considered to affect overall employment levels and associated levels of health and wellbeing across the community as a whole.

Certain routes would be subject to significant increases in traffic flows and/or diversions for the medium to long term. Traffic management plans would be produced to ensure no direct adverse health effects associated with road safety, but increased traffic flows and congestion may contribute to traveller stress.

The likely extent of air pollution exposure across the route of the Proposed Scheme as a whole will be reviewed, based on the findings of the air quality assessment, and health effects will be assessed and reported in the formal ES.

Assessed on a precautionary basis, construction of the Proposed Scheme would result in the demolition of a total of 536 residential properties across the route of the Proposed Scheme. Those affected by relocation to a new residential property would be likely to experience adverse effects, which may include: stress associated with the move itself; negative feelings associated with attachment to existing homes; feelings of frustration or anxiety related to uncertainty and lack of control; practical issues such as specific adaptation requirements; and reduced access to family, social networks, employment or education. These effects may occur prior to, during and after the relocation process.

During the operation of the Proposed Scheme, residents along the route could be exposed to noise from passing trains. Potential effects resulting from the noise assessment will be reported in the formal ES.

9.8 Historic environment

The Proposed Scheme would not have a direct physical effect on any World Heritage Site, registered park and garden or registered battlefield. The Proposed Scheme would

physically affect one scheduled monument; 12 Grade II listed buildings; and 12 conservation areas. Mitigation of the effects of the Proposed Scheme on the historic environment would include a programme of historic environment investigation, recording, reporting and archiving guided by a research and delivery strategy.

Historic environment assessment undertaken for the working draft ES is provisional. As a result it is not possible to identify specific physical effects on heritage assets resulting from operation of the Proposed Scheme. An assessment of operational effects of the Proposed Scheme will be presented in the formal ES.

9.9 Land quality

With the application of the draft Code of Construction Practice and site-specific remediation where required, no significant adverse effects are anticipated during construction in respect of land contamination. The Proposed Scheme overlies a number of sand and gravel and salt deposit mineral safeguarding areas. Where reasonably practicable, exploitation of these resources before or during the construction phase, in areas not directly

affecting the railway, would reduce the impact on these sand and gravel deposits for future use. With this mitigation, it is considered that, on a route-wide basis, the adverse effects on mineral resources would not be significant. Discussions with mineral/land owners, the Mineral Planning Authority and other relevant stakeholders would assist in achieving effective management of minerals.

Any adverse contamination effects during operation through the use of the infrastructure maintenance depots, auto-transformer stations and high speed trains would be controlled through environmental protocols, and are not anticipated to be significant.

9.10 Landscape and visual

No significant adverse route-wide effects are anticipated on landscape and visual receptors arising from the construction or operation of the Proposed Scheme. The landscape and visual impact assessment considers potential effects on The National Forest and The Northern Forest. New woodland planting would be provided as an integral part of the Proposed Scheme, using species composition, planting types and planting density appropriate to specific

areas. This new planting would compensate for loss of woodland and would provide habitat connectivity, enhanced landscape/green infrastructure connectivity, visual screening, connectivity of historic landscape features, where reasonably practicable.

The Proposed Scheme would result in the net gain of approximately 1,225ha of woodland within the Northern Forest, which would contribute to the target of establishing over 100,000 hectares of woodland in the next 25 years. It is anticipated that the operation of the Proposed Scheme would result in a significant beneficial effect on woodland cover on a route-wide basis.

9.11 Major accidents and disasters

The route-wide assessment considers major accident and disaster scenarios during both the construction and operation of the Proposed Scheme.

The design, management, operation and maintenance of the Proposed Scheme must comply with legal requirements around health, safety and environmental risks. The assessment of any likely significant effects arising directly from the Proposed Scheme, if it were to be

affected by a major accident and/or natural disaster, assumes that compliance with relevant legislation is embedded in the Proposed Scheme.

HS2 Ltd will design, build and operate the railway to meet or better the performance standard of HS1, and to reduce safety risks as far as reasonably practicable and in line with best current international practice. This commitment provides the framework within which the risk of major accidents and/or natural disasters impacting the environment would be managed, and applies through the entire supply chain.

Given the processes that are known to be in place, and the resulting measures that would be introduced to avoid and/or reduce the vulnerability of the Proposed Scheme to major accidents and/or natural disasters, no significant environmental effects are expected as part of the provisional assessment in this working draft ES. A complete assessment of significant effects will be reported in the formal ES. Measures to avoid and/or reduce the vulnerability of the Proposed Scheme to major accidents and natural disasters are subject to review under other legislative processes in addition to those established by the hybrid Bill.

9.12 Socio-economics

The route-wide assessment for socio-economics considers the overall changes to employment levels arising from the construction and operation of the Proposed Scheme.

At a route-wide level the Proposed Scheme is expected to generate the equivalent of approximately 8,870 full-time construction jobs, which is considered a significant beneficial effect. The construction works would also generate additional demand for goods and services in the local area, which could stimulate business growth and opportunities to generate further employment (equivalent to 4,440 full-time jobs), which would be a major beneficial effect and would, therefore, be significant.

Construction of the Proposed Scheme would result in the displacement of some existing businesses through land requirements. It is considered that this would result in the relocation of approximately 11,600 jobs. It is not possible at this stage of scheme development to predict accurately the numbers of jobs at risk of being lost route-wide (as a result of businesses failing to relocate and closing, or relocating and contracting, and employees being unable to find work in the short term). However, based

on assumptions, it is currently considered that approximately 1,600 jobs could be lost route-wide from businesses affected during construction. In the context of the economies of the North West, Yorkshire and the Humber, the West Midlands and the East Midlands, which provide over 10.5 million jobs, the potential level of job loss is a relatively small proportion of total employment.

At this stage in design the socio-economic assessment has not identified any businesses that would be directly affected (either negatively or beneficially) by the operations of the Proposed Scheme beyond those already covered in the construction phase analysis. The results of the assessment will be reported in the formal ES.

9.13 Sound, noise and vibration

Noise and vibration effects from construction activities will be confined to local areas around construction operations. Construction noise and vibration effects have been assessed on a local basis and are described for each community area in the Volume 2: Community area reports.

During the operational phase of the Proposed Scheme, noise from passing trains may affect residents and other sensitive receptors (including schools, churches, hospitals and offices), however, these would be local-level effects. It is considered that there would be no significant adverse noise or vibration effects on a route-wide basis associated with the construction or operation of the Proposed Scheme. The results of the assessment will be reported in the formal ES.

9.14 Traffic and transport

Traffic and transport effects during construction and operation are being considered at a regional and route-wide level. The traffic and transport assessment is largely based upon the output from transport models, which rely on economic modelling and assessment. The results of the traffic and transport assessment will be reported in the formal ES.

Reductions in travel times and additional journey opportunities on both HS2 services and on the conventional rail network will result in benefits to users. The transfer of passengers from the conventional rail network and from mode transfer from private vehicles will result

in benefits through reducing forecast future congestion on both the strategic highway and the conventional rail network. The changes to travel times and journey opportunities, together with the extent of reduction in vehicle kilometres as a result of the Proposed Scheme will be reported in the formal ES.

9.15 Waste and material resources

Construction of the Proposed Scheme would be undertaken in accordance with the measures set out in the draft Code of Construction Practice. This includes plans to reduce waste generated from construction activities where reasonably practicable; reuse soil and agricultural subsoil close to the point of excavation; and reuse excavated material that is either uncontaminated or can be cleaned.

Based on the design approach adopted for the Proposed Scheme, it is forecasted that approximately 142 million tonnes of material would be generated throughout the 10-year construction period, of which over 71% (approximately 93.4 million tonnes) would be diverted from landfill. This would be achieved by reusing suitable excavated material to construct the necessary engineering and environmental

mitigation earthworks along the route of the Proposed Scheme and reusing, recycling or recovering construction and demolition wastes where feasible.

This would leave approximately 4.2 million tonnes of non-hazardous material and approximately 188,000 tonnes of hazardous material to be disposed as waste to landfill, which would result in minor adverse environmental effects.

Operational waste would arise from passengers travelling in trains, from track maintenance and the operation of depots and signalling locations. It is forecast that approximately 1,205 tonnes of railway station and train waste would require off-site disposal to landfill in 2034. It has been assumed that for the purposes of this assessment that all railway station and train waste requiring off-site disposal to landfill would be sent to non-hazardous waste landfill.

The quantity of rolling stock maintenance waste that will require off-site disposal to landfill in 2034 would be approximately 4,200 tonnes. It has been assumed that the major portion of rolling stock maintenance waste requiring off-site disposal to landfill would be sent to

non-hazardous waste landfill. The potential for hazardous waste from rolling stock maintenance is negligible. Any hazardous wastes would be disposed to hazardous waste treatment and disposal facilities.

It is estimated that track maintenance would generate approximately 15,400 tonnes of waste during the first year of operation in 2034, 97% of which would be diverted from landfill. Approximately 419 tonnes would require disposal to landfill.

Around 336 tonnes of waste would be generated in the first year of operation, from the operation of the infrastructure maintenance depot; signalling equipment; and operations and maintenance sites. Of this total, 135 tonnes would likely be sent to landfill with the remaining diverted for reuse, recycling and recover. The potential for hazardous waste generated from operation is negligible. Any hazardous wastes would be disposed to hazardous waste treatment and disposal facilities.

Overall, the first year of operation would result in approximately 6,467 tonnes of waste being sent to landfill, which would be non-

hazardous waste, and would result in negligible environmental effects.

During operation of the Proposed Scheme waste generation would be kept as low as reasonably practicable.

9.16 Water resources and flood risk

The overall effects of the Proposed Scheme on surface and groundwater bodies is being considered with specific reference to how the Proposed Scheme complies with the statutory requirements of the Water Framework Directive. A Water Framework Directive compliance assessment will be reported within the formal ES.

The potential risk to water resources associated with accidents or spillages from trains using the Proposed Scheme during its operational phase is being assessed. The results of this assessment will be reported in the formal ES.

It is currently anticipated that the effects of the Proposed Scheme related to route-wide flood risk would not be significant. This will be confirmed through on-going modelling and assessment and will be reported in the formal ES.

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10. Summary of off-route effects

10.1 Introduction

The off-route effects assessment describes the likely residual environmental effects associated with: changes and/or works at off-route railway stations; modifications to the conventional railway lines (including the West Coast Main Line and East Coast Main Line); modifications to existing highways at off-route locations; and potentially new depots and service centres.

It should be noted that the requirement for off-route works often arises at a later stage in the scheme development process. At the time of producing the working draft ES limited information on the types of off-route works and their likely locations is available. The off-route effects assessment reported in the working draft ES includes as much information as possible at this point in time and the full environmental assessment of off-route effects will be reported in the formal ES.

10.2 Off-route railway stations

Off-route railway stations potentially affected by the Proposed Scheme fall into two separate categories:

- Existing railway stations on the conventional railway network, to the north of the Proposed Scheme on the West Coast Main Line corridor and the East Coast Main Line corridor, where physical works would be required. These works may be required to accommodate longer 400m HS2 trains introduced by the Proposed Scheme, or be due to existing capacity constraints necessitating additional infrastructure to accommodate HS2 trains. These are expected to include stations at: Preston; Carlisle; and York. Other stations may also fall within this category and, if so, will be identified in the formal ES.
- railway stations elsewhere on the conventional railway network and at HS2 Phase One stations where operation of the Proposed Scheme would result in an increase in passenger numbers, resulting in an increase in the numbers of vehicles accessing/leaving a station. Modelling information for these stations is not currently available but will be reported in the formal ES.

It is currently expected that the environmental assessment of off-route railway stations to be reported in the formal ES may include the following environmental topics: agriculture, forestry and soils, air quality, community,

ecology and biodiversity, historic environment, landscape and visual, sound, noise and vibration and traffic and transport.

10.3 Off-route depots and service centres

Some HS2 trains may be stabled overnight at existing or new rail depots remote from the route of the Proposed Scheme. These off-route depots will be required to accommodate the overnight stabling, cleaning and servicing of some HS2 trains during operation of the Proposed Scheme.

For the working draft ES only limited information is available, as design and optioneering work is at an early stage. At the current stage of design, a need for three off-route depots has been identified. These include one in between Carlisle, Glasgow and Edinburgh near the West Coast Main Line; one near to the York area; and one near to the Tyne and Wear area.

10.4 Modifications to the conventional railway network

Modification works would be required at a number of locations on the conventional railway network, including the West Coast Main Line and East Coast Main Line. These works would be required to facilitate train operations that would occur as a result of the Proposed Scheme. The proposed works would also help to ensure that best use is made of existing rail capacity, while maintaining operational flexibility. Typically the works require the installation of new track switches and crossings, replacement or installation of crossings, provision of freight loops and supporting signalling, electrification and other rail systems infrastructure as required. Generally, these works fall within the existing conventional railway boundary.

To facilitate the HS2 services that will run on the conventional railway network, there is a need to make minor modifications to the track alignment in four locations on the western leg (Lily Lane to South Preston; Carlisle to Carstairs; Carstairs to Glasgow; and Carstairs to Edinburgh) and four locations on the eastern leg

(Sheffield loop - North of Sheffield to Clayton Junction; Ulleskelf to Colton - electrification works; York station to Skelton Bridge junction; and Northallerton to Newcastle).

10.5 Off-route highway modifications

It is expected that there would be a requirement for a number of off-route highway and junction modifications. The purpose of such modifications is to ensure relevant highways, remote from the route of the Proposed Scheme, can accommodate construction and operational traffic generated by off-route elements of the Proposed Scheme.

Modification works may include: kerb realignments and widening at junctions to allow safe turning and passing of construction vehicles.

The exact location and types of work required will be assessed and reported in the formal ES.

10.6 Power supply

A need to consider power supply for the western leg of Phase 2b to Manchester has been identified, and in particular the feasibility of connecting HS2 Phase 2b traction supplies near

Crewe to the National Grid. The estimated power supply connection date is 2027 when HS2 Phase 2a infrastructure is due to complete. A further increase in power consumption is anticipated to occur when operation of Phase 2b is due to commence in 2033.

New power supply connections may be required in off-route locations to provide enough power to run the forecasted train service. Once confirmed, the proposals will be assessed and reported in Volume 4: Off-route effects of the formal ES.

It is also possible that new power supply connections may be located within community areas to provide enough power to run the forecasted train service. Once confirmed the proposals would be assessed and reported in Volume 2: Community area reports of the formal ES.

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