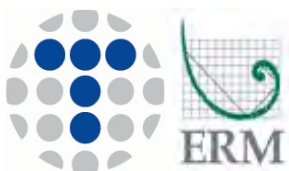


Options for Phase 2 of the high speed network

Appraisal of Sustainability



March 2012

PREFACE

This report was submitted to Government by HS2 Ltd at the end of March 2012 and is part of a suite of documents produced to provide preliminary advice to Government on potential options for phase two of the high speed rail network.

For details of the initial preferred scheme selected by Government, please see the Command Paper “High Speed Rail: Investing in Britain’s Future Phase 2: Leeds, Manchester and beyond”. The initial preferred scheme will form the basis of further engagement. A preferred scheme will be published in 2013 that will form the basis of full public consultation.

Anyone reading the March 2012 reports should be aware of the following:

- The reports describe the development of options. The base proposition referred to is not a recommended or preferred scheme.
- The reports describe route and station options serving Heathrow T5. The options do not reflect an initial preferred scheme. The Government has announced its intention to suspend work on high speed rail options to Heathrow until the Airports Commission has reported.
- Where the Ordnance Survey Licence Number is shown on maps it should read 100049190.

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1. Introduction

1.1. Purpose of the report

- 1.1.1. The Government is proposing the development of a national high speed rail network linking London with Manchester and Leeds via the West Midlands (HS2). The link between London and the West Midlands forms Phase 1 of this network. It has been the subject of an Appraisal of Sustainability (AoS) during 2009/10, the findings of which were published in February 2011¹. Following national public consultation during summer 2011, certain refinements were made to the proposals. In January 2012 the Government announced its intention to progress the scheme and to introduce a hybrid bill by the end of 2013 to provide the necessary powers to construct and operate Phase 1. The Phase 1 proposals are currently the subject of an Environmental Impact Assessment (EIA).
- 1.1.2. This report (prepared by Temple-ERM and hereafter referred to as the *AoS Options Report*) summarises the sustainability performance of the various route, station and depot options that are to be considered by the Secretary of State (SoS) and from which Phase 2 of HS2 would be determined. Phase 2 is defined by two strategic corridors that diverge north-east of Birmingham from Phase 1 of HS2, one passing west of the Pennines, crossing Staffordshire and Cheshire to Manchester; and the other passing east of the Pennines via new stations in the East Midlands and South Yorkshire to Leeds, with onward connections respectively to the West Coast Main Line (WCML) and East Coast Main Line (ECML). A number of route, station and depot options occur within each corridor. A direct link with Heathrow Airport from Phase 1 is also included within the Phase 2 proposals.
- 1.1.3. The route options can be combined in various ways, with certain sections interchangeable between common points (nodes) in order to create different whole route combinations. Each option has been considered in terms of cost, ease of build, journey time and sustainability. This report addresses the last of these, describing the sustainability performance for each option. The wider considerations of business case, engineering and passenger demand, as well as sustainability, are together considered within the main *Options for phase two of the high speed rail network* report. Separate engineering reports have also been produced, and form companions to the AoS Options Report through their detailed engineering descriptions of the options.

1.2. Appraisal of sustainability

Main objectives

- 1.2.1. Sustainability embraces considerations of economic development and job opportunities, and effects on communities, as well as environmental matters such as landscape, natural environment and climate change; a full list of sustainability topics addressed in this report is given in Section 2.1.
- 1.2.2. The term 'appraisal of sustainability' refers to the process used to
- determine the sustainability impacts of different options and, eventually, determine the sustainability performance of a single preferred scheme;

¹ Available at the DfT website: <http://highspeedrail.dft.gov.uk/library/documents/appraisal-sustainability>.

- advise engineers and HS2 Ltd during scheme design of particular sustainability constraints and opportunities;
- advise HS2 Ltd of the relative sustainability advantages and disadvantages of different options at key decision stages; and
- formally report the sustainability performance of the options and, eventually, a preferred scheme.

Development of the AoS process

- 1.2.3. The AoS process follows and builds on the approach used for Phase 1 of HS2, which was developed in consultation with specific statutory agencies and government departments. The AoS process incorporates a range of sustainability appraisal and assessment techniques. In particular the European Strategic Environmental Assessment (SEA) Directive was fundamental in determining the overall appraisal framework. Although the scheme would not qualify as either a plan or a programme under the terms of the Directive, the AoS process takes into account its requirements.

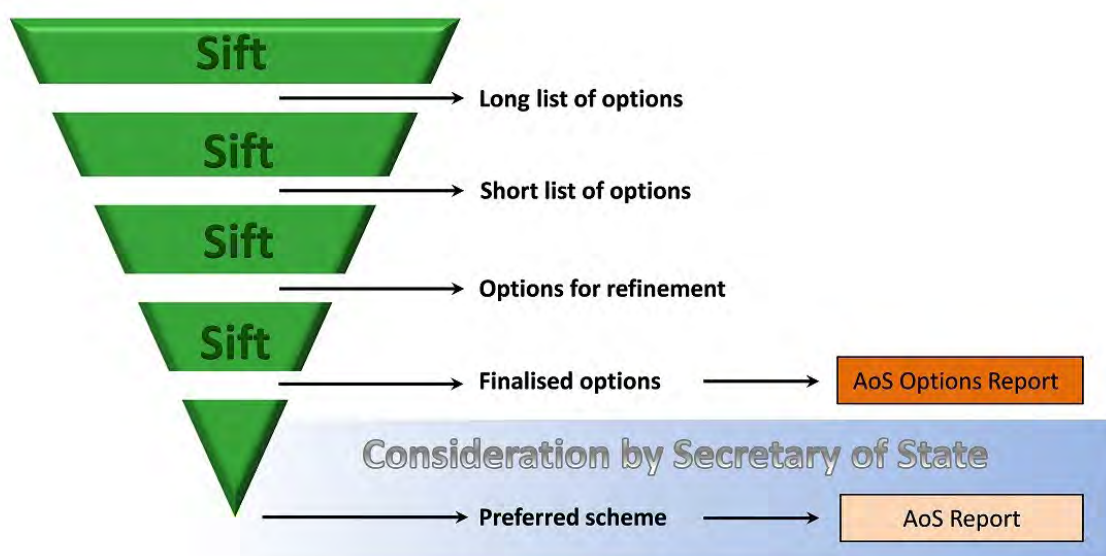
Supporting the designs

- 1.2.4. The AoS has provided guidance to the engineers in designing options and has informed comparisons when deciding which options to progress to the next stage. The level of appraisal has been commensurate with the engineering detail at each stage. In order to reduce the risk of blight, the process to date has not involved wide consultation, except for certain aspects of appraisal work, particularly around stations, where key stakeholders have been engaged in confidence.

Reporting sustainability performance

- 1.2.5. This reporting stage is currently concerned with the sustainability performance of various route section (including stations) and depot options to Manchester and Leeds, as well as the link to Heathrow (see Section 1.3). At a later stage, an initial preferred scheme will be identified by the Secretary of State, and a summary report of its sustainability impacts will be published. Subsequently, following consultation by the Secretary of State, a full AoS report will be produced that focuses on a single preferred scheme (see Section 1.6). This will be the subject of public consultation.
- 1.2.6. The AoS process has consisted of a sequentially more detailed appraisal of options. At the end of each appraisal stage or sift, sustainability performance was formally considered alongside other cost, operational and engineering information by HS2 Ltd, who decided which options should be progressed to the next sift. The selected options then entered the next sift for more detailed appraisal. The options that have emerged from this process are the main subject of this report.
- 1.2.7. Figure 1.1 illustrates the sequence of sifts aimed to reduce the number of options in play. In the later stages, the engineering and sustainability teams worked on the remaining options to mitigate the predicted impacts by refining the vertical and/or horizontal alignments and by introducing certain structures such as green tunnels, viaducts or cuttings with retained walls. In this way, the route development process has ensured that mitigation is inherent within the designs from the outset.

Figure 1.1 Sifting has reduced and improved the options



1.3. The scheme options

- 1.3.1. This report focuses on 42 separate route sections for Manchester (including stations), 32 for Leeds (including stations), eight different depot options, and three Heathrow options (two routes and one station). These options are grouped as follows.

Manchester corridor	Leeds corridor
<ul style="list-style-type: none"> West Midlands to Manchester outskirts Manchester approaches and terminus Interchange stations Intermediate stations West Coast Main Line connection Depots 	<ul style="list-style-type: none"> West Midlands to Leeds outskirts Leeds approaches and terminus East Midland intermediate stations South Yorkshire intermediate stations East Coast Main Line connection Depots
Heathrow options	
<ul style="list-style-type: none"> Connections to mainline and station option 	

- 1.3.2. Figure 1.2 and Figure 1.3 show all of the route options and the way they are divided into the route sections described later in the report. More detailed plans are included within the description of the sustainability performance for each option. Figure 1.4 shows the Heathrow link options and proposed station.
- 1.3.3. The Manchester and Leeds routes and stations options can be used to form various whole route combinations. There are 144 possible whole route combinations for Manchester and 112 for Leeds. Section 15 of the AoS Options Report summarises the sustainability performance of one such combination - termed the base proposition. The base proposition has been developed as the basis for an analysis of the business case (see the main *Options for phase two of the high speed rail network* report).

Figure 1.2 Map of Manchester options

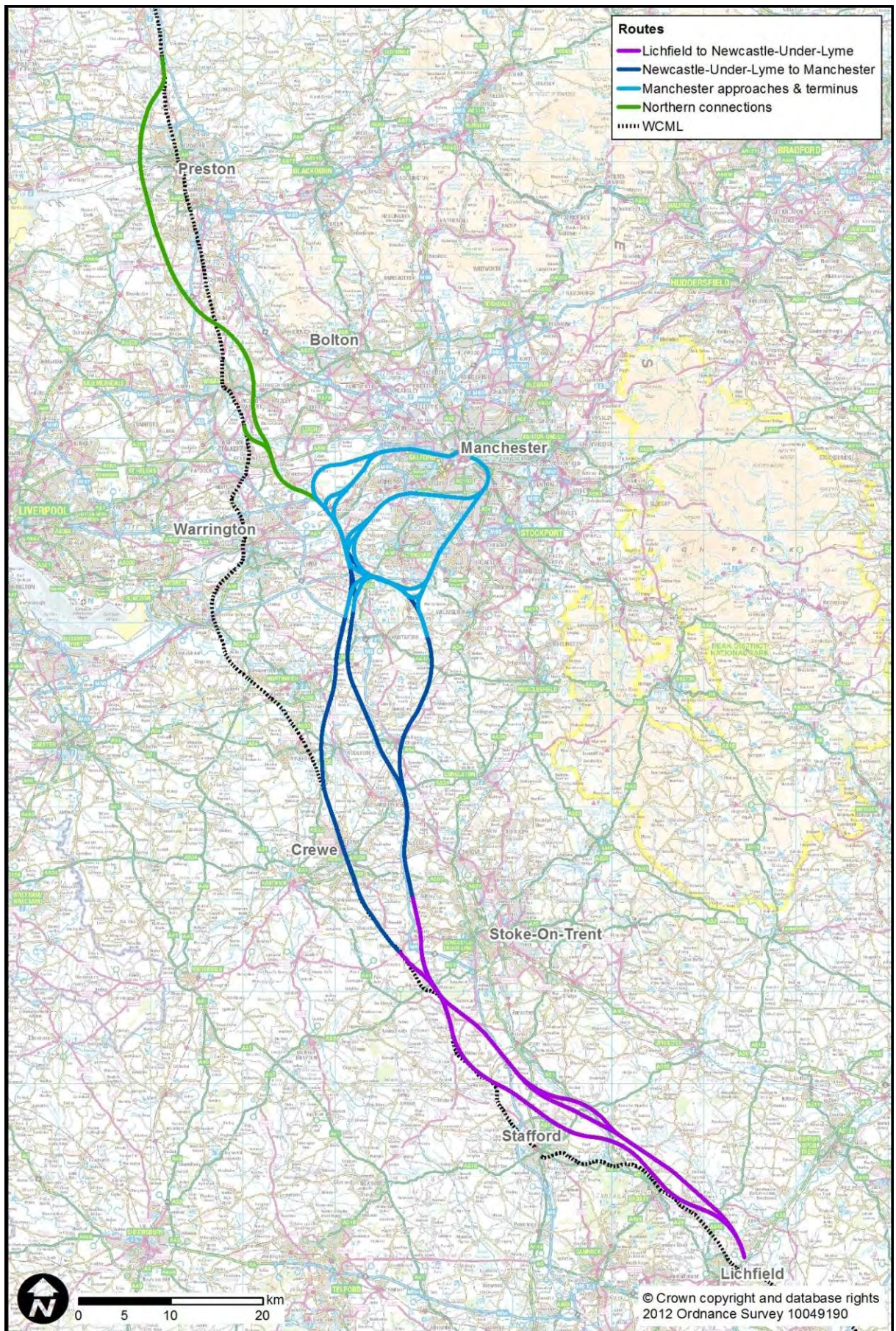


Figure 1.3 Map of Leeds options

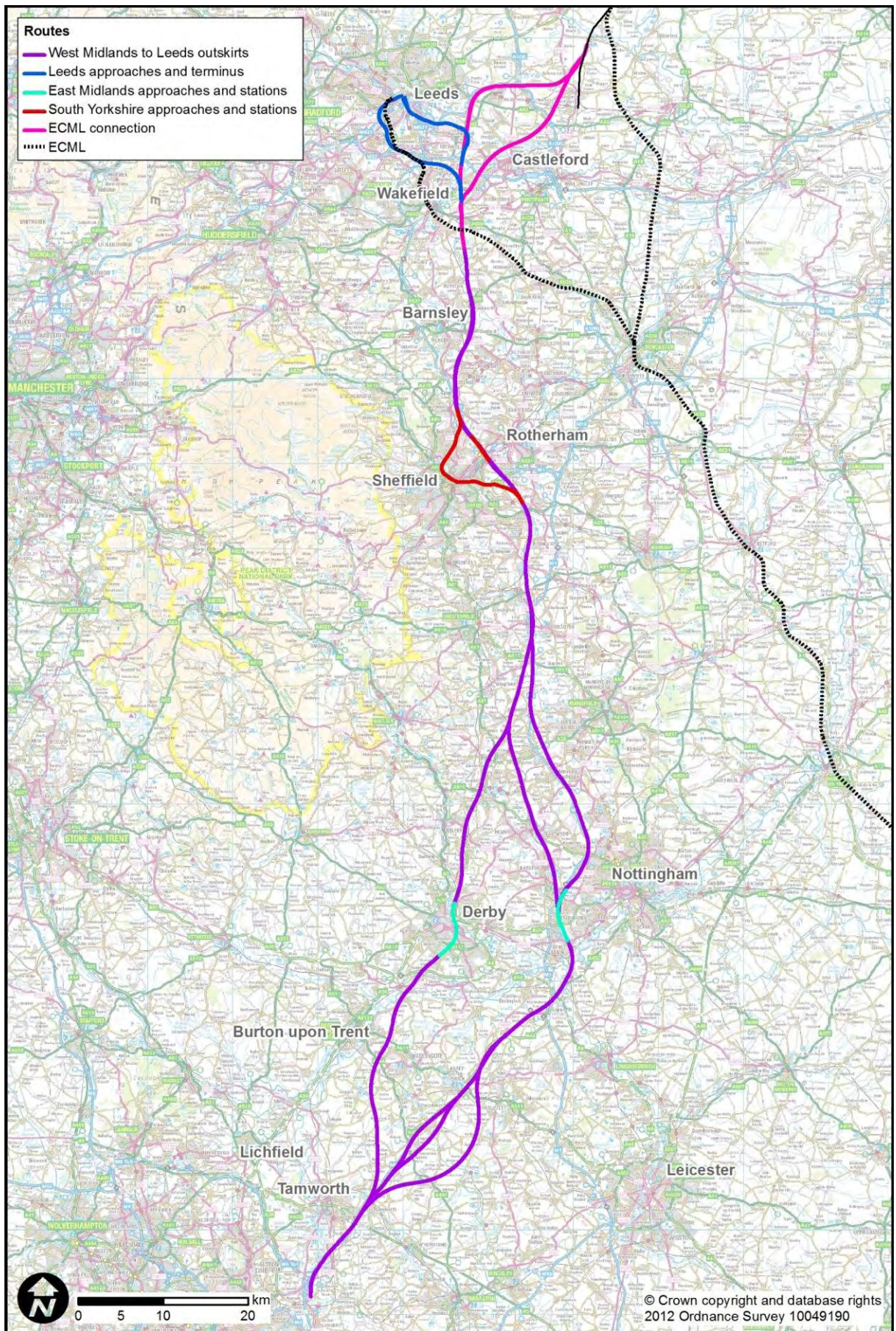
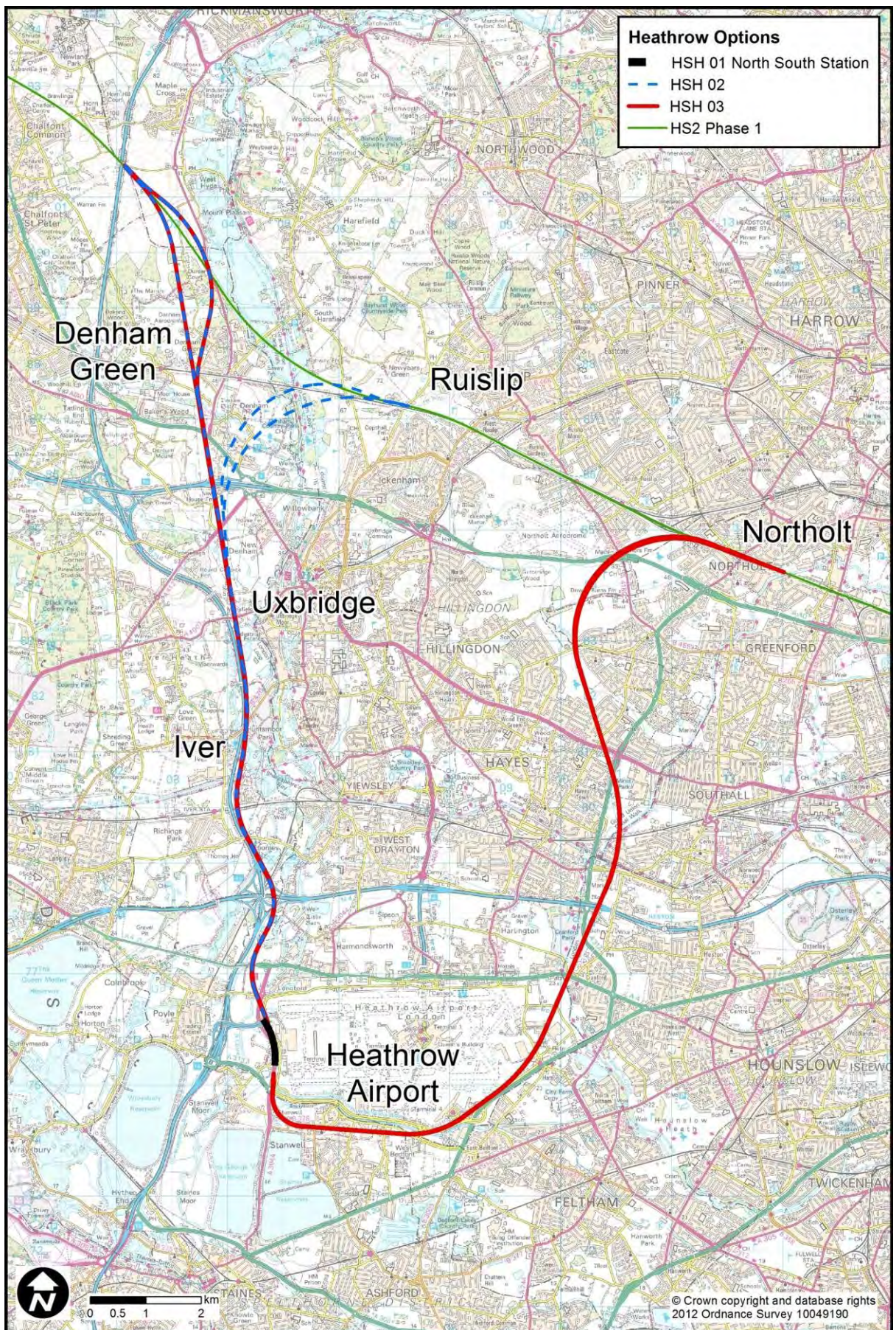


Figure 1.4 Maps of Heathrow options



1.4. Supporting studies

- 1.4.1. In addition to the main AoS process, parallel and supporting studies have included the following:
- **Screening of potential impacts on European designated habitats.** Habitats Regulations Assessment (HRA) screening sheets have been produced for European sites within 10km of the route options. More detailed screening reports were prepared for those European sites where the potential for impacts was identified in order to further explore the nature of the impacts and any possible mitigation. The findings of this screening work are included, where relevant, in this AoS Options Report.
 - **Scoping of social and distributional impacts.** This has looked at the coincidence of certain environmental impacts with *protected characteristic groups*. Its findings are reported in **Appendix 5**.
- 1.4.2. Further work would be undertaken in support of both these studies as designs are progressed.

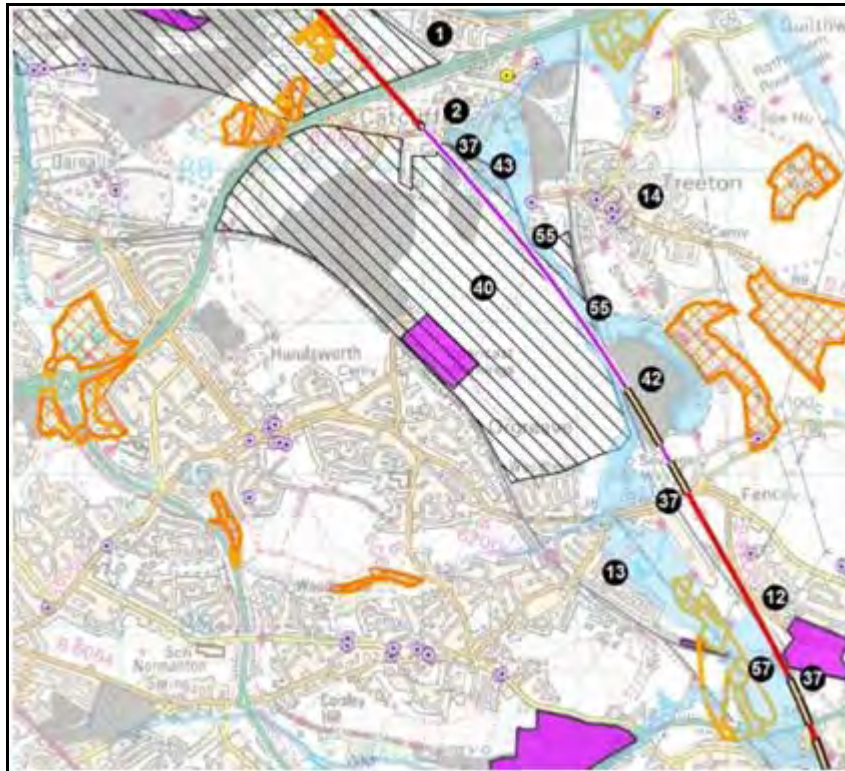
1.5. Using this report

Route section chapters

- 1.5.1. The main focus of this report is the sustainability performance of each of the route and station options for Phase 2 of HS2 referred to in Section 1.3. These are presented in chapters 3 to 14, (Section 15 for Heathrow) with each route section covered presented as a standalone chapter.
- 1.5.2. Opening paragraphs provide context in terms of the function of the route section and those it links with and its place amongst alternatives serving a broadly similar function. They give a very general geographical overview of the route, and they provide a summary of the key mitigation (through modification in vertical and horizontal position of the route alignment) that has been incorporated at this stage within its design.
- 1.5.3. Subsequent paragraphs then address the principal sustainability issues for the route section in terms of:
- population and settlements;
 - noise;
 - health and well-being;
 - access issues;
 - landscape, townscape and cultural heritage;
 - biodiversity and wildlife;
 - water resources and flood risk;
 - land use resources; and
 - waste and material use².
- 1.5.4. Route sections that include stations have also taken account of impacts on major planning and development sites, as well as potential effects on jobs (both displacement and support) and support for housing.

² These can also be used as a proxy for embedded energy, which is not covered explicitly in this report. Operational and embedded carbon impacts will be addressed for the whole route as discussed in Section 1.6.

- 1.5.5. Separate wider appraisals of major planning and development sites (see Appendix 2) were undertaken by HS2 Ltd consultants MSG (for Manchester routes) and Arup (for Leeds routes). Any potential conflicts between route options and development proposals that were identified are reported in the chapters where appropriate.
- 1.5.6. For ease of reference, affected features referred to in each chapter have been given numeric tags (e.g. ②) that are repeated on the accompanying map(s) for the chapter.



The base proposition

- 1.5.7. A summary of the sustainability performance of the example whole route combination forming the base proposition is presented in Section 15.

Appendices

- 1.5.8. There are five appendices that accompany this report.
 - **AoS Framework.** The appraisal criteria used at each stage of the AoS are presented within **Appendix 1**.
 - **Explanation of terms.** Technical terms within this report have been limited as far as possible. However, an explanation of any terms that have been used is provided in **Appendix 2**, along with, where appropriate, any supporting methodological information.
 - **Sifting history.** The sustainability performances of the options that have been considered up to this point have been recorded at each stage. A summary of the key sustainability issues of options that have not been progressed to the group of final options is presented in **Appendix 3**.
 - **Noise appraisal.** A brief note on the method used and assumptions incorporated for the noise appraisal is contained in **Appendix 4**.

- Scoping of social and distributional impacts, as noted earlier, are presented in Appendix 5.

1.6. AoS of a preferred scheme

- 1.6.1. The Secretary of State's identification of preferred route(s) and stations for Phase 2 of HS2 is expected to follow any further informal consultation the Secretary of State wishes to undertake, supported by this report and other reports prepared for and by HS2 Ltd. Following identification of an initial preferred scheme, there will be a period of informal engagement with local councils and MPs preceding a Secretary of State announcement of a preferred scheme in 2013. An AoS of this would be undertaken and reported to a similar level of detail to that provided for Phase 1, ready for public consultation.
- 1.6.2. The AoS report that describes the sustainability performance of that preferred scheme would address the same topics that are reported here, albeit in more detail. In addition, it would include, or be supported by:
- A socio-economic report that consolidates different strands of socio-economic appraisal into a single reference document, reports on the wider economic case for HS2, and demonstrates if and how HS2 would achieve the objectives set by the Government.
 - A carbon report that describes the approach and findings of a carbon assessment for the HS2 scheme from London to Manchester and Leeds, encompassing the construction of the scheme and its operation, including modal shift impacts. It would update the earlier study undertaken in support of Phase 1.
- 1.6.3. Were Phase 2 of HS2 to be progressed to a consents phase, a more detailed EIA process would follow in support of an Environmental Statement that would form part of the documentation for a Parliamentary approvals process.

2. AoS method

2.1. Sustainability topics appraised

- 2.1.1. The AoS has considered 18 sustainability topics, each sitting under one of the four priorities originally set out in the 2005 UK Sustainable Development Strategy: *Securing the Future*³:

Table 2.1 Sustainability topics addressed by the AoS

Reducing greenhouse gas emissions and combating climate change
<ul style="list-style-type: none"> • Climatic factors and adaptability • Greenhouse gases
Natural and cultural resource protection and environmental enhancement
<ul style="list-style-type: none"> • Landscape • Townscape and cultural heritage • Biodiversity and geodiversity • Water resources • Flood risk
Creating sustainable communities
<ul style="list-style-type: none"> • Air quality • Noise and vibration • Community integrity • Accessibility • Health and well-being • Security and safety • Economic prosperity • Economic welfare
Sustainable consumption and production
<ul style="list-style-type: none"> • Soil and land resources • Waste generation • Resource use

- 2.1.2. The information used by the AoS to address these topics, and the way that it has been considered, is defined by the AoS Framework (see Appendix 1). Section 2.2 describes the framework in more detail.
- 2.1.3. For route sifting the AoS relied mostly on mapped information of, for example, environmental designations. This was obtained from third parties, such as statutory government environmental protection agencies, and was reliant on a single source of ready digitised information for each environmental feature. Use of more disparate sources, requiring contact with different organisations was deterred by needs of confidentiality (see paragraph 1.2.4) and logistical

³ HM Government (2005) UK Sustainable Development Strategy: Securing the Future, TSO. This document was published by the previous Government and was valid during the sifting process. It remains valid at the time of writing.

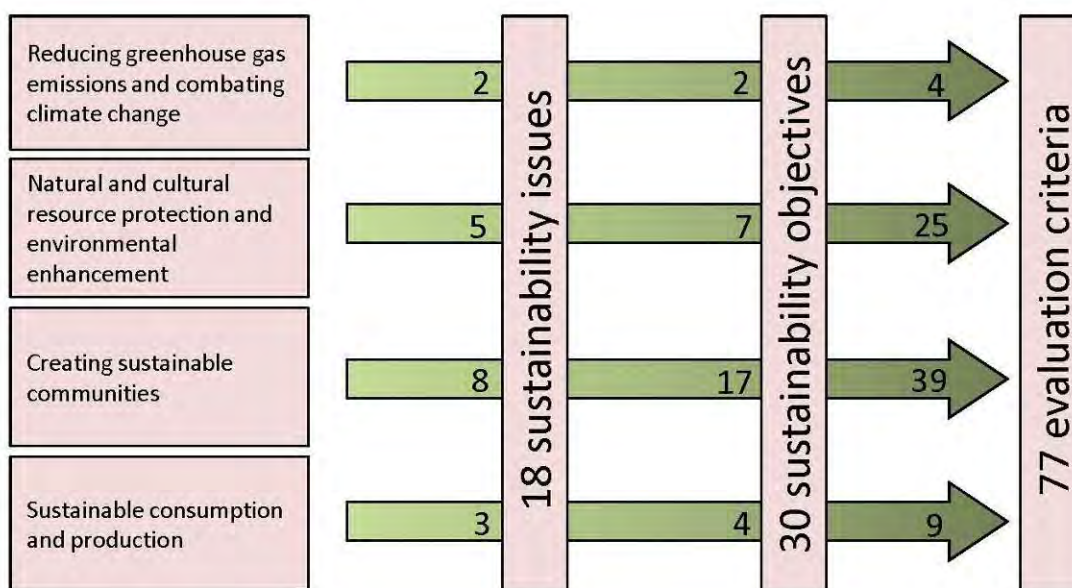
constraints of data processing.

- 2.1.4. Geographical information systems (GIS) combined with a route appraisal tool developed for the project by Temple, enabled the capture, recording and organisation of information obtained in this way.

2.2. The AoS framework

- 2.2.1. The AoS process used an appraisal framework (see Appendix 1) that was developed originally for Phase 1 of HS2. It was slightly revised following the experience gained from that earlier work to better define and differentiate the impacts of Phase 2 of the scheme, but the overall appraisal methods remained the same. For each of the 18 sustainability topics it has used a series of increasingly interrogative objectives and evaluation criteria to determine the overall sustainability performance of the options as they progressed through each sift. This *appraisal cascade* is illustrated in **Figure 2.1** and shows how each of the four overarching sustainability priorities is represented by between two and eight of the sustainability topics listed in **Table 2.1**. Scheme performance for each topic was benchmarked by one or more sustainability objectives by testing it against a range of evaluation criteria to determine the extent to which each objective is achieved by the respective options.

Figure 2.1 The appraisal cascade

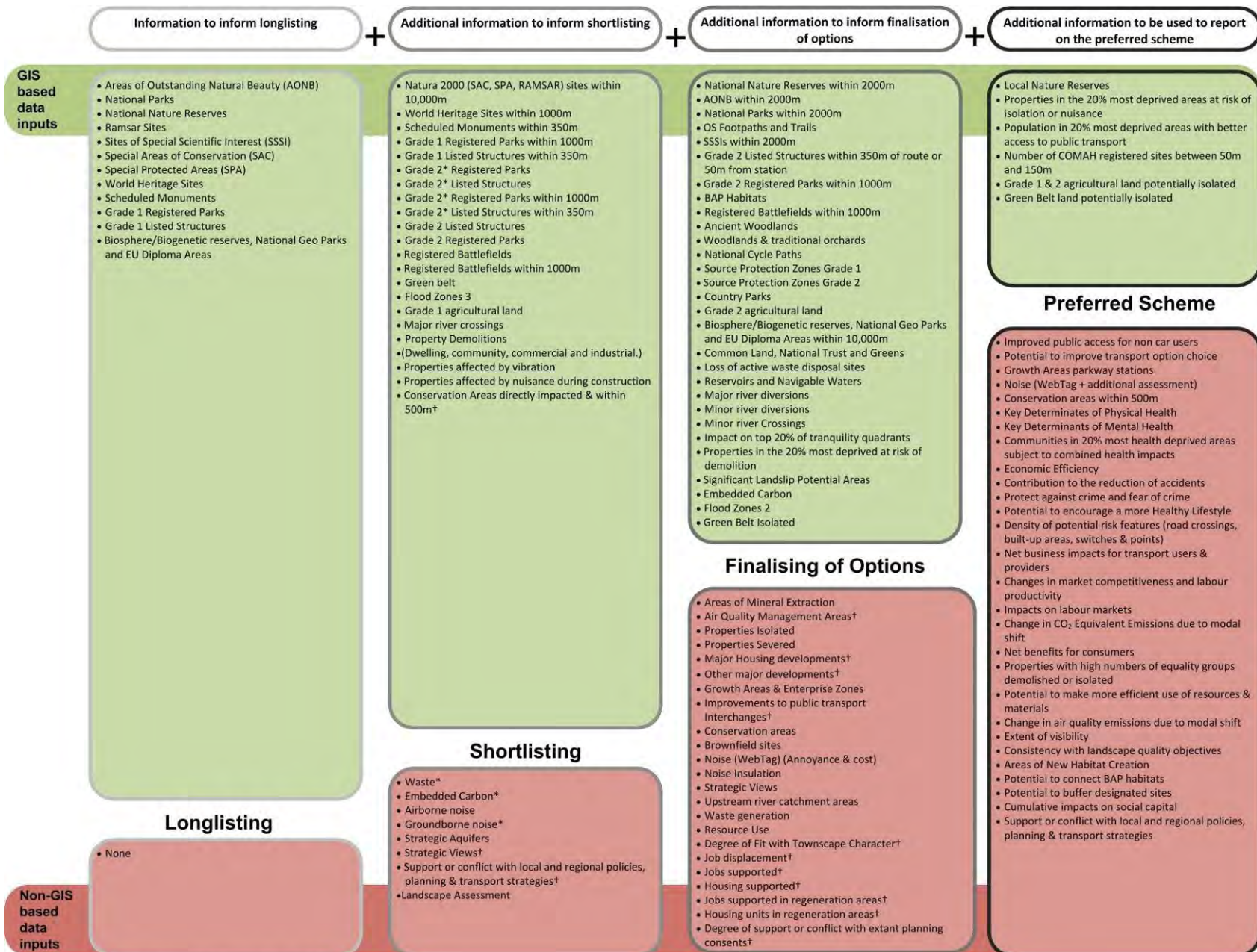


- 2.2.2. The appraisal framework, which lists in full all of the issues, objectives and evaluation criteria, is presented in Appendix 1. Up to the short listing of options, the AoS considered only the highest priority issues to establish relative preferences between different options. In later sifts, the scope and depth of appraisal increased. As less favoured options fell away, the remaining options were worked up in greater engineering detail and were appraised at a correspondingly increased level of detail.
- 2.2.3. **Table 2.2** sets out the changing level of detail used for appraisal of options at each sift. The different types of information considered at each sift are summarised in **Figure 2.2**.

Table 2.2 Increasing detail of successive sifts

	Long listing	Short listing	Option refinement	Finalisation of options
Design detail used for AoS (routes)	Plans showing vertical and horizontal alignments, allowing differentiation of surface, viaduct or tunnel.		Plans showing vertical and horizontal alignments, allowing differentiation of surface, viaduct, tunnel, cutting, embankment and green tunnel (finalisation stage only). Additional vertical profile information defined the height of the route option relative to ground level	
Design detail used for AoS (stations)	Plans showing footprints for station and station throats for Manchester and Leeds termini and East Midlands and South Yorkshire station options. Manchester interchange station options considered at long listing stage only and shown only as a station box with no throat.		Plans showing the operational boundary for the station and station throats, but distinguishing platforms, concourse, station carpark and forecourt, as well as areas of proposed permanent landtake over and above that needed for HS2 infrastructure including, for example, for relocated classic lines. Plans showing the extent of four tracking required for through-stations. Plans showing enabling and associated works. Design information on the possible future appearance of the station. A construction boundary was also identified that defined a provisional footprint needed to accommodate worksites and temporary and permanent works.	
Sustainability factors considered	See Figure 2.2			
Appraisal criteria	See Appendix 1			
Appraisal team	Core team (including planning and socioeconomic specialists) interpreting available mapped information against AoS framework criteria		Core team undertaking initial appraisal, with verification and additional appraisal by sustainability specialists (see below)	
On site appraisal	None	Stations only, to validate and refine predicted townscape and cultural heritage impacts and to undertake a land use survey of station footprints.	Stations and environmental 'hot spot locations' visited by relevant environmental specialists to augment appraisal by GIS. Stations land-use surveys conducted to validate demolition counts.	
Mitigation (see also Section 2.4)	During the sifting of options, mitigation has only been considered through the advice to HS2 Ltd in the context of the relative advantages and disadvantages of different options, thereby supporting decisions to progress certain options over others. This also resulted in new options being developed to resolve sustainability and engineering challenges.			Mitigation incorporated into options that emerged from the option refinement stage, to address specific impacts. Mitigation through adjustment to vertical and/or horizontal alignment, and introduction of tunnels and green tunnels.

Figure 2.2 Increasing range of considerations at each sift



†For stations only * A preliminary appraisal for route comparison only

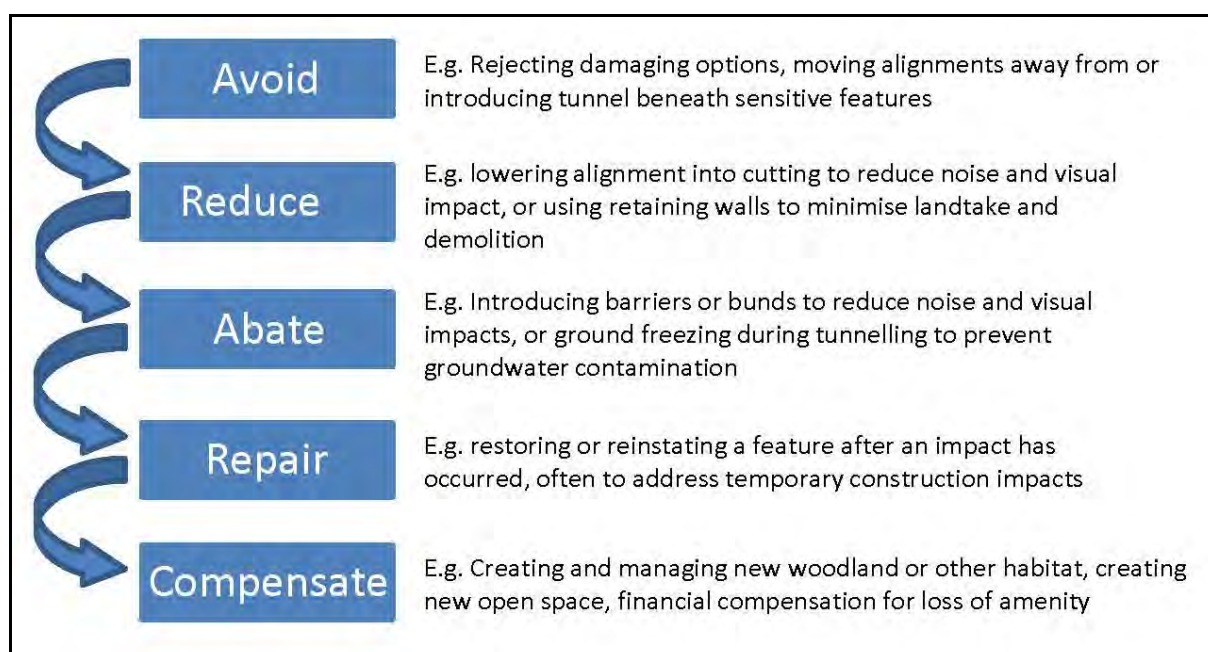
2.3. AoS study area

- 2.3.1. The main AoS study area comprises the areas potentially affected directly by the scheme options, or indirectly through impacts on the settings of certain features. The two corridors west and east of the Pennines (West Midlands to Manchester and West Midlands to Leeds together with their connections to the existing rail network) form the main study areas, along with the Heathrow option corridors. These were the principal focus of the option development work.
- 2.3.2. There is also a wider study area within which effects could occur; for example economic and regeneration effects within cities linked to the high speed network but not served directly by it, or carbon emissions, whose dissemination would be global. This area and these wider impacts are not considered as part of this report, since they are considered to be affected in broadly the same way by each option. However, this wider study area would be further considered as part of the AoS Report for the preferred scheme (see Section 1.6).

2.4. Mitigating impacts

- 2.4.1. As well as establishing certain design principles and supporting the options development and sifting process, the AoS process has enabled a number of potentially adverse effects to be avoided or reduced through design modification.
- 2.4.2. AoS specialists helped to draw up a log of potential impacts for the list of refined options. These were then reviewed by the AoS team (including the specialists) and engineers and, where practicable, the alignments were revised horizontally and/or vertically to avoid or reduce potential adverse effects.
- 2.4.3. The finalised options that are reported here therefore incorporate a number of changes in design. Continuing design would seek to further address any residual adverse effects. The way that opportunities to mitigate environmental impacts are realised at each stage of the project life-cycle is defined by the mitigation hierarchy.

Figure 2.3 The mitigation hierarchy

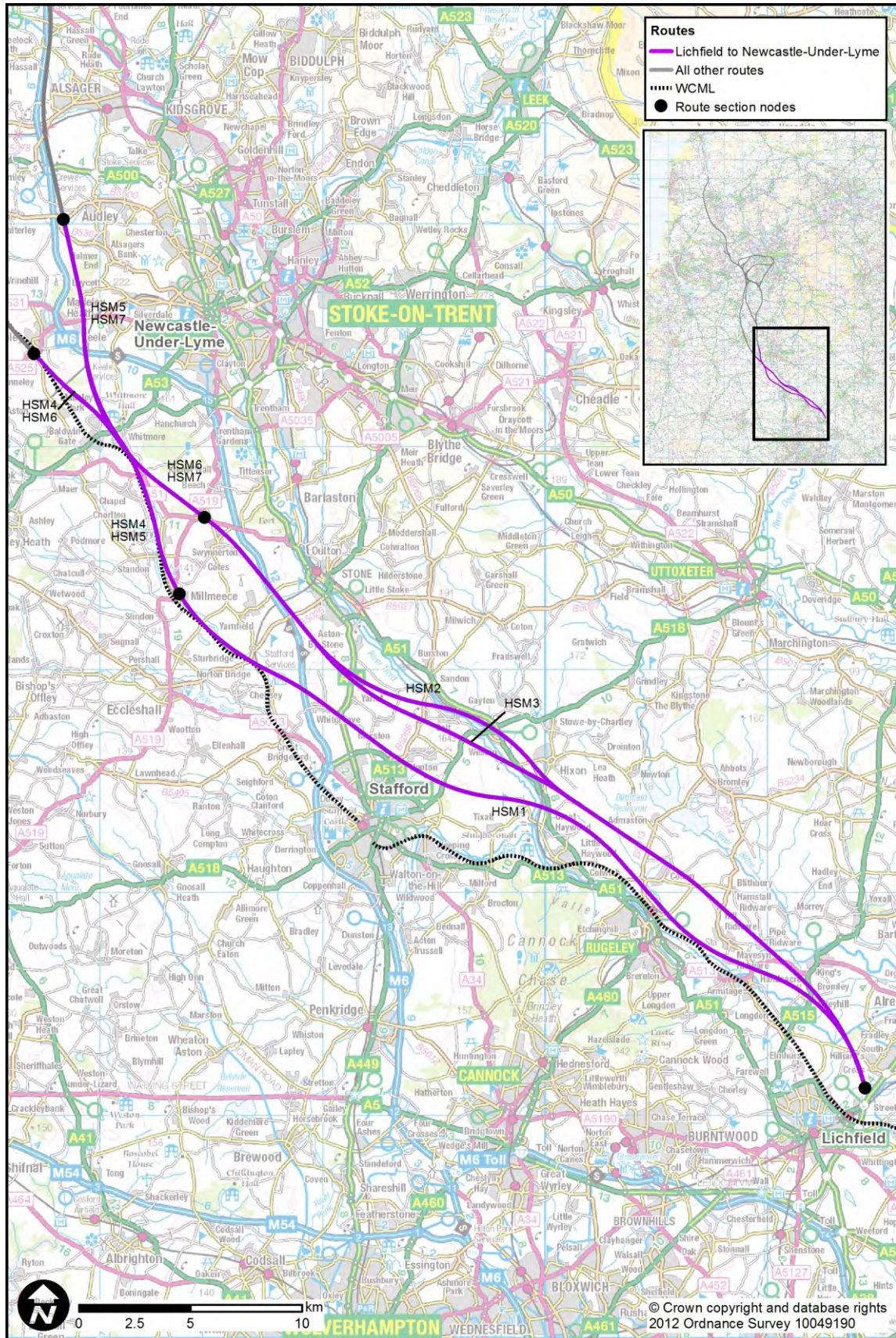


- 2.4.4. In these earliest stages, and well before designs are fixed, potentially adverse impacts may be avoided by rejecting the most environmentally damaging options and realigning

others, either up or down (vertically) or sideways (horizontally). Impacts may be minimised; for example through reducing the width of the rail corridor within sensitive environments to minimise landtake, or lowering it in cutting to reduce visual impacts.

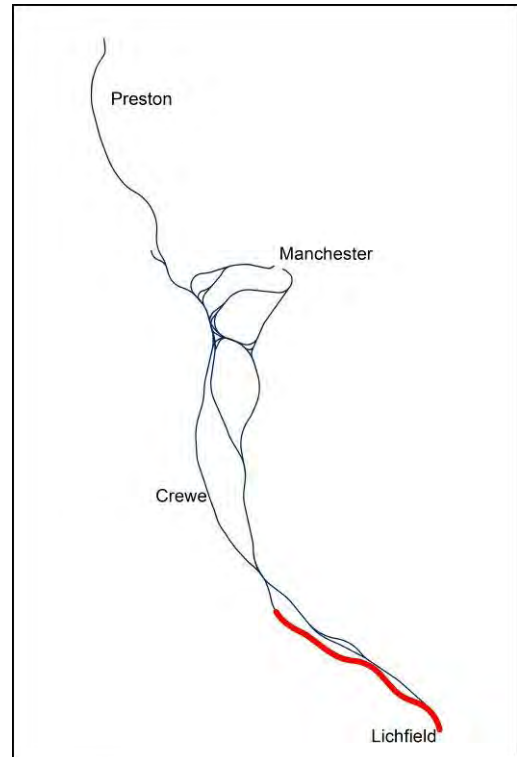
- 2.4.5. As scheme design develops in detail, the opportunity to change the alignment lessens and alternative mitigation strategies become appropriate. In the latest stages, with a design largely fixed, mitigation might best be achieved by providing compensation for an adverse impact that is otherwise deemed unavoidable.
- 2.4.6. HS2 Ltd would also be looking for opportunities for environmental enhancement. For example, a new railway could present an opportunity to reinforce and enhance biodiversity, providing a green corridor to be colonised by plants and animals, and linking with and forming connections between existing habitats. It could provide opportunities for urban regeneration and townscape improvement, especially on the back of wider master planning initiatives. There may also be occasions where noise mitigation introduced as part of the railway design could bring about wider benefits by screening other existing sources of noise, such as major roads and motorways. These kinds of initiatives would be considered as part of the scheme design going forward.

3. Manchester route: Lichfield to Newcastle-under-Lyme



3.1. HSM01: Streethay (A) to Millmeece (B)

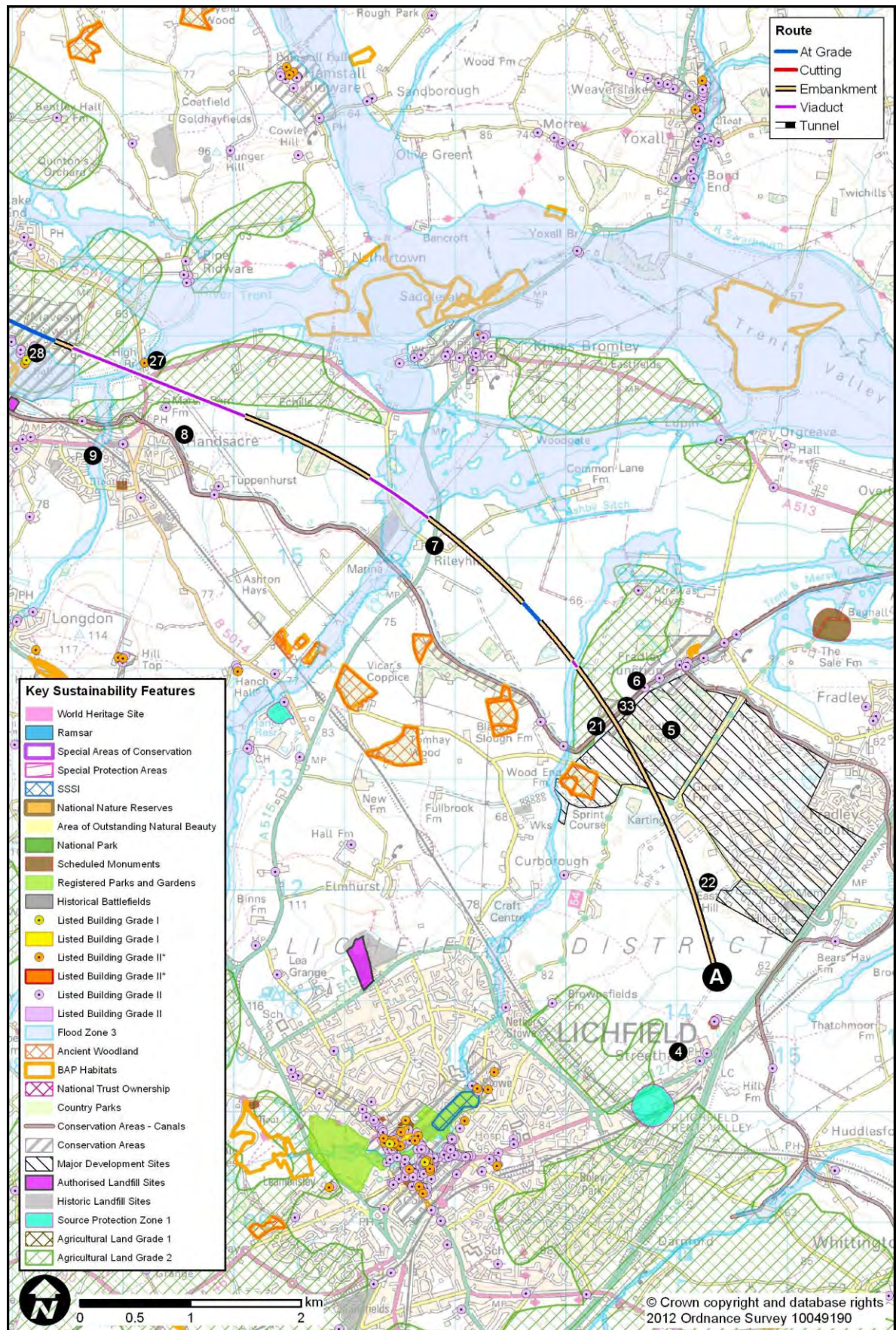
- 3.1.1. The route section between Streethay and Millmeece would be 39.1km (24.3 miles) long. It would commence at the intersection point with Phase 1, 700m north of Streethay and about 300m west of the A38. At Millmeece the route section would continue north either along section HSM04 to Madeley or HSM05 to Shrayleybrook.
- 3.1.2. The route section would run from near Lichfield north-west to pass close by and north east of Rugeley and Stafford, passing within 800m of Cannock Chase AONB at its closest point. It would broadly follow the Trent Valley as far as Great Haywood, and then pick up the Meece Brook Valley near Norton Bridge. The route section would include viaducts across a number of these rivers and tributaries at several locations. At its southern end the majority of the route section would be on embankment. Further north the route section would be a mixture of cutting, at grade and embankment including crossing the M6 and WCML south of Stone.
- 3.1.3. HSM01 Figures 1 to 5 illustrate the route alignment and the principal sustainability features in the area.
- 3.1.4. Specific mitigation included within the route section comprises a number of localised realignments that have sought to reduce noise impacts at residential areas (Whitgreave, North Stafford, Great Haywood, Little Haywood, Rugeley and Handsacre), to move the scheme further away from Cannock Chase AONB and Shugborough Hall registered park, and to avoid residential demolitions near Rugeley Station.
- 3.1.5. **Population and settlements** The route section would result in the demolition of an estimated 14 dwellings and 41 commercial properties. Potential isolation would occur at two locations, affecting an estimated eight dwellings at ① Heamies and 22 dwellings at ② Millmeece. Potential severance would affect 11 dwellings at ③ Whitgreave.
- 3.1.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 713 people (equivalent to the occupants of some 303 dwellings). This would represent about 19 people per km of route section. With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.
- The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ④ Streethay, ⑤ Fradley Wood, ⑥ Fradley Junction, ⑦ Rileyhill, ⑧ Handsacre, ⑨ Armitage, ⑩ Mavesyn Ridware, ⑪ Hill Ridware, ⑫ Rugeley, ⑬ Colton, ⑭ Great Haywood, ⑮ Ingestre, ⑯ Hopton, ⑰ Stafford, ⑱ Whitgreave, ⑲ Norton Bridge, ⑳ Coldmeece and ② Millmeece.
- In terms of noise insulation, approximately 204 dwellings would be



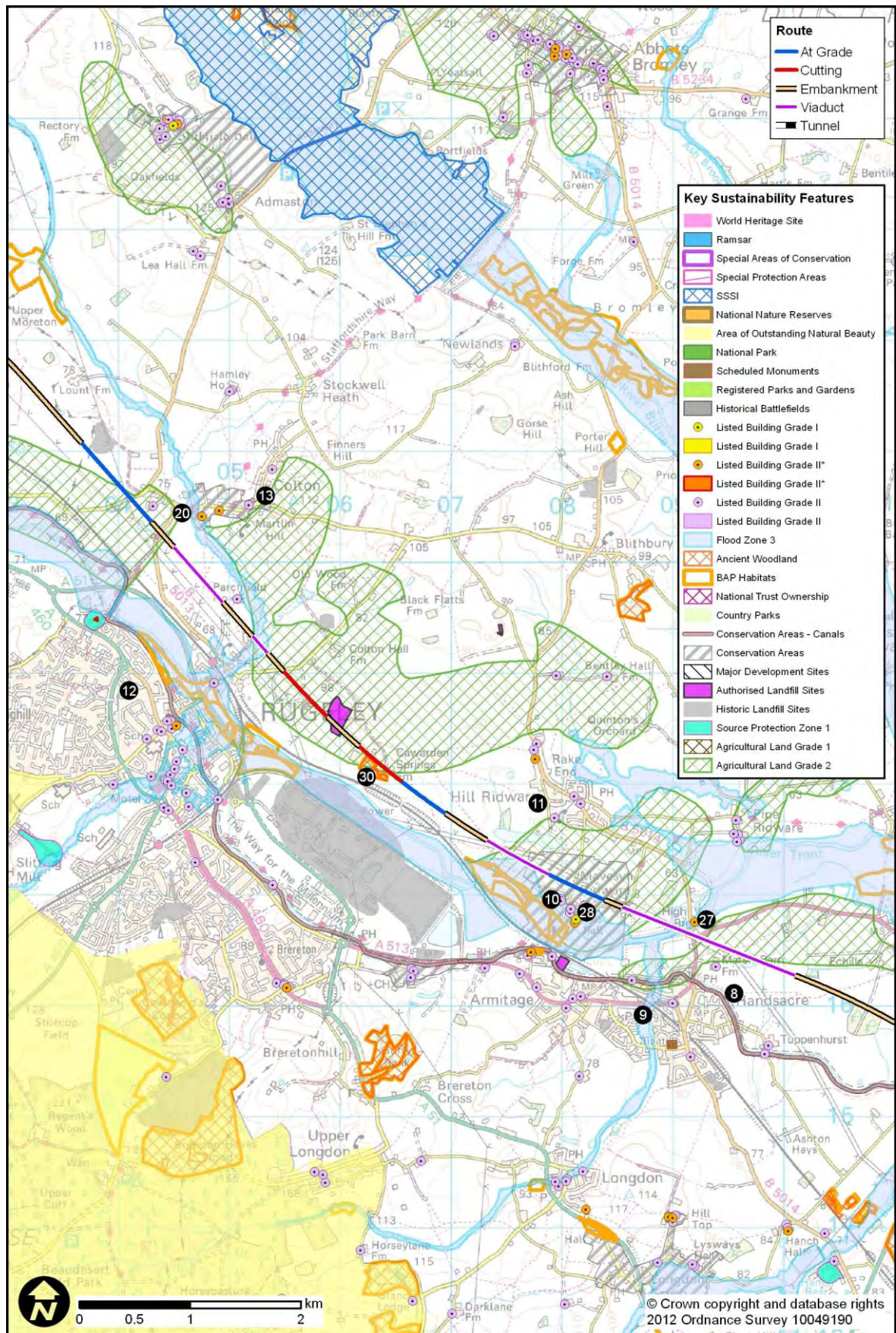
- expected to qualify, particularly at ⑤ Fradley Wood, ⑦ Rileyhill, ⑧ Handsacre, ⑩ Mavesyn Ridware, ⑫ Rugeley, ⑬ Colton, ⑮ Ingestre, ⑲ Whitgreave, ⑳ Norton Bridge and ㉑ Millmeece. This is equivalent to approximately six dwellings per km of route section.
- 3.1.7. Health and well-being Approximately 50 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
- 3.1.8. Access issues Two promoted recreational routes would be crossed by the route section, namely the ㉒ Staffordshire Way and the ㉓ Way for the Millennium. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme. The route section would also intersect 240m of open access land north of Stafford.
- 3.1.9. Planning and Development The route section would pass through ㉔ Fradley Park, near Lichfield. Core Policy 6 of the Lichfield District Council Local Plan identifies Fradley Park as a site for sustainable, mixed use development to provide up to 1,000 dwellings. The route section would also pass through the ㉕ MOD Stafford Beacon Barracks at Beaconside. A planning application is currently being considered by Staffordshire Borough Council for amendments to an existing planning permission for a new guard building and changes to existing buildings in the complex. Passing thorough the edge of the site, it is possible that continued scheme refinement could avoid this potential impact.
- 3.1.10. Landscape, townscape and cultural heritage The route section would run north-west from near Lichfield mainly on embankment as far as Handsacre. A viaduct at ⑧ Handsacre across the Trent Valley would give rise to visual intrusion, affecting recreational enjoyment of riverside areas, as well as views from properties at Handsacre. Another viaduct crossing of the Trent and WCML near ⑭ Great Haywood would result in similar impacts. The route section would pass within 800m of ㉖ Cannock Chase AONB, and would remain within 2km of its boundary for around 9km. Visual impacts on the AONB would be limited due to distance, the route section's adherence to terrain and by its proximity to existing infrastructure, including railway lines (notably near ⑫ Rugeley) and overhead power lines (between ⑧ Handsacre and ⑭ Great Haywood). A series of viaducts over the ㉗ Meece Brook to the south-west of Stone would result in further local impacts. Embankment crossings of the ㉘ M6 south of Stone and the WCML at ⑱ Norton Bridge would exacerbate this local visual intrusion. Eight woodlands (see *biodiversity and wildlife*), would be directly affected by the route section, resulting in impact on landscape character. Impacts on the setting of the scheduled Manor House site, near ④ Streethay, would be only slight. Hopton Heath battlefield is about 1km away, but impacts on its setting are unlikely. Two conservation areas are crossed by the route section: ⑩ Mavesyn Ridware for around 1km and the ㉙ Trent and Mersey Canal. The settings of 17 listed buildings could be affected, but of these, only the Grade II* ㉚ High Bridge north of Handsacre and the Grade II ㉛ Church

- Cottage are expected to have more than minor impacts.
- 3.1.11. Biodiversity and wildlife The route section would pass within 10km of six Natura 2000 wildlife sites. The potential for significant effects at one of these sites, 29 Pasturefields Salt Marsh SAC, cannot be discounted at this stage. Further details are described in an HRA screening report, which acknowledges the need for more detailed analysis.
- In addition to Pasturefields Salt Marsh, two other SSSIs would be within 2km of the route section. However, risks to both these sites are considered low.
- The route section would have direct impacts on three BAP habitat areas, namely two areas of coastal and floodplain grazing marsh and one area of wet woodland. The latter, 30 Cawarden Springs Wood, is also an ancient wood, although located away from the centre of the HS2 rail line, this would potentially be avoided through scheme refinement.
- 3.1.12. Water resources and flood risk 31 Marston Brook Tributary and 32 Meece Brook Tributary, two minor rivers, may be diverted. Continuing scheme design would seek to avoid these impacts, or at least minimise the extent of them.
- The route section would cross some 2km of Flood Zone 3.
- 3.1.13. Land use resources The route section would cross about 5.7km of Grade 2 agricultural land. Five landfill sites located between Rugeley and Whitgreave would be directly affected. The design would require further work to minimise risks to people and the environment from these impacts.
- 3.1.14. Waste and material use It is estimated that the route section would result in a surplus of 269,798m³ of excavated material.
- As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.
- Estimated quantities of bulk building materials for this section comprise 12,600 tonnes of steel and 38,800 tonnes of concrete.

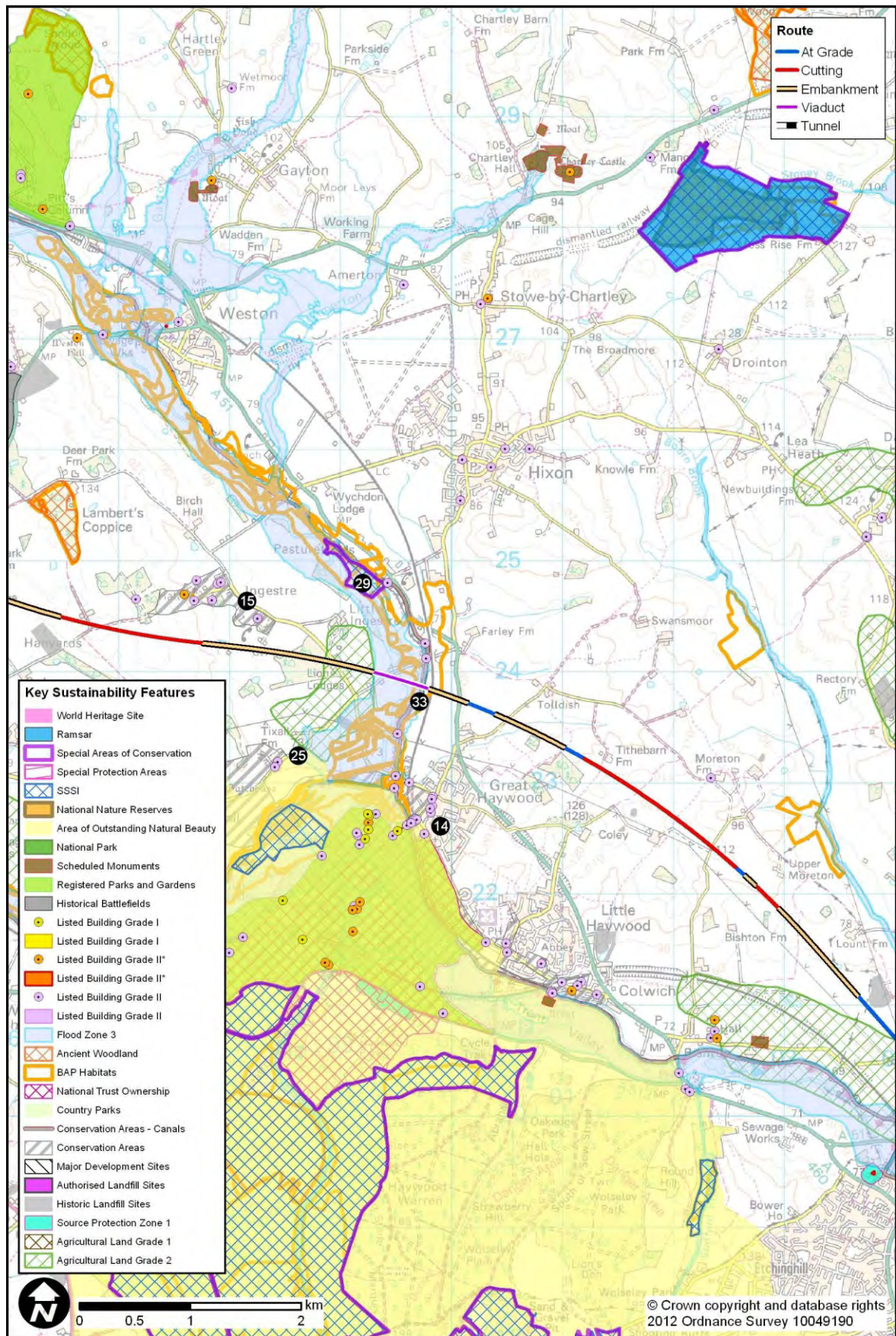
HSM01 - Figure 1 of 5



HSM01 - Figure 2 of 5



HSM01 - Figure 3 of 5



Route

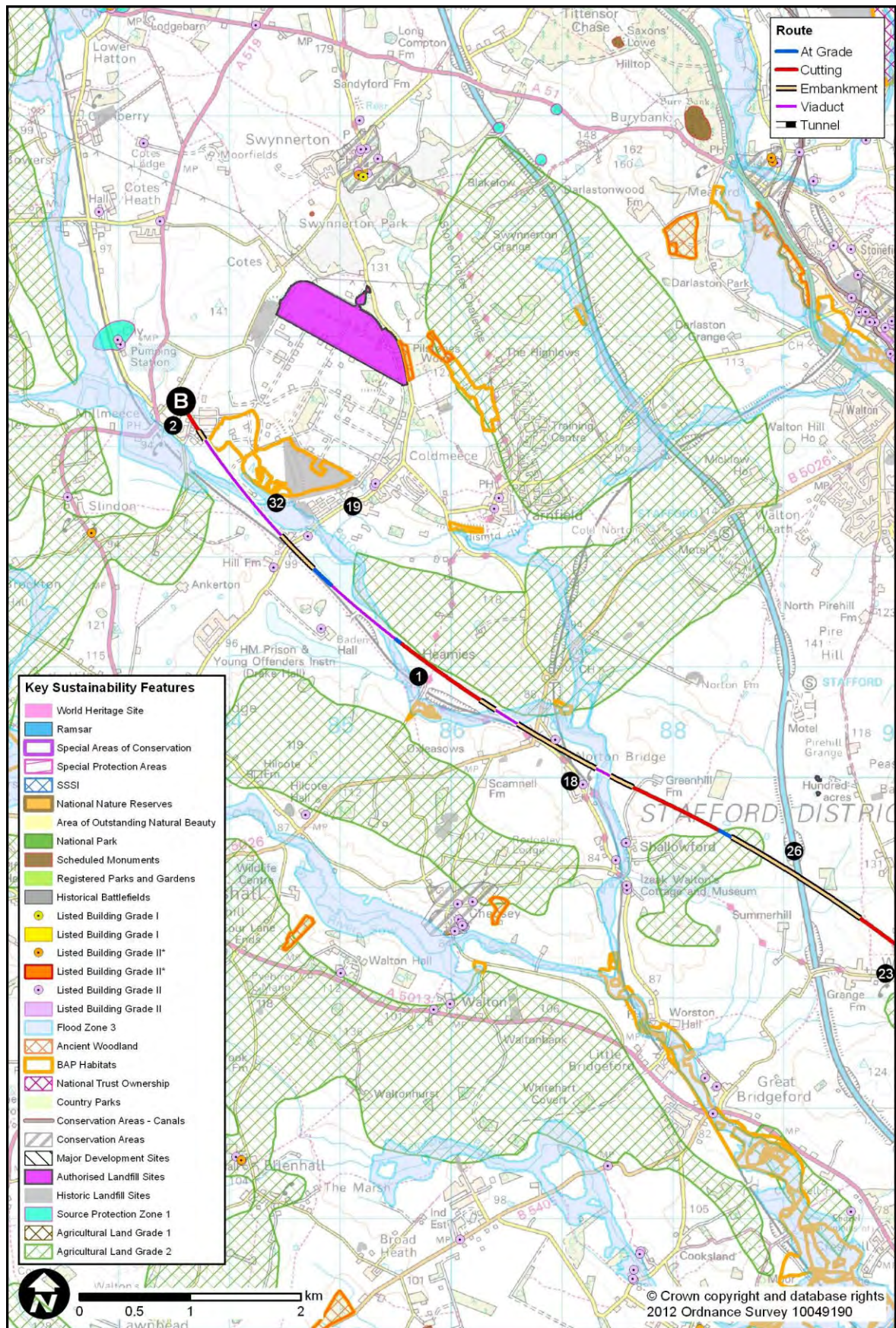
- At Grade
- Cutting
- Embankment
- Viaduct
- Tunnel

Key Sustainability Features

- World Heritage Site
- Ramsar
- Special Areas of Conservation
- Special Protection Areas
- SSSI
- National Nature Reserves
- Area of Outstanding Natural Beauty
- National Park
- Scheduled Monuments
- Registered Parks and Gardens
- Historical Battlefields
- Listed Building Grade I
- Listed Building Grade I*
- Listed Building Grade II*
- Listed Building Grade II
- Listed Building Grade II
- Flood Zone 3
- Ancient Woodland
- BAP Habitats
- National Trust Ownership
- Country Parks
- Conservation Areas - Canals
- Conservation Areas
- Major Development Sites
- Authorised Landfill Sites
- Historic Landfill Sites
- Source Protection Zone 1
- Agricultural Land Grade 1
- Agricultural Land Grade 2

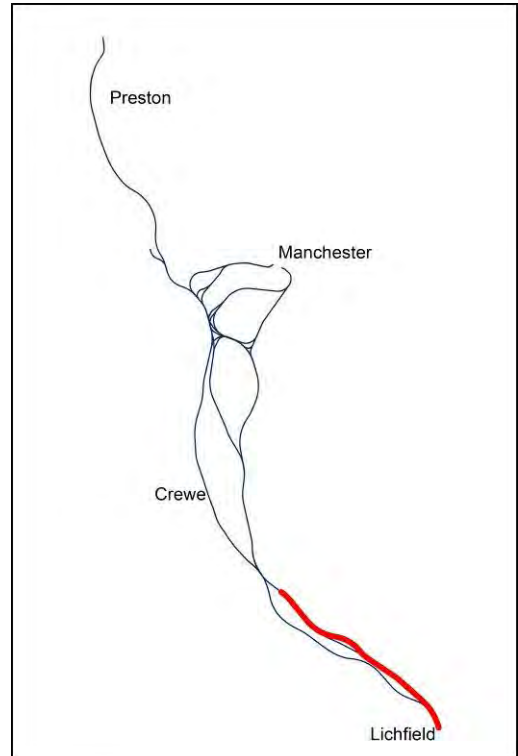
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HSM01 - Figure 5 of 5



3.2. HSM02: Streethay (A) to Swynnerton (C)

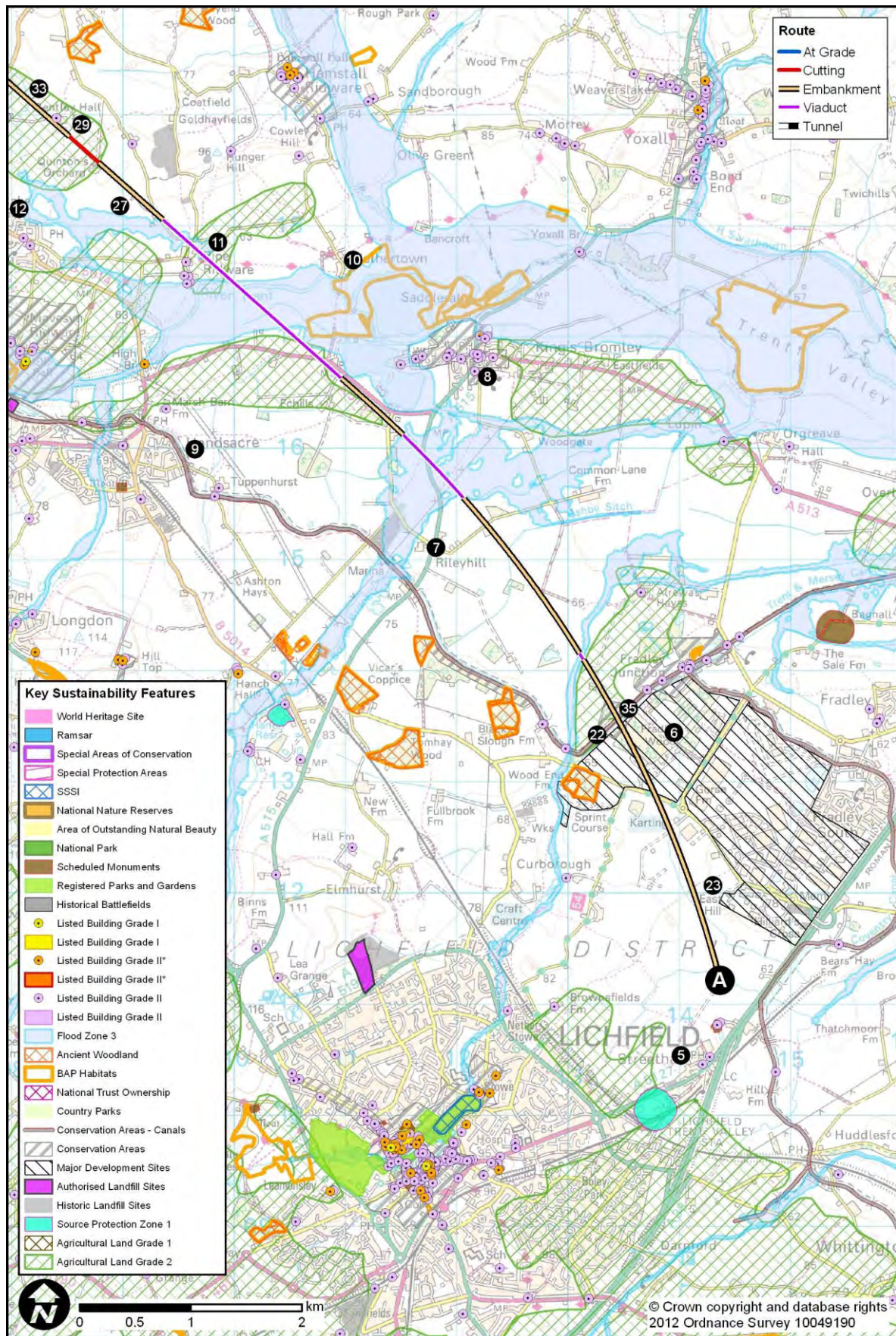
- 3.2.1. The route between Streethay and Swynnerton would commence at the intersection point with Phase 1, 700m north of Streethay and about 300m west of the A38 and would be 40.2km (25 miles) long. At Swynnerton the route would continue north either along section HSM06 to Madeley or HSM07 to Shrayleybrook.
- 3.2.2. The route section would run from near Lichfield north-west to Rugeley and north of Stafford, passing within about 2km of Cannock Chase AONB, and then on to the south-west of Stone. It would cross the River Trent on a long viaduct between Handsacre and Kings Bromley and align briefly with the Trent Valley immediately north of Weston, crossing the river again on two further viaducts. It would then join the M6 corridor to the south-west of Stone. Two viaducts at Salt (south of Sandon Park) and west of Stone would carry the route section over the railway to Stoke on Trent and M6 respectively.
- 3.2.3. HSM02 Figures 1 to 5 illustrate the route alignment and the principal sustainability features in the area.
- 3.2.4. Specific mitigation included within the route section comprises a number of localised realignments that have sought to reduce noise and visual impacts at the residential area of Hixon and Salt and to avoid the demolition of St Peter's Primary School. The design sought to integrate the line with existing transport corridors in order to reduce the impact on Sandon Park, the River Trent and the Trent and Mersey Canal.
- 3.2.5. **Population and settlements** The route section would result in the demolition of an estimated 17 dwellings and 12 commercial properties. Potential isolation would occur at three locations, affecting an estimated four dwellings at ① Weston, two dwellings at ② Hixon and two dwellings at ③ Yarnfield. An area of potential severance at ④ Hixon would affect an estimated two dwellings.
- 3.2.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 516 people (equivalent to the occupants of some 219 dwellings). This would represent about 13 people per km of route section. With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.
- The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ⑤ Streethay, ⑥ Fradley Wood, ⑦ Rileyhill, ⑧ King's Bromley, ⑨ Handsacre, ⑩ Nethertown, ⑪ Pipe Ridware, ⑫ Hill Ridware, ⑬ Blithbury, ⑭ Colton, ⑮ Hixon, ⑯ Weston, ⑰ Salt, ⑱ Sandonbank, ⑲ Walton and ⑳ Swynnerton.
- Approximately 191 dwellings would potentially qualify for noise insulation, particularly at ⑥ Fradley Wood, ⑪ Pipe Ridware, ⑭ Colton, ⑯ Weston,



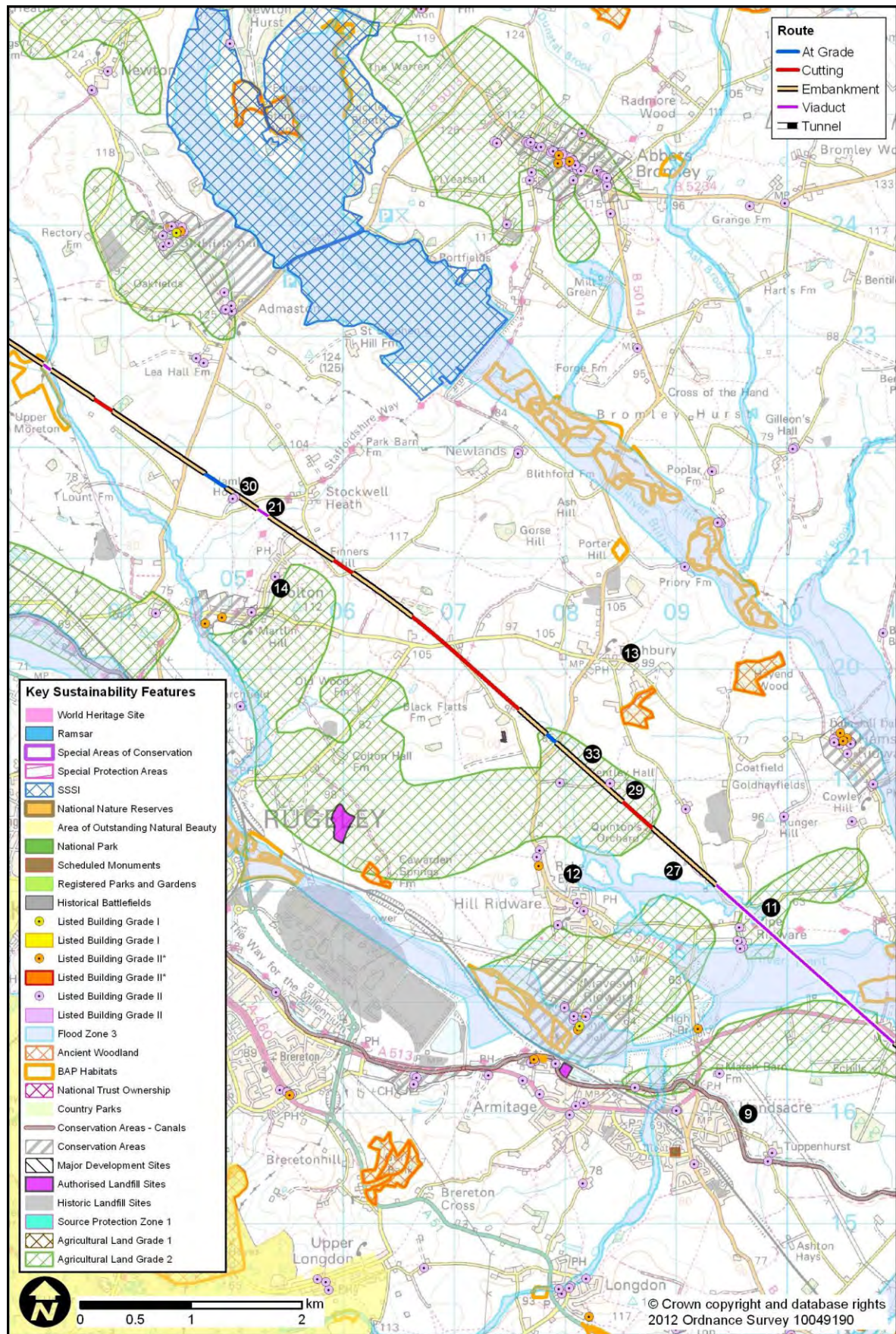
		<p>17 Salt, 18 Sandonbank and 19 Walton. This is equivalent to approximately five dwellings per km of route section.</p>
3.2.7.	Health and well-being	<p>Approximately 60 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.</p>
3.2.8.	Access issues	<p>Two promoted recreational routes would be crossed by the route section, namely the 21 Staffordshire Way and 22 Way for the Millennium. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.</p>
3.2.9.	Planning and Development	<p>The route section would pass through 23 Fradley Park, near Lichfield. Core Policy 6 of the Lichfield District Council Local Plan identifies Fradley Park as a site for sustainable, mixed use development to provide up to 1,000 dwellings.</p>
3.2.10.	Landscape, townscape and cultural heritage	<p>The route section would pass very briefly within 2km of 24 Cannock Chase AONB. Due to the distance it is considered that the potential impacts on the AONB would be minor.</p> <p>Landscape impact would be associated with more prominent elements of the route section in localised areas. In particular, from the embanked crossing of the 26 Trent and Mersey Canal in the south, the 2km viaduct crossing of the River Trent north of 9 Handsacre, the high embankment and viaduct sections across the Trent and a tributary valley north of 10 Weston and south of 25 Sandon Park Grade II Registered Park and Garden; and the 25m high elevated crossing of the 36 M6 west of Stone.</p> <p>The edge of 25 Sandon Park is thinly wooded and the impact on its setting would be moderate.</p> <p>There would be direct impacts on five woodlands although overall impacts on landscape character as a result of this would be minor.</p> <p>The 35 Trent and Mersey Canal Conservation Area would be crossed twice for short sections, once within a wooded area of landscape resulting in moderate impacts on its character, and once in close proximity to other transport routes, where impacts would be minor.</p> <p>Four Grade II listed buildings would be directly affected. These are the 28 Salt Bridge road bridge over the canal, 29 Bentley Hall Farmhouse, 30 Hamley House on Moor Lane and gate piers and attached garden wall immediately south west of Hamley House.</p> <p>The settings of some 15 other listed structures located near to the route section could be affected. Impacts are likely to be negligible for all but a group of five located within 11 Pipe Ridware. The viaduct passing this hamlet would result in moderate impacts.</p>
3.2.11.	Biodiversity and wildlife	<p>The route section would pass within 10km of six Natura 2000 wildlife sites. The potential for significant effects at one of these sites, 31 Pasturefields Salt Marsh SAC, cannot be discounted at this stage. Further details are described in an HRA screening report, which acknowledges the need for more detailed analysis.</p> <p>In addition to Pasturefields Salt Marsh, one other SSSI would be within 2km of the route section. The risk of impact to this is considered to be low.</p> <p>Four areas of BAP habitat would be crossed. These include coastal and</p>

- floodplain grazing marsh; purple moor grass and rush pasture; lowland meadows and a fourth un-named area, although this could probably be avoided through detailed design work.
- 3.2.12. Water resources and flood risk The 32 River Trent, a major river, may be diverted. 33 Bentley Brook and 34 Filly Brook Tributary at Swynnerton Grange, are two minor rivers that may also be diverted. Continuing scheme design would seek to avoid this impact, or at least minimise its extent.
- About 4.3km of the route section would be in cut or tunnel across aquifers of good yield and good quality.
- The route section would cross some 4km of Flood Zone 3.
- 3.2.13. Land use resources The route section would cross about 7.5km of Grade 2 agricultural land. It would cross about 5.1km of green belt.
- Two landfill sites at 3 Yarnfield and 27 Pipe Ridware would be directly affected. The design would require further work to minimise risks to people and the environment from these impacts.
- 3.2.14. Waste and material use It is estimated that the route section would result in a surplus of 39,246m³ of excavated material. This includes 59,400m³ of tunnel excavated material.
- As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.
- Estimated quantities of bulk building materials for this section comprise 12,900 tonnes of steel and 39,800 tonnes of concrete.

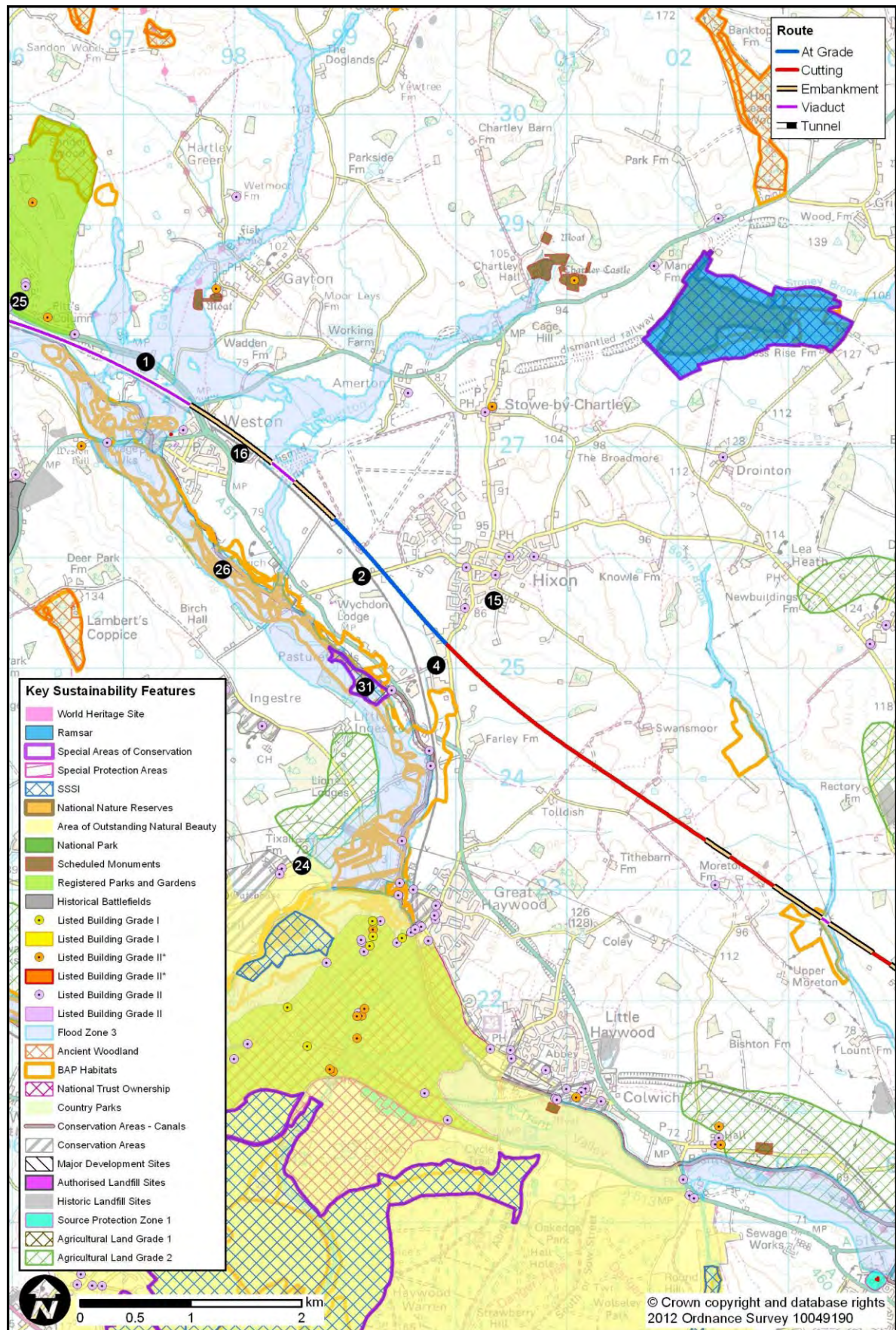
HSM02 - Figure 1 of 5



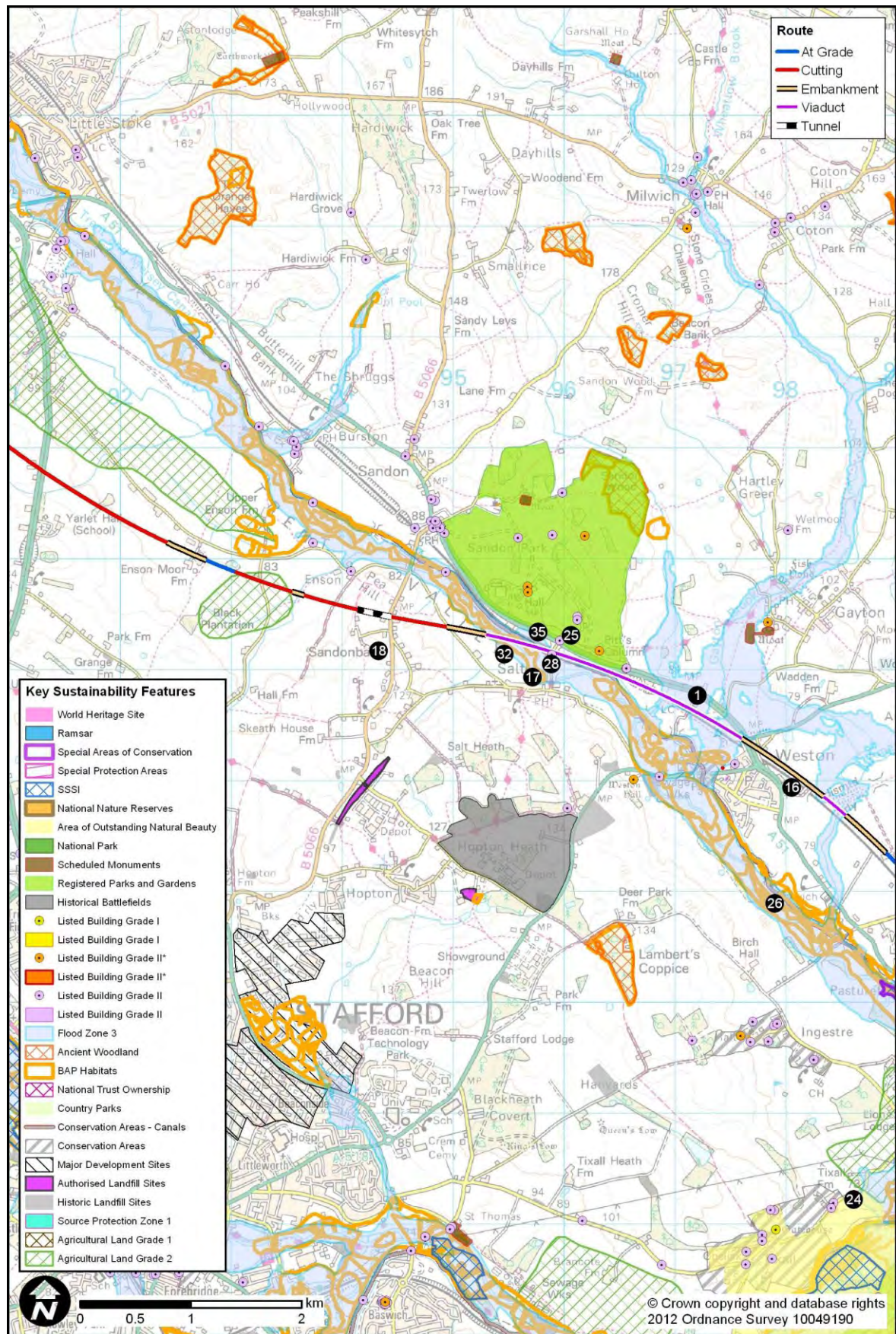
HSM02 - Figure 2 of 5



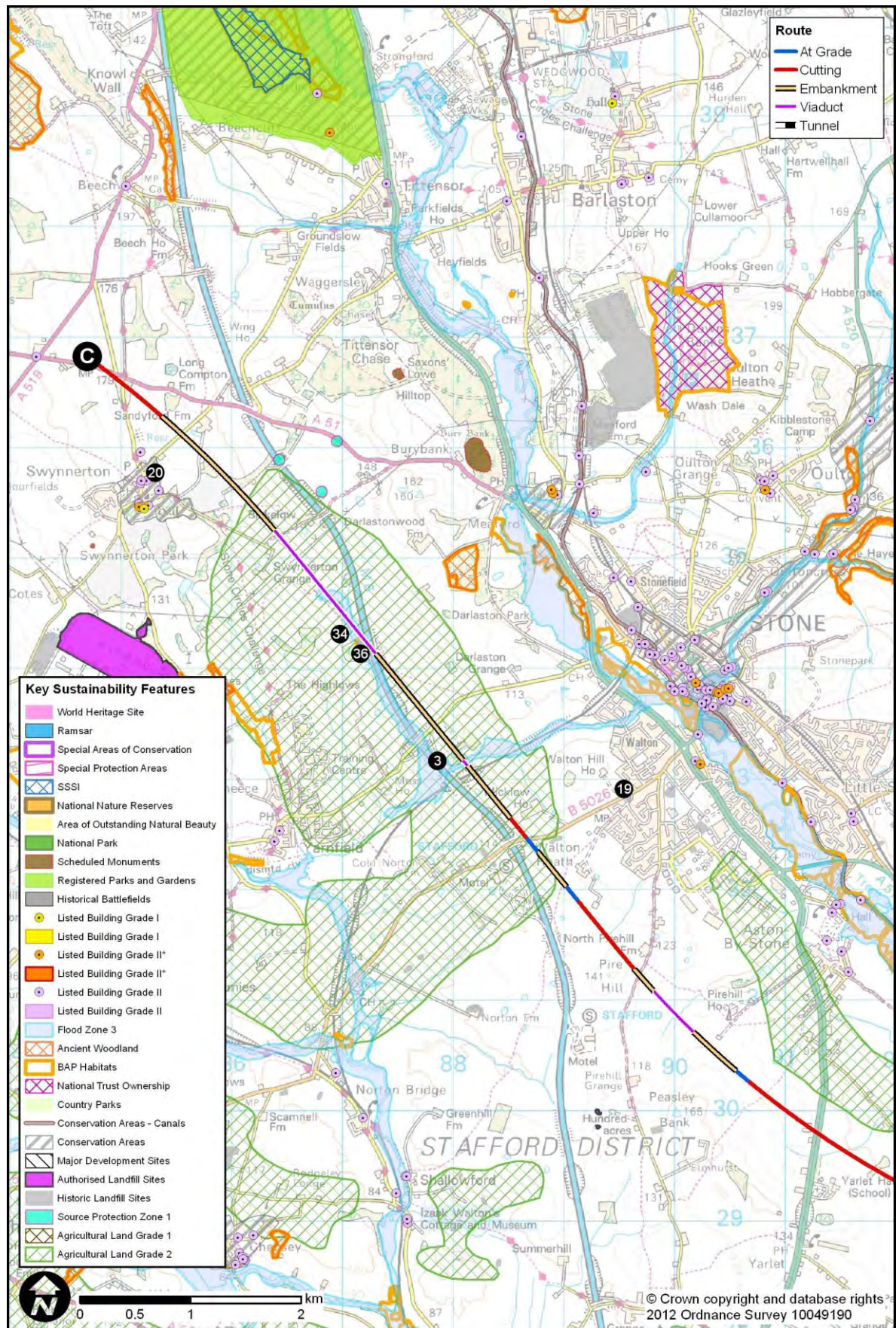
HSM02 - Figure 3 of 5



HSM02 - Figure 4 of 5

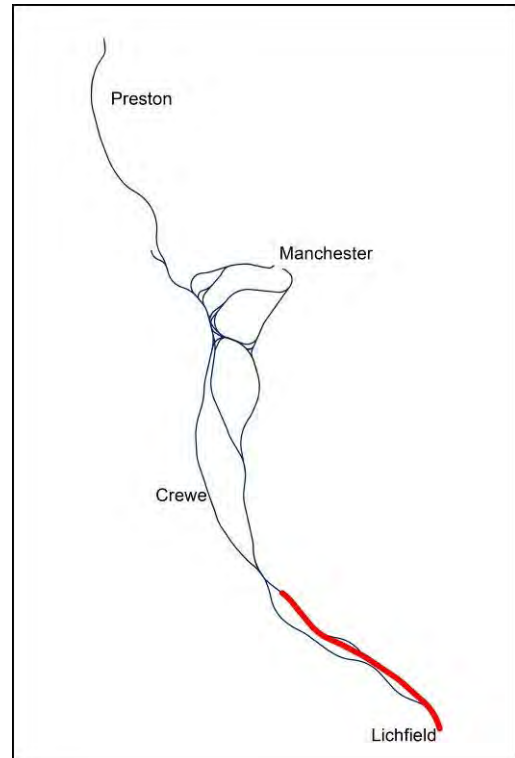


HSM02 - Figure 5 of 5



3.3. HSM03: Streethay (A) to Swynnerton (C)

- 3.3.1. The route section between Streethay and Swynnerton would be 40km (24.9 miles) long. It would commence at the intersection point with Phase 1, 700m north of Streethay and about 300m west of the A38. At Swynnerton the route would continue either along section HSM06 to Madeley or HSM07 to Shrayleybrook.
- 3.3.2. The route section would run from near Lichfield north-west to Rugeley and north of Stafford, passing within about 2km of Cannock Chase AONB, and then on to the south-west of Stone. The route section would cross the Trent Valley on a long viaduct between Handsacre and Kings Bromley. It would cross over the railway to Stoke on Trent at Hixon and would then align briefly with the Trent Valley south of Weston, crossing the river again on two viaducts. The route section would then join the M6 corridor to the south-west of Stone crossing the motorway on a further viaduct.
- 3.3.3. HSM03 Figures 1 to 5 illustrate the route alignment and the principal sustainability features in the area.
- 3.3.4. Specific mitigation included within the route section comprises a number of localised realignments, horizontal and vertical, that have sought to reduce impacts on Hopton Battlefield, Salt and Weston.
- 3.3.5. **Population and settlements** The route section would result in the demolition of an estimated 18 dwellings and seven commercial properties. Potential isolation would affect an estimated two dwellings east of ❶ Yarnfield.
- 3.3.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 516 people (equivalent to the occupants of some 219 dwellings). This would represent about 13 people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.
- The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ❷ Streethay, ❷ Fradley Wood, ❷ Rileyhill, ❸ King's Bromley, ❷ Handsacre, ❹ Nethertown, ❺ Pipe Ridware, ❻ Hill Ridware, ❼ Blithbury, ❽ Colton, ❾ Hixon, ❿ Shirleywitch, ❶⁰ Weston, ❶¹ Salt, ❶² Sandonbank, ❶³ Walton and ❶⁴ Swynnerton.
- In terms of noise insulation, approximately 165 dwellings would be expected to qualify, particularly at ❷ Fradley Wood, ❺ Pipe Ridware, ❽ Colton, ❿ Shirleywitch, ❶² Sandonbank and ❶³ Walton. This is equivalent to approximately five dwellings per km of route section.



- | | | |
|---------|--|---|
| 3.3.7. | Health and well-being | Approximately 50 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity. |
| 3.3.8. | Access issues | Two promoted recreational routes would be crossed by the route section, namely the 17 Way for the Millennium and the 27 Staffordshire Way. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme. |
| 3.3.9. | Planning and Development | The route section would pass through 15 Fradley Park, near Lichfield. Core Policy 6 of the Lichfield District Council Local Plan identifies Fradley Park as a site for sustainable, mixed use development to provide up to 1,000 dwellings. |
| 3.3.10. | Landscape, townscape and cultural heritage | <p>The route section would pass very briefly within 2km of 30 Cannock Chase AONB. Given the distance of the route alignment, potential impacts on the AONB are likely to be minor.</p> <p>Landscape and visual impacts would be generally limited. However, greater impact would be associated with more prominent elements of the route section in localised areas. In particular, the embanked crossing of the 36 Trent and Mersey Canal in the south; the 2km viaduct crossing of the River Trent north of 29 Handsacre; the high embanked and viaduct sections across the Trent south of 9 Hixon and 10 Weston; and the 25m high elevated crossing of the 37 M6 west of Stone.</p> <p>Major landscape impact would affect the 35 Trent Valley north of Stafford, where the route would run parallel with the River Trent and the Trent and Mersey Canal (a conservation area) for some 3km. It would then cut deeply through the steep southern valley sides, affecting valley side woodlands and the village of 12 Sandonbank. In total 13 woodlands would be affected.</p> <p>Two conservation areas would be crossed by the route section. The 16 Trent and Mersey Canal Conservation Area (as mentioned above) would be crossed twice, and the 18 Shirleywich Conservation Area would be crossed at one location. The southern crossing of the canal would occur in a densely wooded area. The second crossing of the canal and the crossing of the Shirleywich Canal Arm would affect a very open area as the route section would be on embankment. The impacts of these crossings on the character of these areas would be major.</p> <p>Four Grade II listed structures would be directly affected. These are the 19 Wychdon Lodge and Outbuildings, 20 Hamley House on Moor Lane and gatepiers and attached garden wall immediately south-west of Hamley House, and 21 Bentley Hall Farmhouse. The importance of Wychdon Lodge and formal garden area comes from their coherence as a group, and their association with the former saltworks and the 18 Shirleywich Canal Arm within the conservation area. Direct impacts on this group would be a major effect.</p> |
| 3.3.11. | (Archaeology) | The registered site of 31 Hopton Heath Battlefield would be 285m away at its closest point. The route section's passage in cutting, tunnel, embankment and viaduct to the north and north-east of the battlefield is unlikely to directly affect the site. However this is not certain as the boundary of the battlefield is not precisely determined. Notwithstanding this, the setting of the battlefield and opportunity to appreciate it within |

the landscape would be affected. The wooded scarp slope north of the site would provide some screening of the route when viewed from the south. The greatest impact would affect views from the north east - from ⑩ Weston and ⑪ Salt along the A518.

3.3.12. Biodiversity and wildlife

The route section would pass within 10km of six Natura 2000 wildlife sites. The potential for significant effects at one of these sites, ②③ Pasturefields Salt Marsh SAC, cannot be discounted at this stage. Further details are described in an HRA screening report, which acknowledges the need for more detailed analysis.

In addition to ②③ Pasturefields Salt Marsh, one other SSSI would be within 2km of the route section. The risk of impact to this is considered to be low.

The route section would affect 11 areas of BAP habitats. It would cross seven coastal and floodplain grazing marshes (although some of this could probably be avoided through further route refinement); purple moor grass and rush pasture; lowland meadows; and two un-classified areas.

3.3.13. Water resources and flood risk

Five diversions of minor rivers may be required for ②⑤ Bentley Brook, River Trent Tributary at ③② Wynchdon Lodge, River Trent Tributary at ③③ Weston Hall, ②④ River Trent Tributary at Black Plantation, Filly Brook Tributary at ③④ Swynnerton Grange. Continuing scheme design would seek to avoid or minimise this impact.

About 4.7km of the route section would be in cut or tunnel across aquifers of good yield and good quality.

The route section would cross some 3km of Flood Zone 3.

3.3.14. Land use resources

The route would cross about 7.6km of Grade 2 agricultural land. It would cross about 4.5km of green belt.

Two landfill sites at ① Yarnfield and ②② Pipe Ridware would be directly affected. The design would require further work to minimise risks to people and the environment from these impacts.

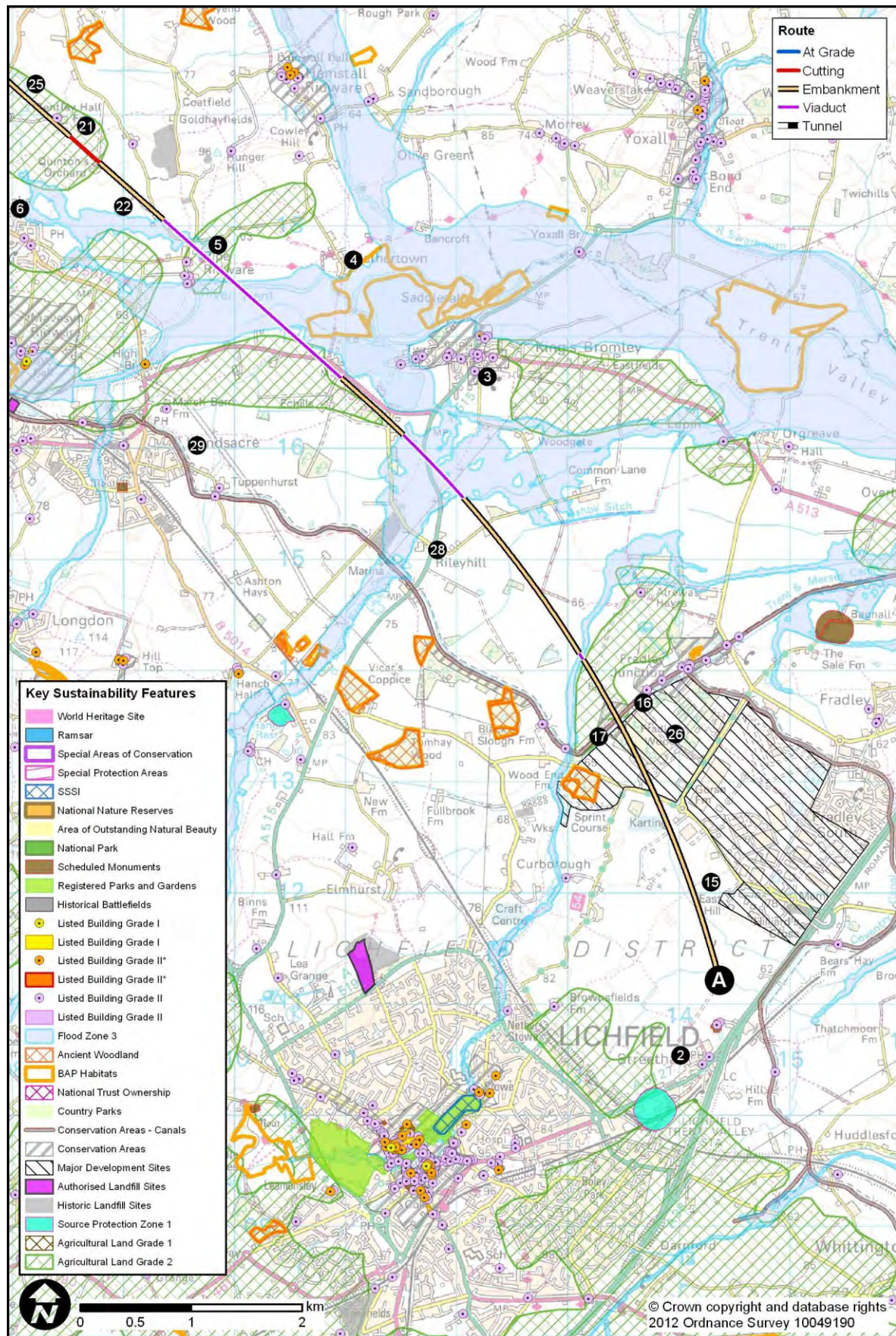
3.3.15. Waste and material use

It is estimated that the route section would result in a deficit of - 2,573,847m³ of excavated material. This includes 35,900m³ of tunnel excavated material.

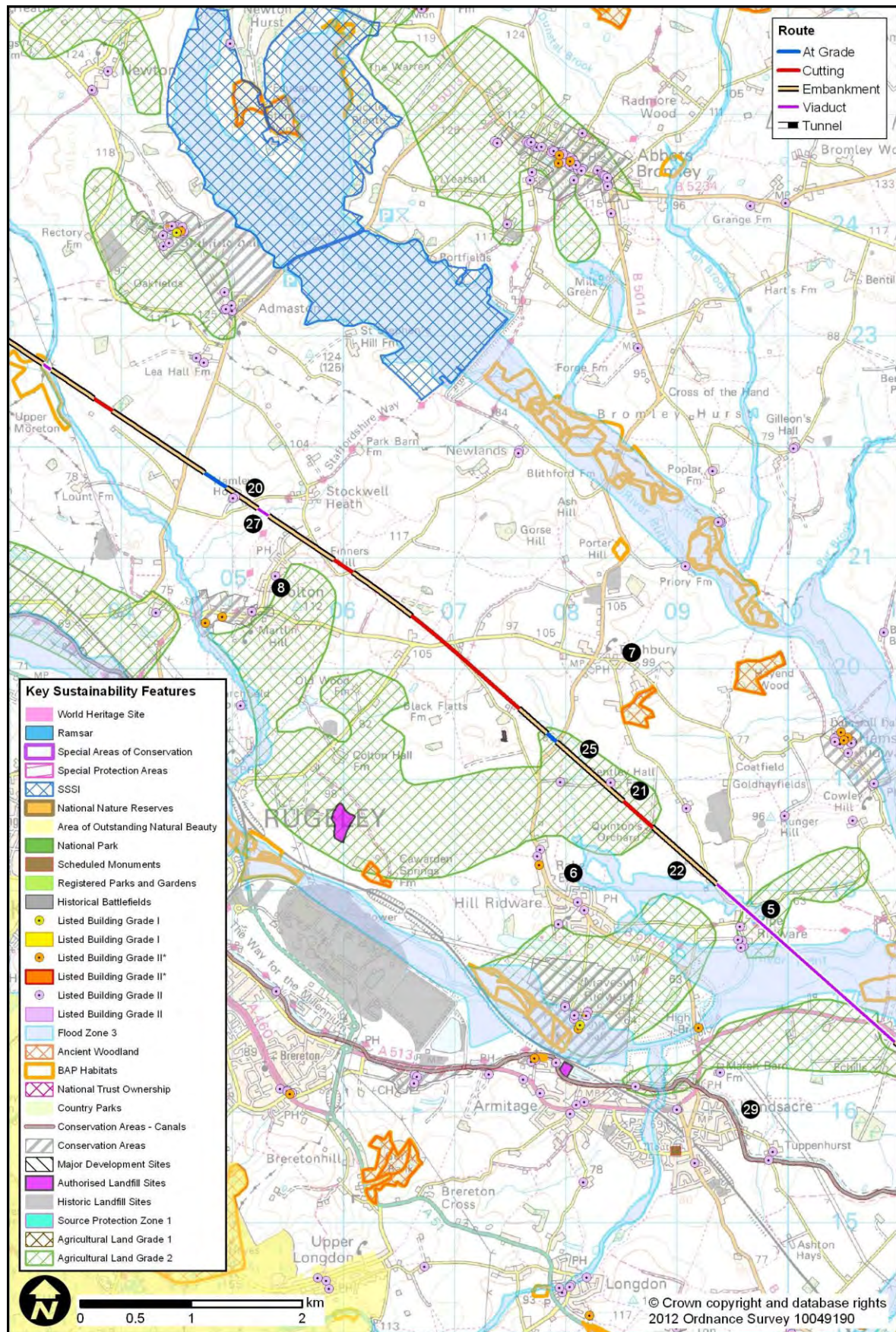
As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.

Estimated quantities of bulk building materials for this section comprise 12,800 tonnes of steel and 39,600 tonnes of concrete.

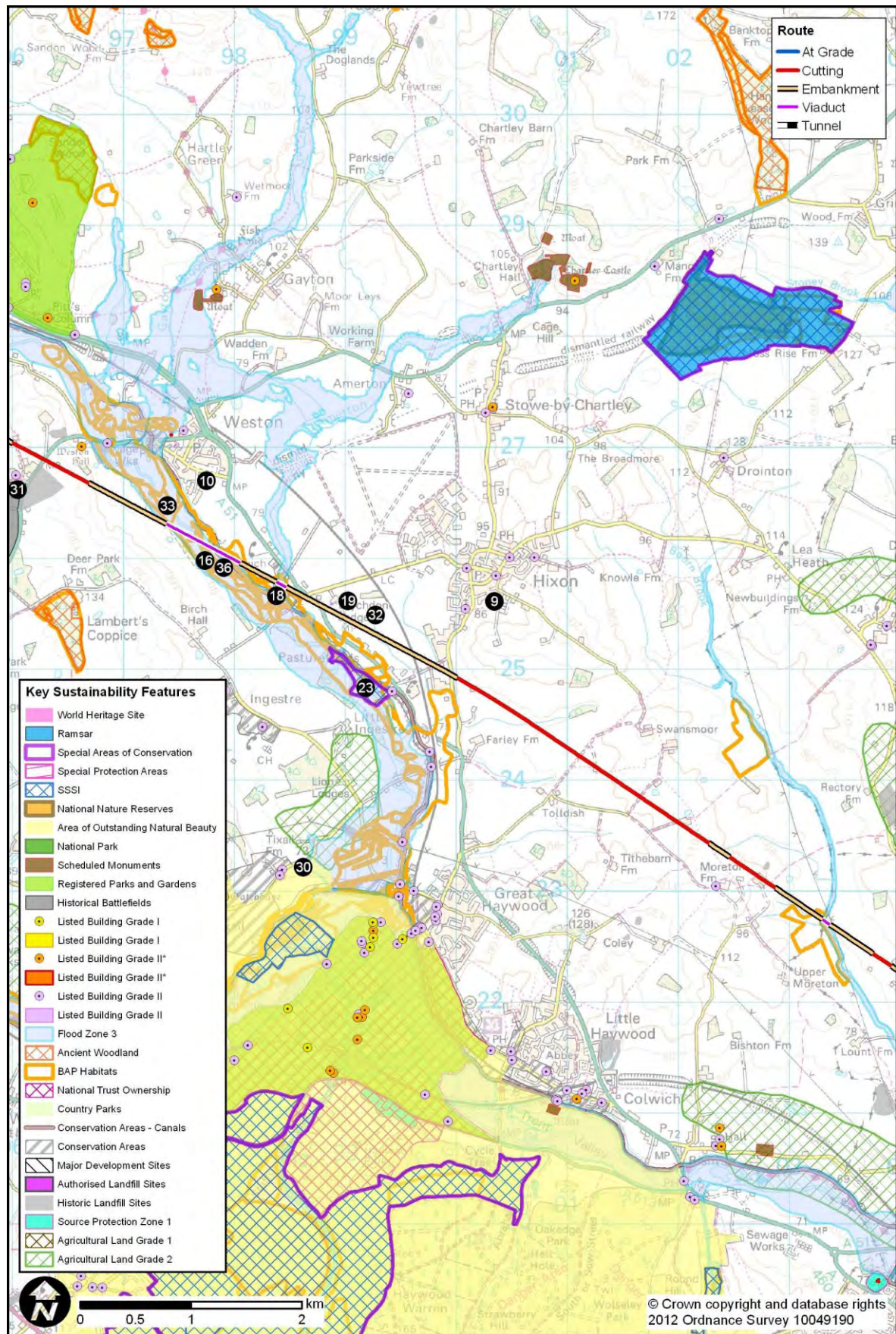
HSM03 – Figure 1 of 5



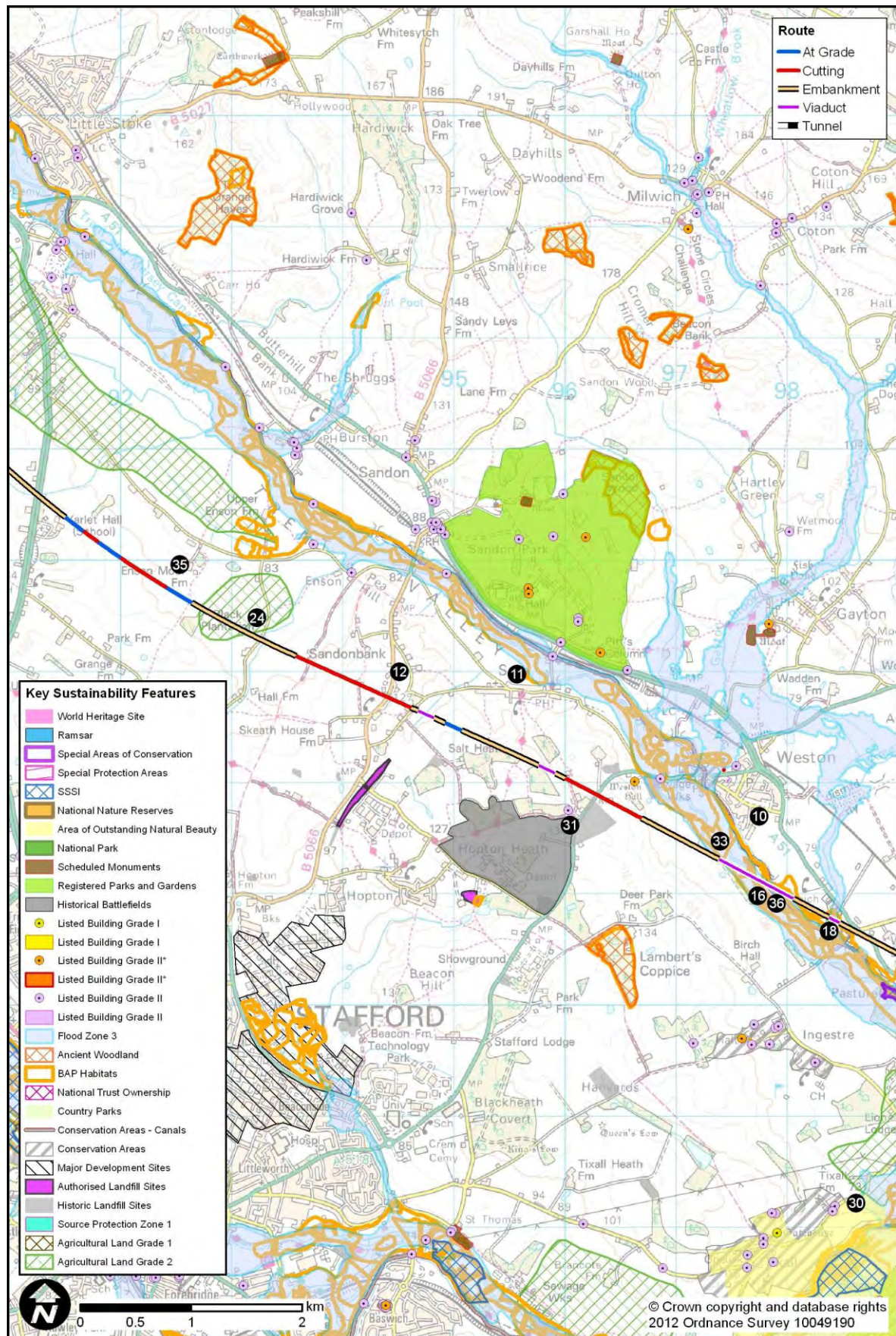
HSM03 – Figure 2 of 5



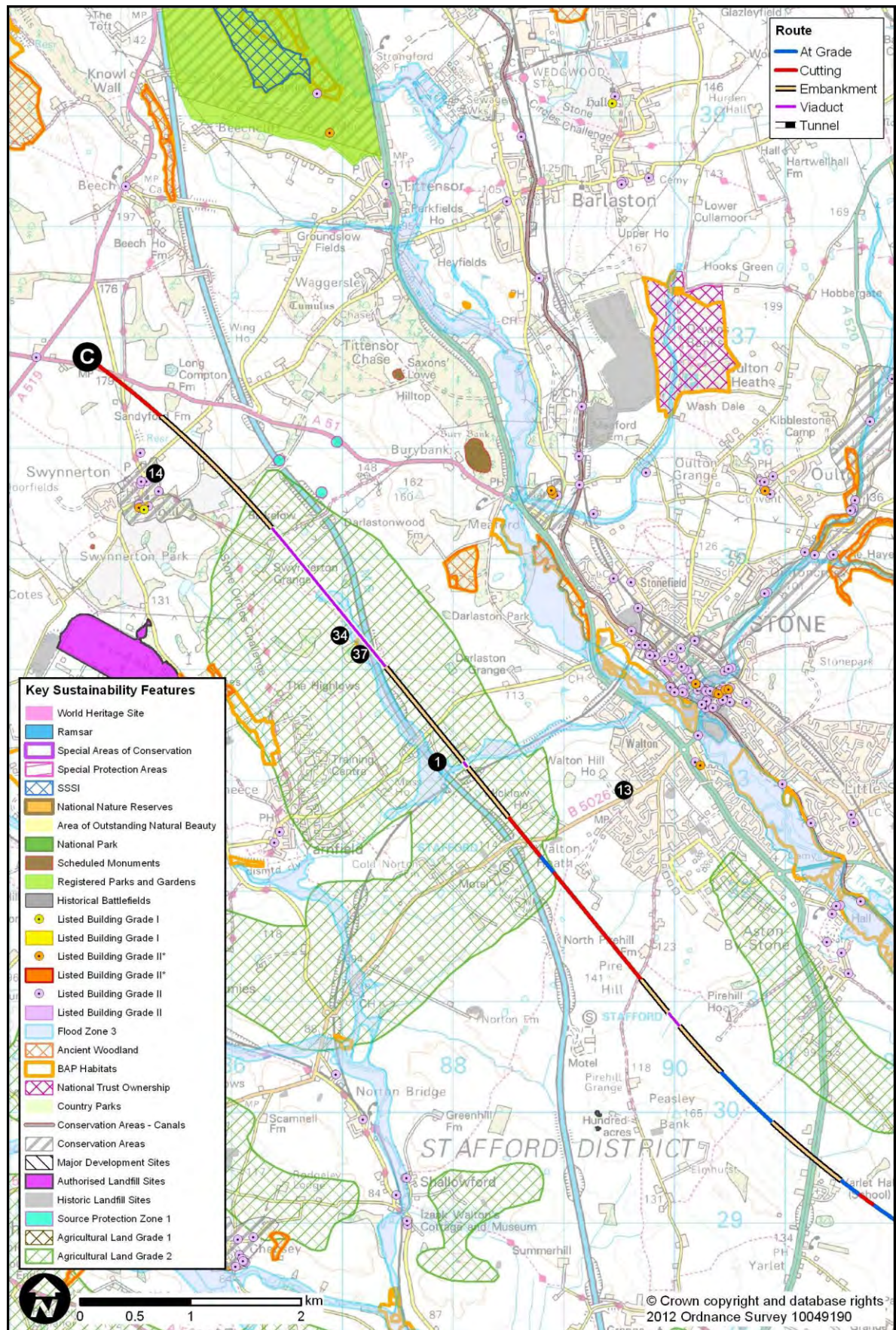
HSM03 – Figure 3 of 5



HSM03 – Figure 4 of 5

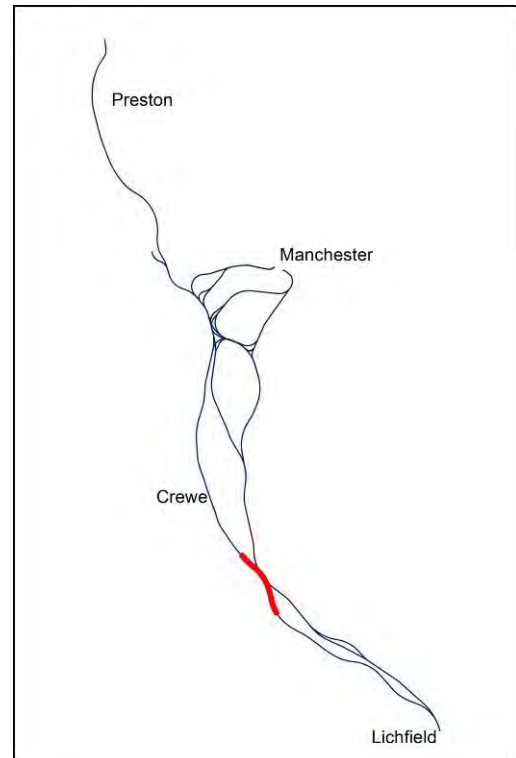


HSM03 – Figure 5 of 5



3.4. HSM04: Millmeece (B) to Madeley (D)

- 3.4.1. The route section between Millmeece and Madeley would be 12.9km (8 mile) long. It would connect south of Millmeece with HSM01 from Streethay. At Madeley the route would continue along section HSM08 to Hough.
- 3.4.2. The route section would follow the Meece Brook Valley alongside the WCML for several kilometres before diverging to the north-west using a cutting and a short tunnel through a low hill west of Whitmore. It would then re-emerge from this into the Lea Valley and re-join the WCML corridor up to Madeley. The close alignment within river valleys would require a number of viaducts, with three such crossings of the Meece Brook and one of the Lea and the WCML.



- 3.4.3. HSM04 Figure 1 illustrates the route alignment and the principal sustainability features in the area.
- 3.4.4. Specific mitigation included within the route section comprises localised realignments that have sought to avoid Hill Chorlton Extraction Site Boreholes, to reduce noise and visual impacts at Whitmore, to shift the alignment from Whitmore Conservation Area to avoid demolitions and minimise impact on the built heritage, to avoid residential demolitions at Madeley and to reduce severance and reduce visual impact at Whitmore.

- 3.4.5. Population and settlements The route section would result in the demolition of an estimated 34 dwellings. These include a cluster at ① Cotes Heath. In addition, one commercial property would also be demolished.

- 3.4.6. Noise Noise from HS2 trains would result in annoyance for an estimated 191 people (equivalent to the occupants of some 81 dwellings). This would represent about 15 people per km of route section. With ambient road noise also taken into account, noise impacts from HS2 would be expected to be less than this.

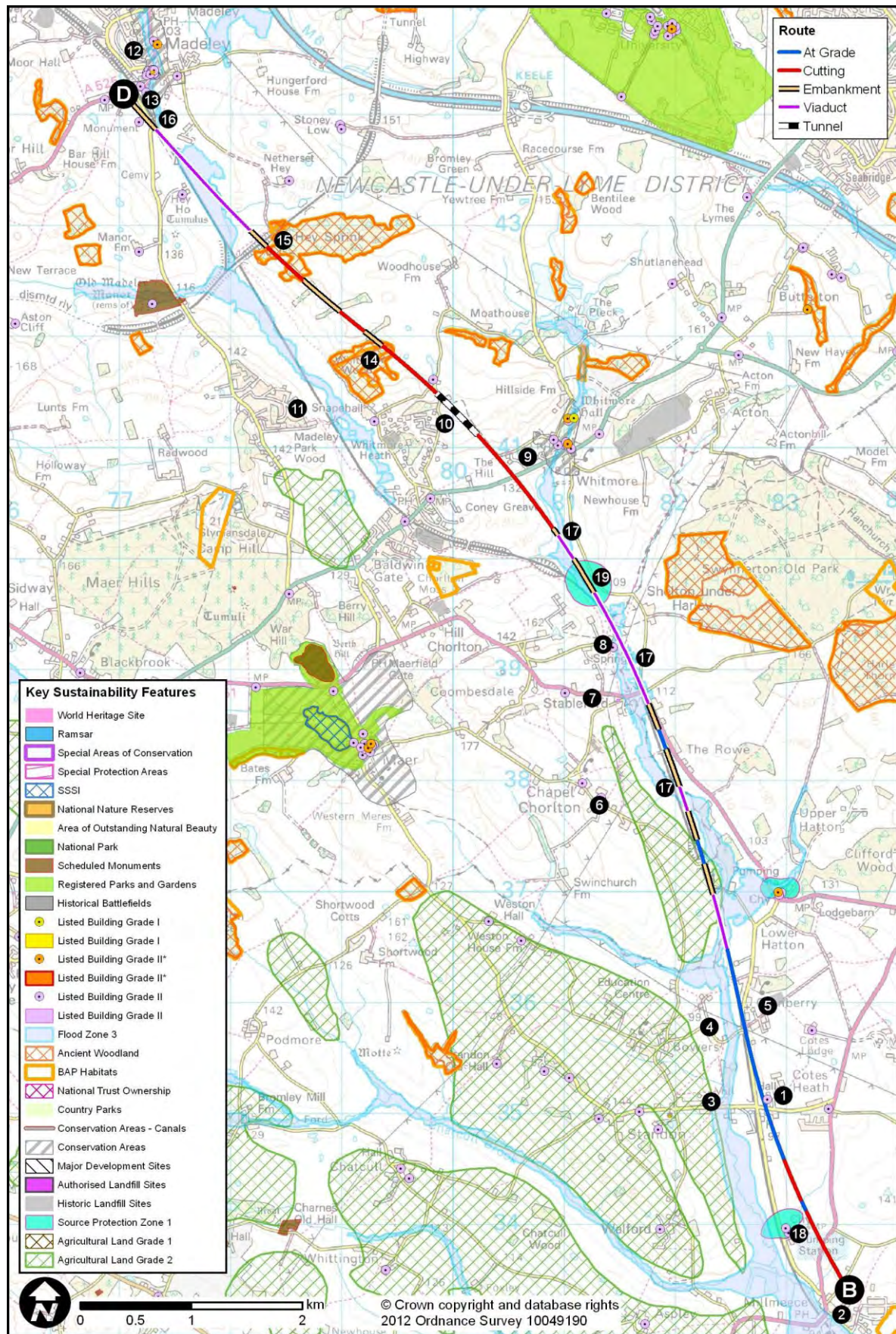
The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ② Millmeece, ① Cotes Heath, ③ Standon, ④ Bowers, ⑤ Cranberry, ⑥ Chapel Chorlton, ⑦ Stableford, ⑧ Springfields, ⑨ Whitmore, ⑩ Whitmore Heath, ⑪ Madeley Park Wood and ⑫ Madeley.

Approximately 196 dwellings would potentially qualify for noise insulation along the route section, particularly at ① Cotes Heath, ⑤ Cranberry, ⑦ Stableford, ⑧ Springfields, ⑩ Whitmore Heath and ⑫ Madeley. This is equivalent to approximately 16 properties per km of route section.

- 3.4.7. Health and well-being Approximately 50 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.

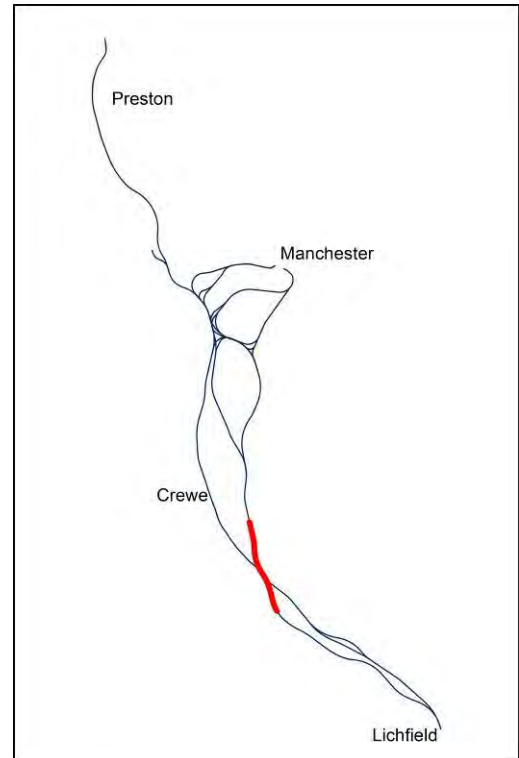
3.4.8.	Access issues	No promoted recreational routes would be crossed by the route section.
3.4.9.	Landscape, townscape and cultural heritage	<p>Moderate visual intrusion is likely to result from the 1.2km long viaduct across the Lea Valley south of ⑫ Madeley and the deep cutting south and west of ⑨ Whitmore.</p> <p>The southern edge of the ⑬ Madeley conservation area would be intersected for approximately 30m, although, it could potentially be avoided through route refinement.</p> <p>Five scarp woods (see also <i>biodiversity and wildlife</i>) would be directly affected, mostly on the scarp slope of the Lea Valley, resulting in impacts on landscape character.</p> <p>The settings of a number of listed structures could be affected, but only the ① Grade II Cotes Hall is expected to have direct impacts.</p>
3.4.10.	Biodiversity and wildlife	<p>The route section would pass within 10km of three Natura 2000 wildlife sites. However, HRA screening confirms that there would be no likely significant effects on these sites.</p> <p>The route section would directly affect the edges of two ancient woodlands on the scarp slope of the Lea Valley, ⑭ Whitmore Wood and ⑮ Hey Spink, which are also wet woodland BAP habitats.</p>
3.4.11.	Water resources and flood risk	<p>The route section's close alignment with minor rivers may result in the diversion of the ⑰ Meece Brook in three locations and of the ⑯ River Lea in one location. Continuing scheme design would seek to avoid or minimise this impact.</p> <p>This route section would be in cut through 0.3km of SPZ2, potentially affecting groundwater flows to ⑱ Mill Meece abstraction point (18,184m³/day). This route section would also pass directly over ⑲ Whitmore borehole (12,420m³/day) at grade.</p> <p>The route section would cross some 2.3km of Flood Zone 3. Approximately 200m of the line would be in cut up to 1m deep in Flood Zone 3, and therefore at risk of flooding.</p>
3.4.12.	Land use resources	<p>The route section would cross about 630m of Grade 2 agricultural land. It would cross about 10km of green belt associated with Newcastle-under-Lyme.</p> <p>One landfill site at ⑳ Millmeece would be directly affected. The design would require further work to minimise risks to people and the environment from this impact.</p>
3.4.13.	Waste and material use	<p>It is estimated that the route section would result in a surplus of - 1,285,430m³ of excavated material. This would include 170,400m³ of tunnel excavated material.</p> <p>As a result of the route section impacting on the landfill site, it is possible that some of the waste material arising in the route section would be hazardous.</p> <p>Estimated quantities of bulk building materials for this section comprise 4,200 tonnes of steel and 12,800 tonnes of concrete.</p>

HSM04 - Figure 1



3.5. HSM05: Millmeece (B) to Shrayleybrook (I)

- 3.5.1. The route section between Millmeece and Shrayleybrook would be about 17.8km (11.1 miles) long. It would connect south of Millmeece with HSM01 from Streethay. At Shrayleybrook the route would continue along section HSM13 to Mere or HSM17 to Mobberley.
- 3.5.2. The route section would follow the Meece Brook Valley alongside the WCML for part of its length before diverging from both in cutting and a short tunnel through a low hill west of Whitmore. It would emerge into a small valley and then cross the M6 and the Silverdale to Madeley railway. The motorway follows a dry river valley and the route section would run close to the east of the valley. The undulating and wooded hills of the valley side would require various cuttings and embankments as the route passes east of Madeley Heath and onto Shrayleybrook.
- 3.5.3. HSM05 Figures 1 to 2 illustrate the route alignment and the principal sustainability features in the area.
- 3.5.4. Specific mitigation included within the route section comprises a number of localised realignments that have sought to avoid Hill Chorlton Extraction Site Boreholes, to reduce noise and visual impacts at Whitmore and to shift the alignment from Whitmore Conservation Area to avoid demolitions and minimise impact on the built heritage.
- 3.5.5. **Population and settlements** The route section would result in the demolition of an estimated 35 dwellings. These include a cluster at ❶ Cotes Heath. In addition, an estimated three commercial properties would also be demolished. Potential severance would affect an estimated five dwellings west of ❷ Newcastle-Under-Lyme.
- 3.5.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 245 people (equivalent to the occupants of some 104 dwellings). This would represent about 14 people per km of route. With ambient road noise also taken into account the noise impact from HS2 would be expected to be less than this.
- The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ❷ Millmeece, ❶ Cotes Heath, ❸ Standon, ❹ Bowers, ❺ Cranberry, ❻ Chapel Chorlton, ❼ Stableford, ❽ Springfields, ❾ Whitmore, ❿ Madeley Heath, ⓫ Halmer End and ⓬ Shrayleybrook.
- In terms of noise insulation, approximately 203 dwellings would be expected to qualify, particularly at ❶ Cotes Heath, ❺ Cranberry, ❼ Stableford, ❽ Springfields, ❾ Whitmore, ❿ Madeley Heath and ⓬ Shrayleybrook. This is equivalent to approximately 12 dwellings per km of route section.



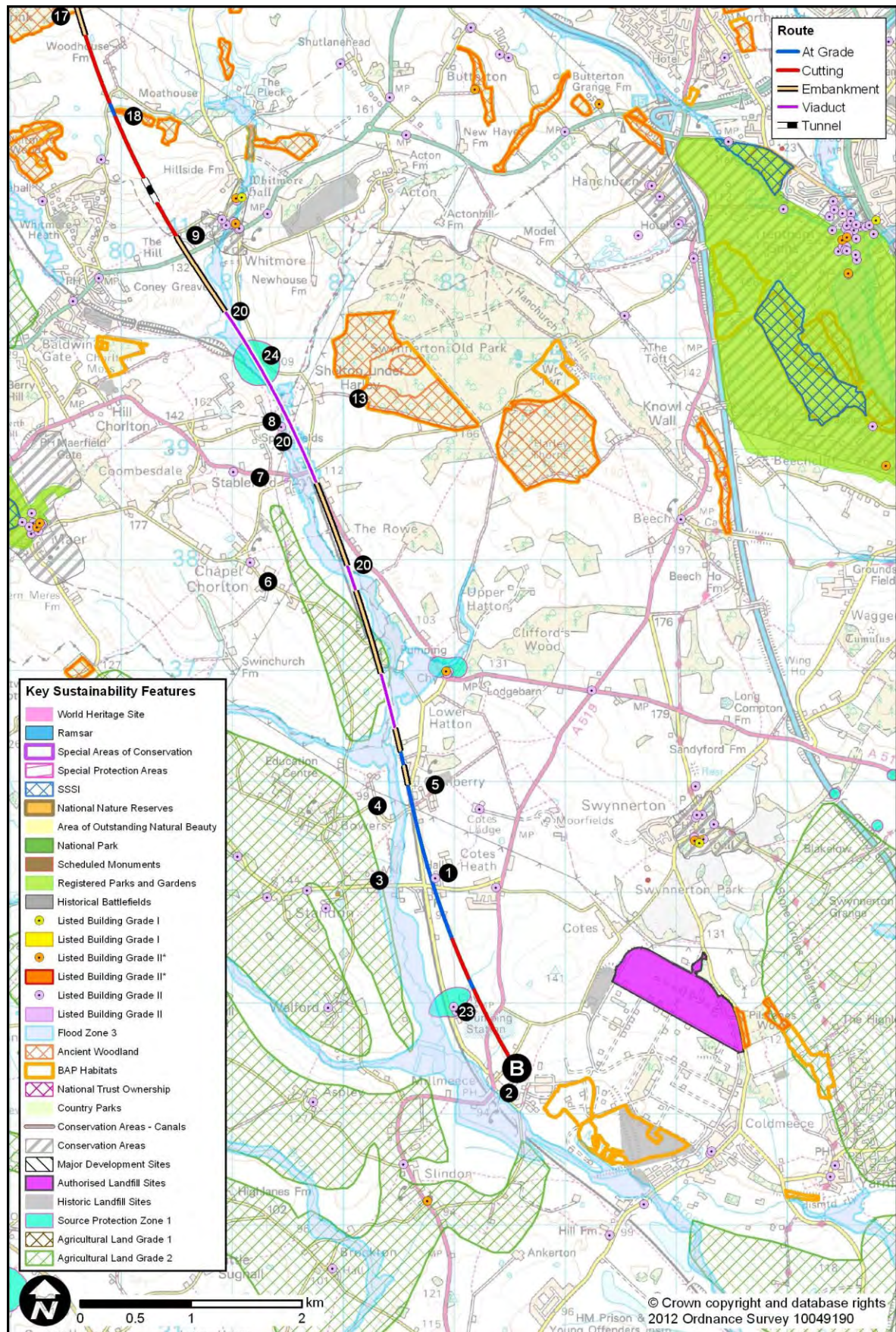
3.5.7.	Health and well-being	Approximately 50 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
3.5.8.	Access issues	No promoted recreational routes would be crossed by the route section.
3.5.9.	Landscape, townscape and cultural heritage	<p>West of Whitmore, the route section would diverge from the existing rail corridor across open farmland of more complex landform, resulting in landscape impacts. There would also be moderate or major visual impacts in a number of areas, including west of 13 Swynnerton Old Park with views of embankment and high viaduct</p> <p>Visual impacts would affect people in the villages of 7 Stableford, 9 Whitmore (also a conservation area), 10 Madeley Heath and 14 Finney Green. The route section would also have a direct impact on eight valley-side and scarp woodlands (see also <i>biodiversity and wildlife</i>). These woods are prominent features in the landscape and their loss would affect the landscape character.</p> <p>The area is characterised by attractive villages and countryside on the western outskirts of 22 Newcastle-under-Lyme and the route section would affect views for residents and recreational users of this area.</p> <p>The Grade II listed 1 Cotes Hall would be directly affected. The settings of an estimated five further listed structures could be affected, but these impacts are expected to be negligible.</p>
3.5.10.	Biodiversity and wildlife	<p>The route section would pass within 10km of three Natura 2000 wildlife sites. However, HRA screening confirms that there would be no likely significant effects on these sites.</p> <p>The route would directly affect five ancient woodlands, which are also wet woodland BAP habitats. These include 15 Bullhorns Wood, 16 Dunge Wood, 17 Hey Spink Wood, 18 Moat Wood, and 19 Hayes Wood. Impacts to the five ancient woodlands would be largely periphery.</p>
3.5.11.	Water resources and flood risk	<p>The route section's close alignment with minor rivers could require diversions of the 20 Meece Brook minor river in three locations. Continuing scheme design would seek to avoid or minimise this impact.</p> <p>The route section would cross an SPZ1, although on embankment and viaduct, this would not have a direct impact. This route section would be in cut through 300m of SPZ2, potentially affecting groundwater flows to 23 Mill Meece abstraction point (18,184m³/day). This route also passes directly over 24 Whitmore borehole (12,420m³/day) in viaduct.</p> <p>The route section would cross some 1.8km of Flood Zone 3.</p>
3.5.12.	Land use resources	<p>The route would cross about 630m of Grade 2 agricultural land. It would cross about 15.6km of green belt.</p> <p>Eight landfill sites between Madeley Heath and Shrayleybrook would be directly affected. The design would require further work to minimise risks to people and the environment from these impacts.</p>

- 3.5.13. Waste and material use It is estimated that the route section would result in a surplus of 1,063,731m³ of excavated material. This includes 59,700m³ of tunnel excavated material.

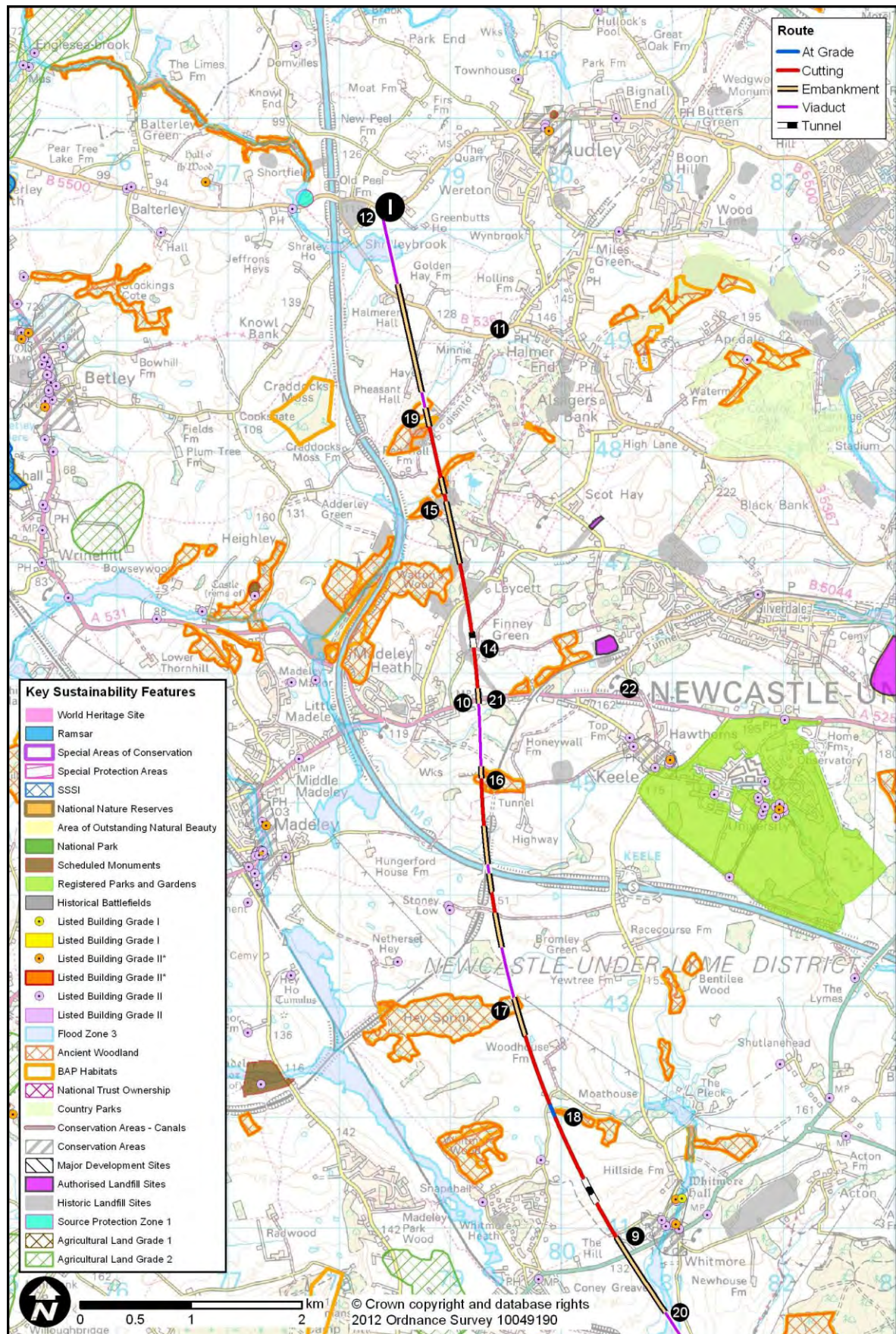
As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.

Estimated quantities of bulk building materials for this section comprise 5,700 tonnes of steel and 17,600 tonnes of concrete.

HSM05 - Figure 1 of 2

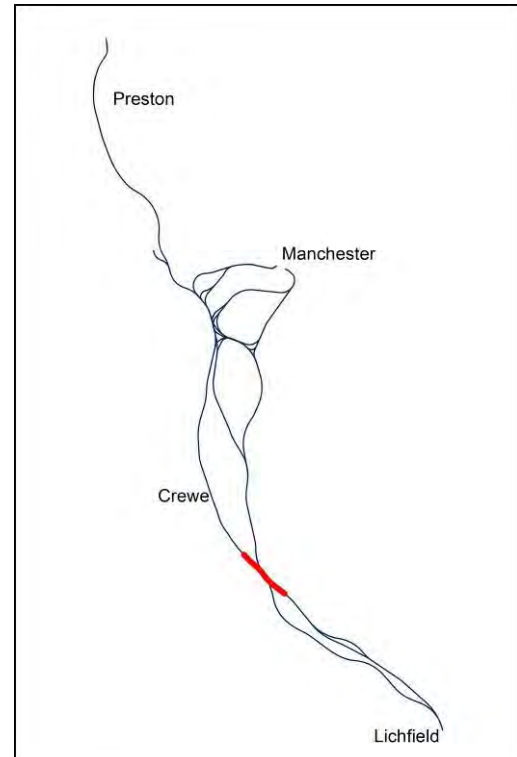


HSM05 - Figure 2 of 2



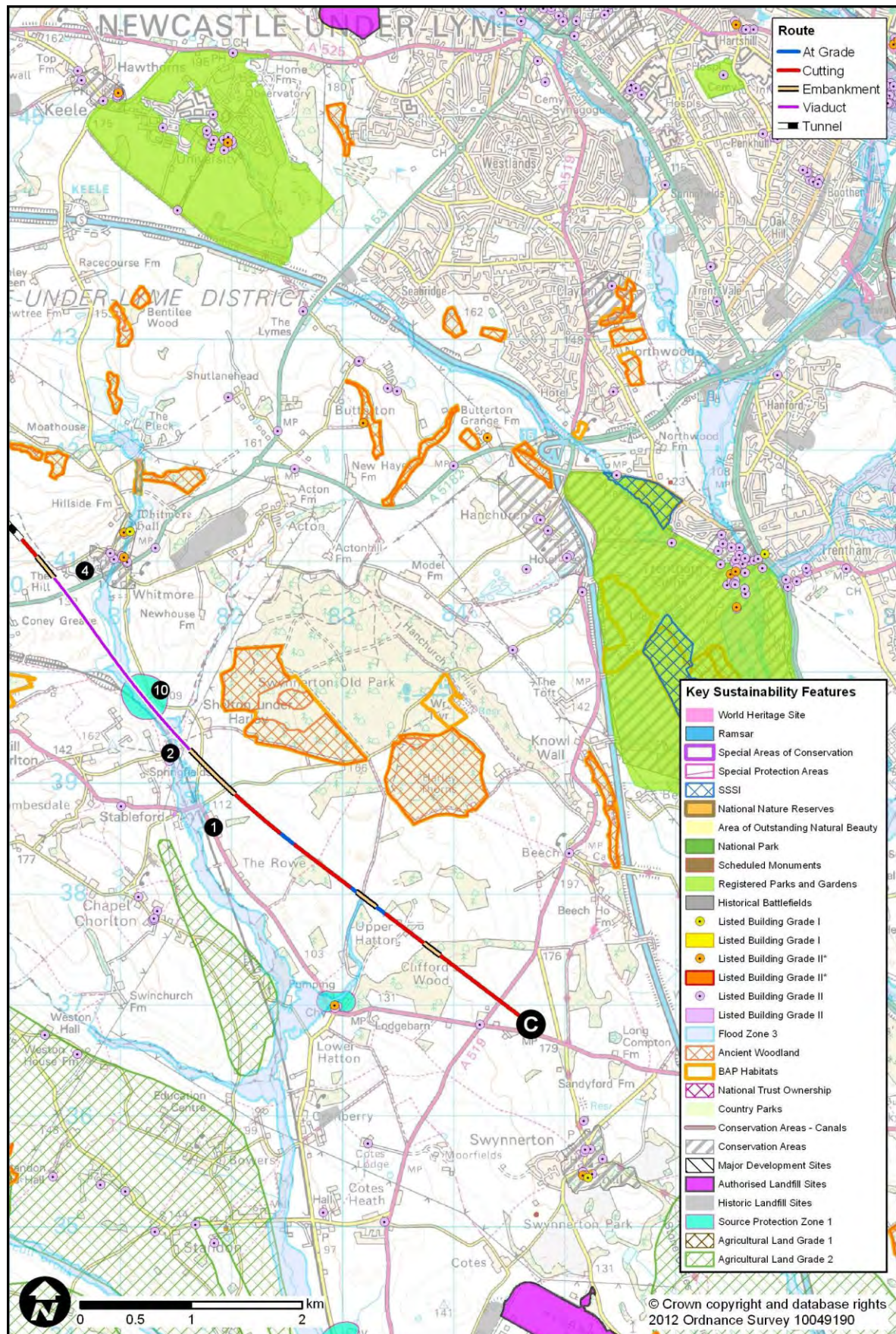
3.6. HSM06: Swynnerton (C) to Madeley (D)

- 3.6.1. The route section between Swynnerton and Madeley would be about 10.7km (6.6 miles) long. It would connect south of Swynnerton with either HSM02 or HSM03 from Streethay. At Madeley the route would continue along section HSM08 to Hough.
- 3.6.2. The route section would pass north-west through the hilly terrain of Hatton Common before emerging into the Meece Brook Valley, crossing it on viaduct. It would then pass into cutting and a short tunnel through the hillside around Whitmore Heath before emerging across the Lea Valley which, would be crossed on viaduct south-west of Madeley.
- 3.6.3. HSM06 Figures 1 to 2 illustrate the route alignment and the principal sustainability features in the area.
- 3.6.4. Specific mitigation included within the route section comprises a number of localised realignments that have sought to avoid Hill Chorlton Extraction Site Boreholes, to reduce noise and visual impacts at Whitmore, to shift the alignment from Whitmore Conservation Area to avoid demolitions and minimise impact on the built heritage and to avoid residential demolitions at Madeley.
- 3.6.5. Population and settlements The route section would result in the demolition of an estimated one dwelling.
- 3.6.6. Noise Noise from HS2 trains would result in annoyance for an estimated 117 people (equivalent to the occupants of some 50 dwellings). This would represent about 11 people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.
- The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ① Stableford, ② Springfields, ③ Baldwin's Gate, ④ Whitmore, ⑤ Whitmore Heath and ⑥ Madeley.
- In terms of noise insulation, approximately 54 dwellings would be expected to qualify, particularly at ② Springfields and ⑥ Madeley. This is equivalent to approximately six dwellings per km of route section.
- 3.6.7. Health and well-being Approximately 15 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
- 3.6.8. Access issues No promoted recreational routes would be crossed by the route section.

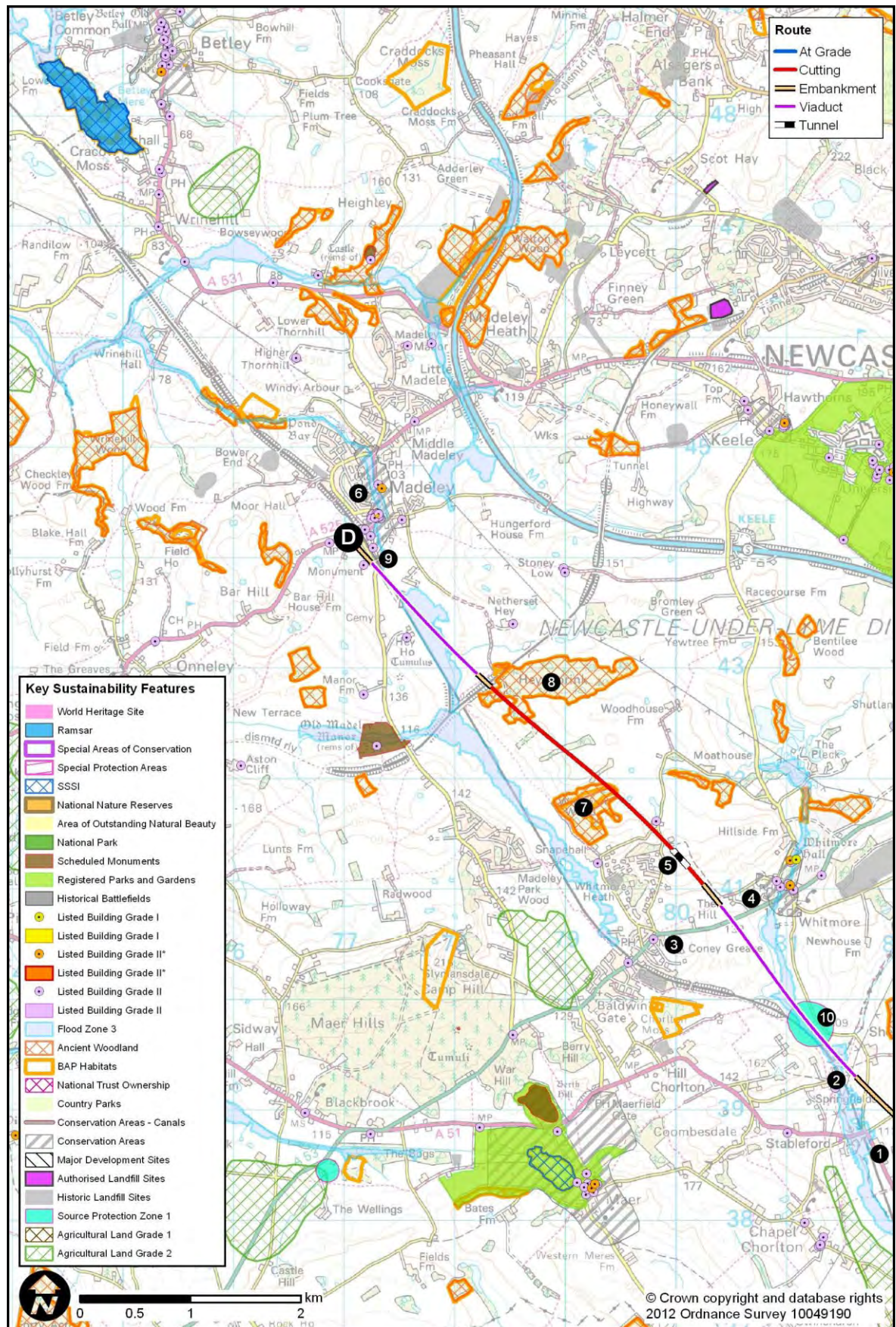


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| 3.6.9. | Landscape, townscape and cultural heritage | <p>The varying landform of the route section would require some deep cutting through hillsides and long viaducts across two valleys. This would result in a major impact on landscape character as well as visual impacts across surrounding areas of open countryside and on the nearby villages of ④ Whitmore (a conservation area), ③ Baldwin's Gate and ⑥ Madeley (also a conservation area).</p> <p>There would be a direct impact on eight woodlands, including some distinctive scarp woodlands (see also <i>biodiversity and wildlife</i>).</p> <p>The southern edge of ⑥ Madeley Conservation Area would be crossed for approximately 30m, although, it could potentially be avoided through scheme refinement.</p> |
| 3.6.10. | Biodiversity and wildlife | <p>The route section would pass within 10km of three Natura 2000 wildlife sites. However, HRA screening confirms that there would be no likely significant effects on these.</p> <p>The route section would directly affect ⑦ Whitmore Wood and ⑧ Hey Spink, two ancient woodlands and wet woodland BAP habitats on the scarp slope of the Lea Valley. The impact to the two ancient woodlands would be largely periphery.</p> |
| 3.6.11. | Water resources and flood risk | <p>One minor river may be diverted, namely the ⑨ River Lea. Continuing scheme design would seek to avoid or minimise this impact.</p> <p>The route section would pass over ⑩ Whitmore borehole (12,420m³/day) in viaduct.</p> <p>The route section would cross some 1km of Flood Zone 3.</p> |
| 3.6.12. | Land use resources | <p>The route section would cross about 9.9km of green belt.</p> |
| 3.6.13. | Waste and material use | <p>It is estimated that the route section would result in a surplus of 1,963,030m³ of excavated material. This includes 33,100m³ of tunnel excavated material.</p> <p>Estimated quantities of bulk building materials for this section comprise 3,400 tonnes of steel and 10,600 tonnes of concrete.</p> |

HSM06 - Figure 1 of 2

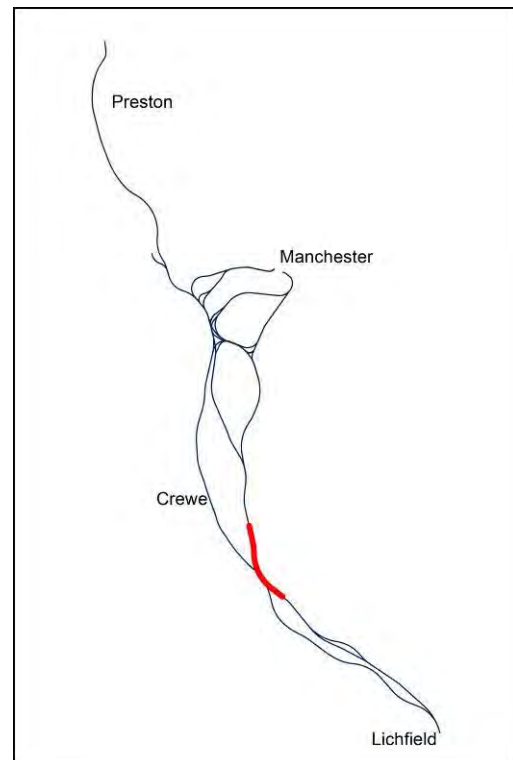


HSM06 - Figure 2 of 2



3.7. HSM07: Swynnerton (C) to Shrayleybrook (I)

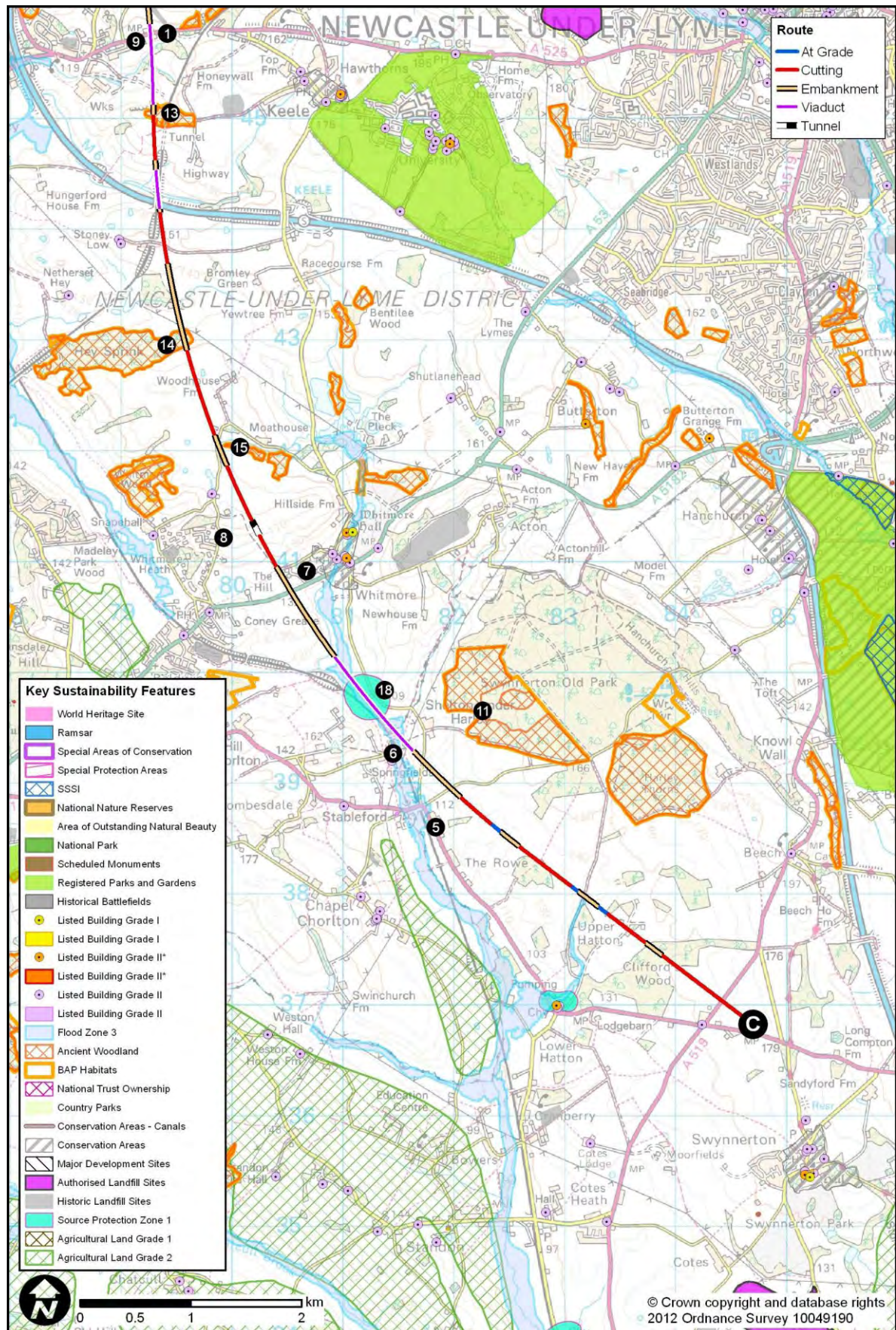
- 3.7.1. The route section between Swynnerton and Shrayleybrook would be 15.5km (9.6 miles) long. It would connect south of Swynnerton with either HSM02 or HSM03 from Streethay. At Shrayleybrook the route would continue along either HSM13 to Mere or HSM17 to Mobberley.
- 3.7.2. The route section would pass north-west through the hilly terrain of Hatton Common before emerging into the Meece Brook Valley, crossing it on viaduct and embankment. The route section would then pass into cutting and a short tunnel through the hillside around Whitmore Heath and would continue north through this undulating terrain west of Keele, where it would cross the M6. The route section would cross over the Hazeley Brook Valley, on the western edge of Newcastle-Under-Lyme, and the A525 on viaduct before aligning east of the M6. The undulating nature of the landform and wooded hills of the valley side would require various cuttings and embankments as the route passes east of Madeley Heath and onto Shrayleybrook.
- 3.7.3. HSM07 Figures 1 to 2 illustrate the route alignment and the principal sustainability features in the area.
- 3.7.4. Specific mitigation included within the route section comprises localised realignments that have sought to avoid Hill Chorlton Extraction Site Boreholes, to reduce noise and visual impacts at Whitmore, to shift the alignment from Whitmore Conservation Area, to avoid demolitions and minimise impact on the built heritage and to reduce residential demolitions at Madeley.
- 3.7.5. **Population and settlements** This route section would result in the demolition of an estimated two dwellings. In addition, an estimated one commercial property would be demolished.
Potential severance would affect an estimated 15 dwellings west of ①, ② Newcastle-under-Lyme.
- 3.7.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 179 people (equivalent to the occupants of some 76 dwellings). This would represent about 12 people per km of route. With ambient road noise also taken into account, the noise impacts from HS2 would be expected to be less than this.
The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ⑤ Stableford, ⑥ Springfields, ⑦ Whitmore, ⑧ Whitmore Heath, ⑨ Madeley Heath, ② Finney Green, ③ Halmer End and ④ Shrayleybrook.
In terms of noise insulation, approximately 31 dwellings would be



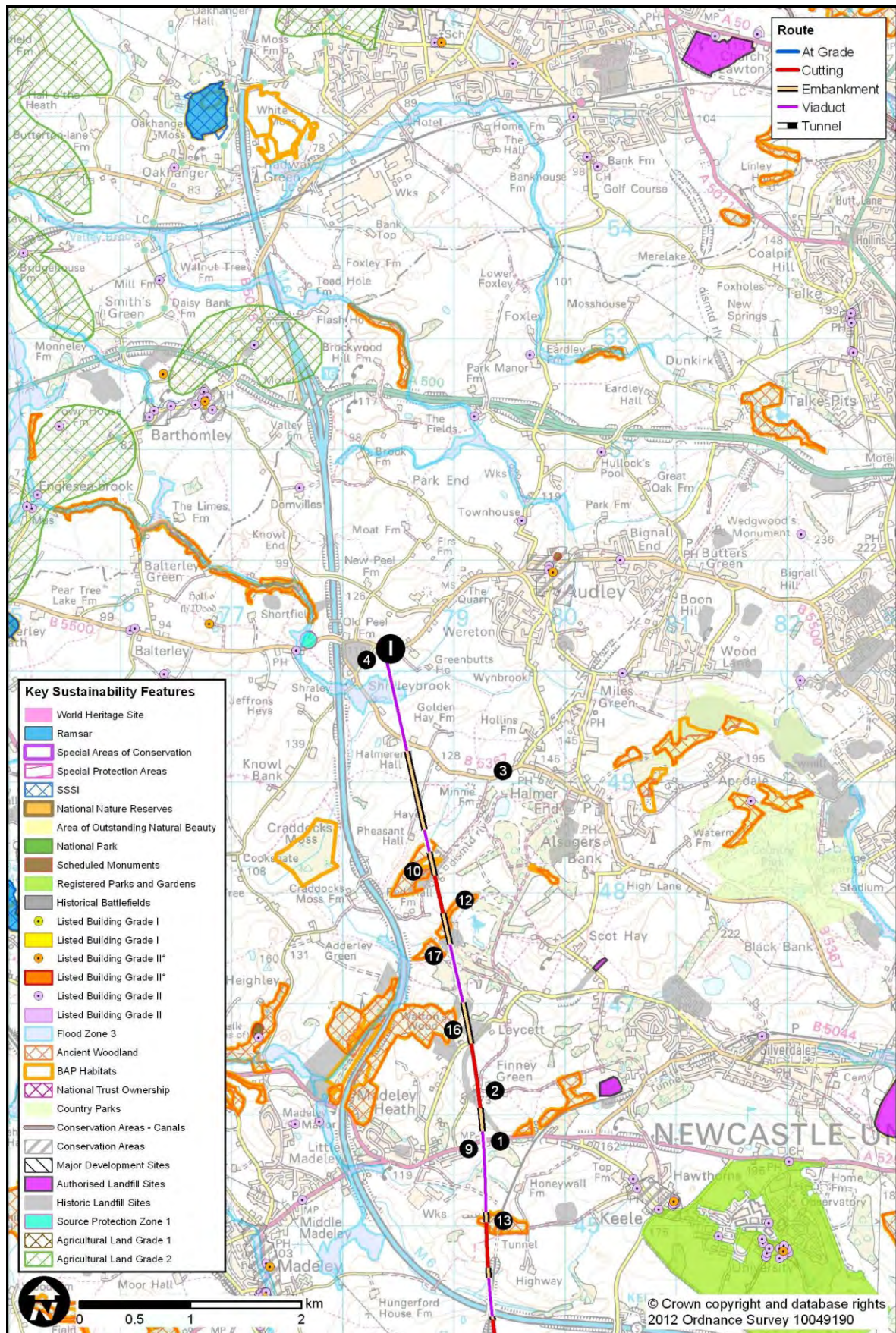
		expected to qualify, particularly at ⑥ Springfields, ② Finney Green and ④ Shralebrook. This is equivalent to approximately two dwellings per km of route section.
3.7.7.	Health and well-being	Approximately 20 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
3.7.8.	Access issues	No promoted recreational routes would be crossed by the route section.
3.7.9.	Landscape, townscape and cultural heritage	<p>The route section would run through an area of incised, well-wooded hills and farmland. The southern part would mainly be in cutting; further north it would cut across relatively complex terrain and this discordance would have a disruptive effect on landscape character. There would also be moderate or major visual impacts in a number of areas, including west of ⑪ Swynnerton Old Park with views of embankment and high viaduct; west of ⑦ Whitmore with views of high embankment and deep cutting; and east and north of ⑨ Madeley Heath with views of very high viaducts. The area is characterised by attractive villages and countryside on the ① western outskirts of Newcastle-under-Lyme and the route section would affect views of residents and recreational users of this area.</p> <p>There would also be significant direct impacts on eight small woodlands. The loss of and damage to these distinctive, small valley-side woodlands over a short distance, would have a marked impact on landscape character (see also <i>biodiversity and wildlife</i>).</p> <p>No listed buildings would be directly affected. Three Grade II listed structures would be close to the route, but impacts on their settings are expected to be negligible.</p>
3.7.10.	Biodiversity and wildlife	<p>The route section would pass within 10km of three Natura 2000 wildlife sites. However, HRA screening confirms that there would be no likely significant effects on these sites.</p> <p>The route section would directly affect five ancient woodlands in the Lea Valley, all of which are also wet woodland BAP habitat. These are ⑫ Bullhorns Wood, ⑬ Dunge Wood, ⑭ Hey Spink, ⑮ Moat Wood (intersected only very slightly and potentially avoidable through further route refinement), and ⑩ Hayes Wood. The impacts to the ancient woodlands would be largely peripheral, although the impact to ⑫ Bullhorns Wood would be more adverse.</p>
3.7.11.	Water resources and flood risk	<p>The route section would cross an SPZ1, although on embankment and viaduct, this would not have a direct impact. It would pass over ⑮ Whitmore borehole (12,420m³/day) on embankment.</p> <p>The route section would cross some 670m of Flood Zone 3.</p>
3.7.12.	Land use resources	<p>The route section would cross about 15.4km of green belt.</p> <p>Seven landfill sites, four north-east of ⑮ Madeley Heath and three south west of ⑰ Halmer End, would be directly affected. The design would require further work to minimise risks to people and the environment from these impacts.</p>

- 3.7.13. Waste and material use
- It is estimated that the route section would result in a surplus of 246,167m³ of excavated material. This includes 19,300m³ of tunnel excavated material.
- As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.
- Estimated quantities of bulk building materials for this section comprise 5,000 tonnes of steel and 15,400 tonnes of concrete.

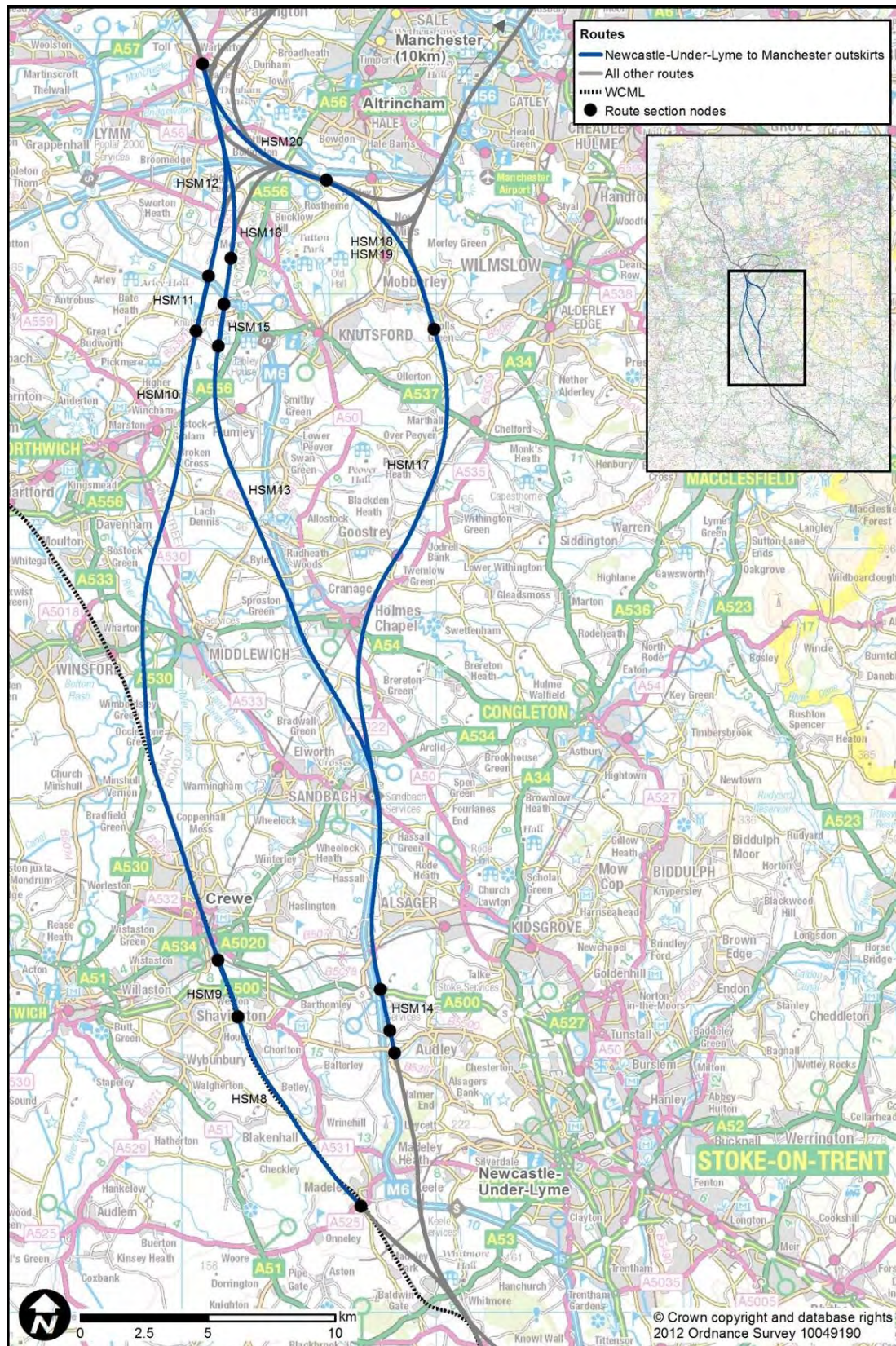
HSM07 - Figure 1 of 2



HSM07 - Figure 2 of 2



4. Manchester route: Newcastle-under-Lyme to Manchester outskirts

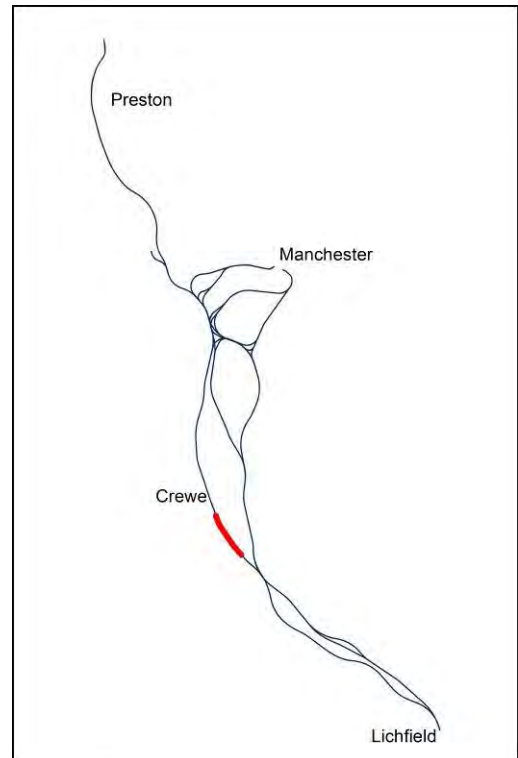


4.1. HSM08: Madeley (D) to Hough (E)

- 4.1.1. The route section between Madeley and Hough would be 8.9km (5.5 miles) long. It would connect south of Madeley with either HSM04 from Millmeece or HSM06 from Swynnerton. At Hough the route would continue north along section HSM09 to connect to the WCML south of Crewe Station or HSM10 to Winterbottom.
- 4.1.2. The route section would follow the corridor of the WCML. The gently undulating landform would require some shallow cutting and embankment, and a deeper cut and cover tunnel to the south-west of Betley and Betley Mere. Further north the route section would be largely at grade as it passes between Chorlton and Hough.
- 4.1.3. HSM08 Figure 1 illustrates the route alignment and the principal sustainability features in the area.
- 4.1.4. Specific mitigation included within the route section comprises a number of localised realignments that have sought to reduce noise and landscape and visual impacts at Wrinehill and Madeley.
- 4.1.5. **Population and settlements** The route section would result in the demolition of an estimated 10 dwellings.
Potential isolation would affect eight dwellings at ❶ Madeley.
- 4.1.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 273 people (equivalent to the occupants of some 116 dwellings). This would represent about 31 people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.

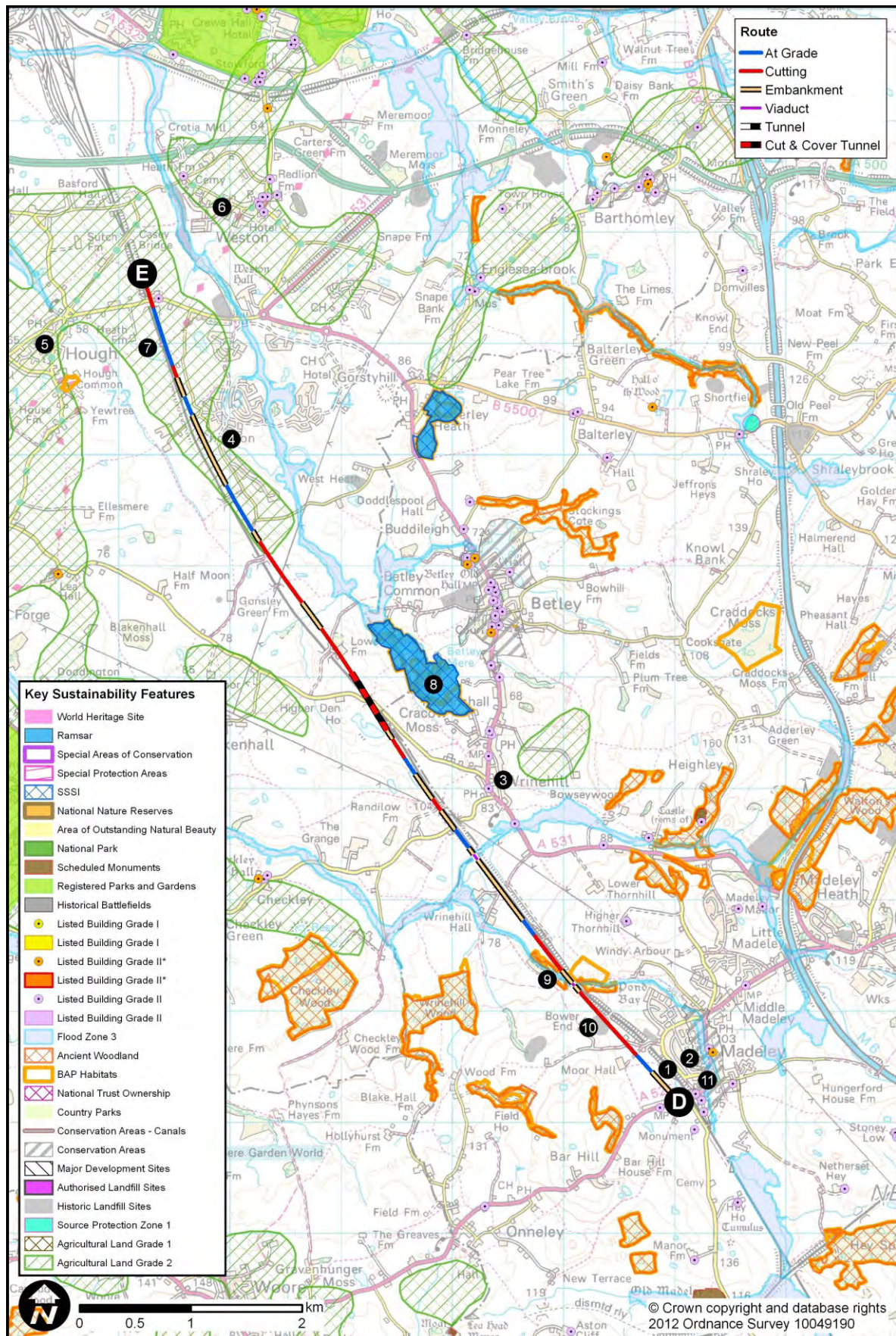
The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ❷ Madeley, ❸ Wrinehill, ❹ Chorlton, ❺ Hough and ❻ Weston.

In terms of noise insulation, approximately 237 dwellings would be expected to qualify, particularly at ❷ Madeley and ❹ Chorlton. This is equivalent to approximately 27 dwellings per km of route section.
- 4.1.7. **Health and well-being** Approximately 70 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
- 4.1.8. **Access issues** The ❼ South Cheshire Way promoted recreational route would be crossed by the route section. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.



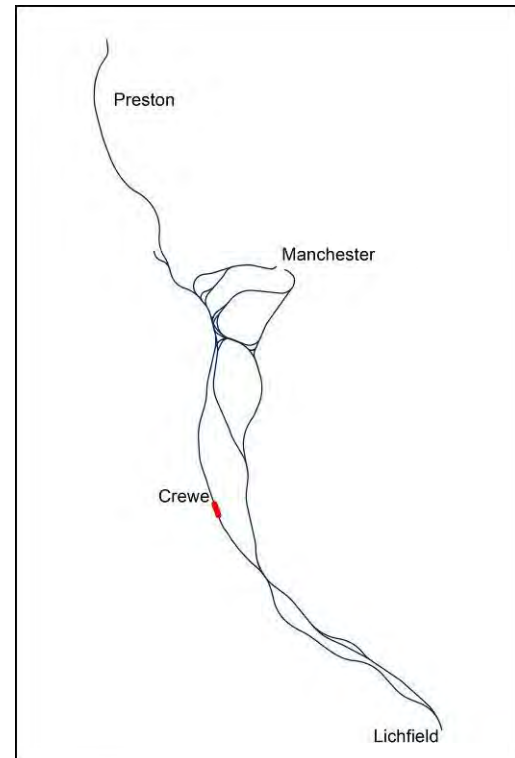
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| 4.1.9. | Landscape, townscape and cultural heritage | <p>As the route section is generally either in cutting or at grade, and closely follows the WCML, landscape and visual impacts would be quite limited. However, a short section of low embankment would result in visual impact for residents at ④ Chorlton near to the route section.</p> <p>The setting of the Grade I listed ⑪ Church of All Saints in Madeley may be affected, although it is currently screened by trees and buildings and the route would be seen in the context of the existing railway.</p> |
| 4.1.10. | Biodiversity and wildlife | <p>The route section would pass within 10km of three Natura 2000 wildlife sites. However, HRA screening confirms that there would be no likely significant effects on these sites. ⑧ Betley Mere SSSI forms part of the West Midland Meres & Mosses - Phase 1 Ramsar and is 290m from the route section at its closest point. There would be a risk of moderate impact through disturbance of birds using the mere, but these are not part of the 'qualifying interest' of the Ramsar.</p> <p>One further SSSI would be within 2km of the route section, but risk of impact to this is considered to be low.</p> <p>The route section would directly affect two ancient woodlands, ⑨ Graftons Wood and an unnamed wood, which are also wet woodland BAP habitats.</p> |
| 4.1.11. | Water resources and flood risk | <p>The route section would cross some 70m of Flood Zone 3.</p> |
| 4.1.12. | Land use resources | <p>The route would cross about 2.8km of Grade 2 agricultural land. It would cross about 2.4km of green belt land.</p> <p>One landfill site ⑩ (Bower End Lane near Madeley) would be directly affected. The design would require further work to minimise risks to people and the environment from this impact.</p> |
| 4.1.13. | Waste and material use | <p>It is estimated that the route section would result in a surplus of 629,999m³ of excavated material.</p> <p>As a result of the route section impacting on the landfill site, it is possible that some of the waste material arising in the route section would be hazardous.</p> <p>Estimated quantities of bulk building materials for this section comprise 2,900 tonnes of steel and 8,900 tonnes of concrete.</p> |

HSM08 - Figure 1



4.2. HSM09: Hough (E) to Crewe (F)

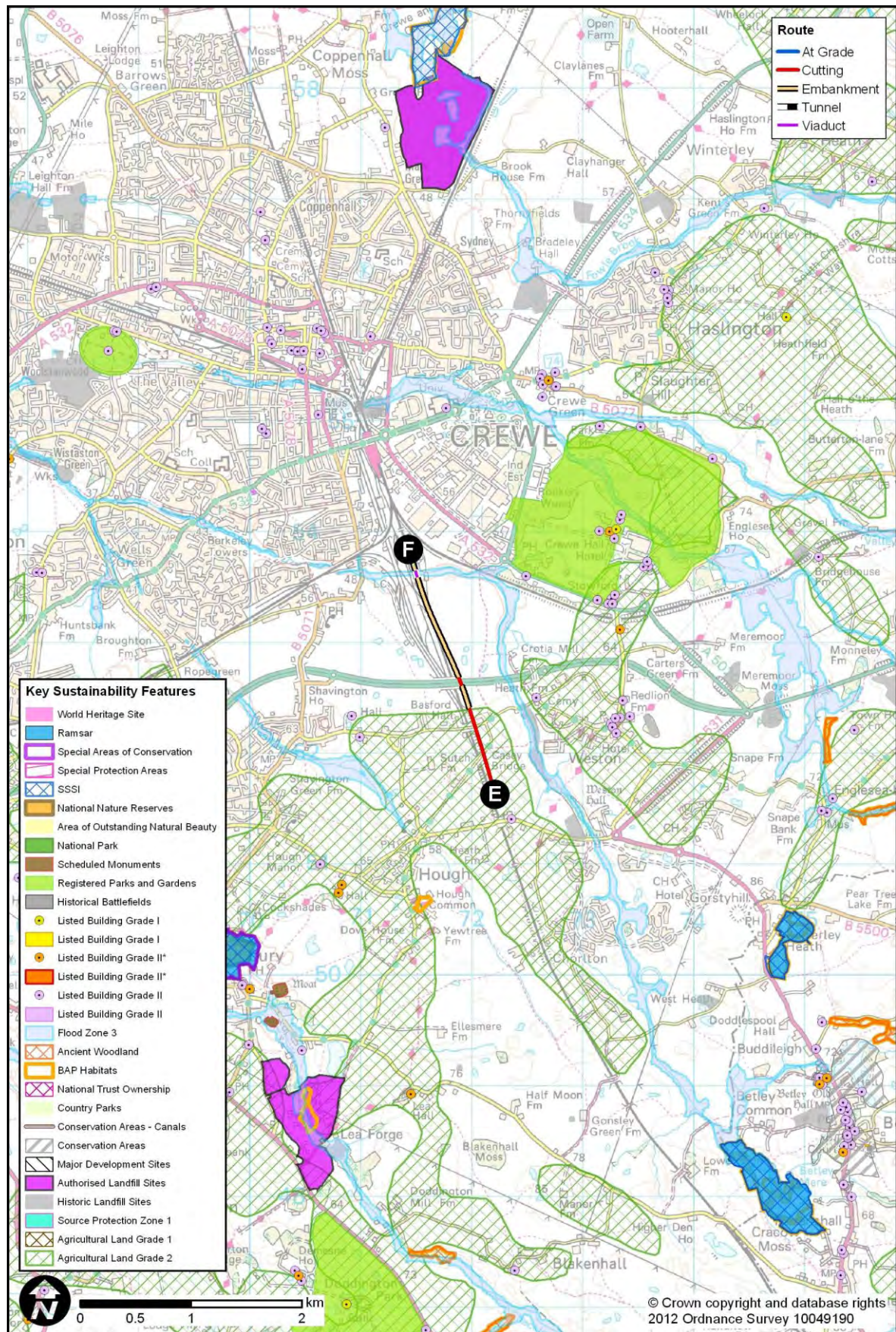
- 4.2.1. The route section between Hough and Crewe would be 2.3km (1.4 miles) long. It would connect south of Hough with HSM08 from Madeley. To the north it would provide a connecting spur between the HS2 route and the WCML south of Crewe Station.
- 4.2.2. The route section would run along the line of the WCML, under the A500 in cutting and then on embankment, which would allow the connection with the WCML to pass beneath it.
- 4.2.3. HSM09 Figure 1 illustrates the route alignment and the principal sustainability features in the area.
- 4.2.4. No additional mitigation has been incorporated into the route section at this stage.



- 4.2.5. Population and settlements The route section would result in the demolition of one dwelling.
- 4.2.6. Noise Noise from HS2 trains would result in annoyance for an estimated five people (equivalent to three dwellings). This would represent three people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.
In terms of noise insulation, one dwelling along the route section would be expected to qualify.
- 4.2.7. Health and well-being Approximately two dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
- 4.2.8. Access issues No promoted recreational routes would be crossed by the route section.
- 4.2.9. Landscape, townscape and cultural heritage There is likely to be some impact on landscape character as a result of an embankment, which would be up to 12m high. However, visual impacts would be limited as there are no sensitive receptors nearby.
One woodland would be affected, although, away from the centre of the HS2 rail line, this could be avoided through route refinement.
- 4.2.10. Biodiversity and wildlife The route section would pass within 10km of three Natura 2000 wildlife sites. However, HRA screening confirms that there would be no likely significant effects on these sites.
- 4.2.11. Water resources and flood risk The route section would cross some 40m of Flood Zone 3.

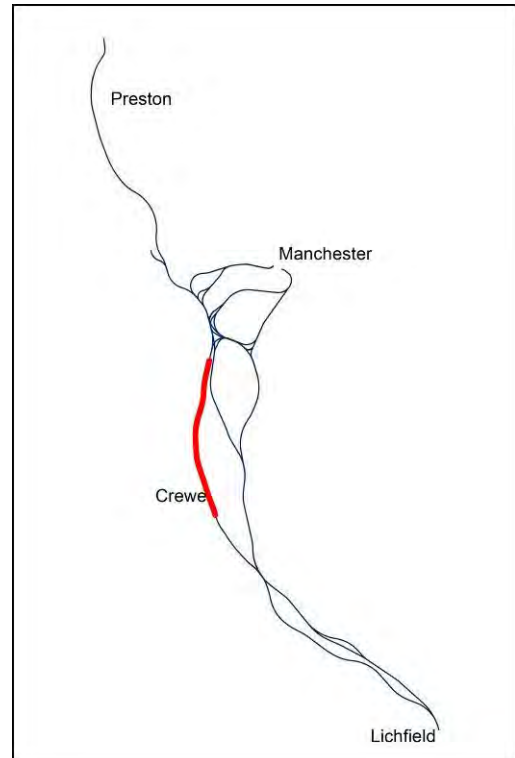
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| 4.2.12. | Land use resources | The route would cross 1.6km of Grade 2 agricultural land. |
| 4.2.13. | Waste and material use | <p>It is estimated that the route section would result in a surplus of 485,205m³ of excavated material.</p> <p>Estimated quantities of bulk building materials for this section comprise 1,500 tonnes of steel and 4,600 tonnes of concrete.</p> |

HSM09 - Figure 1



4.3. HSM10: Hough (E) to Winterbottom (H)

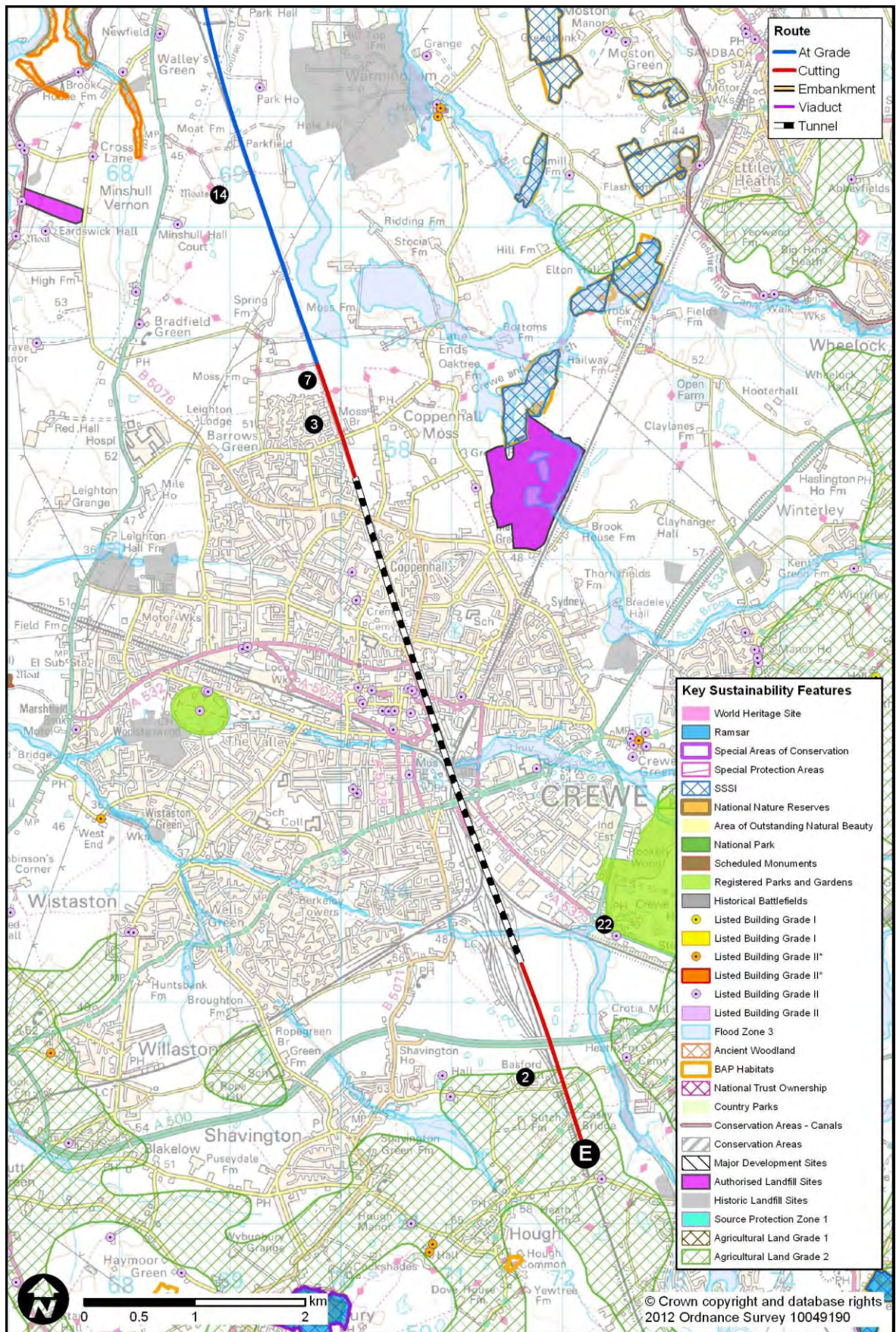
- 4.3.1. The route section between Hough and Winterbottom would be 29.9km (18.6 miles) long. It would connect south of Hough with HSM08 to Madeley. At Winterbottom the route would continue along section HSM12 to Warburton or HSM28A to Ardwick.
- 4.3.2. The route section would include a tunnel approximately 4.7km long beneath Crewe with lengths of cuttings at either end. North of the tunnel it would follow the WCML, diverging away to the east at Walley's Green. Much of the alignment would be at grade within the flat landscape between the broad valleys of the rivers Weaver and Wheelock. Cuttings would take the route beneath the A54 and A533, but it would then rise onto a viaduct over the River Dane and remain on embankment for several kilometres across the former marshlands and numerous rivers east and north of Northwich. It would drop briefly into cutting before rising onto embankment up to its crossing of the M6 south of Winterbottom.
- 4.3.3. HSM10 Figures 1 to 3 illustrate the route alignment and the principal sustainability features in the area.
- 4.3.4. Specific mitigation included within the route section comprises a number of localised realignments that have sought to reduce the number of crossings of the River Dane, and reduce noise and visual impacts at East Winsford and Bostock Hall. Vertical realignment has sought to minimise impact on the Trent and Mersey Canal.
- 4.3.5. **Population and settlements** The route section would result in the demolition of an estimated ten dwellings and two commercial properties. Potential isolation would occur at one location, affecting an estimated single dwelling at ❶ Lostock Green.
- 4.3.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 394 people (equivalent to the occupants of some 167 dwellings). This would represent about 14 people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.
- The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ❷ Basford, ❸ Crewe, ❹ Clive Green, ❺ Clive, ❻ Stanthorne, ❼ Lach Dennis, ❽ Lostock Green, ❾ Lostock Gralam, ❿ Higher Wincham, ❾ Pickmere, ❿ Tabley Superior and other scattered dwellings.
- In terms of noise insulation, approximately 148 dwellings would be expected to qualify, particularly at ❸ Crewe, ❹ Clive Green, ❽ Lostock Green, ❾ Lostock Gralam and ❿ Tabley Superior. This is equivalent to



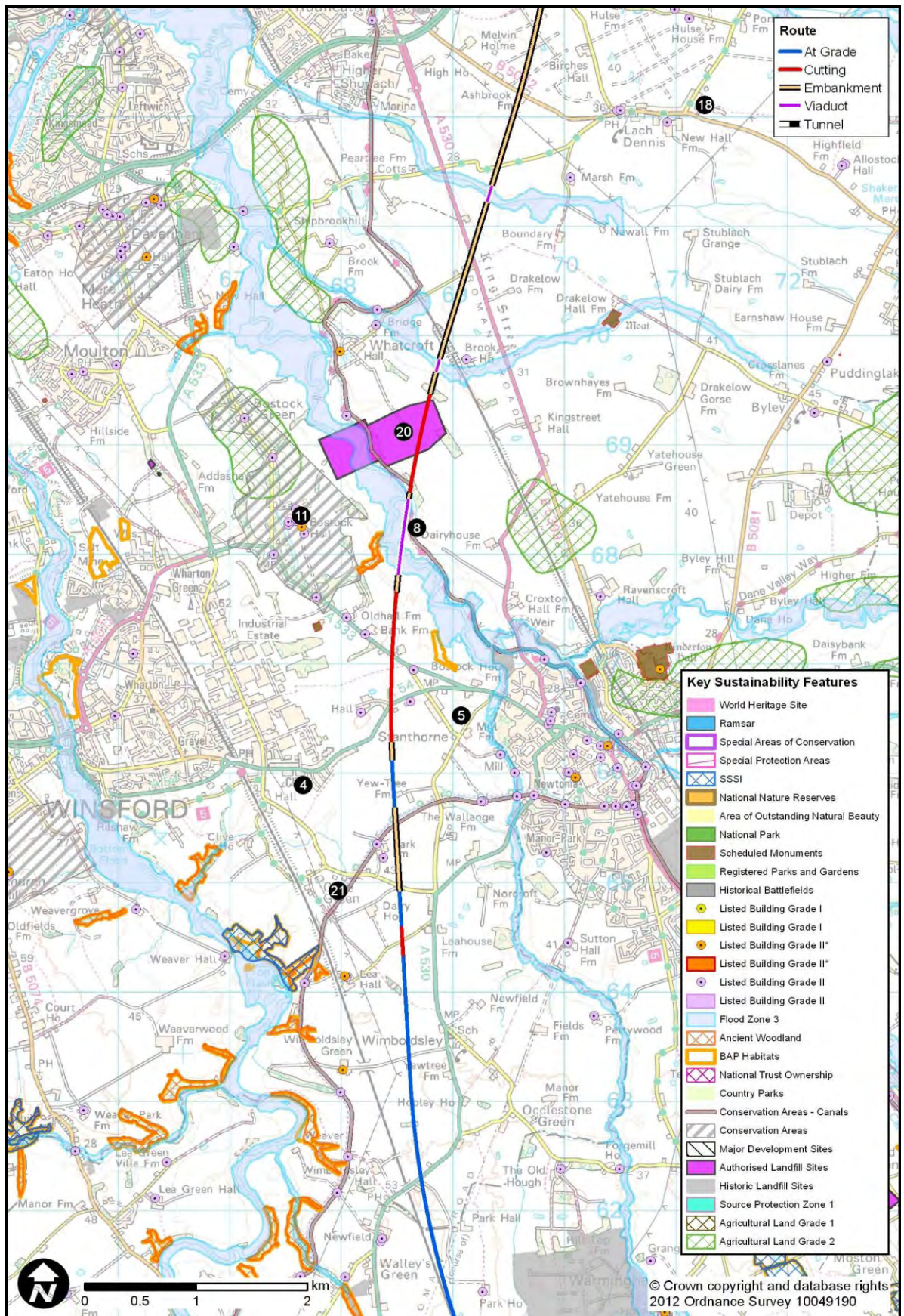
		approximately five dwellings per km of route section.
4.3.7.	Health and well-being	Approximately 152 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
4.3.8.	Access issues	Three promoted recreational routes would be crossed by the route section, namely the ⑦ Crewe and Nantwich Circular Walk; the ⑧ Trent and Mersey Canal; and the ⑨ North Cheshire Way. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.
4.3.9.	Landscape, townscape and cultural heritage	<p>Emerging from tunnel north of Crewe, the route would pass across several kilometres of very gently undulating landscape at grade, except where it passes on viaduct over the Trent and Mersey Canal and the River Dane. Minor or moderate visual impacts would affect ④ Clive near Winsford, and ⑪ Bostock Hall (which includes a conservation area), the latter affected by the viaduct over the river. Further north the route would run through open farmland with small fields, distinctive ponds, meres and mosses and many small tree-lined streams. The integrity of these historic landscape patterns might be affected to some degree, for example where valley-side woodlands are directly affected. In addition, there might be a moderate visual intrusion (for example, at ⑬ Lostock Green) due to the fact that much of the route would be on high embankments, with frequent short viaducts at stream crossings.</p> <p>The route section would approach the M6 at grade before rising on embankment some 1.5km west of the A556 near Tabley Park to bridge the M6. The approach embankments could result in visual intrusion within the relatively flat and open landscape and there would also be a direct visual impact on users of ⑩ Heyrose Golf Club.</p> <p>Two woodlands would be directly affected by the route (see also <i>biodiversity and wildlife</i>).</p> <p>One conservation area would be directly affected: the ⑧ Trent and Mersey Canal where the canal is crossed for about 10m.</p> <p>There is the potential for impact on the setting of one scheduled monument: a moated site at ⑭ Minshull Vernon that is located in open farmland and would have clear views of the alignment where it is at grade along the line of a pre-existing railway.</p> <p>No listed buildings would be directly affected, and of those near the route, only Grade II ⑮ Hollow Wood farmhouse, is likely to have its setting affected, although it is screened to some extent by existing modern farm buildings. ②② Crewe Hall Grade II Registered Park, some 850m distance, is well screened from the route.</p>
4.3.10.	Biodiversity and wildlife	<p>The route section would pass within 10km of four Natura 2000 wildlife sites. However, HRA screening confirms that there would be no likely significant effects on these sites.</p> <p>In addition, four SSSIs would be within 2km, although the risk of impact to all of them is considered to be low.</p> <p>The route would directly affect two ancient woodlands, ⑯ Leonard's and Smoker Woods and ⑰ Winnington Wood, including one area of wet woodland BAP habitat.</p>

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| 4.3.11. | Water resources and flood risk | <p>19 Wincham Brook minor river may need to be diverted. Continuing scheme design would seek to avoid or minimise this impact.</p> <p>The route section would cross about 1.4km of Flood Zone 3.</p> |
| 4.3.12. | Land use resources | <p>The route would cross about 810m of Grade 2 agricultural land. It would cross about 5.5km of green belt.</p> <p>One landfill site near 20 Bostock Green would be directly affected. The design would require further work to minimise risks to people and the environment from these impacts.</p> |
| 4.3.13. | Waste and material use | <p>It is estimated that the route section would result in a surplus of 2,623,146m³ of excavated material. This includes 1,560,600m³ of tunnel excavated material.</p> <p>As a result of the route section impacting on the landfill site, it is possible that some of the waste material arising in the route section would be hazardous.</p> <p>Estimated quantities of bulk building materials for this section comprise 9,600 tonnes of steel and 29,700 tonnes of concrete.</p> |

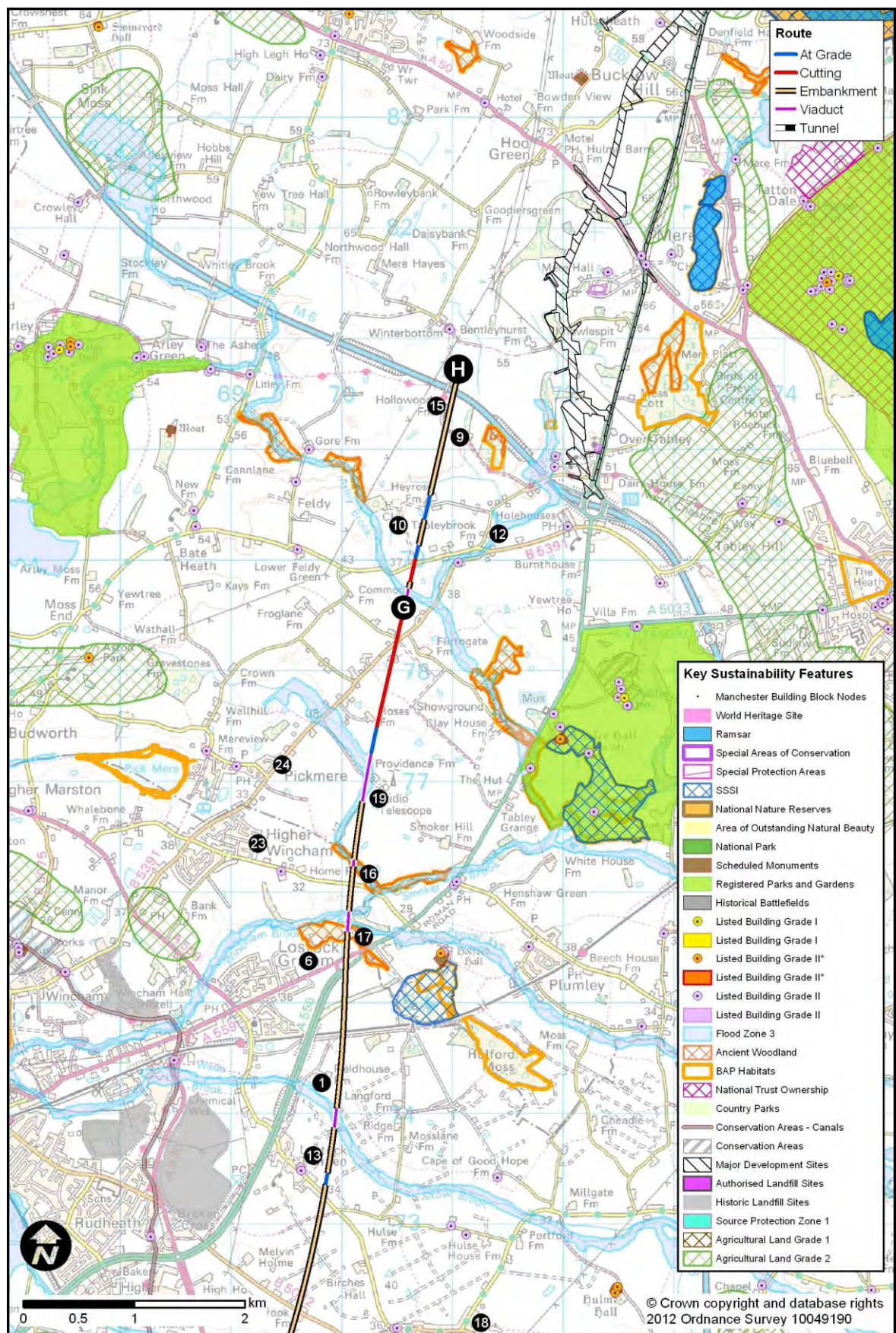
HSM10 - Figure 1 of 3



HSM10 - Figure 2 of 3

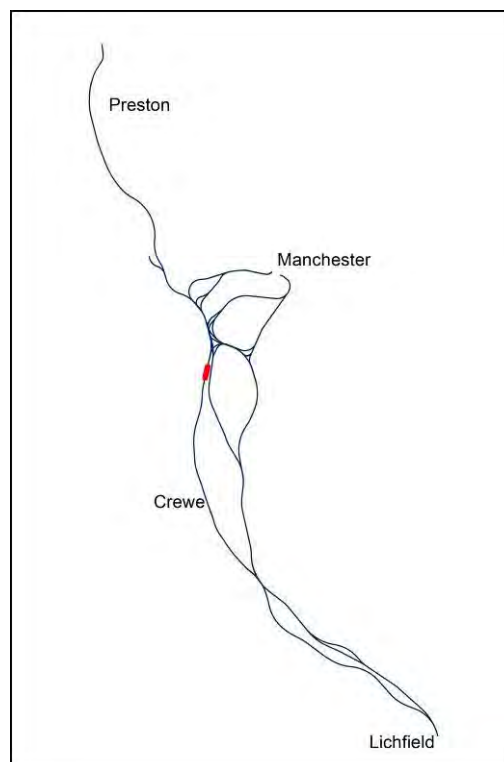


HSM10 - Figure 3 of 3



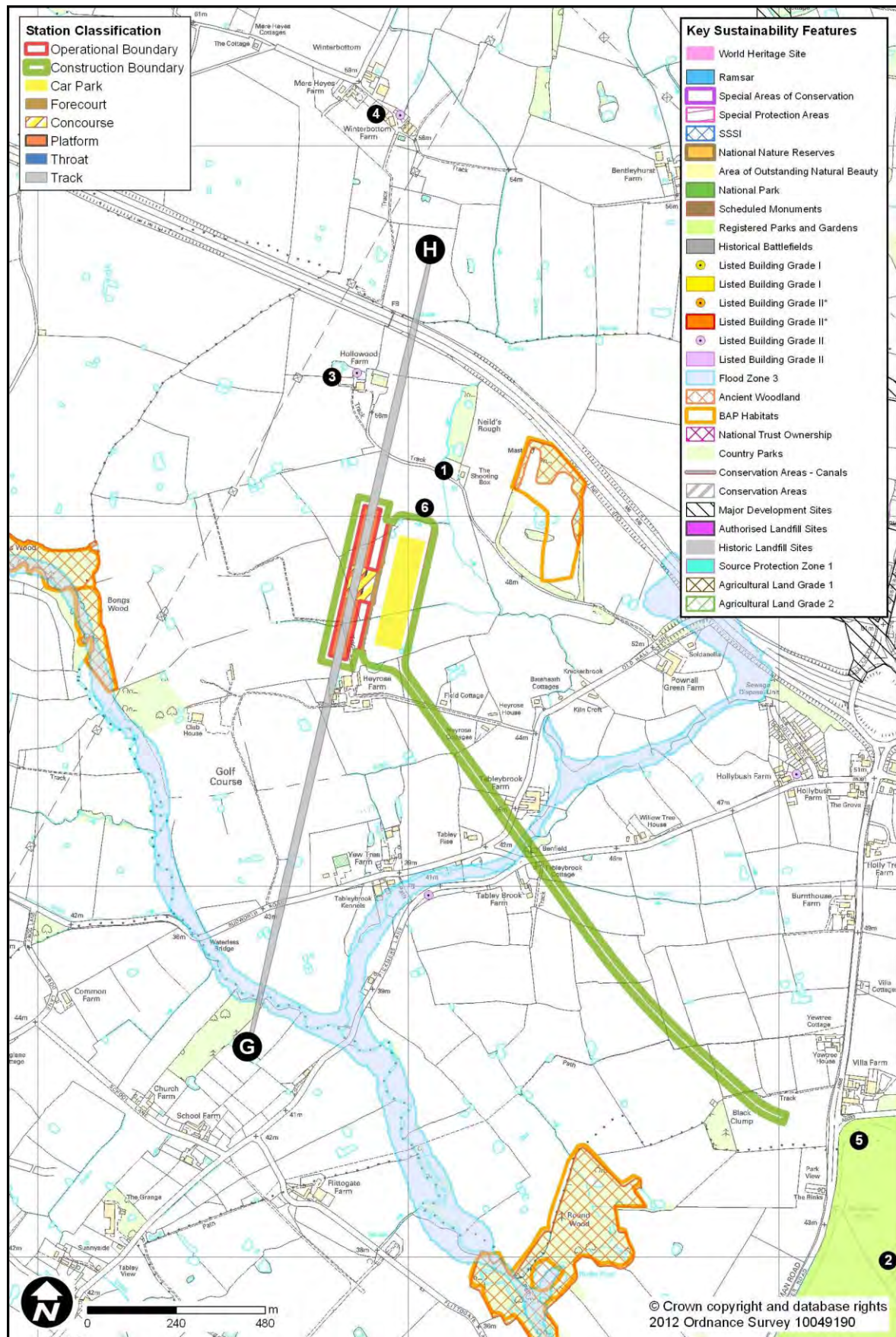
4.4. HSM11: Pickmere (G) to Winterbottom (H) including Knutsford interchange

- 4.4.1. The route section for the Knutsford interchange station would be 2.2km (1.4 miles) long. It would connect to the south with HSM10 from Hough. The route section would continue north from the station along section HSM12 to Warburton or HSM28A to Ardwick.
- 4.4.2. The route section would comprise an interchange station and two four-track sections that would be located to the south of the M6, about 3.5km (two miles) west of Knutsford. The southern four-track section would approach the new station on an embankment. On passing through the elevated station the route section would continue north on embankment passing over the M6 and on to Manchester Piccadilly.
- 4.4.3. HSM11 Figure 1 illustrates the route alignment and the principal sustainability features in the area.
- 4.4.4. The potential for mitigation was limited at this early stage of station design. However, care was taken to minimise impact on the surrounding settlements, green belt, landscape and Tabley Park (a Grade II Registered Park and Garden).
- 4.4.5. **Population and settlements** The route section would result in the demolition of an estimated four dwellings.
- 4.4.6. **Noise** Modelling of noise impacts from the operational station will be undertaken as designs are progressed. They would be influenced by plant and PA systems, generated road traffic, and the frequency and speed of trains.
- 4.4.7. **Health and well-being** Approximately seven dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
- 4.4.8. **Access issues** This station would offer interchange with the national road network via the M6.
The station alignment would cross the ❶ North Cheshire Way promoted recreational route. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.
- 4.4.9. **Jobs and houses** Given the green belt location, opportunity for the station to support additional jobs or housing would be limited.
- 4.4.10. **Planning and development** The station would conflict with planning policies (Macclesfield Local Plan 2004 and emerging LDF) on green belt.
- 4.4.11. **Landscape, townscape and cultural** This station would be 3.5km west of Knutsford. Given the station's height and mass; the presence of a mezzanine level; the relatively flat, open, rural character of the landscape; and the station's lack of clear



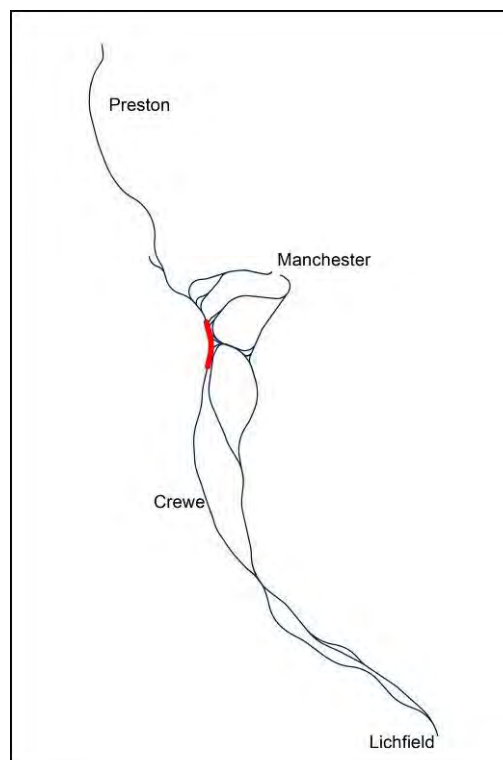
heritage	<p>association with other transport infrastructure, it is likely to have a major adverse impact on landscape character and integrity. In addition, there would be visual impacts on the golf course to the south, residential properties and on motorists on the M6. The four-track sections would be on embankments to the south and north of the station, which would be visually intrusive within the relatively flat and open landscape.</p> <p>There would be no direct impacts on conservation areas. There could be an indirect impact on the ② Tabley House Conservation Area, although, due to mature tree cover this would be minor.</p> <p>Two Grade II listed properties are located fairly close to the station. ③ Hollow Wood Farmhouse, although 60m away, would be largely screened by modern farm buildings; and ④ Winterbottom Farm House is about 320m away. Impacts on the settings of each would be minor.</p> <p>⑤ Tabley Park Grade II Registered Park and Garden would be within 160m from the station at its closest point during construction, and could moderate impact on its setting.</p>
4.4.12. Biodiversity and wildlife	<p>The route section would pass within 10km of two Natura 2000 sites. However, the HRA screening confirms that there would be no likely significant effects on these sites.</p>
4.4.13. Water resources and flood risk	<p>A tributary of ⑥ Tabley Brook, a minor river, may be diverted. Continuing scheme design would seek to avoid or minimise this impact.</p> <p>The station footprint would occupy about 600m² of Flood Zone 3. The four-track section would cross about 50m of Flood Zone 3.</p>
4.4.14. Land use resources	<p>The route section and station would impact approximately 27.5ha of green belt.</p>
4.4.15. Waste and material use	<p>It is estimated that the route section would result in a deficit of - 163,600m³ of excavated material.</p> <p>Estimated quantities of bulk building materials for this section comprise 600 tonnes of steel and 1,700 tonnes of concrete. The station would require an additional 174,400 tonnes of concrete; estimated quantities of steel are not provided at this stage.</p>

HSM11 - Figure 1



4.5. HSM12: Winterbottom (H) to Warburton (Q)

- 4.5.1. The route section between Winterbottom and Warburton would be 8.5km (5.3 miles) long. It would connect south of Winterbottom with HSM10 to Hough. At Warburton the route section would continue along section HSM21 to Lowton or HSM35⁴, HSM39 or HSM40 to Winton (and then to Salford or Piccadilly).
- 4.5.2. The route section would pass generally along the route of overhead power lines. It would be mainly in cutting to pass beneath the A50 and M56, before rising onto embankment over the Bridgewater Canal and viaduct over the River Bollin.
- 4.5.3. HSM12 Figure 1 illustrates the route alignment and the principal sustainability features in the area.
- 4.5.4. Specific mitigation included within the route section comprises a number of localised realignments that have sought to reduce noise and visual impacts at the residential areas of Bucklow Hill, Lymm, Broomedge and Mere.
- 4.5.5. Population and settlements The route section would result in the demolition of an estimated two dwellings. Were HSM16 to connect with HSM35 it would result in the demolition of an estimated nine dwellings.
- 4.5.6. Noise Noise impacts for the route section would depend in part on the terminus station it is linked with, since this would affect the number of trains operating on the line. The estimated noise impacts arising from each of the possible scenarios are given below:



Terminus option	Number of people annoyed by noise	Equivalent to:	Qualifying for noise insulation
Piccadilly via airport tunnel (via HSM28)	95	41 dwellings or 12 people per km	21 dwellings
Piccadilly via Mersey tunnel (via HSM33)	128	55 dwellings or 15 people per km	28 dwellings
Salford terminus (via HSM39 or 40)	175	75 dwellings or 21 people per km	30 dwellings
Salford terminus (via HSM35)	169	72 dwellings or 20 people per km	34 dwellings

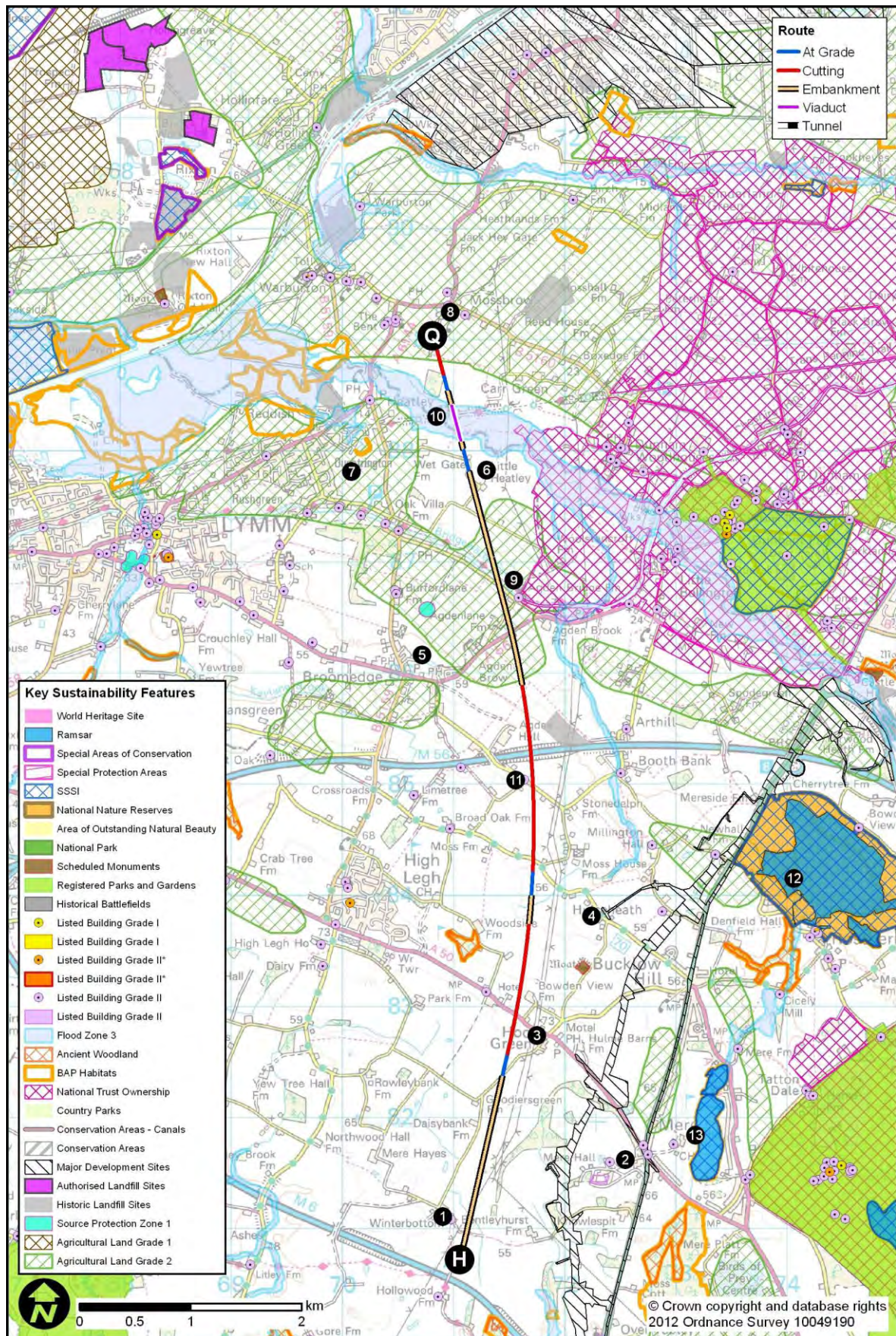
With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.

The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful

⁴ Were HSM12 to connect with HSM35, it would need to follow a marginally different alignment, in order to accommodate the junction between the two. This would have implications for property and noise.

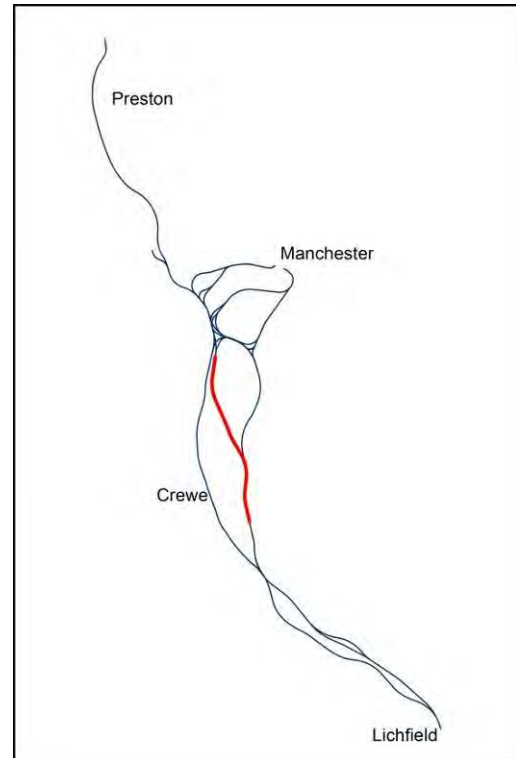
		<p>consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ① Winterbottom, ② Mere, ③ Hoo Green, ④ Hulseheath, ⑤ Broomedge, ⑥ Little Heatley, ⑦ Lymm and ⑧ Mossbrow.</p> <p>Dwellings qualifying for noise insulation would be located in ① Winterbottom, ④ Hulseheath, ⑤ Broomedge and ⑥ Little Heatley.</p>
4.5.7.	Health and well-being	Approximately 46 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
4.5.8.	Access issues	Two promoted recreational routes would be crossed by the route section, namely the ⑨ Cheshire Ring Canal Walk and the ⑩ Trans Pennine Trail. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.
4.5.9.	Landscape, townscape and cultural heritage	<p>The route section would run from just north of the M6 to east of Lymm closely following two overhead power lines. The embanked sections in the north and south would have an impact on landscape character, and there are likely to be visual impacts on a number of hamlets along the route and on users of the ⑨ Bridgewater Canal and ⑨ Cheshire Ring Canal Walk. Such impacts would be relatively slight.</p> <p>The route section would run north from the Bridgewater Canal mainly on embankment, crossing the Bollin valley on low viaduct and then crossing the ⑩ Trans Pennine Trail. There would be modest landscape and visual impacts. One woodland would be directly affected by the route.</p> <p>No listed buildings would be directly affected, and of those near the route, only the Grade II ① Winterbottom Farmhouse at Winterbottom and the Grade II ⑪ Ovenback Cottage near High Legh, are likely to have anything more than minor impacts on setting.</p>
4.5.10.	Biodiversity and wildlife	The route section would pass within 10km of four Natura 2000 wildlife sites. The potential for significant effects at two of these, ⑫ Rostherne Mere Ramsar and ⑬ Midland Meres and Mosses, Phase 1 Ramsar, site cannot be discounted at this stage. Further details are described in an HRA screening report for Rostherne Mere, and the HRA screening sheet for Midland Meres and Mosses, which acknowledges the need for more detailed analysis.
4.5.11.	Water resources and flood risk	The route section would cross some 310m of Flood Zone 3.
4.5.12.	Land use resources	The route would cross about 2.6km of Grade 2 agricultural land. It would cross about 8.5km of green belt.
4.5.13.	Waste and material use	<p>It is estimated that the route section would result in a surplus of 608,077m³ of excavated material.</p> <p>Estimated quantities of bulk building materials for this section comprise 2,800 tonnes of steel and 8,400 tonnes of concrete.</p>

HSM12 - Figure 1



4.6. HSM13: Shrayleybrook (I) to Mere (N)

- 4.6.1. The route section between Shrayleybrook and Sandbach would be 32.7km (20.3 miles) long. It would connect south of Shrayleybrook with either HSM05 from Millmeece or HSM07 from Swynnerton. At Mere the route section would continue along section HSM16 to Warburton or HSM29 to Rostherne.
- 4.6.2. The majority of the route section would closely follow the M6 corridor, only diverging from it after about 22km, to the south-east of Northwich. It would then continue north across the flat river-crossed landscape west of Lower Peover before converging briefly once again with the M6 and crossing over it just west of junction 19, near Over Tabley. The rivers Dane and Wheelock and their numerous tributaries, as well as the Trent and Mersey Canal, necessitate a raised alignment in the route section, on embankment or viaduct along almost its whole length. The route section passes close to the towns of Alsager, Sandbach and Homes Chapel within what is generally a well-populated area to the south of Manchester.
- 4.6.3. HSM13 Figures 1 to 3 illustrate the route alignment and the principal sustainability features in the area.
- 4.6.4. Specific mitigation included within the route section comprises a number of localised realignments that have reduced river crossings over the Peover Eye and to reduce noise impacts and demolitions at East Sandbach, Holmes Chapel, Plumley and Goostrey. Additional mitigation sought to minimise demolitions of scattered dwellings along the route section and to reduce the impacts at Sandbach services.
- 4.6.5. **Population and settlements** The route section would result in the demolition of an estimated 27 dwellings. In addition, one commercial property would also be demolished.
- Potential isolation would occur at four locations, affecting an estimated 15 dwellings west of ① Audley, 10 dwellings east of ② Sandbach, eight dwellings west of ③ Alsager and two dwellings west of ④ Holmes Chapel (including one community building).
- 4.6.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 876 people (equivalent to the occupants of some 372 dwellings). This would represent about 27 people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be substantially less than this.
- The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ⑤ Shrayleybrook, ⑥ Park End, ⑦ Oakhanger, ⑧ Alsager, ⑨ Day Green, ⑩ Hassall Green, ⑪ Sandbach, ⑫ Brickhouses, ⑬ Brindley Green, ⑭



Bradwall Green, ¹⁵ Sproston Green, ¹⁶ Holmes Chapel, ¹⁷ Cranage, ¹⁸ Rudheath Woods, ¹⁹ Shakerley Mere, ²⁰ Lach Dennis, ²¹ Plumley, ²² Tabley Superior and ²³ Mere.

In terms of noise insulation, approximately 320 dwellings would be expected to qualify, particularly at ⁵ Shralebrook, ⁶ Park End, ⁷ Oakhanger, ⁸ Alsager, ⁹ Day Green, ¹⁰ Hassall Green, ¹¹ Sandbach, ¹² Brickhouses, ¹³ Brindley Green, ¹⁴ Bradwall Green, ¹⁶ Holmes Chapel, ¹⁷ Cranage, ¹⁹ Shakerly Mere, ²¹ Plumley and ²² Tabley Superior. This is equivalent to approximately 10 dwellings per km of route section.

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| 4.6.7. | Health and well-being | Approximately 84 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity. |
| 4.6.8. | Access issues | <p>Three promoted recreational routes would be crossed by the route section, namely the ²⁴ Dane Valley Way, the ²⁵ Cheshire Ring Canal Walk and the ²⁶ North Cheshire Way. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.</p> <p>In addition, a small triangle of open access land alongside the M6 near ¹⁷ Cranage would be directly impacted.</p> |
| 4.6.9. | Planning and development | The route section would pass through the ²⁷ Knutsford to Bowdon Roads Improvement scheme (A556). The Highways Agency intends to improve the A556 trunk road between junction 19 of the M6 near Knutsford, and Junction 7 of the M56 near Bowdon. The proposals are, at time of writing, in the pre-application stage and the Highways Agency intends to submit a Development Consent Order application in 2012. |
| 4.6.10. | Landscape, townscape and cultural heritage | <p>The majority of the route section would be alongside or close to the M6 and, seen in this context, its landscape and visual impacts would be generally limited. Nonetheless, there would be impacts on landscape character, especially north of ¹⁶ Holmes Chapel where the route would diverge from the motorway across a relatively flat landscape of meres and mosses. Visual intrusion would also be likely, particularly associated with viaducts over Valley Brook west of ⁸ Alsager; the Trent and Mersey Canal at ⁹ Day Green and ¹⁰ Hassall Green; the, River Dane and M6 west of ¹⁶ Holmes Chapel; and various minor streams.</p> <p>At its northern end the route section would affect the wider landscape setting of the Grade II listed Registered Park and Garden of ²⁸ Tabley House. It would pass within around 300m of the park at grade or on low embankment directly affecting woodland that is associated with the park. It would continue north across open farmland mainly on embankment, adversely affecting the character of the open countryside near Mere Hall. There would be a direct impact on woodlands around ²³ Mere Hall that appear to be part of the wider designed landscape around ²⁹ Tatton Park (Registered Park and Garden Grade II*) to the east.</p> <p>The route section would be on embankment in a flat area either side of the ³⁰ Trent and Mersey Canal Conservation Area, which it would cross at right angles. It would lie between two sets of locks, very close to one of them. Although the M6 lies on the other side of that lock, the impact of the new route would be major, intruding in a generally rural setting.</p> |

There is the potential for impact on the setting of three scheduled monuments, namely, World War II defence of the former airfield of 38 RAF Cranage, 31 Hulme Hall moated site and 32 Holford Hall moated site. World War II defences of the former airfield of RAF Cranage consist of six parts, which would be bisected by the proposed embankment, compromising an appreciation of the site as a whole.

Hulme Hall moated site includes the Grade II* listed 31 Hulme Hall and the bridge across the moat. The settings of these would be greatly affected by the proposed embankment. 32 Holford Hall moated site would lie at greater distance, and trees to the east of the designated area may help to lessen the impact of the proposed viaduct and embankment.

A farmhouse at 2 Brickhouse Farm is a Grade II listed structure that would be directly affected by the route section. A number of other Grade II listed buildings at 2 Brickhouse Farm would have moderate impacts on their settings. Of some 15 other listed structures subject to potential impacts on setting, all would have either minor or negligible impacts, other than the Grade II listed 34 Church of St John, 13 Brindley Green Farmhouse in Brereton, a farm building west of 35 Over Tabley Hall, and 33 Over Tabley Hall itself.

4.6.11. Biodiversity and wildlife

The route section would pass within 10km of five Natura 2000 wildlife sites. However, the HRA screening confirms that there would be no likely significant effects on these sites.

39 Oakhanger Moss is a SSSI that forms part of the Midland Meres and Mosses (Phase 2) Ramsar site. The 40 Mere, Mere is a SSSI that forms part of the Midland Meres and Mosses (Phase 1). These, along with two further SSSIs, would be within 2km of the route section. However, risks to all of these are deemed low and adverse effects are considered unlikely.

The route section would directly affect four areas of BAP habitat. These include two areas of fen, one of lowland raised bog and one of wet woodland. The latter, 36 Round and Rinks Wood, is also ancient woodland.

4.6.12. Water resources and flood risk

The 37 Smoker Brook, a major river, may be diverted. Eight minor rivers may also be diverted. Continuing scheme design would seek to avoid or minimise this impact.

The route section would cut through about 1.1km of SPZ2 potentially affecting groundwater flows to 41 Audley abstraction point (4,546m³/day).

The route section would cross some 1.1km of Flood Zone 3.

4.6.13. Land use resources

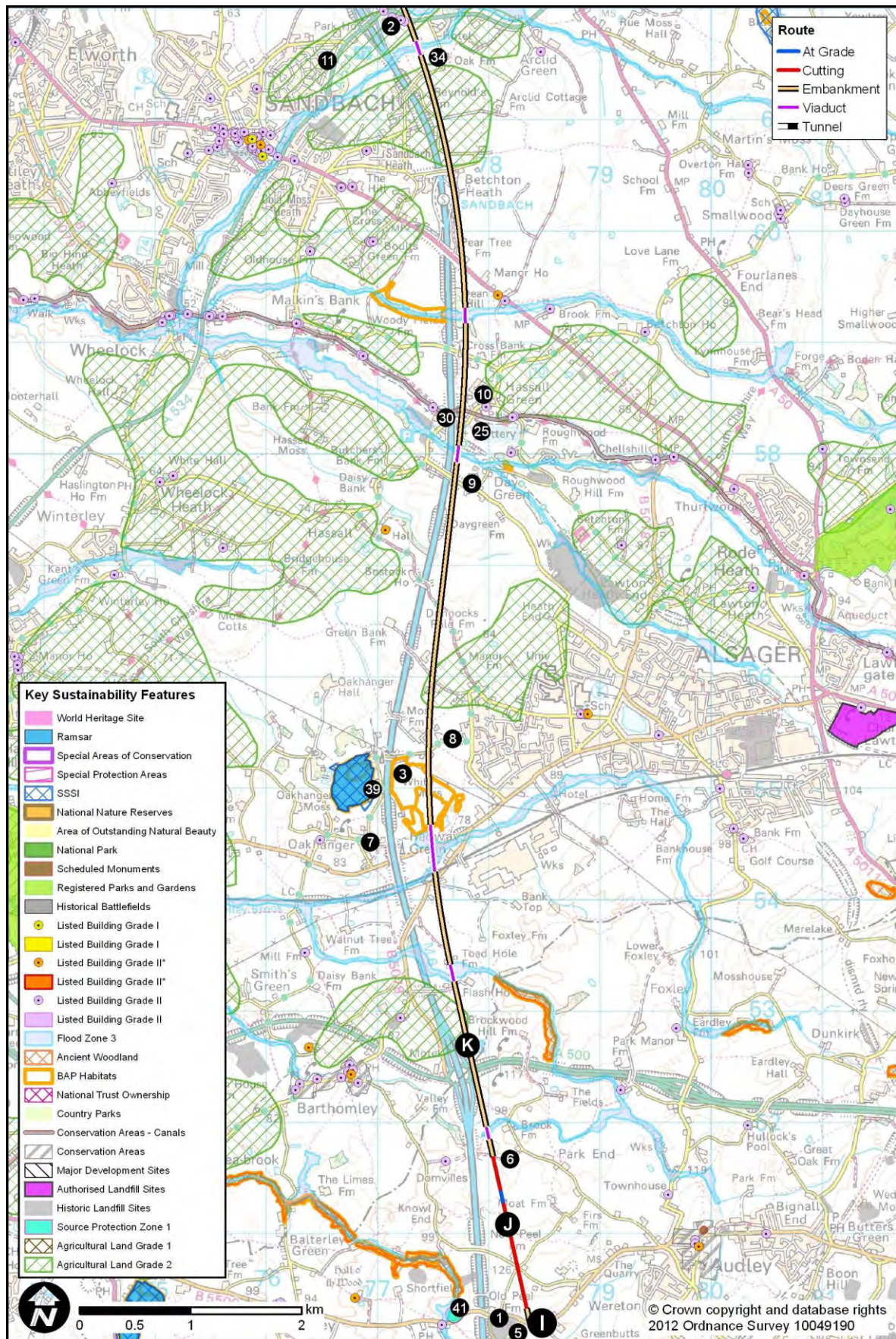
The route would cross about 4km of Grade 2 agricultural land. It would cross an estimated 11.6km of green belt.

4.6.14. Waste and material use

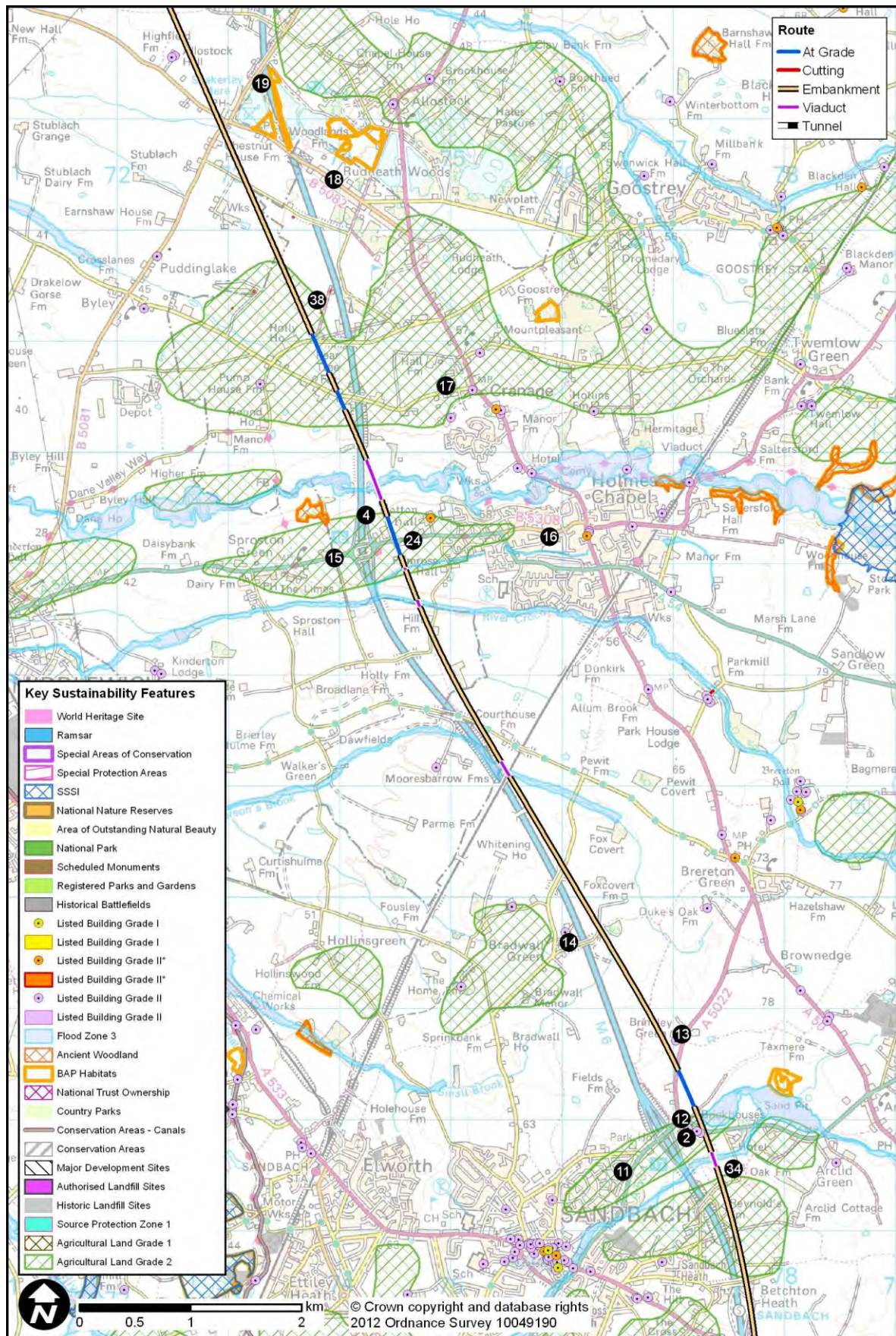
It is estimated that the route section would result in a deficit of - 12,354,881m³ of excavated material.

Estimated quantities of bulk building materials for this section comprise 10,500 tonnes of steel and 32,300 tonnes of concrete.

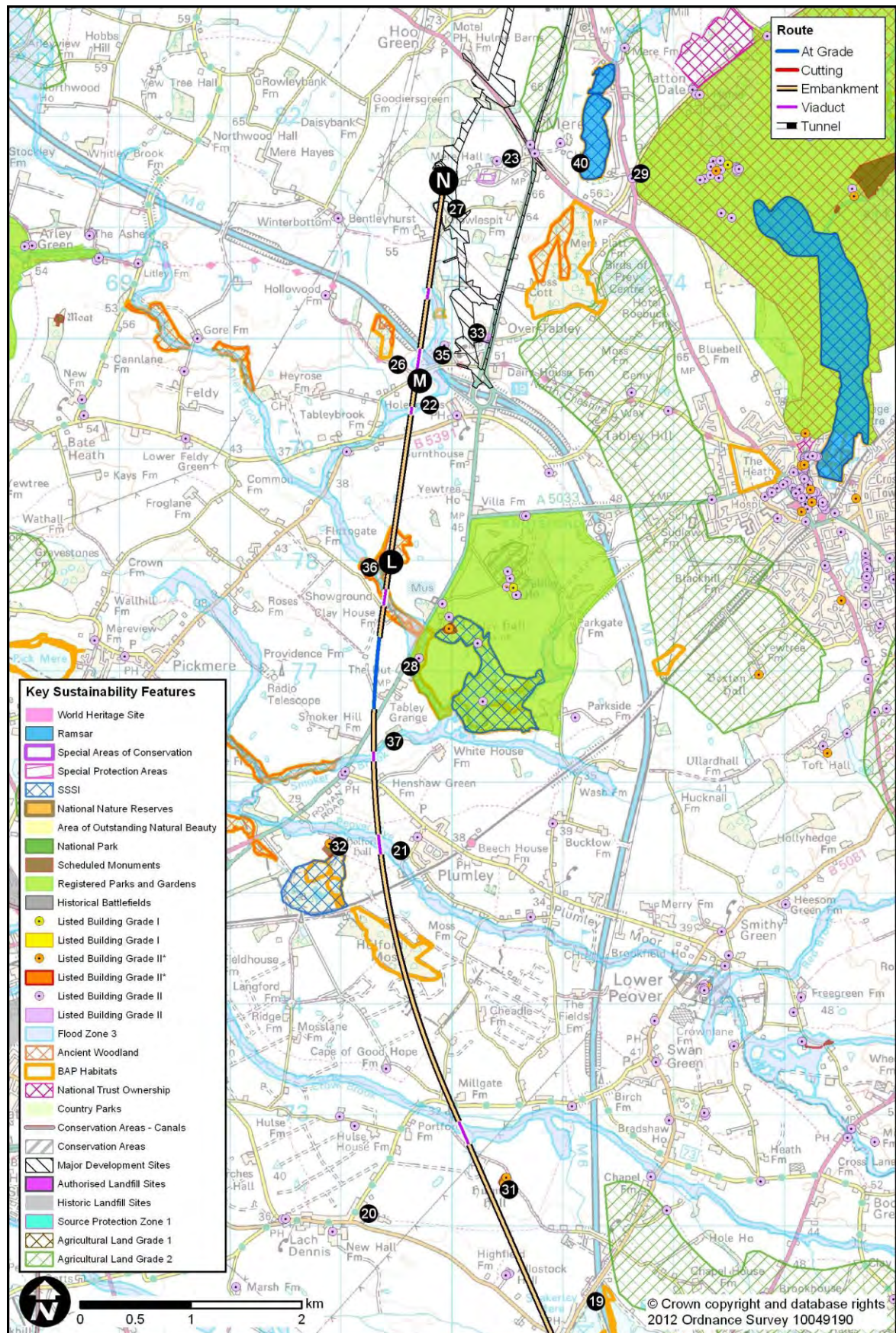
HSM13 - Figure 1 of 3



HSM13 - Figure 2 of 3

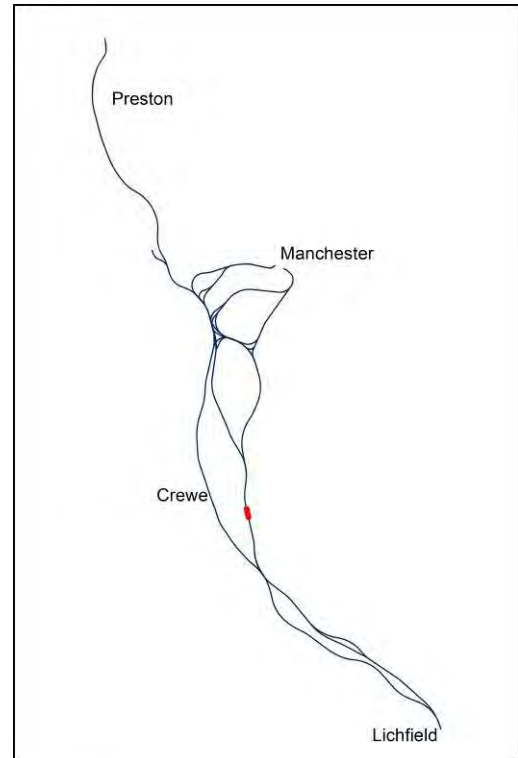


HSM13 - Figure 3 of 3



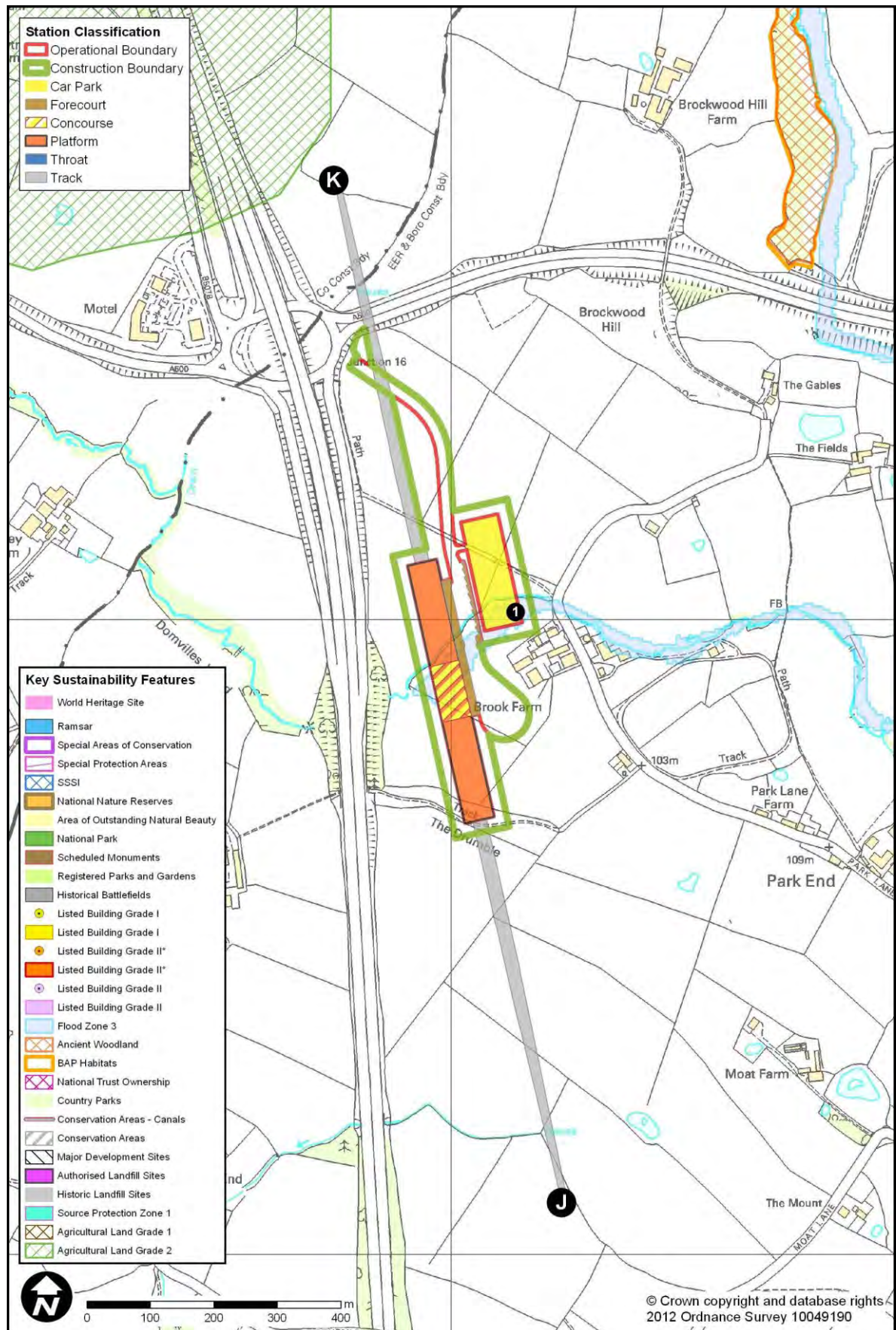
4.7. HSM14: Audley (J) to M6 Junction Radway Green (K) including M6 intermediate

- 4.7.1. The route section for the M6 intermediate station is 1.7km (1 miles) long. It would connect to the south with either HSM05 from Millmeece or HSM07 from Swynnerton. The route would continue north from the station along HSM13 to Mere or HSM17 to Mobberley.
- 4.7.2. The route section would run parallel to the M6 between Audley and junction 16 of the motorway, approximately 14km north-west of Stoke. It would include an interchange station and two four-track sections. The station would be at grade. The southern section would approach the station in cutting and would continue north of the station on embankment over the A500.
- 4.7.3. HSM14 Figure 1 illustrates the route alignment and the principal sustainability features in the area.
- 4.7.4. The potential for mitigation was limited at this early stage of station design. However, care was taken to minimise impact on the surrounding settlements and landscape features. Detailed designs would be influenced in particular by the surrounding settlements, rivers and the green belt.
- 4.7.5. **Population and settlements** The route section would result in no residential demolitions, nor in any isolation or severance of dwellings.
- 4.7.6. **Noise** Modelling of noise impacts from the operational station will be undertaken as designs are progressed. They would be influenced by plant and PA systems, generated road traffic, and the frequency and speed of trains.
- 4.7.7. **Health and well-being** An estimated one dwelling would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
- 4.7.8. **Access issues** This station would offer an interchange with the national road network via the M6.
- 4.7.9. **Jobs and houses** The station would displace no existing businesses. Given the green belt location, opportunity for the station to support additional jobs or housing would be limited.
- 4.7.10. **Planning and development** The station would conflict with local planning policies (Newcastle under Lyme Core Strategy 2009) on green belt.
- 4.7.11. **Landscape, townscape and cultural heritage** This station option would be located on agricultural land just to the east of the M6. The proposed station canopy would be 20m or so above existing ground levels but partly below motorway level. There would be relatively few visual receptors with the exception of the motorway users and isolated farmsteads. The nearest larger settlement is Audley, around 2km



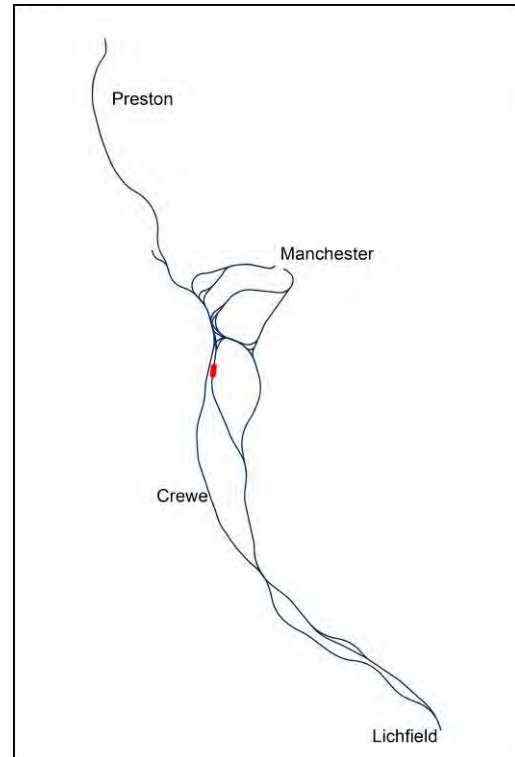
- to the south-east. People in these locations would experience some visual intrusion but the station would be seen within the context of the motorway, so the overall impact would be minor.
- 4.7.12. Biodiversity and wildlife The route section would pass within 10km of three Natura 2000 sites. However, an HRA screening confirms that there would be no likely significant effects on these sites.
- 4.7.13. Water resources and flood risk **①** Barthomley Brook, a minor river, may be diverted. Continuing scheme design would seek to avoid or minimise this impact. Approximately 13,725m² of the station's construction boundary and 400m of the station's approach track in cut would intersect SPZ2, and would potentially affect groundwater flows to Audley abstraction point (4,546m³/day). The station footprint would impact about 4,000m² of Flood Zone 3.
- 4.7.14. Land use resources The route section and station would impact approximately 16.7ha of green belt.
- 4.7.15. Waste and material use It is estimated that the route section would result in a deficit of - 56,500m³ of excavated material. Estimated quantities of bulk building materials for this section comprise 500 tonnes of steel and 1,600 tonnes of concrete. The station would require an additional 164,300 tonnes of concrete; estimated quantities of steel are not provided at this stage.

HSM 14 - Figure 1



4.8. HSM15: Tabley (L) to M6 Junction 19 Knutsford (M) including Knutsford interchange

- 4.8.1. The route section for the Knutsford interchange station option is 1.6km (1 miles) long. It would connect to the south with HSM13 from Shrayleybrook. The route section would continue north from the station along section HSM16 to Warburton or HSM29 to Rostherne.
- 4.8.2. The route section would comprise an interchange station and two four-track sections, located around 2.5km west of Knutsford. The southern four-track section would approach the elevated station on embankment and would continue north until it crossed Tabley Brook on viaduct. It would then continue on embankment up to junction 19 of the M6.
- 4.8.3. HSM15 Figure 1 illustrates the route alignment and the principal sustainability features in the area.
- 4.8.4. The potential for mitigation was limited at this early stage of station design. However, care was taken to minimise impact on the surrounding settlements, landscape and Tabley Park (a Grade II Registered Park and Garden). Detailed designs would be influenced by the surrounding settlements, watercourses, Tabley Park and ancient woodland.
- 4.8.5. **Population and settlements** The route section would result in the demolition of an estimated three dwellings.
- 4.8.6. **Noise** Modelling of noise impacts from the operational station will be undertaken as designs are progressed. They would be influenced by plant and PA systems, generated road traffic, and the frequency and speed of trains.
- 4.8.7. **Health and well-being** Approximately two dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
- 4.8.8. **Access issues** This station would offer an interchange with the national road network via the M6.
- 4.8.9. **Jobs and houses** Given the green belt location, opportunity for supporting additional jobs or housing would be limited.
- 4.8.10. **Planning and development** The station would conflict with local planning policies (Macclesfield Local Plan 2004 and emerging LDF) on green belt.
- 4.8.11. **Landscape, townscape and cultural heritage** The station would be located just to the south of the M6, around 2.5km west of Knutsford. Given the station's height and mass; the presence of a mezzanine level; and the relatively flat, open, rural character of the landscape, it would be an intrusive feature in the landscape. Motorists and residents of nearby hamlets would be affected by visual intrusion, and although ① Tabley Park has trees around its perimeter, recreational users of the park could be affected by some open views. The four-track



sections are also likely to be intrusive with a direct impact on ancient woodland to the south (see also *biodiversity and wildlife*). The overall impact would be major adverse.

There would be no direct impacts on conservation areas, but could be an indirect impact on the ② Tabley House Conservation Area, although with existing mature tree cover, this would be only minor.

The ① Tabley House Grade II Registered Park and Garden would be within 150m at its closest point during construction, resulting in a potential moderate impact on the setting of the park.

4.8.12. Biodiversity and wildlife

The route section would pass within 10km of two Natura 2000 sites. However, the HRA screening confirms that there would be no likely significant effects on these sites.

The route section would directly affect the ③ Round and Rinks Wood ancient woodland, which is also a wet woodland BAP habitat. One further unnamed BAP habitat would also be affected.

4.8.13. Water resources and flood risk

There may be diversions of three minor rivers, namely a tributary of ④ Tabley Brook, ⑤ Tabley Brook itself and a tributary of ⑥ Smoker Brook. Continuing scheme design would seek to avoid or minimise this impact. The northern four-track section would intersect 80m of Flood Zone 3.

4.8.14. Land use resources

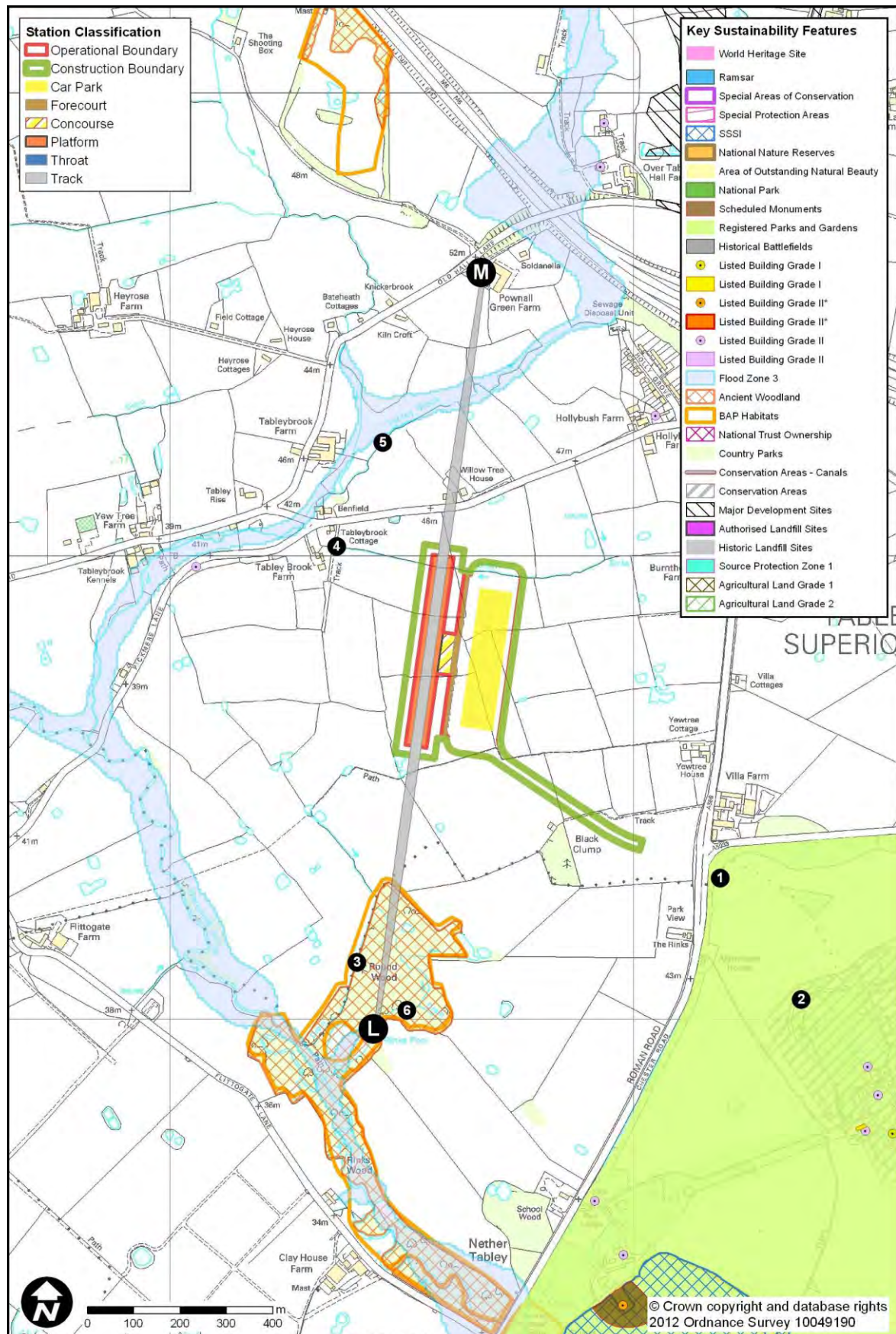
The station footprint would occupy approximately 25.3ha of green belt.

4.8.15. Waste and material use

It is estimated that the route section would result in a deficit of - 194,200m³ of excavated material.

Estimated quantities of bulk building materials for this section comprise 400 tonnes of steel and 1,200 tonnes of concrete. The station would require an additional 171,500 tonnes of concrete; estimated quantities of steel are not provided at this stage.

HSM15 - Figure 1

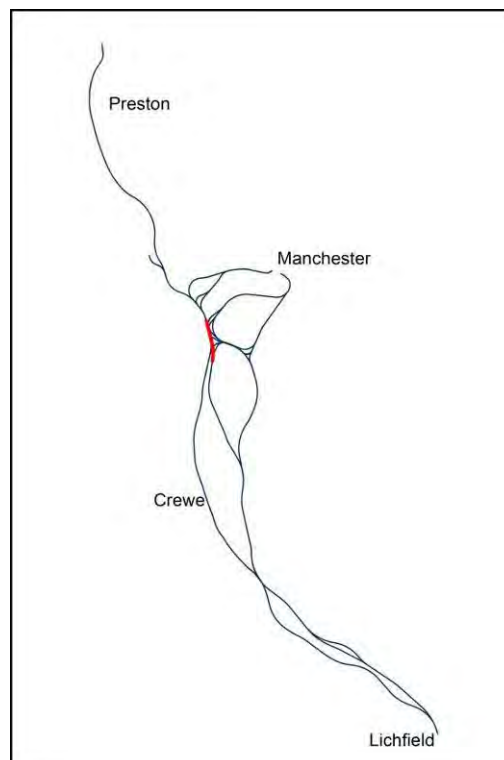


4.9. HSM16: Mere (N) to Warburton (Q)

4.9.1. The route section between Mere and Warburton would be about 7.8km (4.8 miles) long. It would connect to the south with HSM13 from Shrayleybrook. At Warburton the route section would continue along section HSM21 to Lowton or HSM35⁵, HSM39 or HSM40 to Winton (and then to Salford or Piccadilly).

4.9.2. The route section would loosely follow the route of overhead power lines, crossing beneath them in cutting at Hulseheath and beneath the M56. The route section would continue northwards, rising onto embankment for several kilometres past Broomedge and Heatley and using viaducts to cross the Bridgewater Canal, and Bollin Valley.

4.9.3. HSM16 Figure 1 illustrates the route section and the principal sustainability features in the area.



4.9.4. Specific mitigation included within the route section comprises a number of localised realignments that have sought to reduce noise and visual impacts at the residential areas of Bucklow Hill, Heatley and Mere.

4.9.5. Population and settlements The route section would result in the demolition of an estimated three dwellings. Were HSM16 to connect with HSM35 it would result in the demolition of an estimated 17 dwellings.

4.9.6. Noise Noise impacts for the route section would depend in part on the terminus station it is linked with, as this would affect the number of trains operating on the line. The estimated noise impacts arising from each of the possible scenarios are given below.

Terminus option	Number of people annoyed by noise	Equivalent to:	Qualifying for noise insulation
Piccadilly via airport tunnel (via HSM29)	49	21 dwellings or 7 people per km	10 dwellings
Piccadilly via Mersey tunnel (via 34)	69	30 dwellings or 9 people per km	18 dwellings
Salford terminus (via 39 or 40)	193	82 dwellings or 25 people per km	41 dwellings
Salford terminus (via HSM35)	205	87 dwellings or 27 people per km	75 dwellings

With ambient road noise also taken into account, noise impacts from HS2

⁵ Were HSM16 to connect with HSM35, it would need to follow a marginally different alignment, in order to accommodate the junction between the two. This would have implications for property, noise and archaeology

would be expected to be less than this.

The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ① Mere, ② Hoo Green, ③ Bucklow Hill, ④ Hulseheath, ⑤ Broomedge, ⑥ Little Heatley, ⑦ Lymm, ⑧ Mossbrow and ⑨ Warburton.

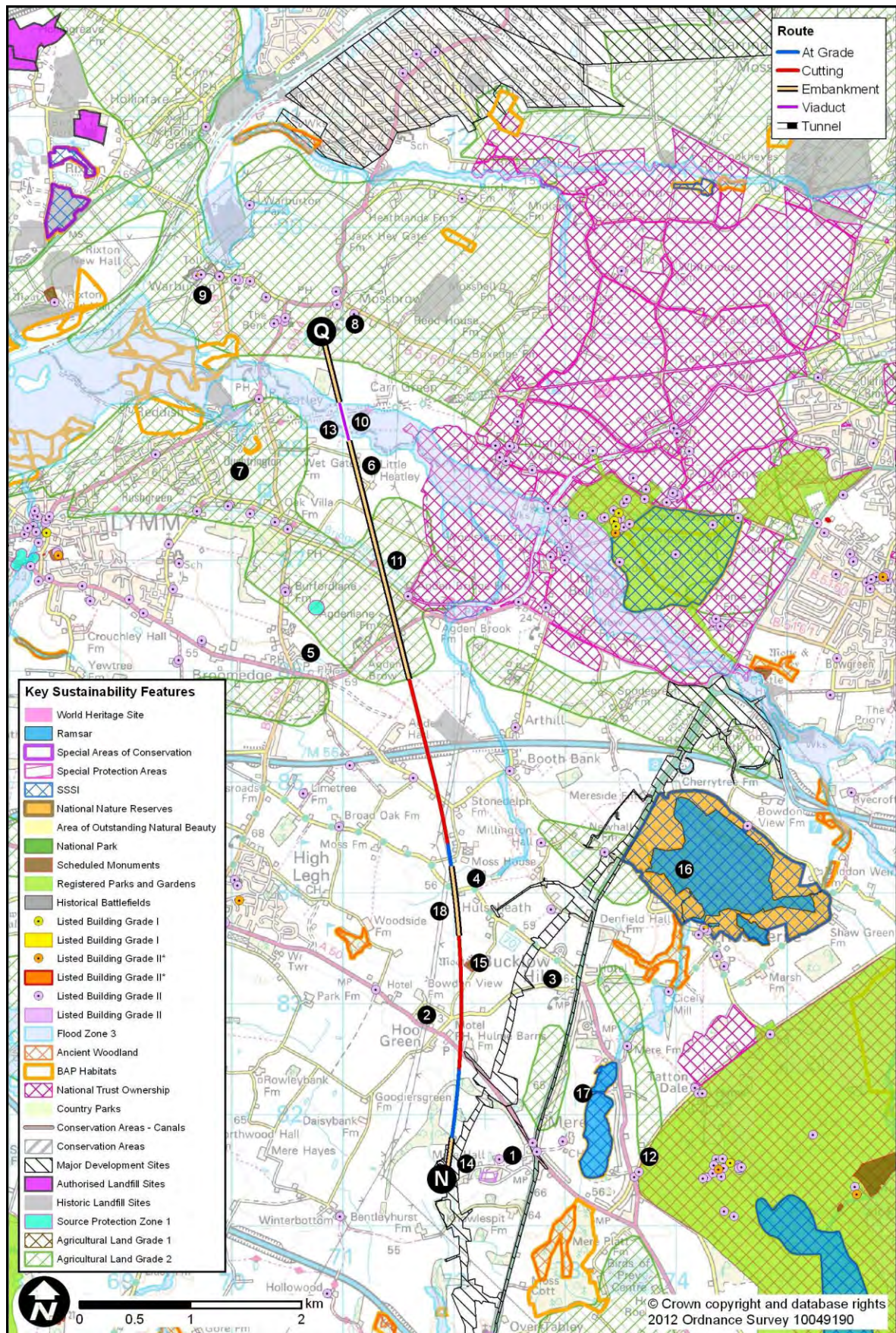
Dwellings qualifying for noise insulation would be located in ④ Hulseheath, ⑤ Broomedge and ⑥ Little Heatley.

- | | | |
|---------|--|--|
| 4.9.7. | Health and well-being | Approximately 26 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity. |
| 4.9.8. | Access issues | Two promoted recreational routes would be crossed by the route section, namely the ⑩ Trans Pennine Trail and the ⑪ Cheshire Ring Canal Walk. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme. |
| 4.9.9. | Planning and development | The route section would pass through the ⑭ Knutsford to Bowdon Roads Improvement scheme (A556). The Highways Agency intends to improve the A556 trunk road between junction 19 of the M6 near Knutsford, and Junction 7 of the M56 near Bowdon. The proposals are, at time of writing, in the pre-application stage and the Highways Agency intends to submit a Development Consent Order application in 2012. |
| 4.9.10. | Landscape, townscape and cultural heritage | <p>The route section would run north of the M6 near Knutsford broadly along the line of two overhead power lines, before cutting through woodlands possibly associated with the wider designed landscape of ⑫ Tatton Park (Registered Park and Garden, Grade II*) to the east. The route section would pass through the edge of the villages of ② Hoo Green and ④ Hulseheath, and then run under the M56 in tunnel. Landscape and visual impacts would be minor to moderate.</p> <p>The route section would continue north of the M56 on embankment, crossing the Bridgewater Canal and River Bollin on viaducts. Landscape impacts would affect the relatively flat, open landscape of the ⑬ Bollin Valley, which is popular for recreation. Localised visual impacts would affect isolated properties and hamlets and recreational users of the ⑪ Cheshire Ring Canal Walk and the ⑩ Trans Pennine Trail, which the route section would cross.</p> <p>The route section would then follow high embankment as far north as ⑧ Mossbrow. There would be some impact on the character of the landscape south of ⑨ Warburton and on views from the hamlet of ⑧ Mossbrow due to the introduction of embankment. Two woodlands would be directly affected by the route section (see also <i>biodiversity and wildlife</i>).</p> <p>There would be a direct impact on the scheduled ⑮ Hough Hall Moated Site, with its ancillary enclosure and fishpond. The route section would have a direct impact on the fabric of the monument as well as a substantial impact on its setting. It would also be likely to have a direct impact on any adjacent remains outside of the scheduled area. It is possible that this impact could be avoided through further scheme refinement, although this would not be possible were HSM16 to connect</p> |

with HSM35.

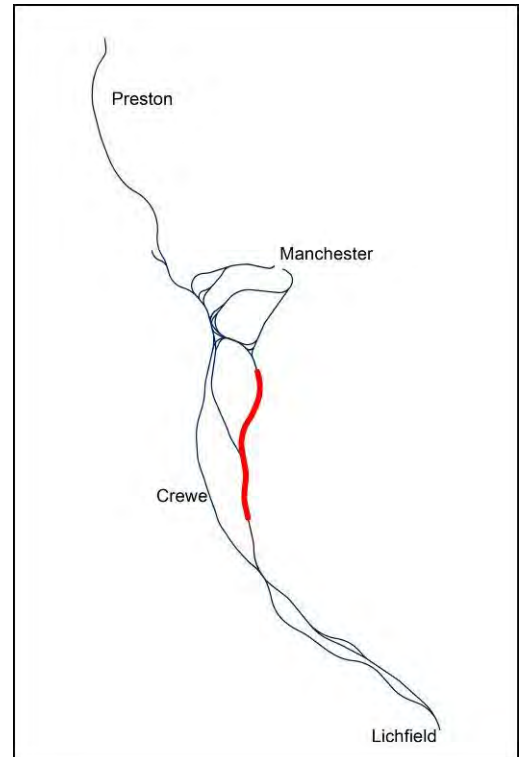
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| 4.9.11. | Biodiversity and wildlife | <p>The route section would pass within 10km of four Natura 2000 wildlife sites. The potential for significant effects at two of these, 16 Rostherne Mere Ramsar and 17 Midland Meres and Mosses, Phase 1 Ramsar, site cannot be discounted at this stage. Further details are described in an HRA screening report for Rostherne Mere, and an HRA screening sheet for Midland Meres and Mosses, which acknowledges the need for more detailed analysis.</p> <p>The route would not directly affect any ancient woodlands or BAP habitats.</p> |
| 4.9.12. | Water resources and flood risk | <p>The 18 Agden Brook Tributary at Broad Oak, a minor river, may be diverted. Continuing scheme design would seek to avoid or minimise this impact.</p> <p>The route section would cross some 500m of Flood Zone 3.</p> |
| 4.9.13. | Land use resources | <p>The route would cross about 1.6km of Grade 2 agricultural land and about 7.4km of green belt.</p> |
| 4.9.14. | Waste and material use | <p>It is estimated that the route section would result in a surplus of 773,807m³ of excavated material.</p> <p>Estimated quantities of bulk building materials for this section comprise 2,500 tonnes of steel and 7,700 tonnes of concrete.</p> |

HSM16 - Figure 1



4.10. HSM17: Shrayleybrook (I) to Mobberley (O)

- 4.10.1. The route section between Shrayleybrook and Mobberley would be 29.4km (18.3 miles) long. It would connect to the south with either HSM05 from Millmeece or HSM07 from Swynnerton. At Mobberley the route would continue along HSM18 or HSM19 to M56 junction 7 Rostherne, or along HSM25 to Ardwick.
- 4.10.2. The route section would follow the M6 corridor for about 10km, as far as Sandbach, before diverging briefly across open country to the east and picking up the route of the Crewe to Manchester railway for a further 6.5km. It would continue up to the south of Mobberley in open countryside. Alongside the M6, its passage across a number of river valleys would necessitate embankment, but the route section would pass at grade over to the railway, and then pass beneath it in a 1km tunnel to the west of Jodrell Bank. It would use a mix of at-grade sections and cuttings to continue north.
- 4.10.3. HSM17 Figures 1 to 3 illustrate the route alignment and the principal sustainability features in the area.
- 4.10.4. Specific mitigation included within the route section comprises a number of localised realignments that have sought to reduce demolitions, noise and visual impacts at the residential areas to the east of Sandbach, Holmes Chapel, Hassel Green and Goostrey and to reduce residential demolitions at Peover. Additional mitigation sought to minimise impacts on the existing railway at Goostrey and impacts on Jodrell Back Telescope, Toad Hall and Blackden Ball.
- 4.10.5. **Population and settlements** The route section would result in the demolition of an estimated 33 dwellings.
Potential isolation would occur at four locations, affecting an estimated 17 dwellings at ❶ Holmes Chapel, 15 dwellings ❷ west of Audley, eight dwellings ❸ west of Alsager and five dwellings in ❹ Brickhouses, east of Sandbach.
- 4.10.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 863 people (equivalent to the occupants of some 366 dwellings). This would represent about 30 people per km of route. With ambient road noise, also taken into account noise impacts from HS2 would be expected to be less than this.
The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ❷ Shrayleybrook, ❺ Park End, ❻ Oakhanger, ❼ Alsager, ❸ Day Green, ❹ Hassall Green, ❿ Sandbach, ❻ Brickhouses, ⓫ Brindley Green, ⓬ Brereton Green, ⓪ Holmes Chapel, ⓫ Twemlow Green, ⓬ Goostrey, ⓭ Peover Heath, ⓮ Chelford, ⓯ Marthall, ⓰ Noonsun and other scattered



dwellings.

Approximately 483 dwellings would be expected to qualify for noise insulation, particularly at ② Shraleybrook, ⑤ Park End, ⑥ Oakhanger, ⑦ Alsager, ⑧ Day Green, ⑨ Hassall Green, ⑩ Sandbach, ④ Brickhouses, ⑪ Brindley Green, ⑫ Holmes Chapel, ⑬ Twemlow Green, ⑭ Goostrey, ⑮ Peover Heath, ⑯ Chelford ⑰ Marthall and ⑳ Noonsun. This is equivalent to approximately 17 dwellings per km of route section.

4.10.7. Health and well-being

Approximately 143 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.

4.10.8. Access issues

Two promoted recreational routes would be crossed by the route section, namely the ⑮ Cheshire Ring Canal Walk and the ⑰ Dane Valley Way. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.

4.10.9. Landscape, townscape and cultural heritage

The route section would run close to the M6 to just north of Sandbach. Within this transport corridor impacts would be limited despite the number of short viaducts required across small streams and the Trent and Mersey Canal. However, some visual intrusion from higher viaducts and embankments (up to 20m high in places) is likely, especially on the western outskirts of Alsager, at ⑨ Hassall Green on the Trent and Mersey Canal (which accommodates the Cheshire Ring Canal Walk), and at ④ Brickhouses north-east of Sandbach.

North of Sandbach the route section would diverge from the M6 and largely follow an existing railway line before veering northwards through open countryside south-east of Knutsford. Most of the route section would run through a relatively flat landscape at grade, with a few short embanked sections and a longer length of cutting in the area east of Goostrey. It is likely there would be some visual intrusion associated with viaduct crossings, especially the high crossing of the ⑰ River Dane near Holmes Chapel. There would be further visual impacts on a number of small villages, including ⑫ Brereton Green, ⑯ Chelford and ⑳ Noonsun, as well as ⑬ Twemlow Green.

There would be a minor or locally moderate impact on landscape character, where the route diverges from the M6 and/or affects existing woodlands (see also *biodiversity and wildlife*), six of which would be directly affected.

Two Grade II listed structures, would be demolished. One is a ② Victorian milepost, which could be preserved although away from its geographical context. However, the other – ②③ Toad Hall – is a late 16th century cottage. It may be possible that with further route refinement could avoid this.

Of those listed structures near the route, the setting of the Grade II* ②① Blackden Hall would be moderately affected. Grade II listed buildings with moderate impacts on their settings would include a group of four farm buildings at ④ Brickhouses and the ②④ Church of St John at Sandbach Heath.

4.10.10. Biodiversity and wildlife

The route section would pass within 10km of three Natura 2000 wildlife sites. However, the HRA screening confirms that there would be no likely

significant effects on these sites.

In addition, two SSSIs would be within 2km, although risk of impact is low and therefore adverse effects are considered unlikely.

The route would directly affect two ancient woodlands, 25 Bomish Wood and 26 Ryecroft Wood, both of which are also wet woodland BAP habitat. Two large areas of fen BAP habitat would also be directly affected.

4.10.11. Water resources and flood risk

27 Pedley Brook is a minor river that may need to be diverted. Continuing scheme design would seek to avoid or minimise this impact. About 1.1km of this route section would cut through SPZ2 potentially affecting groundwater flows to 28 Audley abstraction point (4,546m³/day). The route section would cross some 1km of Flood Zone 3.

4.10.12. Land use resources

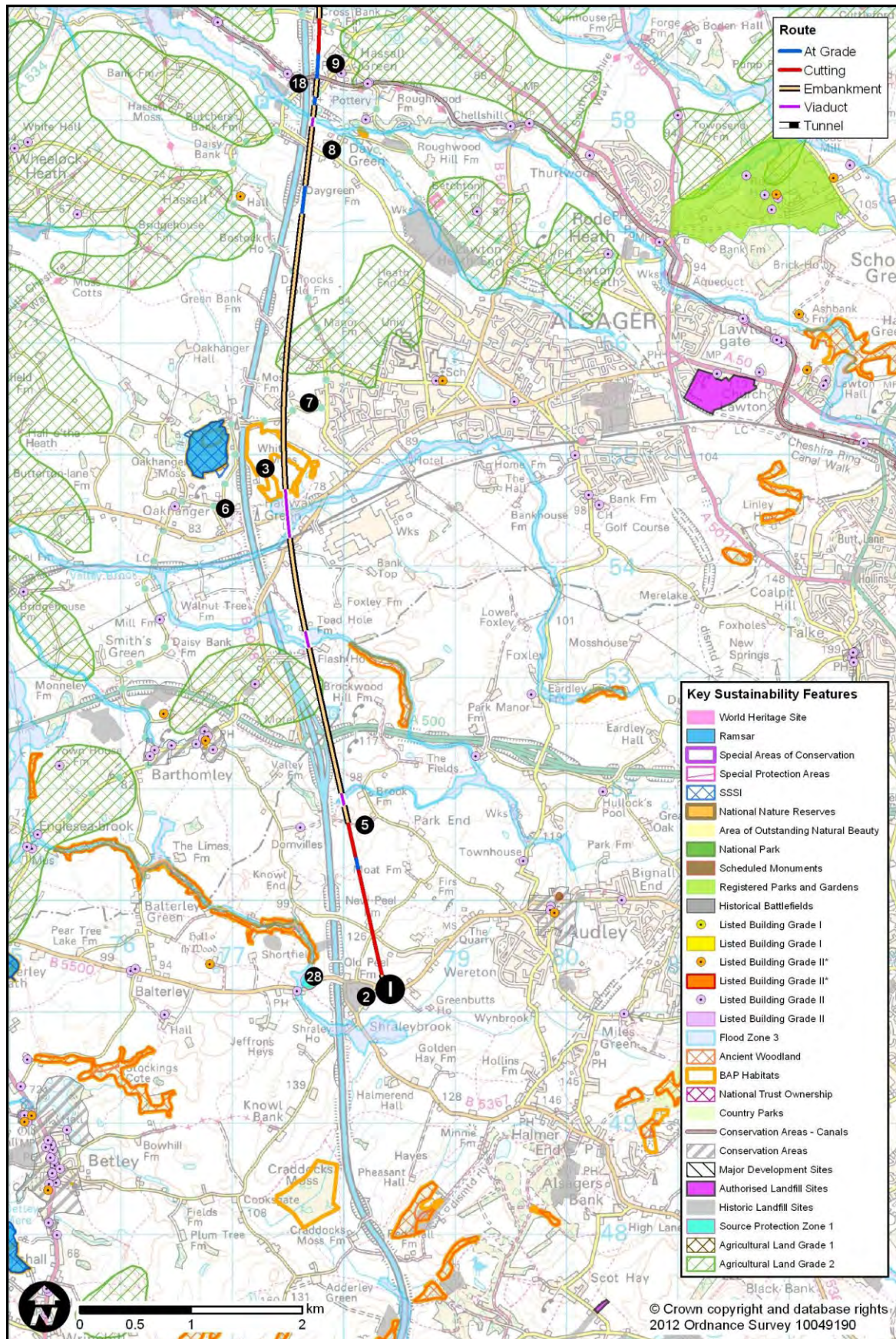
The route would cross about 4.1km of Grade 2 agricultural land. It would cross about 11.1km of green belt.

4.10.13. Waste and material use

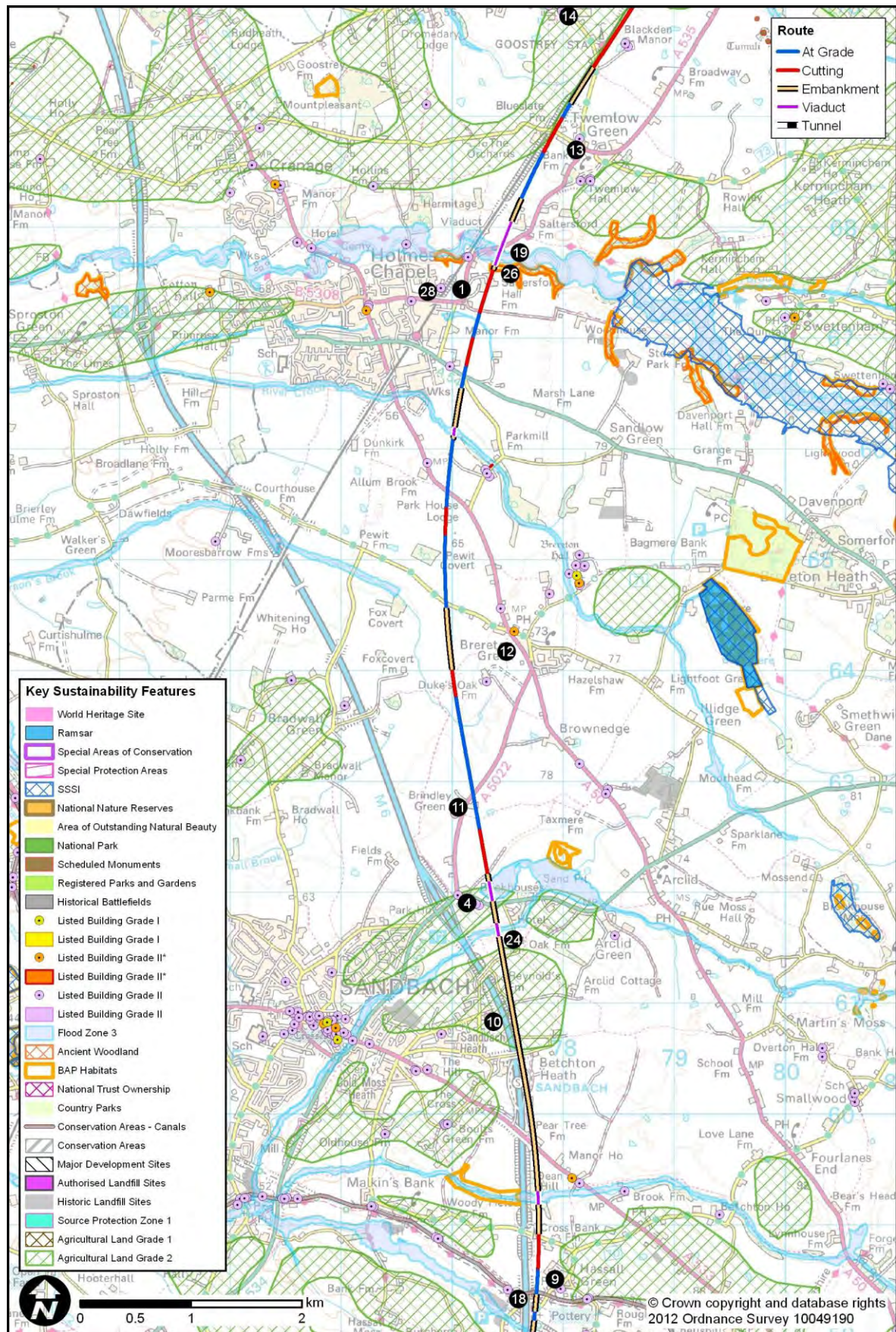
It is estimated that the route section would result in a deficit of - 12,354,881m³ of excavated material.

Estimated quantities of bulk building materials for this section comprise 9,400 tonnes of steel and 29,000 tonnes of concrete.

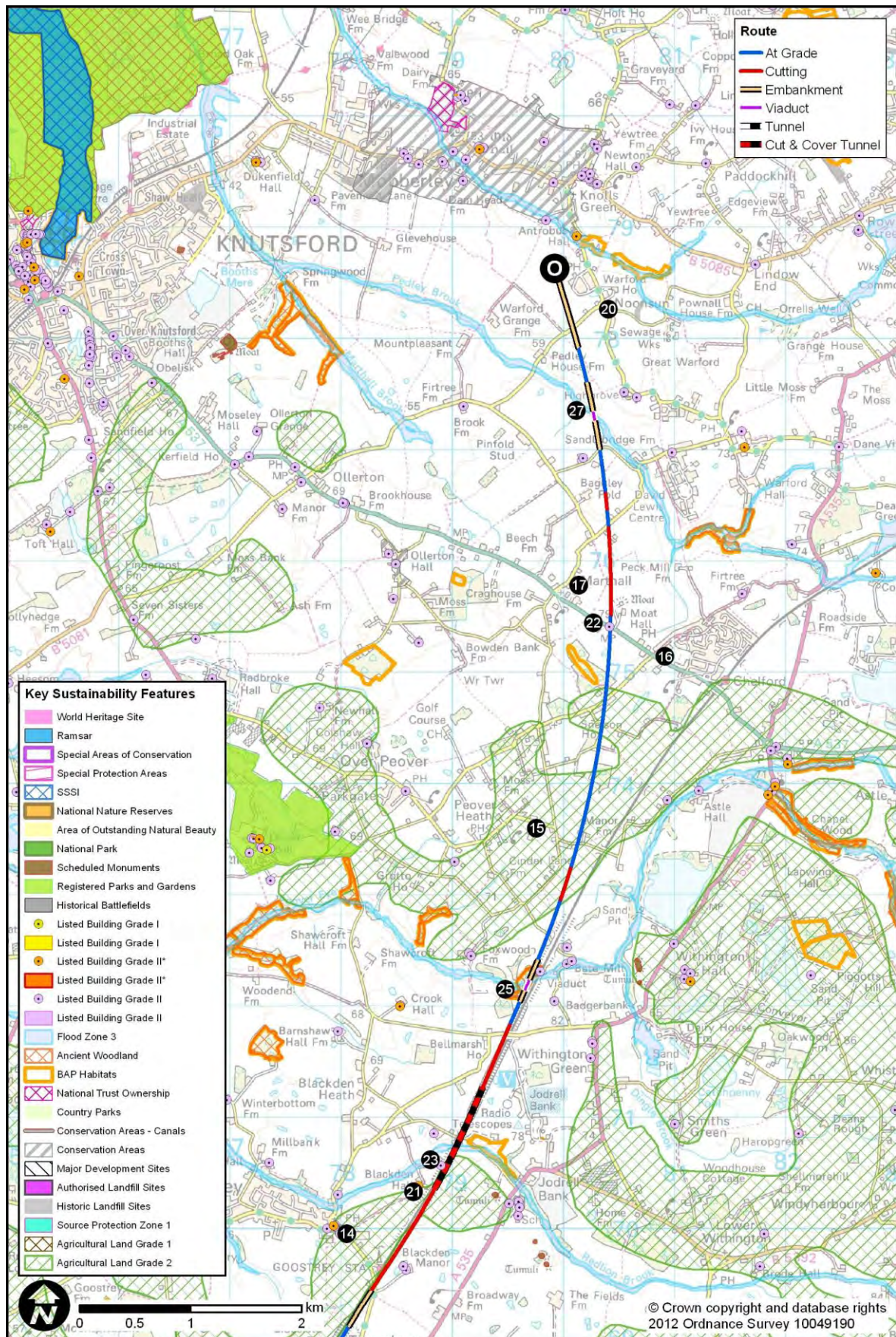
HSM17 - Figure 1 of 3



HSM17 - Figure 2 of 3

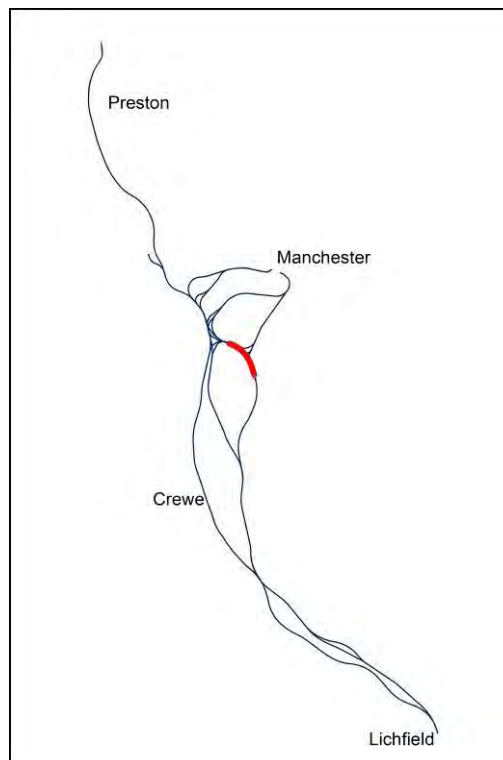


HSM17 - Figure 3 of 3



4.11. HSM18: Mobberley (O) to M56 Junction 7 Rostherne (P)

- 4.11.1. The route section between Mobberley and M56 junction 7 Rostherne would be 8km (4.8 miles) long. It would connect to the south with HSM17 from Shrayleybrook. From the M56 junction 7 Rostherne, the route section would continue along either section HSM20 to Warburton or HSM31A Carrington. HSM19 forms the same route section, but includes an interchange station option.
- 4.11.2. The route section would comprise a long section of cutting commencing between Mobberley and Knolls Green and past the western end of the southern runway at Manchester Airport. It would rise onto embankment, curving west past Tatton Park at grade and joining the alignment of the M56, passing over Mobberley Brook on a viaduct.
- 4.11.3. HSM18 Figure 1 illustrates the route alignment and the principal sustainability features in the area.
- 4.11.4. Specific mitigation included within the route section comprises localised realignments that have sought to reduce noise and visual impacts at the residential area of Mobberley. Additional mitigation sought to reduce the impact on Mobberley Conservation Area, Mobberley Primary School playing fields and to reduce landscape and visual impacts at Tatton Park and Rostherne Mere.
- 4.11.5. In addition, there is an option to replace the section of cutting through Mobberley with a tunnel (see the engineering report). This could be either a bored tunnel or a green tunnel. The implications on sustainability of this change have only been appraised at high level, but would include avoidance of severance, reduced noise impacts and reduced impacts on the conservation area. The bored tunnel option would also avoid some demolitions at Knolls Green including the Grade II listed Coppock House.
- 4.11.6. **Population and settlements** The route section would result in the demolition of an estimated 11 dwellings. Potential isolation at one location would affect one dwelling ① north of Mobberley. Potential severance would affect an estimated 10 dwellings at ② Mobberley.
- 4.11.7. **Noise** Noise impacts for the route section would depend in part on the terminus station it is linked with, as this would affect the number of trains operating on the line. The estimated noise impacts arising from each of the possible scenarios are given below.



Terminus option	Number of people annoyed by noise	Equivalent to:	Qualifying for noise insulation
Piccadilly via airport tunnel (via HSM25)	61	26 dwellings or 8 people per km	19 dwellings

Salford terminus (via HSM34,39 or 40)	89	38 dwellings or 12 people per km	44 dwellings
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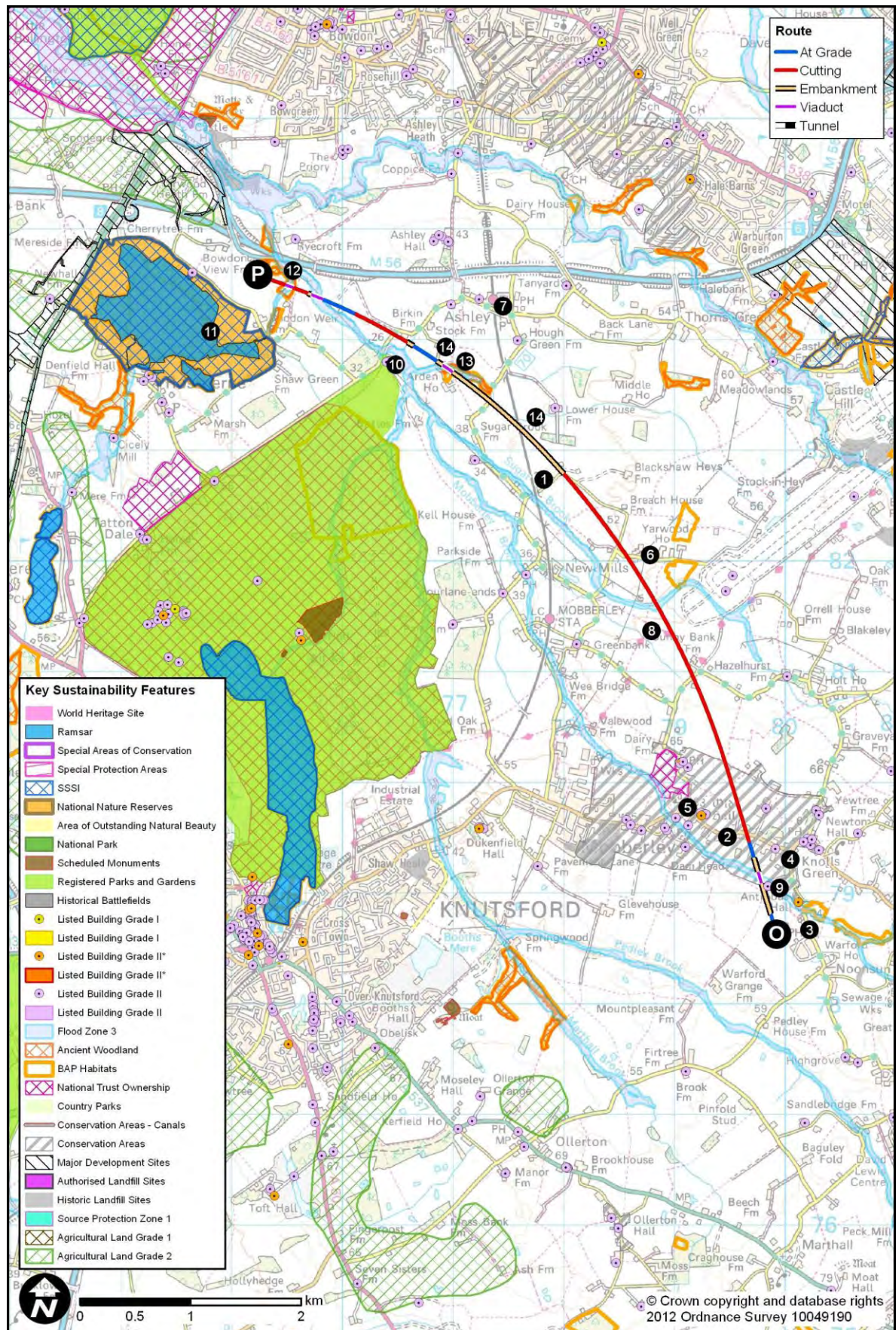
The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ③ Noonsun, ④ Knolls Green, ⑤ Mobberley, ⑥ New Mills and ⑦ Ashley.

Dwellings qualifying for noise insulation would be located in ④ Knolls Green, ⑤ Mobberley, ⑥ New Mills and ⑦ Ashley.

- 4.11.8. Health and well-being
Approximately 50 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
- 4.11.9. Access issues
One promoted recreational route would be crossed by the route section, namely the ⑧ Cheshire Way. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.
- 4.11.10. Landscape, townscape and cultural heritage
The route section would run north from Mobberley (a conservation area) and then run largely in cutting and then at grade. The southern end of the route section would give rise to localised visual intrusion affecting residents near ④ Knolls Green (just east of Mobberley).
Near Tatton Park, the embanked and at grade parts of the route are likely to have minor or locally moderate visual impacts on the residents of nearby hamlets, as the embankment would rise up to 10m.
There would also be some direct impacts on valley woodlands, two of which would be affected (see also *biodiversity and wildlife*).
The ⑤ Mobberley Conservation Area would be crossed for a little over 1km. However, impacts would be limited by the alignment in cutting and its position away from the historic cores of the conservation area. The key impacts would be the loss of the Grade II Listed ⑨ Coppock House and some severance of the villages. Of the listed buildings near the route, impacts on their settings would be minor or, for the majority, which would be well screened by trees, negligible.
Running at grade or on embankment along the slopes north-east of Sugar Brook, it would pass the northern tip of ⑩ Tatton Park (National Trust Land and Grade II* Registered Park and Garden). The park is 140m away at its nearest point. However its eastern side is well-wooded and the ground drops gently down towards the route, ensuring it would be barely visible from the park. Potential impacts on the setting of the park would be negligible.

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| 4.11.11. Biodiversity and wildlife | <p>The route section would pass within 10km of three Natura 2000 wildlife sites. The potential for significant effects at one of these sites, ⑪ Rostherne Mere Ramsar site, cannot be discounted at this stage. Further details are described in an HRA screening report for Rostherne Mere, which acknowledges the need for more detailed analysis. There is also a potential for disturbance to the wintering birds at the site. Wintering birds are not a qualifying feature of the Ramsar, so although potential impact to them would be relevant to the NNR and SSSI designation, it would not affect the qualifying interest and integrity of the Ramsar site.</p> <p>The route section would directly affect two ancient woodlands, ⑫ Hancocks Bank and ⑬ Arden House Wood, which are also wet woodland BAP habitat.</p> |
| 4.11.12. Water resources and flood risk | <p>Two diversions of the ⑭ Middle House Brook minor river may be required. Continuing scheme design would seek to avoid or minimise this impact.</p> <p>The route section would cross some 320m of Flood Zone 3. Approximately 60m of the line would be in cut up to 5m deep in Flood Zone 3, and therefore at risk of flooding.</p> |
| 4.11.13. Land use resources | <p>The route would cross about 8km of green belt.</p> |
| 4.11.14. Waste and material use | <p>It is estimated that the route section would result in a surplus of 2,862,833m³ of excavated material.</p> <p>Estimated quantities of bulk building materials for this section comprise 2,600 tonnes of steel and 7,900 tonnes of concrete.</p> |

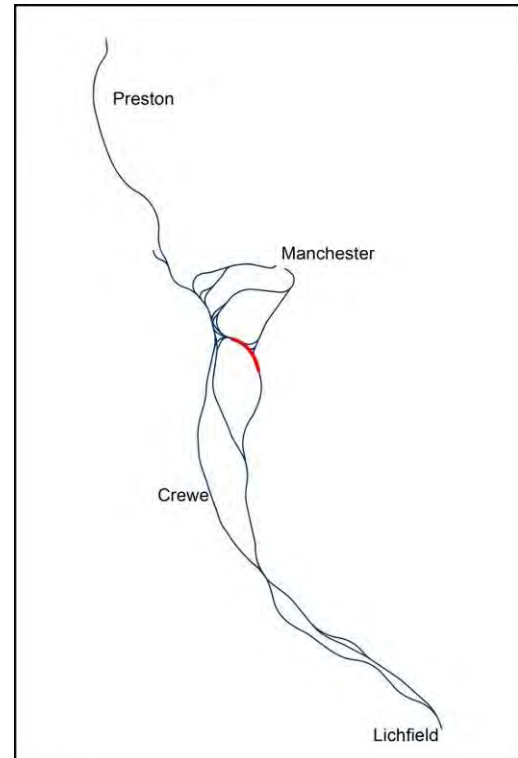
HSM18 - Figure 1



4.12. HSM19: Mobberley (O) to M56 Junction 7 Rostherne (P) including E/W airport station

- 4.12.1. The route section between Mobberley and M56 junction 7 Rostherne is 8km (5 miles) long and would include an interchange station. The section of route would connect south of Mobberley with HSM17 to Shrayleybrook. At M56 junction 7 Rostherne the route would continue along either section HSM20 to Warburton or HSM31A to Carrington. HSM18 forms the same route section without an interchange station option.
- 4.12.2. The route section would comprise a long section of cutting commencing between Mobberley and Knolls Green and past the western end of the southern runway at Manchester Airport. Immediately north-west of this, a new intermediate station would be provided, including a new road to link the station with the existing road network at Castle Mill Lane. The route section would curve west past Tatton Park at grade and join the alignment of the M56, passing over Mobberley Brook on a viaduct.
- 4.12.3. The station would be located south of the M56 and west of Manchester Airport with two four-track sections north and south. The southern section would approach the new elevated station in cutting, then continuing north on embankment passing over the existing Chester to Altrincham railway line on to Manchester.
- 4.12.4. HSM19 Figures 1 to 2 illustrate the route alignment and the principal sustainability features in the area.
- 4.12.5. Specific mitigation included within the route section comprises a number of localised realignments that have sought to reduce noise and visual impacts at the residential area of Mobberley and to reduce residential demolitions at Peover. Additional mitigation sought to reduce the impact on Mobberley Conservation Area, Mobberley Primary School playing fields and to reduce landscape and visual impacts at Tatton Park and Rostherne Mere. The potential for mitigation for the station was limited at this early stage of design. However, care was taken to minimise impact on the surrounding settlements and landscape features.
- 4.12.6. In addition, there is an option to replace the section of cutting through Mobberley with a tunnel. This has been described in Section 4.11 for route section HSM18, for which it is equally applicable.
- 4.12.7.

Population and settlements	<p>The route section would result in the demolition of an estimated seven dwellings. In addition, the station option would require the demolition of 11 dwellings and one commercial property.</p> <p>Potential isolation would occur at one location, affecting an estimated one dwelling ❶ north of Mobberley. Potential severance would affect an estimated 10 dwellings at ❷ Mobberley.</p>
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| 4.12.8. | Noise | <p>Noise from HS2 trains would result in annoyance for an estimated 96 people (equivalent to the occupants of some 41 dwellings). This would represent about 12 people per km of route.</p> <p>The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ③ Noonsun, ④ Knolls Green, ② Mobberley, ⑤ New Mills, ⑥ Ashley.</p> <p>Approximately 53 dwellings would potentially qualify for noise insulation, particularly at ④ Knolls Green, ② Mobberley, ⑤ New Mills, ⑥ Ashley. This is equivalent to approximately seven dwellings per km of route section.</p> <p>Modelling of noise impacts from the operational station will be undertaken as designs are progressed. They would be influenced by plant and PA systems, generated road traffic, and the frequency and speed of trains.</p> |
| 4.12.9. | Health and well-being | <p>Approximately 30 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.</p> |
| 4.12.10. | Access issues | <p>The station would offer a potential interchange with the M56 and Manchester Airport and its existing transport facilities, such as rail and Metrolink (under construction at the time of writing).</p> <p>One promoted recreational route would be crossed by the route section, namely the ⑦ Cheshire Way. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.</p> |
| 4.12.11. | Jobs and houses | <p>Given the green belt location, opportunity for the station to support additional jobs or housing would be limited.</p> |
| 4.12.12. | Planning and development | <p>The station would potentially support the new Enterprise Zone located at ⑧ Manchester Airport. However, it would conflict with the green belt designated by the Cheshire East Emerging Core Strategy (Issues and Options Stage).</p> |
| 4.12.13. | Landscape, townscape and cultural heritage – line of route | <p>The route section would run north from Mobberley (a conservation area) and then run largely in cutting and then at grade. The southern end of the route section would give rise to localised visual intrusion affecting residents near ④ Knolls Green (just east of Mobberley).</p> <p>Near Tatton Park, the embanked and at grade parts of the route are likely to have minor or locally moderate visual impacts on the residents of nearby hamlets, as the embankment would rise up to 10m for around 500m. There would also be some direct impacts on valley woodlands, two of which would be affected (see also <i>biodiversity and wildlife</i>).</p> <p>The ② Mobberley Conservation Area would be crossed for a little over 1km. However, impacts would be limited by the alignment in cutting and its position away from the historic cores of the conservation area. The key impacts would be the loss of the ⑨ Grade II Listed Coppock House and some severance of the villages. Of the listed buildings near the route, impacts on their settings would be minor or, for the majority, which</p> |

would be well screened by trees, negligible.

Running at grade or on embankment along the slopes north-east of Sugar Brook, the route section would pass the northern tip of 10 Tatton Park (National Trust owned and a Grade II* Registered Park and Garden). The park is 140m away at its nearest point. However, its eastern side is well-wooded and the ground drops gently down towards the route, ensuring that it would barely be visible from the park. Potential impacts on the setting of the park would be negligible.

4.12.14. Landscape, townscape and cultural heritage – station

This station option would be located in green belt. The nearest settlements to the station option are the villages of 5 New Mills and 6 Ashley, each around 1km to the south and north respectively. There would be visual impacts on these villages and especially on views from the quiet country lanes that connect them. In addition, there would be visual impacts on longer distance views from the surrounding countryside, possible including the northern outskirts of the village and conservation area of 2 Mobberley to the south. Views from 10 Tatton Park across the intervening valley landscape of Sugar Brook and Mobberley Brook may be possible, given the station's height and mass. The station approaches would also affect two woodlands over a distance of around 5.5km.

The four-track section would cross 2 Mobberley Conservation Area for about 500m and would exacerbate impacts referred to for the main route section. It would require the demolition of the Grade II listed 10 Tanyard Farmhouse and the eastern block of the farm courtyard. There would be a minor impact on the setting of the Grade II listed 12 Lower House Farmhouse and the 13 Old Rectory.

4.12.15. Biodiversity and wildlife

The route section would pass within 10km of three Natura 2000 wildlife sites. The potential for significant effects at one of these sites, 14 Rostherne Mere Ramsar site, cannot be discounted at this stage. Further details are described in an HRA screening report for Rostherne Mere, which acknowledges the need for more detailed analysis. There is a potential for disturbance to the wintering birds at the site. Wintering birds are not a qualifying feature of the Ramsar, so although potential impact to them would be relevant to the NNR and SSSI designation, it would not affect the qualifying interest and integrity of the Ramsar site.

The route and station would directly affect two ancient woodlands, 15 Hancocks Bank and 16 Arden House Wood, which are also wet woodland BAP habitat.

4.12.16. Water resources and flood risk

One diversion of 11 Middle House Brook, a minor river, may be required. Continuing scheme design would seek to avoid or minimise these impacts.

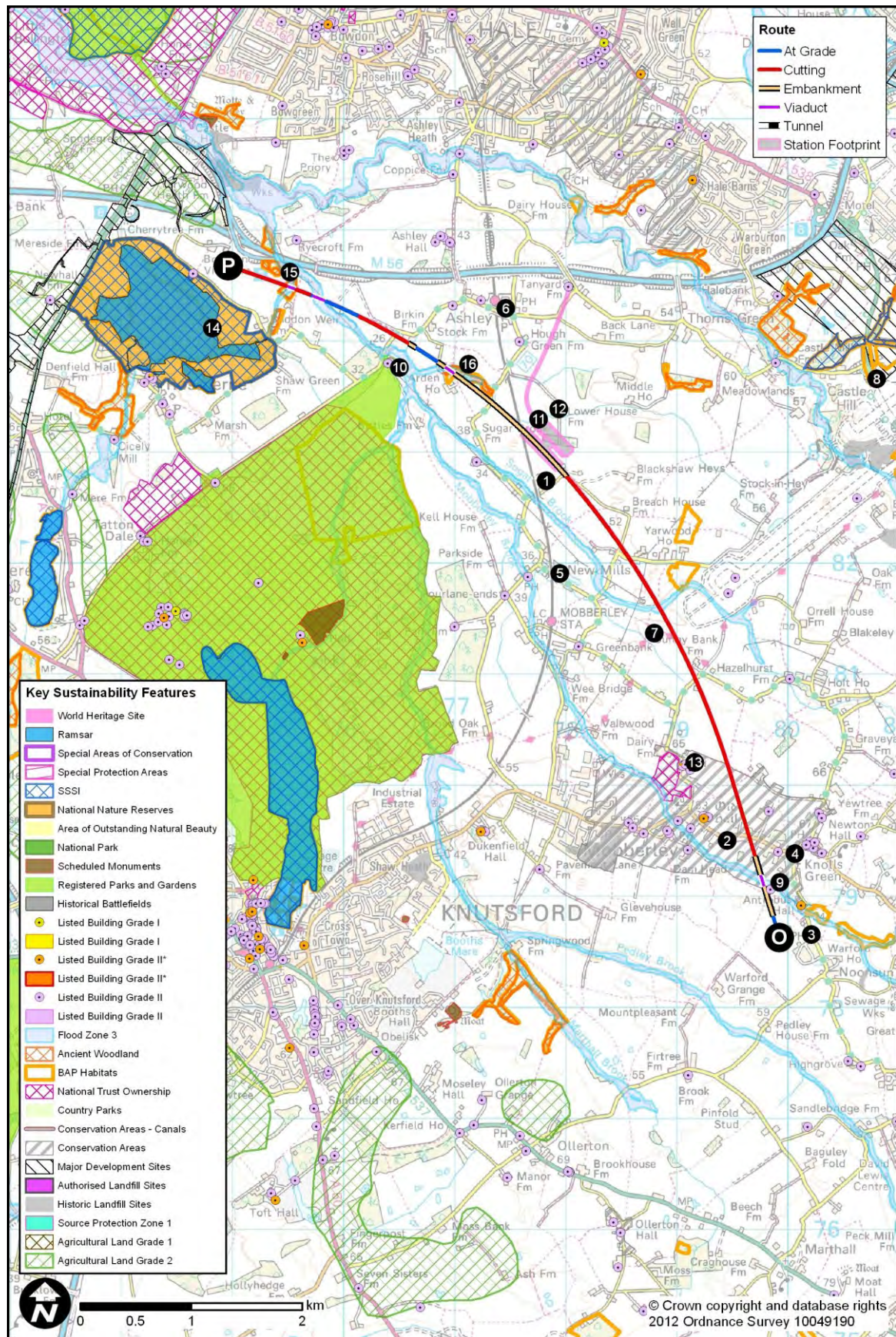
The route section would cross some 70m of Flood Zone 3, the majority of which would be in cutting and therefore at risk of flooding. The four-track section would cross an additional 260m of Flood Zone 3.

4.12.17. Land use resources

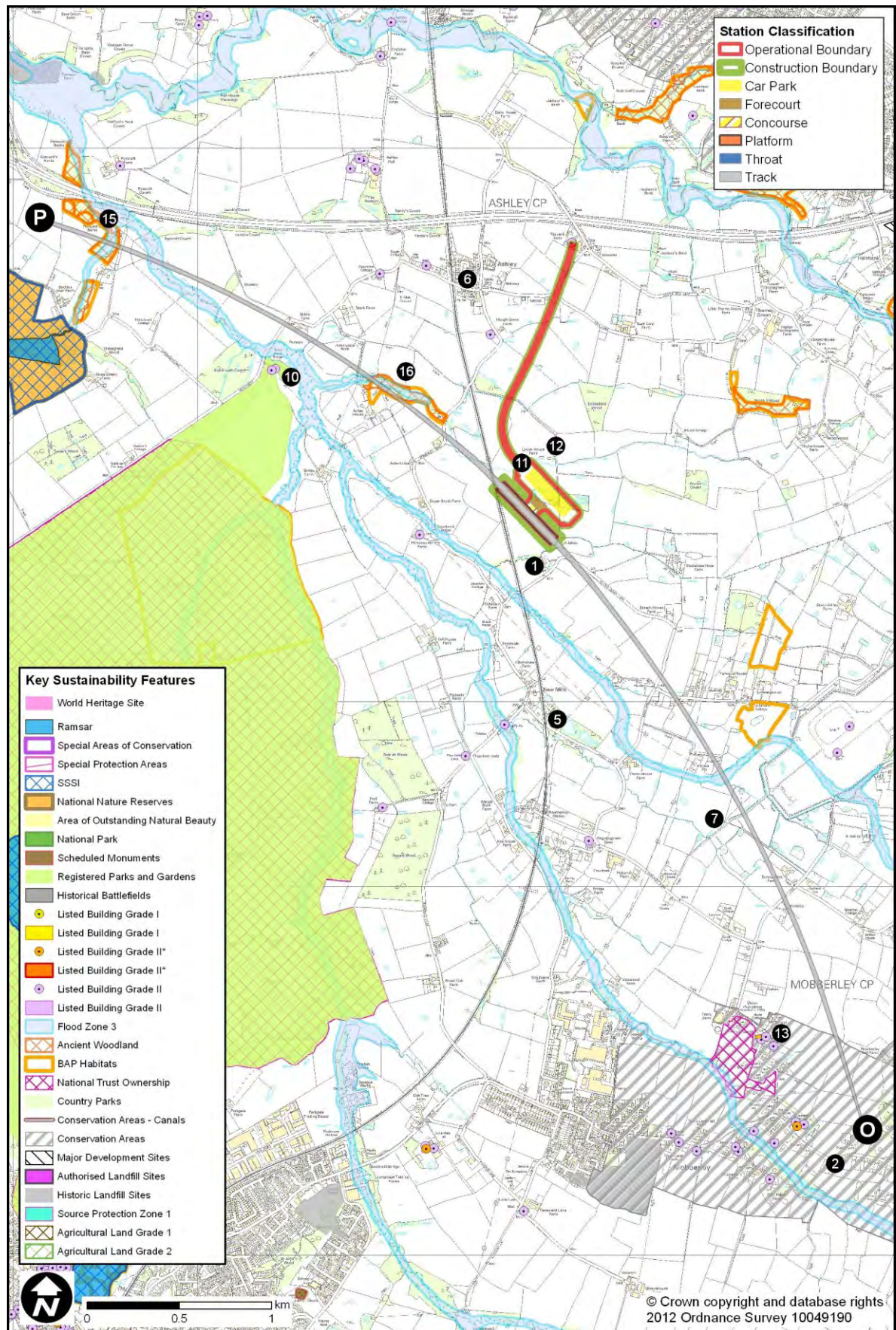
The route section would cross a little over 8.3km of green belt. The station footprint would occupy an additional 75.5ha of green belt.

- 4.12.18. Waste and material use
- It is estimated that the route section would result in a surplus of 2,987,685m³ of excavated material.
- Estimated quantities of bulk building materials for the route section comprise 2,700 tonnes of steel and 8,200 tonnes of concrete. The station would require an additional 173,400 tonnes of concrete; estimated quantities of steel are not provided at this stage.

HSM19 - Figure 1 of 2



HSM19 Figure 2 of 2



4.13. HSM20: M56 Junction 7 Rostherne (P) to Warburton (Q)

4.13.1. The route section between the M56 junction 7 Rostherne and Warburton would be 6.6km (4.1 miles) long. It would connect to the south with either HSM18 or HSM19 from Mobberley. At Warburton the route would continue along HSM21 to Lowton. If using a Salford terminus it could also link with HSM35, HSM39 or HSM40 to Winton.

4.13.2. The route section would pass just to the north of Rostherne Mere in cutting and continue beneath the A56 and M56 and Bridgewater Canal, bearing northwards and west of the Dunham Estate. It would rise through undulating terrain onto viaduct to cross the River Bollin, east of Lymm, before cutting through the gently rising land south of Warburton.

4.13.3. HSM20 Figure 1 illustrates the route section and the principal sustainability features in the area.

4.13.4. Specific mitigation included within the route section comprises a number of localised realignments. For example to reduce landscape and visual impacts on Rostherne Mere and Dunham Massey, reduce demolitions and severance at Little Bollington, Warburton and Heatley.

4.13.5. **Population and settlements** The route section would result in the demolition of an estimated seven dwellings. In addition, one commercial property would also be demolished.

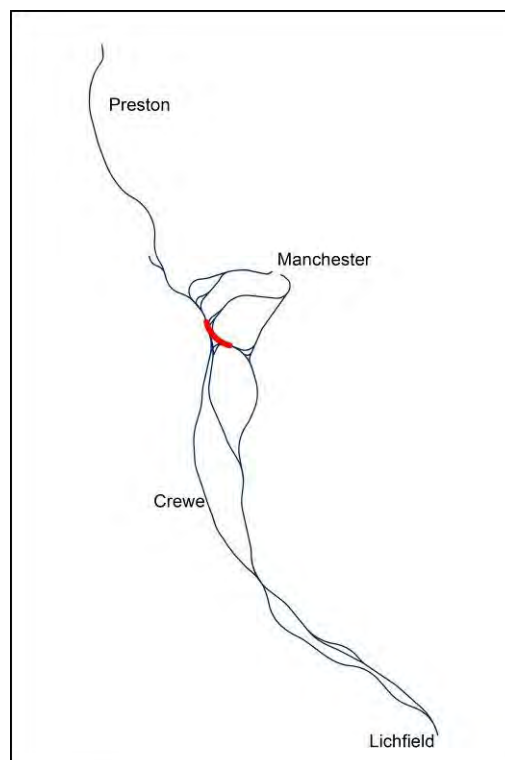
Potential isolation would occur at one location, affecting an estimated three dwellings at an area ① north of Rostherne Mere. Potential severance would affect an estimated eight dwellings at ② Arthill.

4.13.6. **Noise** Noise impacts for the route section would depend in part on the terminus station it is linked with, as this would affect the number of trains operating on the line. The estimated noise impacts arising from each of the possible scenarios are given below.

Terminus option	Number of people annoyed by noise	Equivalent to:	Qualifying for noise insulation
Piccadilly via airport tunnel (via HSM31)	38	17 dwellings or six people per km	12 dwellings
Salford terminus (via HSM35, 39 or 40)	71	31 dwellings or 11 people per km	15 dwellings

With ambient road noise, also taken into account, noise impacts from HS2 would be expected to be less than this.

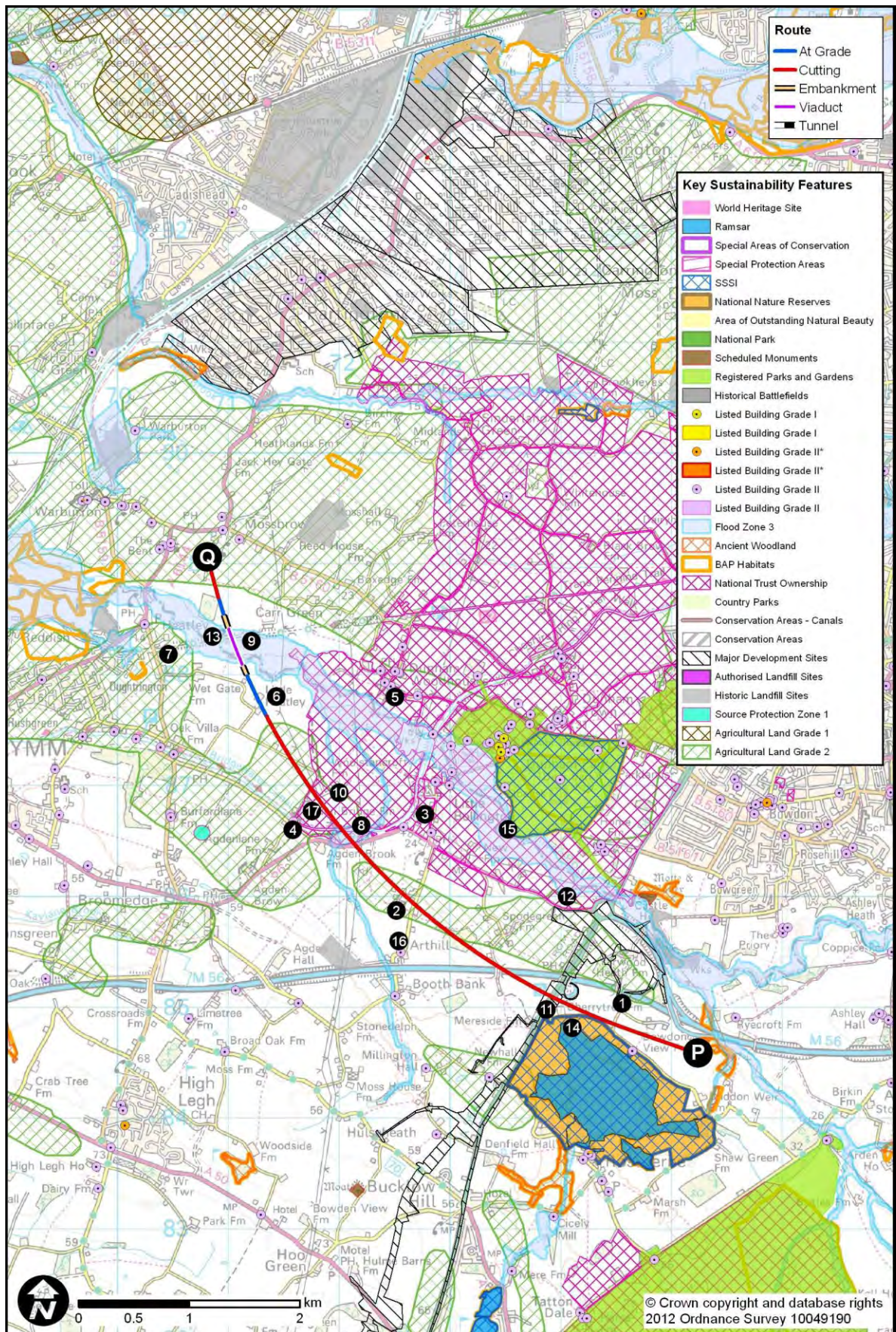
The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ① Arthill, ③



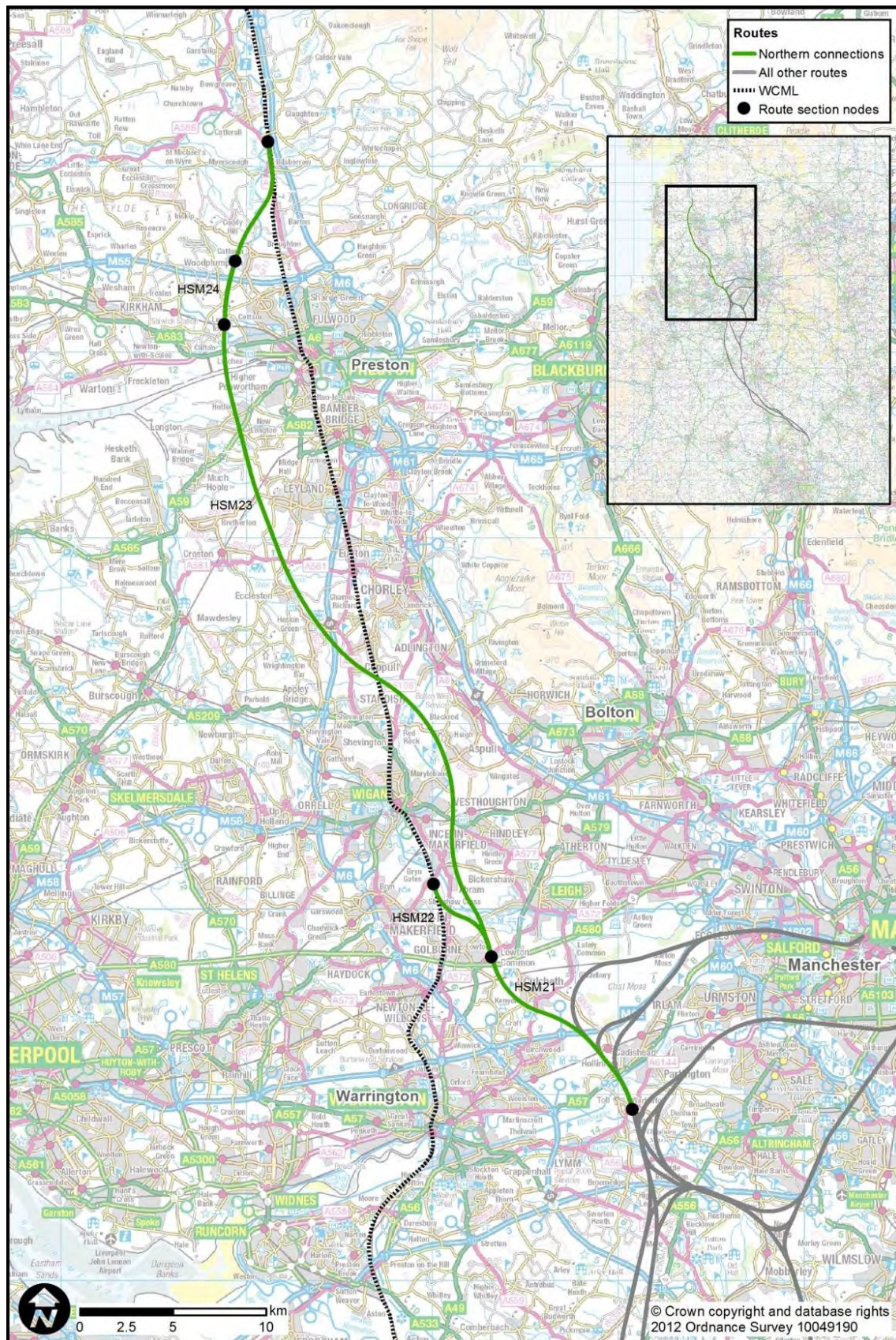
- Little Bollington, ④ Agden, ⑤ Dunham Woodhouses, ⑥ Little Heatley and ⑦ Heatley.
Dwellings qualifying for noise insulation would be located in ③ Little Bollington and ⑥ Little Heatley.
- 4.13.7. Health and well-being Approximately 32 dwellings would be located within 100m of the route section that could be disturbance from construction activity.
- 4.13.8. Access issues Two promoted recreational routes would be crossed by the route section, namely ⑧ the Cheshire Ring Canal Walk and ⑨ the Trans Pennine Trail. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.
In addition, 600m of National Trust owned land would be crossed by the route section ⑩ west of Little Bollington at the western edge of the Dunham Estate, although this would be some distance from ⑮ Dunham Park itself (see *landscape, townscape and cultural heritage*).
- 4.13.9. Planning and development The route section would pass through the ⑪ Knutsford to Bowdon Roads Improvement scheme (A556). The Highways Agency intends to improve the A556 trunk road between junction 19 of the M6 motorway, near Knutsford, and junction 7 of the M56 motorway, near Bowdon. The proposals are in the pre-application stage and the Highways Agency intends to submit a Development Consent Order application in 2012.
- 4.13.10. Landscape, townscape and cultural heritage In cutting south of the M56, near Rostherne Mere, there would be little or no landscape or visual impact. The route section would continue north through an attractive and well used rural recreational landscape on the outskirts of ⑫ Altrincham, and would pass under the Bridgewater Canal. Its passage in cutting along most of its length would effectively limit its landscape and visual impacts. It would have little or no visual impact on ⑬ Dunham Park or ⑭ Little Bollington, but further north at least moderate landscape and visual impacts would result from disruption to landscape character, including the viaduct crossing of the ⑬ River Bollin and ⑨ the Trans Pennine Trail. Direct impact on one wood would result in only very minor landscape impact.
- 4.13.11. Biodiversity and wildlife The route section would pass within 10km of four Natura 2000 wildlife sites. The potential for significant effects at one of these sites, ⑭ Rostherne Mere Ramsar site, cannot be discounted at this stage. Further details are described in an HRA screening report for Rostherne Mere, which acknowledges the need for more detailed analysis. There is a potential for disturbance to the wintering birds at the site. Wintering birds are not a qualifying feature of the Ramsar, so although potential impact to them would be relevant to the NNR and SSSI designation, it would not affect the qualifying interest and integrity of the Ramsar site.
One further SSSI, ⑮ Dunham Park, which is designated for its invertebrate assemblage associated with ancient trees, would be within 2km of the route section. Impacts from pollution and changes in hydrology are unlikely due to distance and the intervening River Bollin.

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| 4.13.12. | Water resources and flood risk | <p>The 12 Agden Brook Tributary at Woolstencroft Farm, a minor river, may be diverted. Continuing scheme design would seek to avoid or minimise this impact.</p> <p>The route section would cross some 490m of Flood Zone 3. Approximately 200m of the line would be in cutting in Flood Zone 3, and therefore at risk of flooding.</p> |
| 4.13.13. | Land use resources | <p>The route would cross 2.4km of Grade 2 agricultural land. It would cross an estimated 6.6km of green belt.</p> |
| 4.13.14. | Waste and material use | <p>It is estimated that the route section would result in a surplus of 2,760,191m³ of excavated material.</p> <p>Estimated quantities of bulk building materials for this section comprise 2,100 tonnes of steel and 6,600 tonnes of concrete.</p> |

HSM20 - Figure 1



5. Manchester route: northern connections



5.1. HSM21: Warburton (Q) to Lowton (R)

5.1.1. The route section between Warburton and Lowton would be about 12.2km (7.6 miles) long. It would connect to the south with either HSM12, HSM16, HSM30 or HSM20. At Lowton the route would continue along HSM22 to connect to the WCML at Bamfurlong or HSM23 to connect to the WCML at Brock, north of Preston. If using a Salford terminus it could also link with HSM35⁶, HSM39 or HSM40 to Winton.

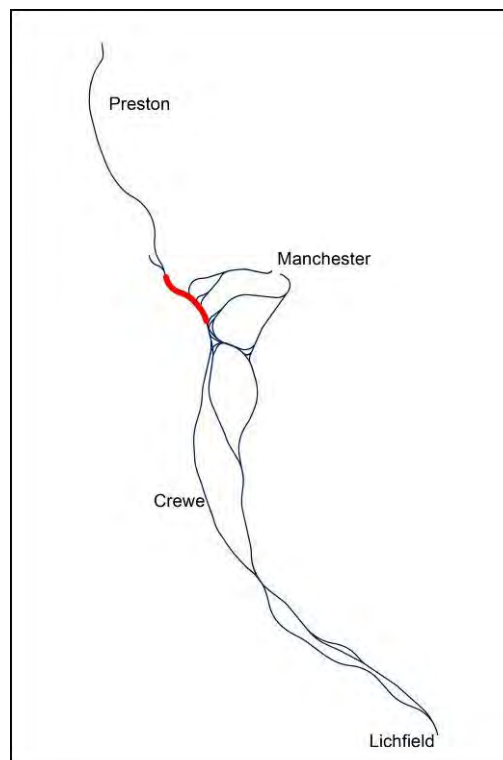
5.1.2. The route section would rise onto a high viaduct over the Manchester Ship Canal and would remain on embankment for several kilometres to cross over the Liverpool to Manchester and the M62. It would drop into cutting around the southern edge of Culcheth along the line of a dismantled railway and would remain in cutting apart from a short section that would cross over the Chester to Manchester railway.

5.1.3. HSM21 Figures 1 to 2 illustrates the route alignment and the principal sustainability features in the area.

5.1.4. Specific mitigation included within the route section comprises localised realignments that have sought to reduce noise and visual impacts at the residential areas of Gorse Covert and Culcheth.

5.1.5. Population and settlements The route section would result in the demolition of an estimated three dwellings and 18 commercial properties.

5.1.6. Noise Noise impacts for the route section would depend in part on the terminus station it is linked with, as this would affect the number of trains operating on the line. The estimated noise impacts arising from each of the possible scenarios are given below.



Terminus option	Number of people annoyed by noise	Equivalent to:	Qualifying for noise insulation
Piccadilly	257	109 dwellings or 22 people per km	5 dwellings
Salford (via HSM39 or 40)	444	189 dwellings or 37 people per km	88 dwellings
Salford (via HSM35)	280	119 dwellings or 23 people per km	7 dwellings

With ambient road noise also taken into account, noise impacts from HS2 would be expected to be less than this.

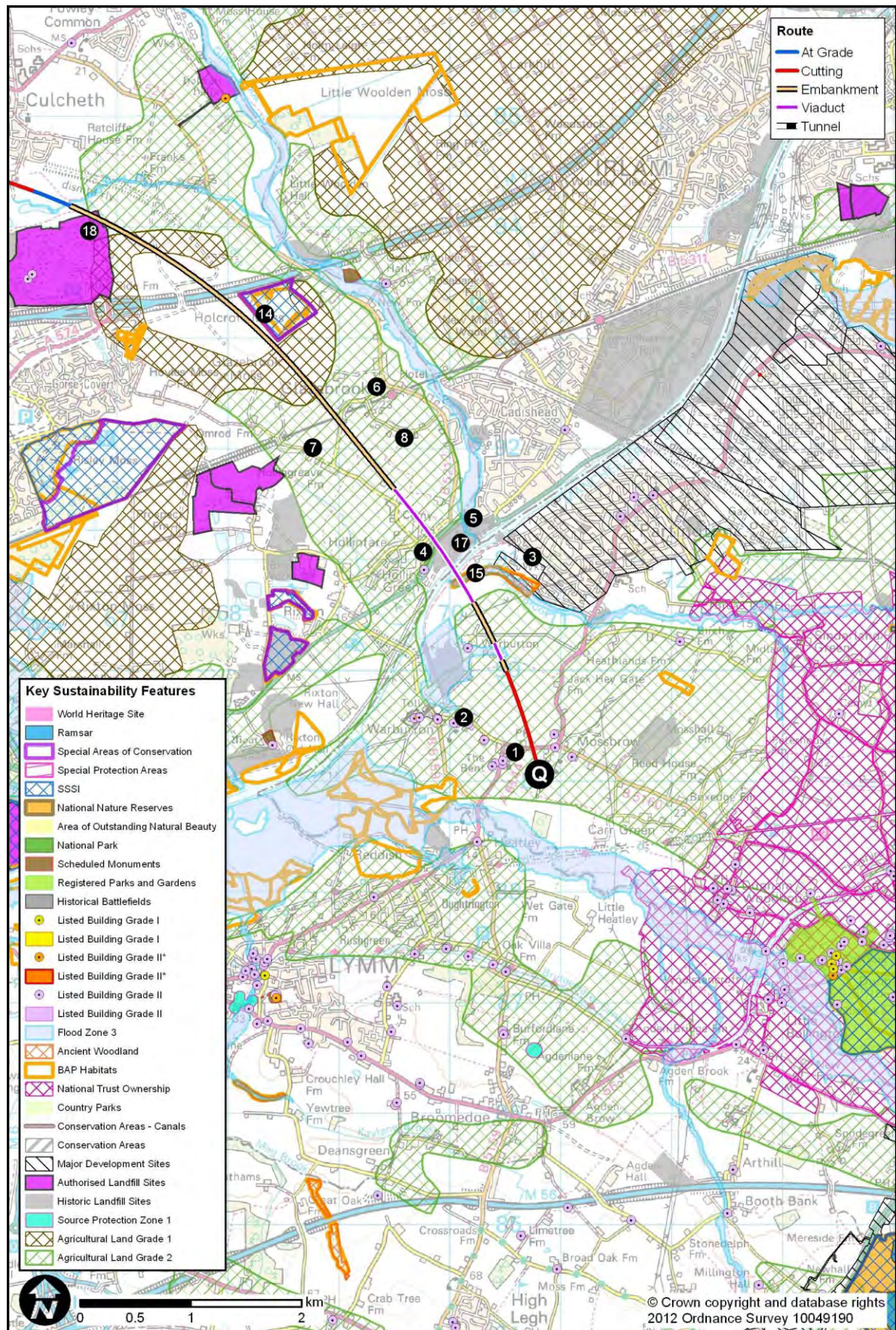
Given the distribution of dwellings potentially affected by noise and their

⁶ Were HSM21 to connect with HSM35, it would need to follow a marginally different alignment, in order to accommodate the junction between the two. This would have implications for noise.

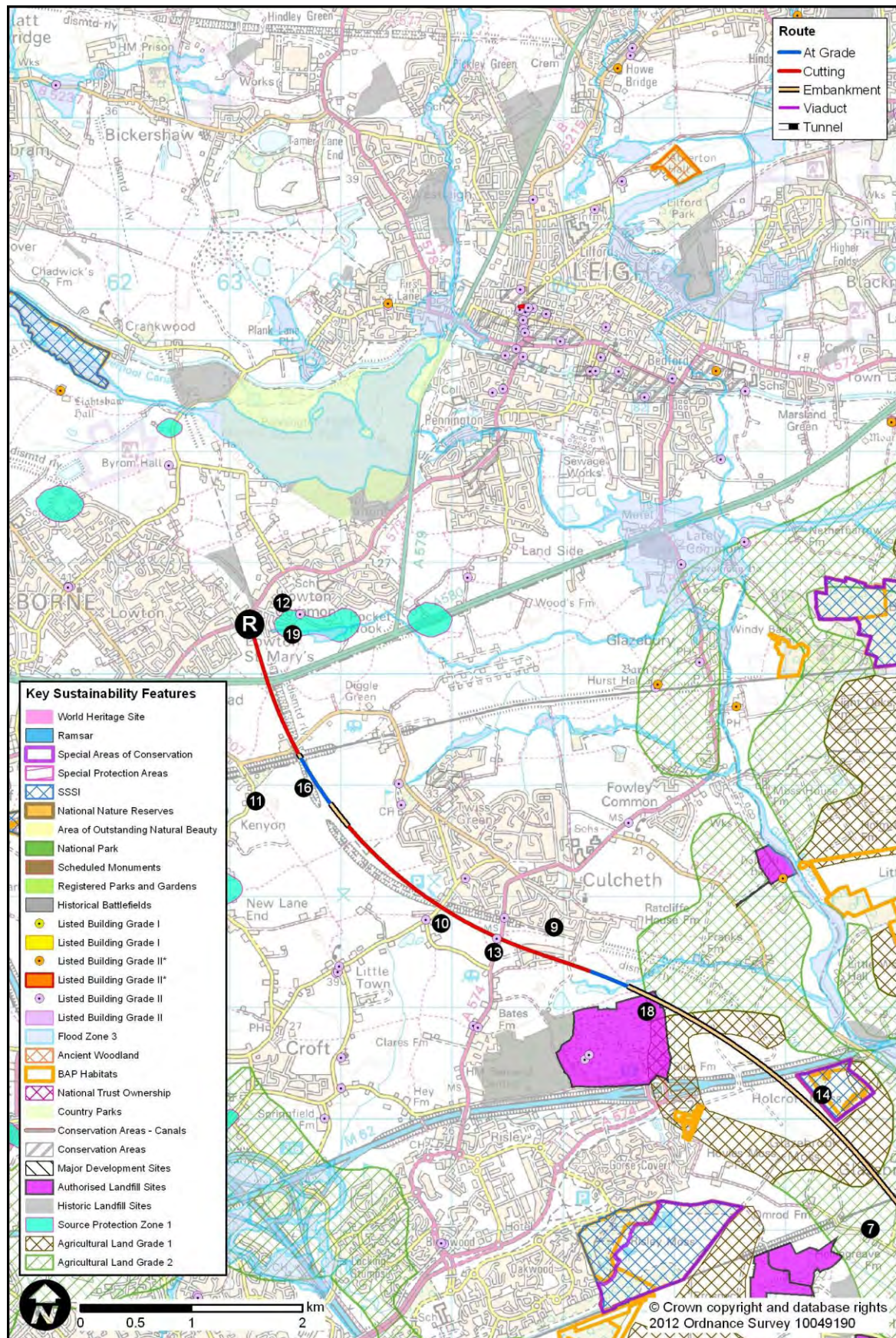
		<p>proximity to the route, many would be well placed to benefit from additional mitigation such as noise barriers or earth bunds. However, residual noise annoyance would still be expected at ① Mossbrow, ② Warburton, ③ Partington, ④ Hollins Green, ⑤ Cadishead, ⑥ Glazebrook, ⑨ Culcheth, ⑩ Wigshaw, ⑪ Wilton Grange, ⑫ Lowton Common and other scattered dwellings.</p> <p>Dwellings qualifying for noise insulation would be located in ④ Hollins Green (Salford via M62 Slow and Chat Moss Approach), ⑥ Glazebrook (Salford via M62 East).</p>
5.1.7.	Health and well-being	Approximately 114 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
5.1.8.	Access issues	No promoted recreational routes would be crossed by the route section.
5.1.9.	Landscape, townscape and cultural heritage	<p>The high viaduct over the Manchester Ship Canal would give rise to significant visual intrusion for residents at ③ Partington, ④ Hollins Green and ⑤ Cadishead, as well as motorists on the A57 beneath it. The impacts at ④ Hollins Green and ⑤ Cadishead would persist from the embankment that would continue to the north-west.</p> <p>The embanked section, which would cross the M62, would have some effect on landscape character but would have little impact on residential receptors, except at Glazebrook village, around 300m to the east. The route section would drop into cutting south of ⑨ Culcheth, with limited visual impact on the town as a result.</p> <p>One woodland would be directly affected by the route section (see also <i>biodiversity and wildlife</i>).</p> <p>The Grade II listed ⑬ Newchurch old 'refectory' would be demolished by the route section.</p>
5.1.10.	Biodiversity and wildlife	<p>The route section would pass within 10km of four Natura 2000 wildlife sites. The potential for significant effects at one of these sites, ⑭ Manchester Mosses SAC, cannot be discounted at this stage. Further details are described in an HRA screening report.</p> <p>The route section would cross ⑮ Coroners Wood, an ancient woodland and upland oakwoods BAP habitat at the edge of Partington, although it is possible that this could be avoided by careful location of viaduct piers.</p>
5.1.11.	Water resources and flood risk	<p>The ⑯ Carr Brook Tributary, a minor river, may require diversion. Continuing scheme design would seek to avoid or minimise this impact.</p> <p>This route section would cut through approximately 1.2km of SPZ2, potentially affecting groundwater flows to ⑰ Pocket Nook 1 abstraction point (7,956m³/day).</p> <p>The route section would cross some 250m of Flood Zone 3.</p>
5.1.12.	Land use resources	<p>The route would cross about 900m of Grade 1 agricultural land and about 3.8km of Grade 2 agricultural land. It would cross approximately 10.5km of green belt.</p> <p>Two landfill sites at ⑱ Hollins Green and ⑲ Risley would be directly affected. The design would require further work to minimise risks to people and the environment from these impacts.</p>

- 5.1.13. Waste and material use
- It is estimated that the route section would result in a deficit of - 266,656m³ of excavated material.
- As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.
- Estimated quantities of bulk building materials for this section comprise 3,800 tonnes of steel and 11,700 tonnes of concrete.

HSM21 - Figure 1 of 2



HSM21 - Figure 2 of 2



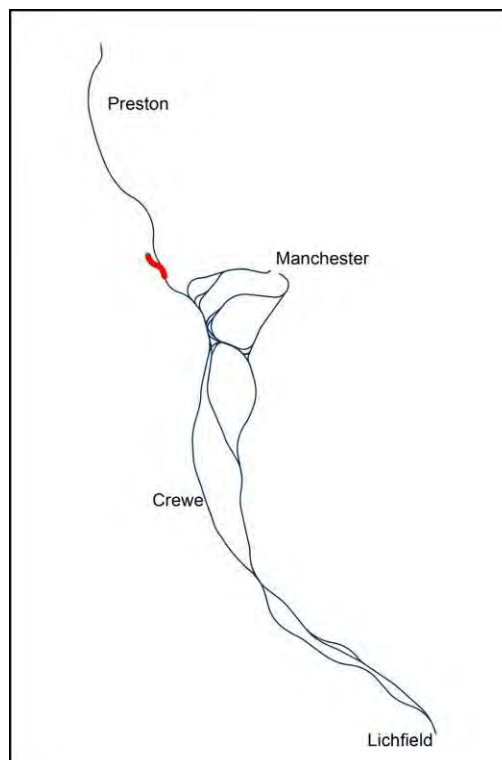
5.2. HSM22: Lowton (R) to Bamfurlong (AA)

5.2.1. The route section between Lowton and Bamfurlong would be about 5.2km (3.2 miles) long. It would connect south of Lowton with HSM21 from Warburton. This section of route provides a spur to the WCML from the through route that would run to the north of Preston.

5.2.2. The route section would run north-west from Lowton St Mary's to near Abram, south of Wigan. Initially mainly in cutting, it would then run at grade or on embankment parallel to the Leeds to Liverpool Canal, joining the WCML west of Abram.

5.2.3. HSM22 Figure 1 illustrates the route alignment and the principal sustainability features in the area.

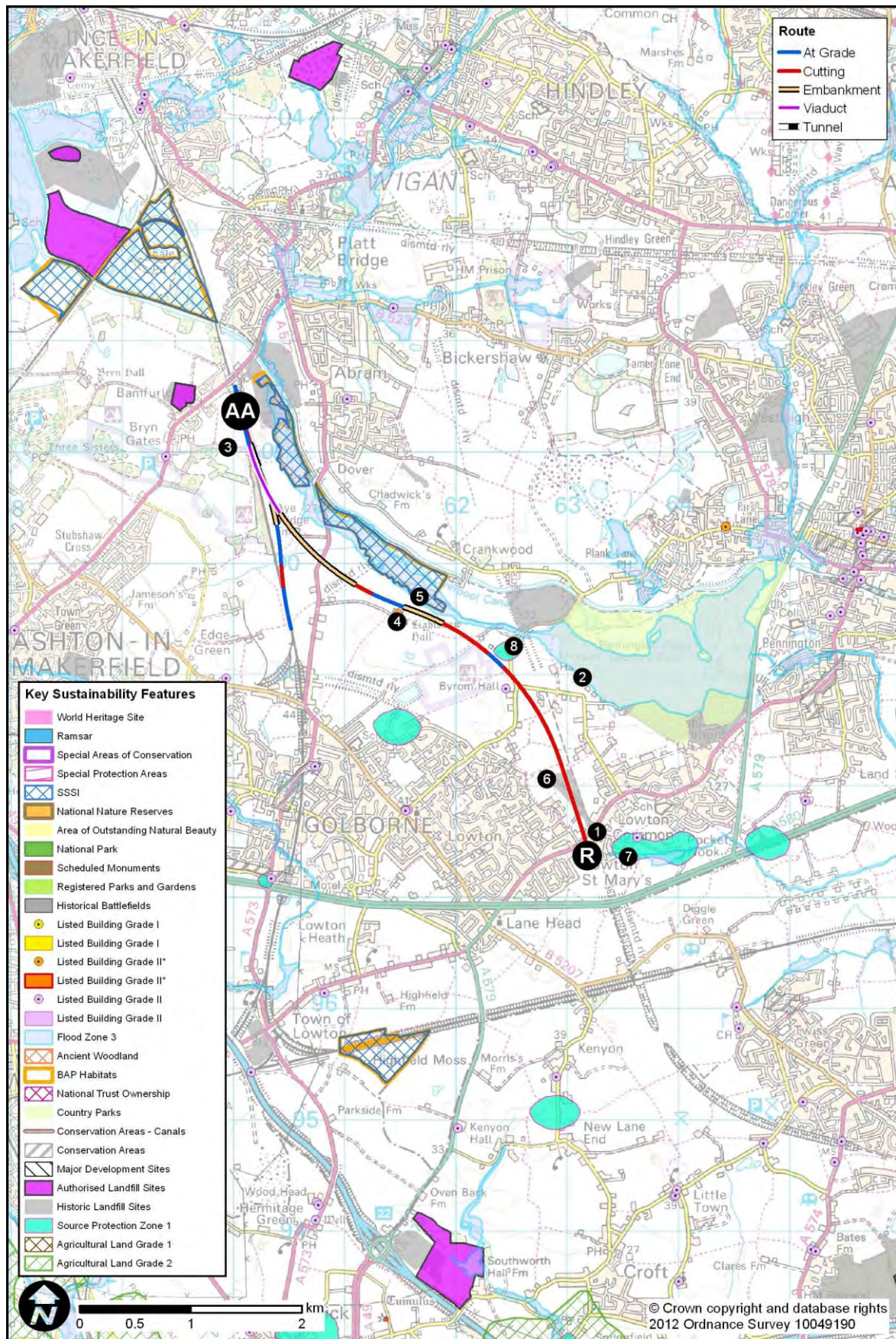
5.2.4. No additional mitigation has been incorporated into the route section at this stage.



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| 5.2.5. | Population and settlements | The route section would result in the demolition of an estimated six dwellings. Of the total, one demolition would be in an area of relatively high deprivation. |
| 5.2.6. | Noise | <p>Noise from HS2 trains would result in annoyance for an estimated 20 people (equivalent to the occupants of some nine dwellings). This would represent about four people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.</p> <p>Approximately five dwellings would potentially qualify for noise insulation, equivalent to one dwelling per km of route section.</p> |
| 5.2.7. | Health and well-being | Approximately 100 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity. |
| 5.2.8. | Access issues | No promoted recreational routes would be crossed by the route section. |
| 5.2.9. | Landscape, townscape and cultural heritage | <p>The route section would initially be mainly in cutting, before running at grade and embankment parallel to the Leeds & Liverpool Canal and joining the WCML north of Golborne. It would affect views from some dwellings at ① Lowton Common to the east. Recreational users of ② Pennington Flash Country Park (400m), local footpaths and the canal to the north-east might also be affected. Towards its northern end the route section would rise onto embankment and viaduct and this is likely to affect landscape character locally and cause some visual impact on access land at ③ Bryn Gates. One woodland would be directly affected.</p> <p>No listed buildings would be directly affected, and of those near the route, only ④ Grade II* Lightshaw Hall, is likely to have its setting affected to</p> |

- any degree.
- 5.2.10. Biodiversity and wildlife The route section would pass within 10km of two Natura 2000 wildlife sites. However, the HRA screening confirms that there would be no likely significant effects on these sites.
In addition, two SSSIs would be within 2km, but the risk of impact to these is considered to be low. ⑤ Abram Flashes SSSI is about 30m away at its nearest point. Although vulnerable to pollution, changes in hydrology and disturbance, good construction practice and sensitive design will limit risk of impact to the site. However, there is a clear risk of impact to this site.
- 5.2.11. Water resources and flood risk This route section would cut through approximately 1.6km of SPZ2 and would potentially affect groundwater flows to ⑦ Pocket Nook 1 abstraction point (7,956m³/day) and ⑧ Slag Lane abstraction point (7,728m³/s), which would be about 100m away.
- 5.2.12. Land use resources The route would cross about 9.8km of green belt.
One landfill site at ⑥ Golborne would be directly affected. The scheme design would require further work to minimise risks to people and the environment from this impact.
- 5.2.13. Waste and material use It is estimated that the route section would result in a deficit of - 8,499m³ of excavated material.
As a result of the route section impacting on the landfill site, it is possible that some of the waste material arising in the route section would be hazardous.
Estimated quantities of bulk building materials for this section comprise 3,300 tonnes of steel and 10,200 tonnes of concrete.

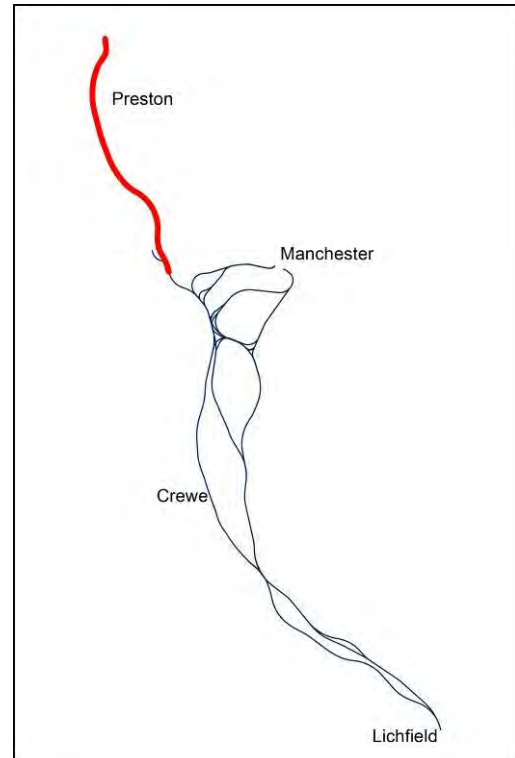
HSM22 - Figure 1



5.3. HSM23: Lowton (R) to Brock (AB)

5.3.1. The route section between Lowton and Brock would be about 45.9km (28.5 miles) long. It would connect south of Lowton with HSM21 from Warburton. At its northern end, the route section would connect with the WCML at Brock.

5.3.2. This long section would pass through built up areas between Wigan and Hindley, and west of Chorley, Leyland and Preston. It would use embankments and short viaducts across roads, rivers and canals, such as Hey Brook and the Leeds and Liverpool Canal; the A58 west of Hindley; Bucknow Brook near Adlington Park; and the River Yarrow north of Ecclestone. The route would pass beneath the M6 west of Chorley with long sections of cutting through this area to limit impacts on local settlements, such as Ecclestone. A long embankment would carry the route west of Leyland and allow its crossing over the Ormskirk branch line. A particularly long section of viaduct and embankment would take the route across the River Ribble west of Preston and then continue northwards over the M55. Having bridged the New Mill Brook and Lancaster Canal the route section would drop into cutting and align with the WCML east of Bilsborrow.



5.3.3. HSM23 Figures 1 to 5 illustrate the route alignment and the principal sustainability features in the area.

5.3.4. No additional mitigation has been incorporated into the route section at this stage.

5.3.5. **Population and settlements** The route section would result in the demolition of an estimated 69 dwellings. These include a cluster at ① west of Hindley. Of the total, three demolitions would be in areas of relatively high deprivation. An estimated 16 commercial properties would be demolished.

Potential isolation would affect one dwelling south east of ② Ecclestone. An area of potential severance would affect an estimated 137 dwellings at ③ Coppull Moor, 98 across two areas near ④ Crankwood, 28 west of ① Hindley, up to 700 across two areas at ⑤ Hutton (including one community building) and five at ⑥ Ince-in-Makerfield.

5.3.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 1590 people (equivalent to the occupants of some 674 dwellings). This would represent about 35 people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.

The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ⑦ Lowton, ⑧ Lowton Common, ④ Crankwood, ⑨ Abram, ⑩ Bickershaw, ⑪ Platt Bridge, ⑫ Hindley, ⑬ Ince-in-Markfield, ⑭ Pennington Green, ⑮ Top Lock, ⑯ Aspull, ⑰ Copull, ⑱ Heskin Green, ⑲ Ecclestone, ⑳ Ulmes

Walton, 16 Shaw Green, 17 Wymott, 18 Moss Side, 19 Farms in South Ribble, 20 Longton, 5 Hutton, 21 Larches, 22 Lea Town, 23 Cottam, 24 Woodplumpton, 25 Moor Side, 26 Hollowforth, 27 Bilsborrow and 28 Brock.

In terms of noise insulation, approximately 321 dwellings would be expected to qualify, particularly at 7 Lowton, 8 Lowton Common, 4 Crankwood, 9 Abram, 35 Hindley, 6 Ince-in-Markerfield, 37 Copull, 14 Heskin Green, 17 Wymott, 18 Moss Side, 19 Farms in South Ribble, 20 Longton, 5 Hutton, 23 Cottam, 25 Moor Side, 26 Hollowforth, 27 Bilsborrow and 28 Brock. This is equivalent to approximately seven dwellings per km of route section.

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|--------|-----------------------|---|
| 5.3.7. | Health and well-being | Approximately 560 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity. |
| 5.3.8. | Access issues | <p>Two promoted recreational routes would be crossed by the route section, namely the 29 Ribble Way and the 30 Rotary Way. The latter crossed at two places. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.</p> <p>In addition, 300m of open access land (the 32 Worthington Lakes Country Park) would also be crossed by the route section.</p> |
| 5.3.9. | Landscape | <p>The route section would avoid Pennington Flash Country Park, passing to its west, but causing localised visual intrusion from the embankment and viaduct crossing of the 33 Leeds and Liverpool Canal. Running northward, it would cause some visual intrusion to residents on the edge of 9 Abram. In the Platt Bridge area the route would cross a small recreational lake and nature reserve (34 Low Hall Park) on viaduct, with visual impacts on recreational users and nearby residents at 11 Platt Bridge and 1 Hindley as well as direct impacts on woodlands.</p> <p>Near Standish the route section would pass on high viaduct again over the 33 Leeds and Liverpool Canal, and the adjacent 61 River Douglas. Although visual impacts on this attractive, historic valley landscape should be relatively contained, there would be localised impacts on landscape character, direct impacts on a woodland, and direct impacts on the northern edge of 32 Worthington Lakes Country Park.</p> <p>North of Standish, the route section would run mainly through relatively flat farmland broadly at grade. There would be some visual intrusion associated with at-grade and embanked sections, notably at 14 Heskin Green, 39 Leyland, 40 New Longton and 5 Hutton. There would also be direct impacts on the wooded valley landscape near 14 Heskin Green and on some villages, especially 40 New Longton and 5 Hutton.</p> <p>There would be moderate visual intrusion west of 41 Preston associated with the high viaduct crossing of the 42 Ribble, although the landscape setting in this area is unremarkable.</p> <p>Continuing northwards west of Preston and across the 43 Lancaster Canal and the M55, the route section would run at grade and in cutting past unregistered historic parkland at 44 Bartle Hall, before rising again onto embankment to cross the motorway. The embanked sections could cause minor impacts on landscape character within this sparsely</p> |

populated agricultural landscape, which is already crossed by overhead power lines. There could also be localised visual impact on canal users. The route section would run north-east across open countryside on embankment, crossing the Lancaster Canal twice before entering cutting and joining the WCML near Barton. It would run north through the village of Bilsborrow in cutting and on low viaduct over the River Brock. Some impact on landscape character could arise from the embankment, as well as some visual impact on canal users, but in general any landscape or visual impacts are expected to be fairly minor.

Twelve woodlands would be directly affected by the route (see also *biodiversity and wildlife*).

5.3.10. Heritage

The 46 Haigh Conservation Area would be crossed for a distance of 360m on its west side, affecting open fields with clumps of woodland and the Grade II Listed 47 windmill.

No scheduled monuments would be directly affected, but three, located close to the route section, would be likely to have their settings affected. The 48 Moat House moated site is about 100m away. The route section would pass the monument in deep cutting and a short length of tunnel. This would help to reduce the impact on its setting, as would the presence of a number of mature trees, which would provide some screening.

49 Bradley Hall moated site, fishponds and connecting channels would be about 200m away. Construction of the route to its west in cutting would generate impacts on the monument's setting, although this is likely to be reduced by woodland, intervening buildings and hedgerows.

The 50 moated site at Arley Hall, Haigh near Wigan would be 100m away. It is located within a golf course and is partly surrounded by trees, with a car park to the west. The wider setting is essentially rural. The route, which would be constructed in cutting before crossing the 61 River Douglas on a bridge, would be likely to result in a noticeable impact on setting.

No listed buildings would be directly affected. Approximately 40 Grade II listed buildings could have impacts on their settings from the route section. The majority would experience either negligible or minor impacts. Six are likely to have moderate impacts, namely: the 19th century windmill in 47 Haigh Conservation Area; a group of 16 late 18th century terraces on 51 Dukes Row; and four canal bridges by John Rennie – 52 Quaker's Bridge (Number 19); 53 White Horse Bridge (Number 45); 54 Park Head Bridge (Number 41); and 55 Bell Fold Bridge Lancaster Canal Bridge.

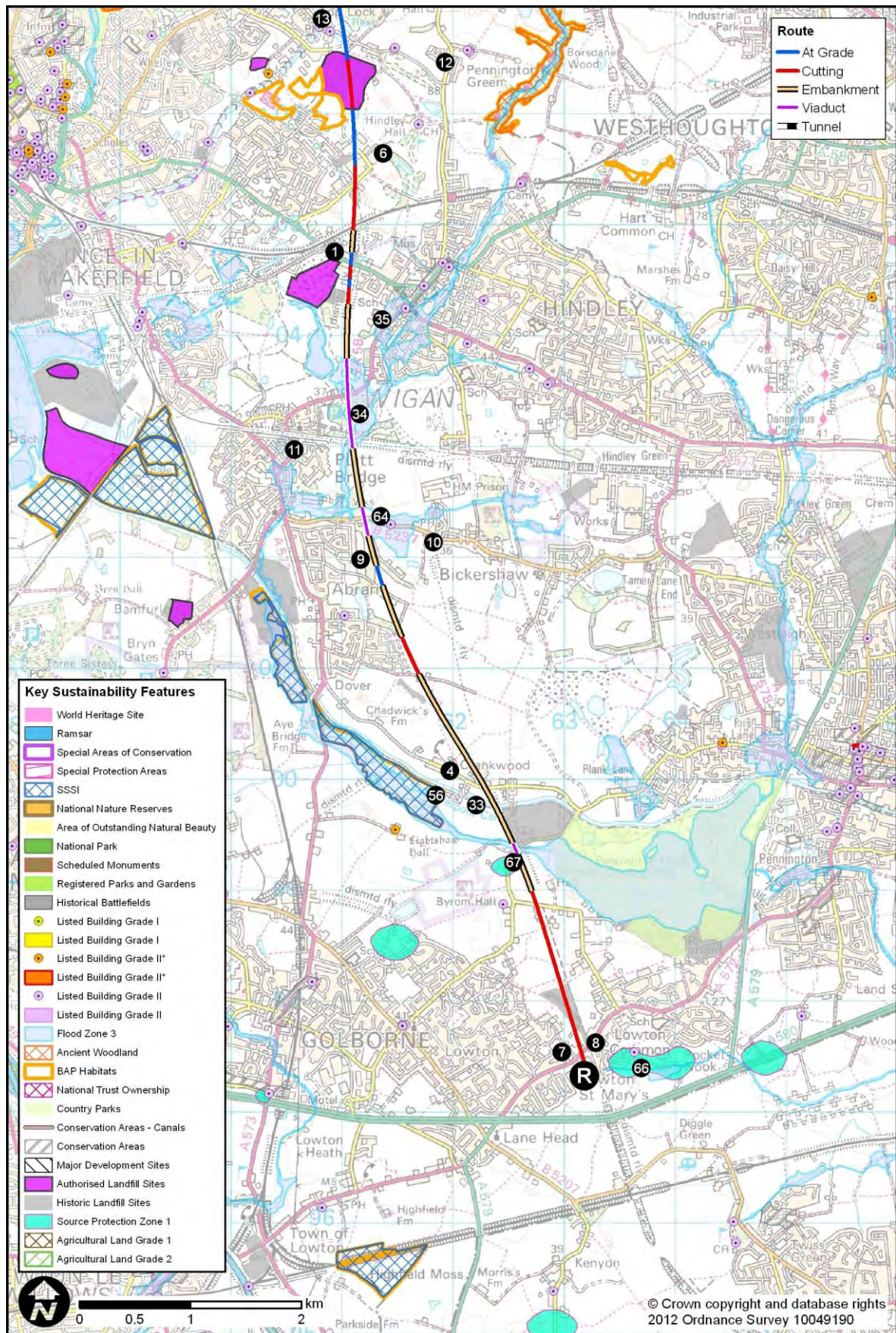
5.3.11. Biodiversity and wildlife

The route section would pass within 10km of four Natura 2000 wildlife sites. The potential for significant effects at 63 Ribble and Alt Estuaries, which is an SPA and Ramsar site, cannot be discounted at this stage. Further details are described in the HRA screening report.

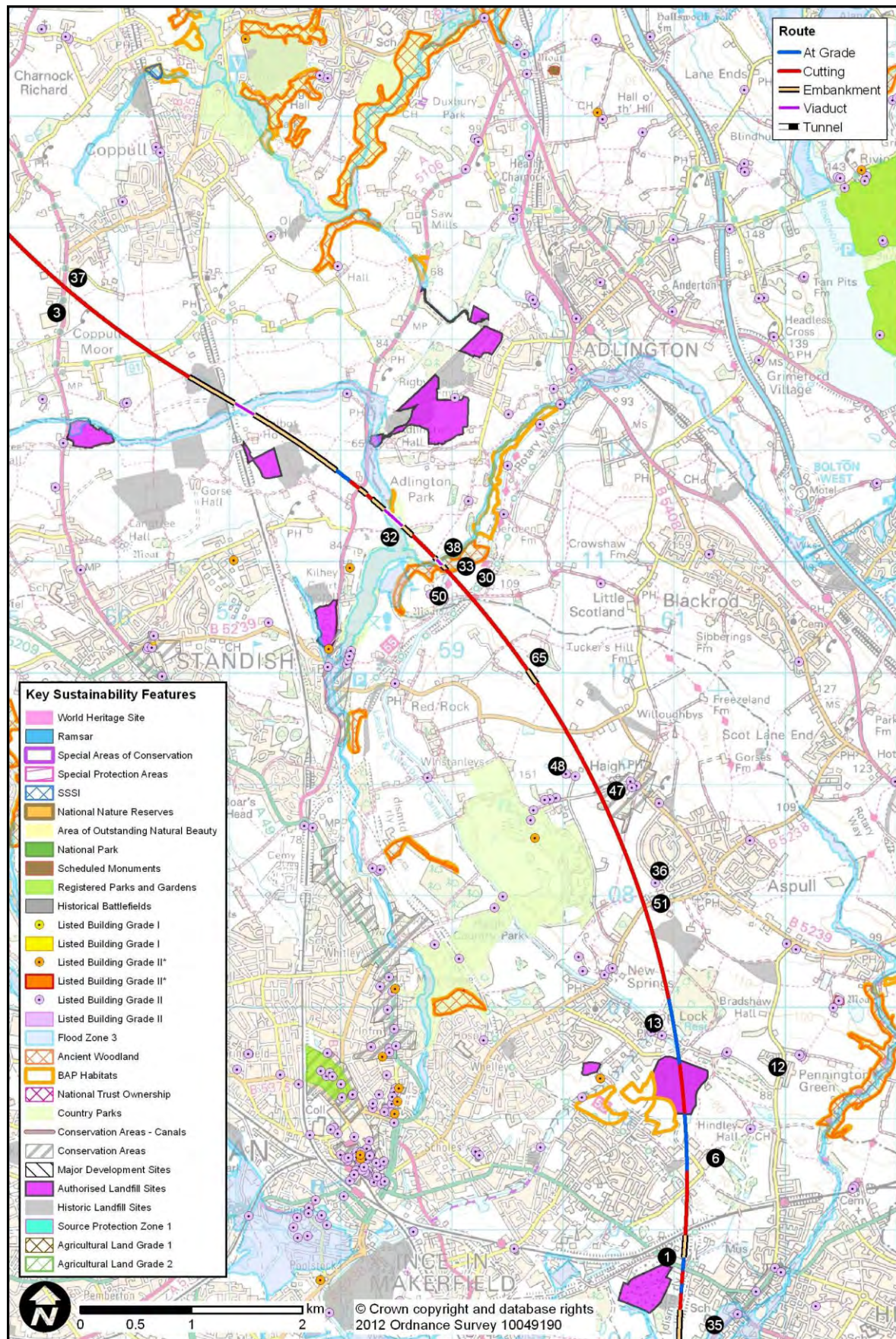
In addition, four SSSIs would be within 2km of the route section. Risks to three of the sites are considered generally to be low, and adverse impacts would be unlikely. However, the route section would pass on viaduct within 290m of 56 Abram Flashes SSSI and would separate it from another water body, potentially resulting in habitat fragmentation and bird disturbance.

- The route section would directly affect two ancient woodlands, 38 Arley Wood and 60 Little Wood, which are also BAP habitats. It would affect a further 11 BAP habitats, including three mudflats, seven coastal and floodplain grazing marshes and one reedbed.
- 5.3.12. Water resources and flood risk
Eight diversions of minor rivers may be needed, namely 64 Brookside Brook Tributary at Abram, 65 Arley Brook Tributary at Willoughby's, 57 Syd Brook Tributary at Charnock Richard, 58 Longton Brook Tributary at Bottom of Hutton, 59 Mill Brook, 62 Savick Brook tributary at Lea Town (two diversions) and 45 Barton Brook tributary at Bell Fold. Continuing scheme design would seek to avoid or minimise this impact.
- About 10m of the route section would be in cut or tunnel across aquifers of good yield and poor quality. Around 9.6km would be through aquifer of good yield and poor quality.
- The route section would intersect about 3.1km of SPZ2, affecting several abstractions, particularly at: 66 Pocket Nook (7,956m³/day) and 67 Slag Lane (7,728m³/day). Additional abstraction points that may experience a less significant impact would be 68 Broughton A-H (23,000m³/day), 69 Broughton A-J (23,000m³/day), 70 Broughton B-E (23,000m³/day), 71 Broughton B-G (23,000m³/day), 72 Broughton B-k (23,000 m³/day), 73 Franklaw A-L (34,000m³/day), 74 Franklaw A-M (52,000 m³/day), 75 Franklaw A-R (8,000 m³/day), 76 Franklaw B-P (14,000 m³/day) and 77 Franklaw B-Q (14,000 m³/day).
- The route would cross an estimated 2.9km of Flood Zone 3, about 1km of which will be in cutting and therefore at risk of flooding.
- 5.3.13. Land use resources
The route would cross about 1.1km of Grade 1 agricultural land, and about 2.6km of Grade 2 agricultural land. It would cross about 33.5km of green belt.
- Twelve landfill sites between Lowton and Woodplumpton would be directly affected, and the design would require further work to minimise risks to people and the environment from these impacts.
- 5.3.14. Waste and material use
It is estimated that the route section would result in a surplus of 3,980,969m³ of excavated material.
- As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.
- Estimated quantities of bulk building materials for this section comprise 15,700 tonnes of steel and 48,300 tonnes of concrete.

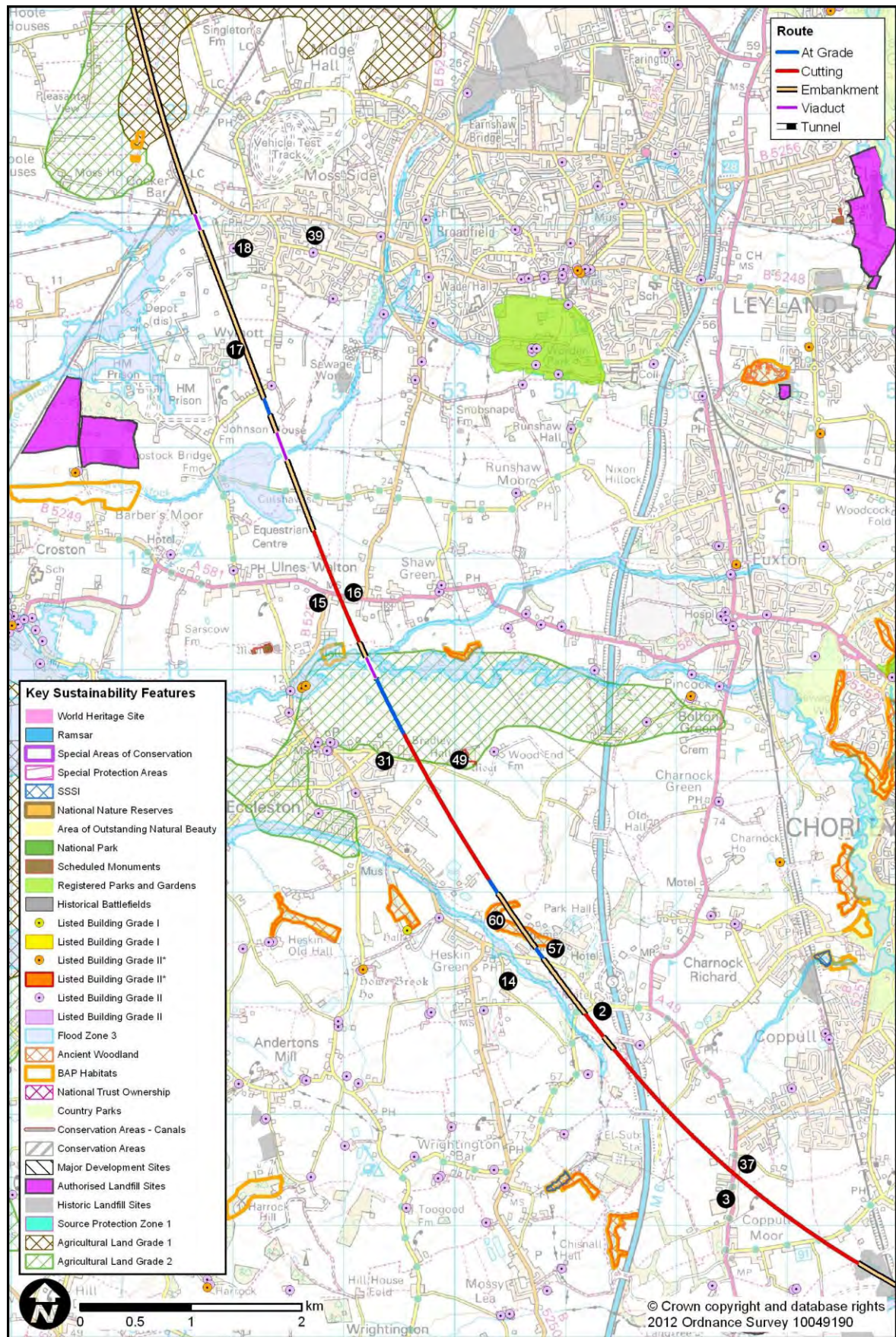
HSM23 - Figure 1 of 5



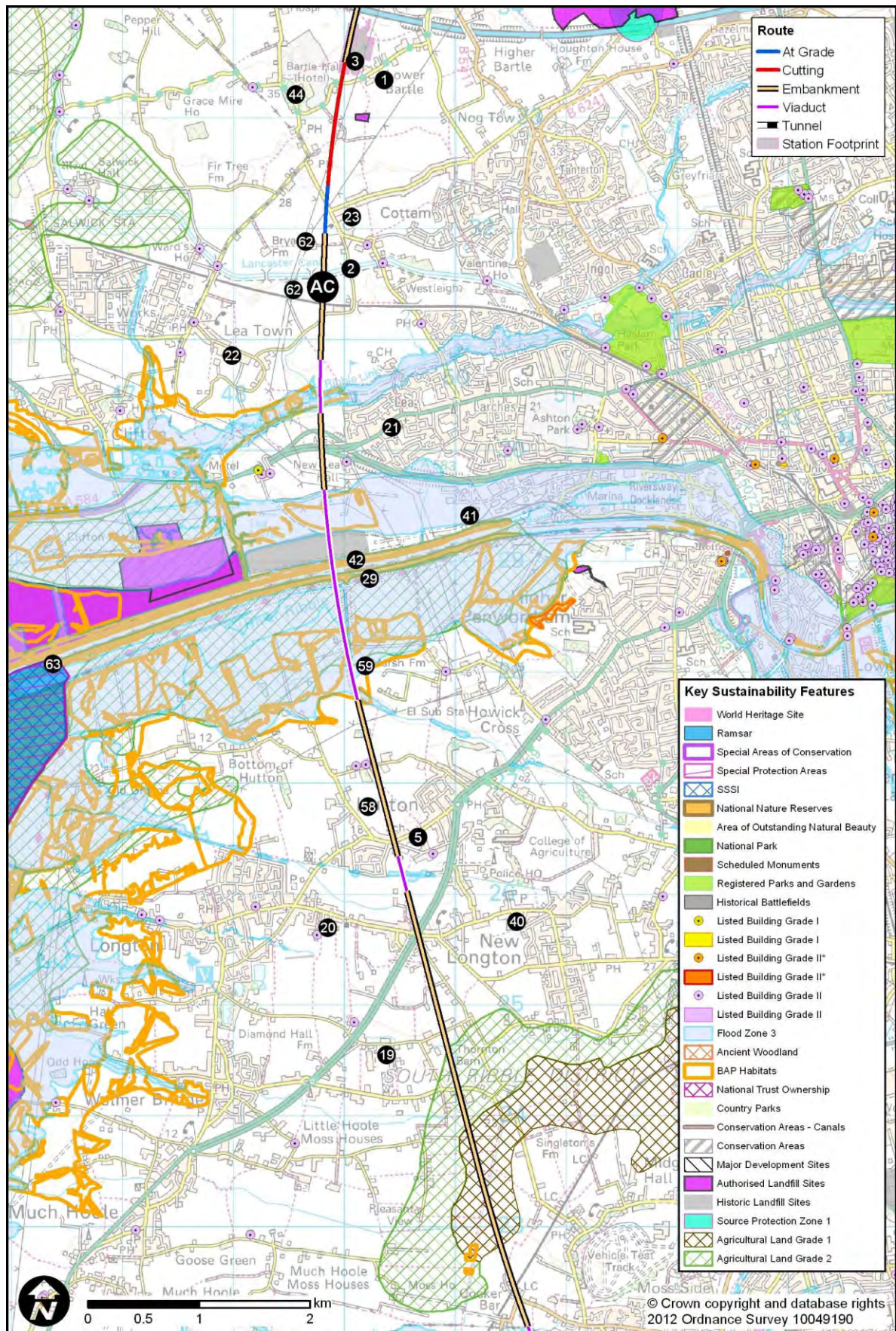
HSM23 - Figure 2 of 5



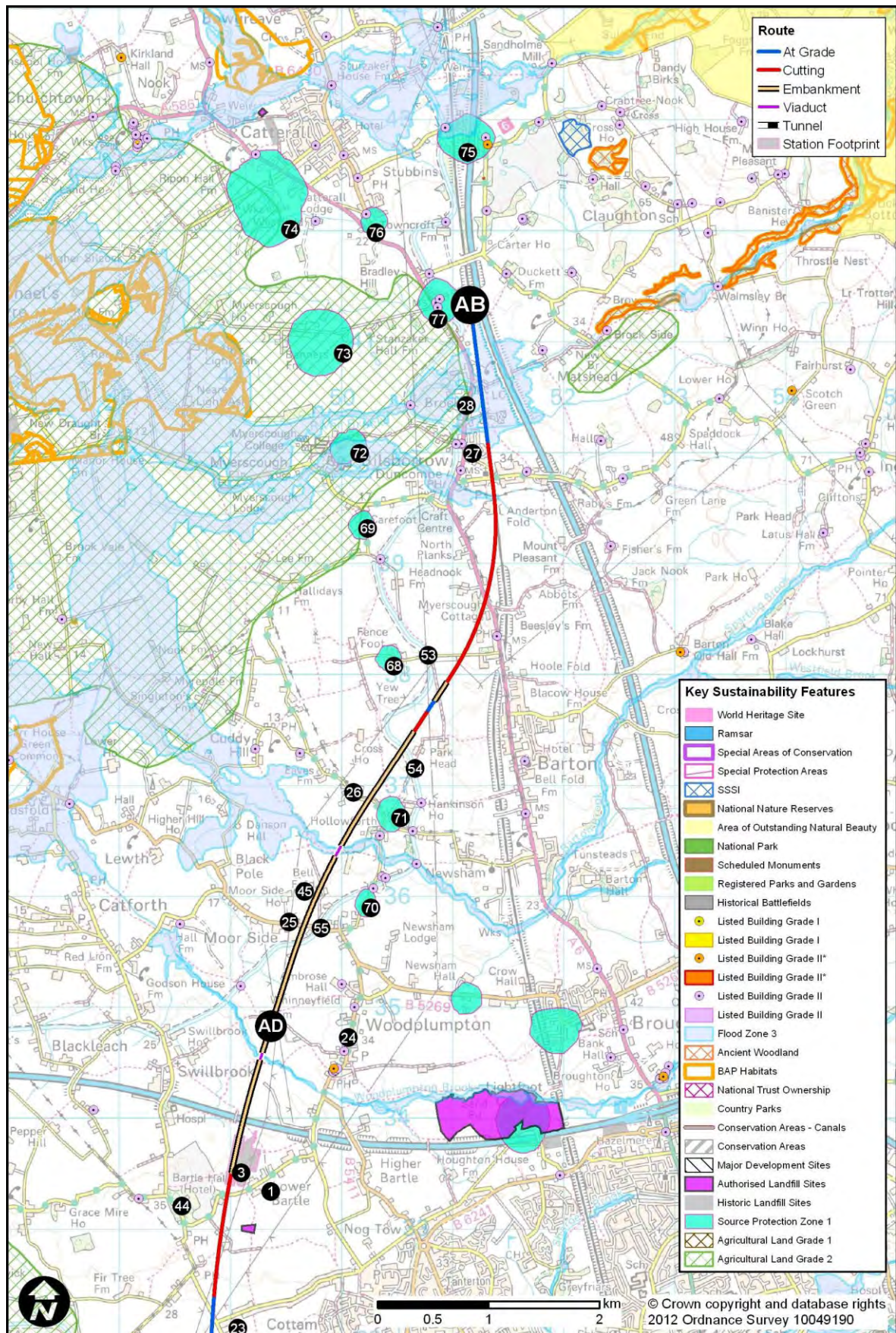
HSM23 - Figure 3 of 5



HSM23 - Figure 4 of 5

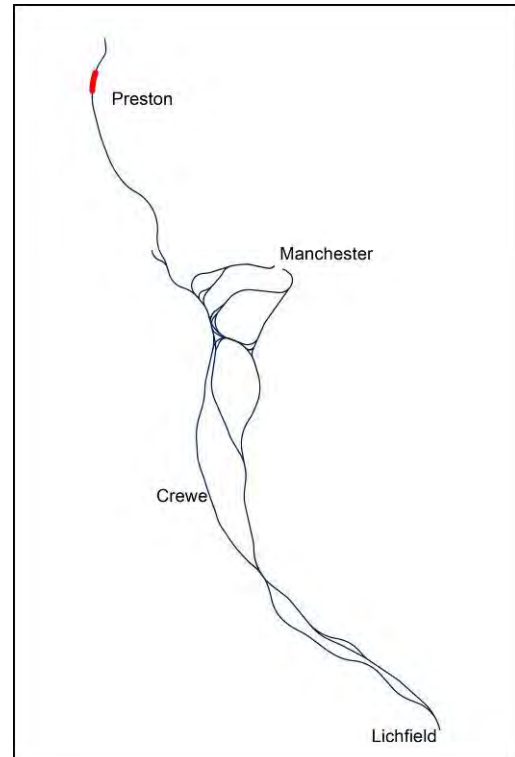


HSM23 - Figure 5 of 5



5.4. HSM24: Lea (AC) to Woodplumpton (AD)

- 5.4.1. The route section would be 3.4km (2.1 miles) long. It would be located within the longer route section HSM23 between Lowton and Brock. The route section would include a station option and two four-track sections.
- 5.4.2. The station would be located on greenfield land to the south of the M55 and north-west of Preston. The southern four-track section would approach the elevated station in cutting. The tracks would then continue north on embankment over the M55.
- 5.4.3. HSM24 Figure 1 illustrates the route alignment and the principal sustainability features in the area.
- 5.4.4. The potential for mitigation was limited at this early stage of station design. However, care was taken to minimise impact on the surrounding settlements and landscape features. Detailed designs would be influenced by the surrounding settlements, rivers and the rural landscape.



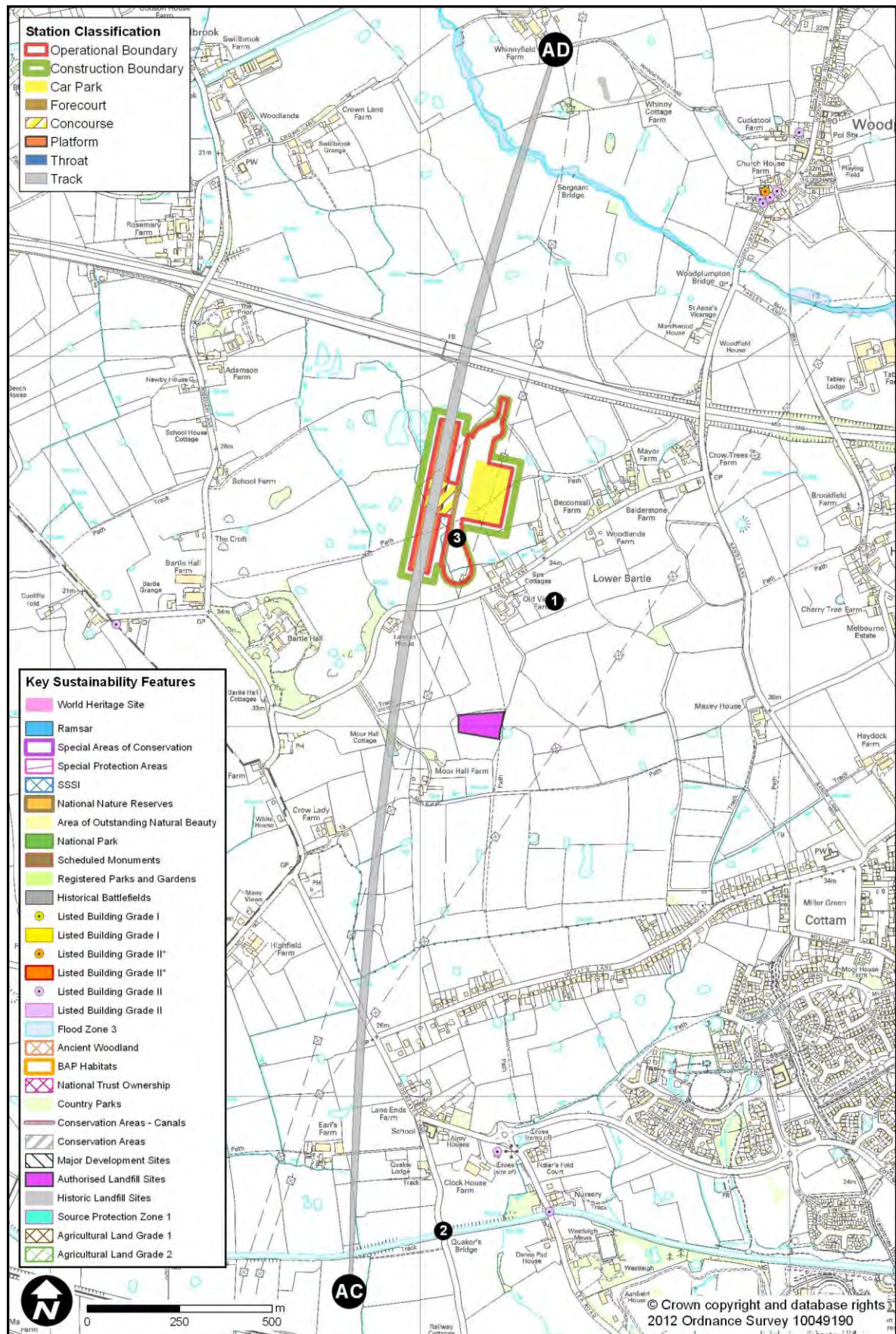
- 5.4.5. Population and settlements The route section would result in the demolition of an estimated three dwellings.
- 5.4.6. Noise Modelling of noise impacts from the operational station will be undertaken as designs are progressed. They would be influenced by plant and PA systems, generated road traffic, and the frequency and speed of trains.
- 5.4.7. Health and well-being Approximately 17 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
- 5.4.8. Access issues This station would offer a potential interchange with the national road network via the M55.
- 5.4.9. Jobs and Houses Given the green belt location, opportunity for the station to support additional jobs or housing would be limited.
- 5.4.10. Planning and development This station option conflicts with local planning policies (Central Lancashire Publication Core Strategy 2010/ Local Plan 2004) on open countryside and lowland fringe farmland.
- 5.4.11. Landscape, townscape and cultural heritage The station would be on greenfield agricultural land just south of the M55 on the outskirts of Preston. The surrounding countryside is relatively open, gently rolling mixed farmland. The nearest settlements are Cottam, Lower Bartle and Swillbrook. Given the station's height and mass, the presence of a mezzanine and the relatively flat, open, rural character of the surrounding landscape, the station would be likely to be a widely visible and potentially incongruous feature. Motorists and residents or nearby hamlets would be affected by visual intrusion. Impacts are expected to be major, especially at ① Lower Bartle, where

residents would have views of the car park and station from distances of 100-300m. The four-track embankments, coupled with a new elevated motorway junction, are also likely to be intrusive within the relatively flat and open landscape.

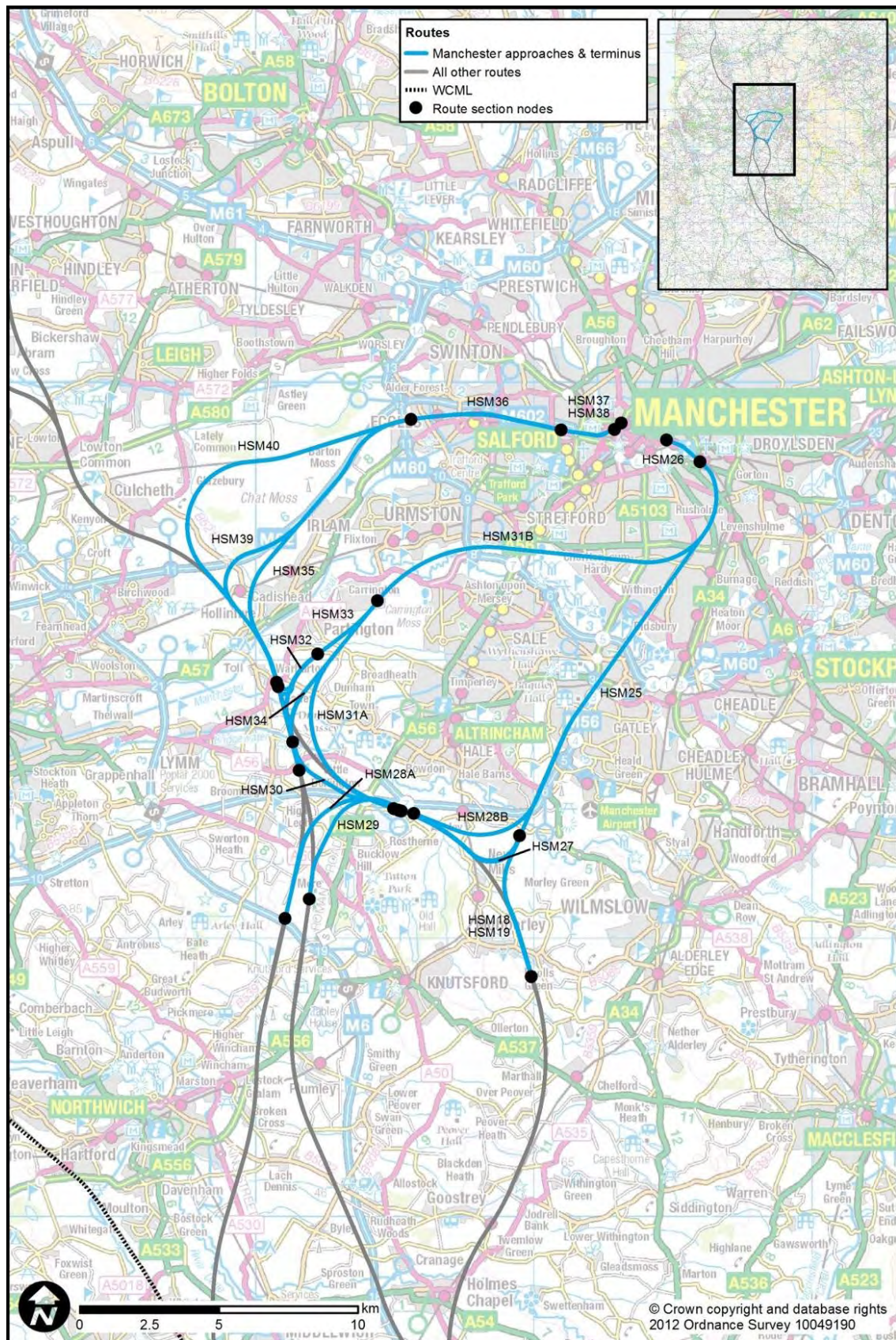
The station would be located within 350m of a Grade II listed ② Canal Bridge. The tracks would be on embankment over the canal and visible from the bridge.

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| 5.4.12. Biodiversity and wildlife | No key ecological designations would be affected either directly or indirectly by the route section. |
| 5.4.13. Water resources and flood risk | <p>The station would require the diversion of a ③ tributary of Woodplumpton Brook.</p> <p>The four-track section would cross about 20m of Flood Zone 3.</p> |
| 5.4.14. Land use resources | No key land use resources would be affected by the route section. |
| 5.4.15. Waste and material use | <p>It is estimated that the route section would result in a deficit of - 171,093m³ of excavated material.</p> <p>Estimated quantities of bulk building materials for the route section comprise 1,600 tonnes of steel and 5,000 tonnes of concrete. The station would require an additional 176,200 tonnes of concrete; estimated quantities of steel are not provided at this stage.</p> |

HSM24 Figure 1



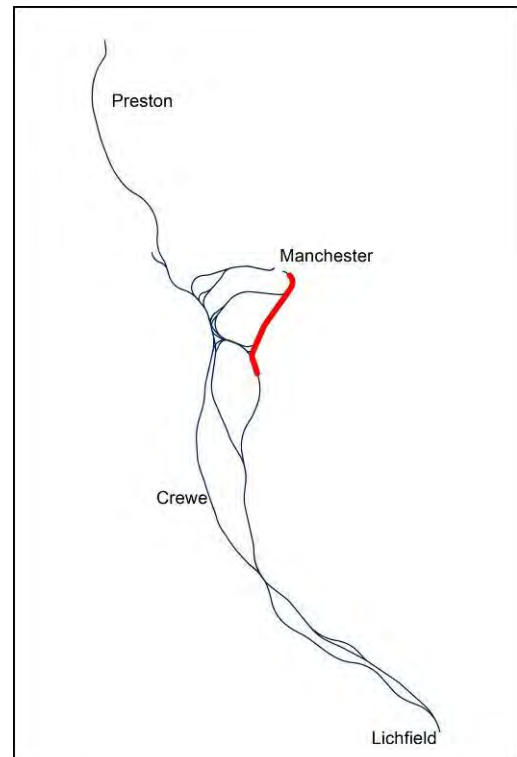
6. Manchester route: Manchester approaches and terminus



6.1. HSM25: Mobberley (O) to Ardwick (Y), including N/S airport station

6.1.1. The route section between Mobberley and Ardwick would be 21km (13 miles) long and forms part of the spur to Manchester Piccadilly. It would connect south of Mobberley with HSM17 from Shrayleybrook. At Ardwick the route would continue along HSM26 to the station option at Manchester Piccadilly.

6.1.2. The route section would be mainly either in cutting or in tunnel. It would pass the western end of the southern runway at Manchester Airport, rising only briefly to cross the River Bollin on viaduct. An interchange station for Manchester Airport would be provided at this location. The route would then enter tunnel beneath Woodhouse Park, Wythenshawe, Didsbury, Withington and Rusholme. The route section would emerge in cutting just north of Longsight alongside the railway corridor into Piccadilly.



6.1.1. The interchange station would be located to the west of Manchester Airport and just south of the M56. The concourse would be at grade with the platforms in cutting below. There would be four-track approaches to this on embankment and cutting to the south and in cutting to the north.

6.1.2. HSM25 Figures 1 to 3 illustrate the route alignment and the principal sustainability features in the area.

6.1.3. Specific mitigation included within the route section comprises a number of localised realignments that have sought to reduce noise and visual impacts at the residential areas of Mobberley and Hale. The potential for mitigation of the station was limited at this early stage of design. However, care was taken to minimise impact on the surrounding settlements and landscape features. Detailed designs would be influenced by the surrounding settlements, rivers and the rural landscape.

6.1.4. In addition, there is an option to replace the section of cutting through Mobberley with a tunnel. This has been described in Section 4.11 for route section HSM18, for which it is equally applicable.

6.1.5. **Population and settlements** The route section would result in the demolition of an estimated 42 dwellings. These include a cluster at 18 West Gorton. Of the total, 25 demolitions would be in areas of relatively high deprivation. In addition, an estimated 10 commercial properties would also be demolished. The station would require the demolition of an additional nine dwellings and two commercial properties.

Potential severance would affect 15 dwellings around 17 Mobberley and nine dwellings at 13 Thorns Green.

6.1.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 59 people (equivalent to the occupants of some 25 dwellings). This would represent about three people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.

The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ⑨ Noonsun, ⑥ Knolls Green, ⑪ Mobberley, ① New Mills, ② Meadowlands, ③ Thorns Green, ④ Hale Barns, ⑫ West Gorton and other scattered dwellings.

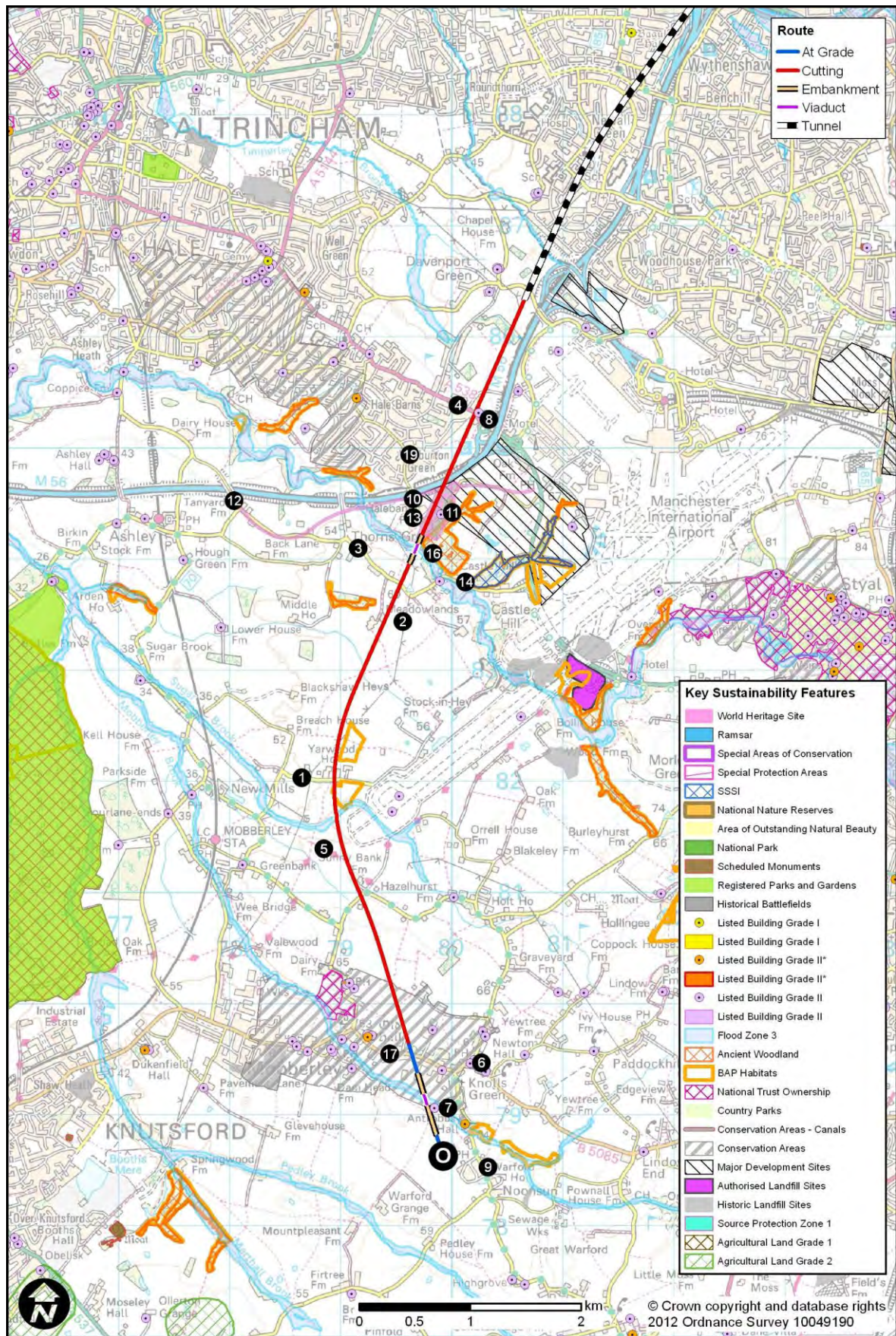
In terms of noise insulation, approximately 46 dwellings would be expected to qualify, particularly at ⑥ Knolls Green, ① New Mills, ② Meadowlands, ③ Thorns Green, ④ Hale Barns, ⑫ West Gorton. This is equivalent to approximately three dwellings per km of route section.

Modelling of noise impacts from the operational station will be undertaken as designs are progressed. These would be influenced by plant and PA systems, generated road traffic, and the frequency and speed of trains.

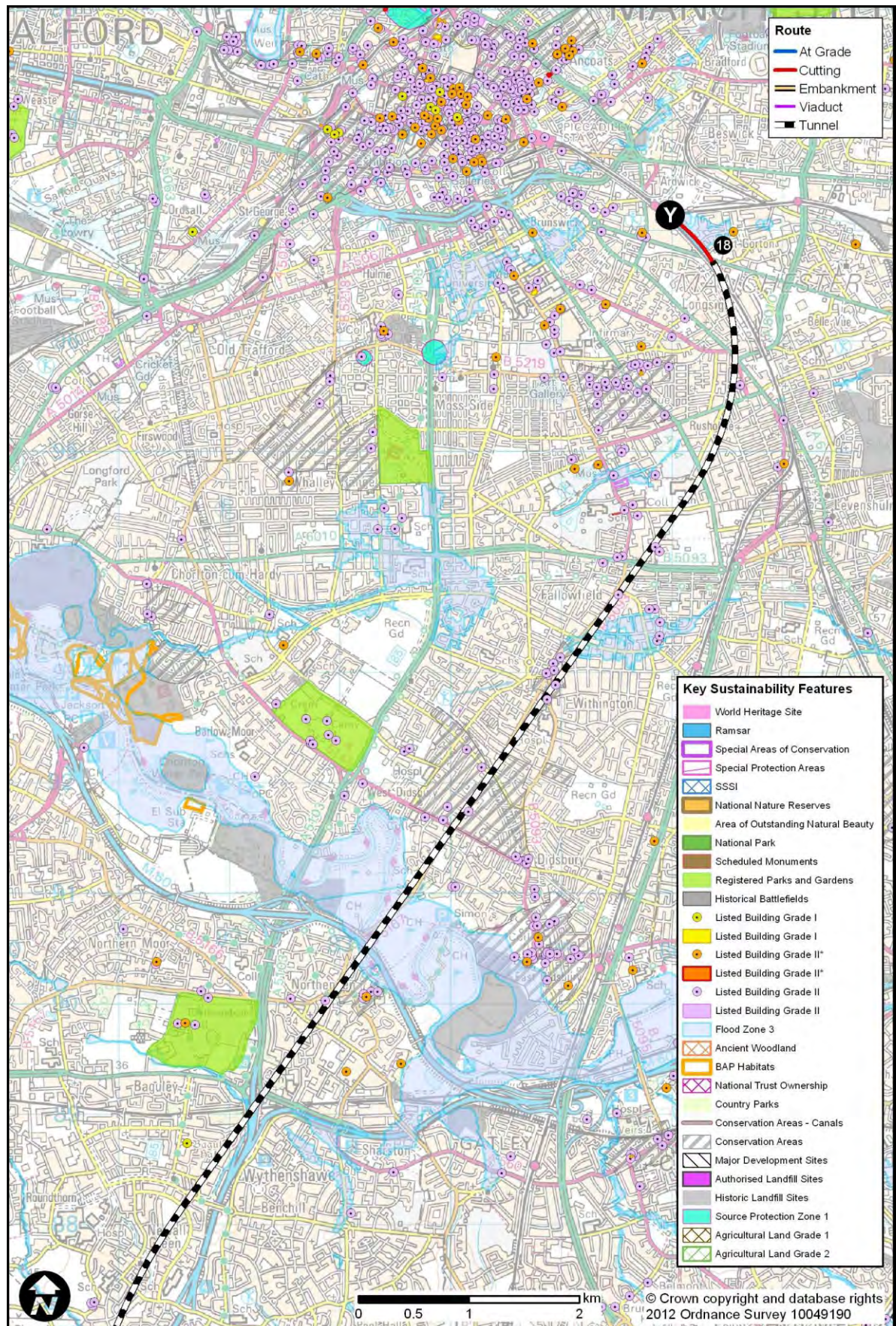
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| 6.1.7. | Health and well-being | Approximately 160 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity. A further 59 would be within 100m of the station footprint and four-track sections. |
| 6.1.8. | Access issues | <p>The station option would offer a potential interchange with the M56 and Manchester Airport and its associated interchange opportunities, such as rail and Metrolink.</p> <p>One promoted recreational route would be crossed by the route section, namely the ⑤ Cheshire Way. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.</p> |
| 6.1.9. | Jobs and houses | It is estimated that up to 50 jobs would be displaced due to the demolition of existing commercial businesses. However, it is estimated that some 600 jobs would be supported at this station location if green belt land was released. |
| 6.1.10. | Planning and development | The Manchester City core strategy (adopted July 2012) supports the expansion of the airport in a way that is environmentally sensitive and improves public transport access to the airport. With the adjacent designation of the Manchester Airport Enterprise Zone the proposed interchange station would support the enterprise zone objectives of private sector growth and wider regeneration. The south section of the proposed station would occupy an area of designated green belt (see Land use resources). Given the thrust of local development policy in support of the airport, the interchange station would be expected to support the proposed growth of the airport, and in particular, to further objectives for improved public transport access. |
| 6.1.11. | Landscape, townscape and cultural heritage – line of route | <p>South of Mobberley the route section would be on embankment or at grade and would give rise to localised visual intrusion affecting residents near ⑥ Knolls Green (just east of Mobberley). It would pass the Mobberley Conservation Area for a little over 1km. However, the route would be mainly in cutting and would be positioned away from the historic cores of the conservation area, running between Mobberley and Knolls Green. The key impacts would be the loss of the Grade II listed structure ⑦ Coppock House and some severance of the villages.</p> <p>The route section would continue north of Mobberley in cutting across relatively flat or gently rolling farmland. It would continue in cutting north-</p> |

		<p>west of Manchester Airport, having only negligible landscape and visual impacts.</p> <p>The route section would cross the 16 River Bollin tributary on a short but high viaduct, directly affecting valley side woodlands and giving rise to localised moderate visual impact on recreational users of the valley.</p> <p>From here the route section would run into cutting beneath the M56 and along the south-east edge of 19 Warburton Green and 4 Hale Barns, where visual impacts would be negligible, before passing into tunnel. The 8 Buckhall former farmhouse, a Grade II listed structure, now used as offices, and located alongside the M56 would be directly affected.</p>
6.1.12.	Landscape, townscape and cultural heritage – station	<p>The station concourse would be at grade with platforms below ground level. 10 Halebank on the south of the motorway would be directly impacted. The height and massing of the new station would be intrusive within this relatively flat, open landscape. However, given the presence of the motorway the impact of the station and new road connections would be moderate. The four-track route sections would be mainly in cut with limited visual impact.</p> <p>The station would require the demolition of one Grade II listed building, 11 Yewtree House. The station would have a moderate impact on the setting of two Grade II listed buildings (12 Tanyard Farmhouse and the 12 eastern block of Farm Courtyard at Tanyard Farm).</p>
6.1.13.	Biodiversity and wildlife	<p>The route section would pass within 10km of three Natura 2000 wildlife sites. However, HRA screening confirms that there would be no likely significant effects on these.</p> <p>There would be one SSSI (14 Cotteril Clough) within 2km of the route section. There is a risk of moderate impact to this through disturbance to birds and loss of supporting habitat.</p> <p>There would be a significant loss of 15 Sunbank Wood, which is an ancient woodland and BAP habitat.</p> <p>There would be an impact on the periphery of an undetermined grassland BAP habitat.</p>
6.1.14.	Water resources and flood risk	<p>The 16 River Bollin tributary, a minor river, may need to be diverted. Continuing scheme design would seek to avoid or minimise this impact.</p> <p>The route section would cross some 520m of Flood Zone 3, some 400m of which would be in cutting and therefore at risk of flooding. The four-track sections would cross 40m of Flood Zone 3.</p>
6.1.15.	Land use resources	<p>The route section would cross an estimated 13.1km of green belt. The station and four-track section would occupy an additional 38.6ha of green belt.</p>
6.1.16.	Waste and material use	<p>It is estimated that the route section would result in a surplus of 5,763,694m³ of excavated material. This includes 2,112,800m³ of tunnel excavated material.</p> <p>Estimated quantities of bulk building materials for this section comprise 8,500 tonnes of steel and 25,800 tonnes of concrete. The station would require an additional 164,500 tonnes of concrete; estimated quantities of steel are not provided at this stage.</p>

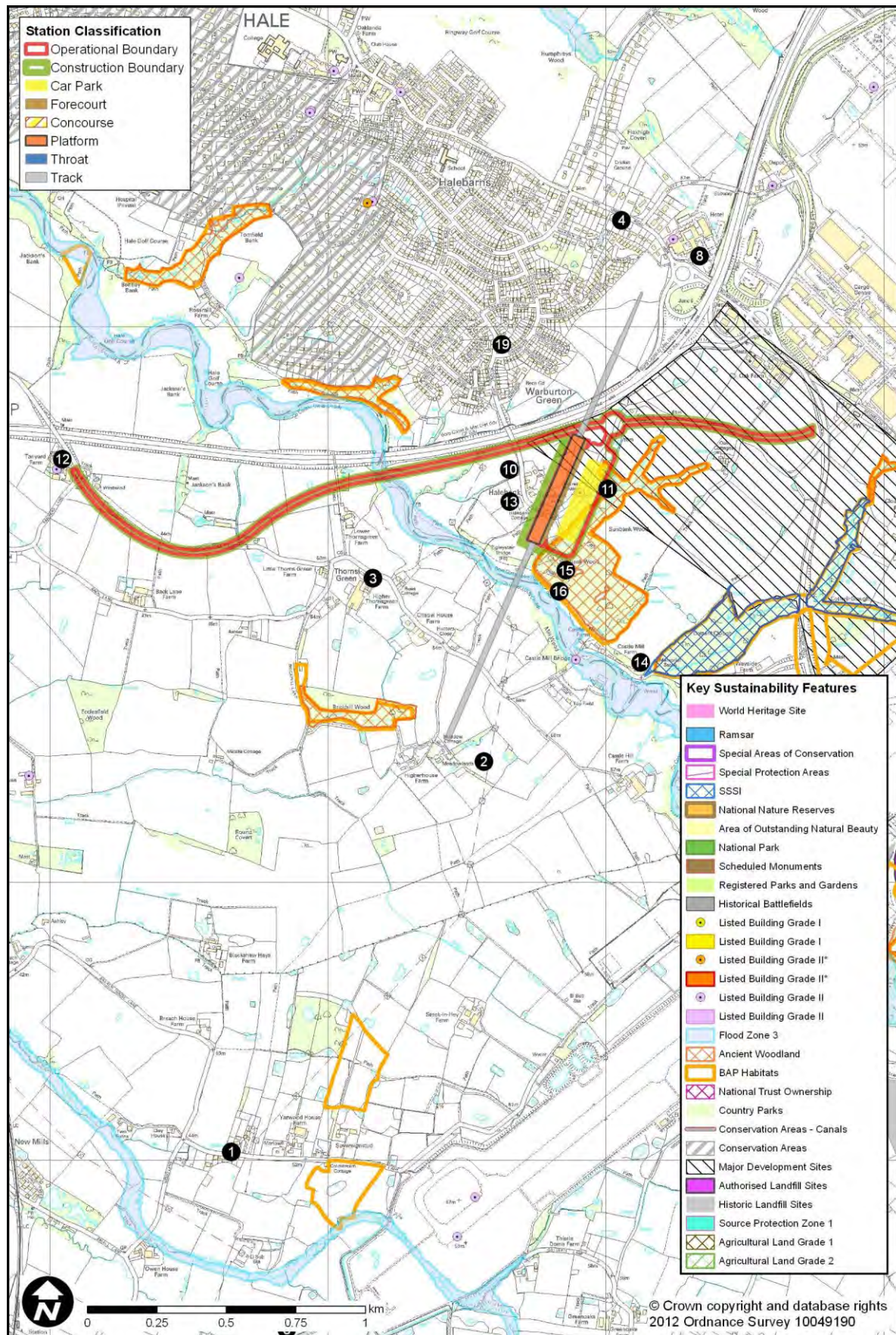
HSM25 - Figure 1 of 3



HSM25 - Figure 2 of 3

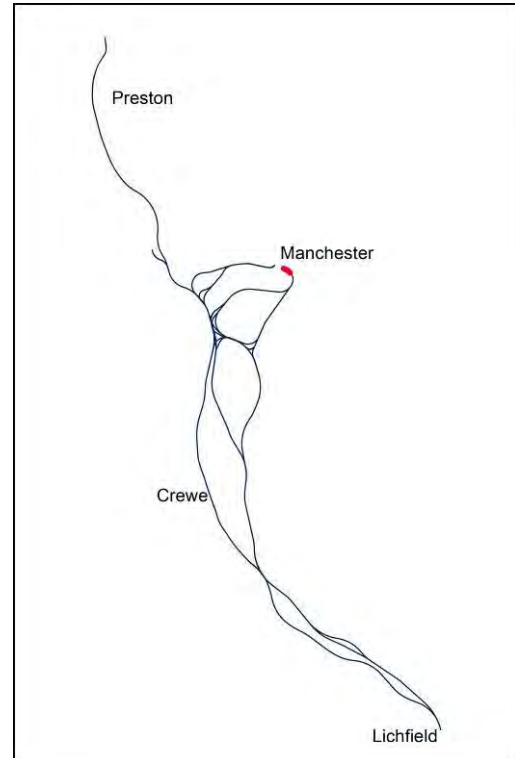


HSM25 Figure 3 of 3



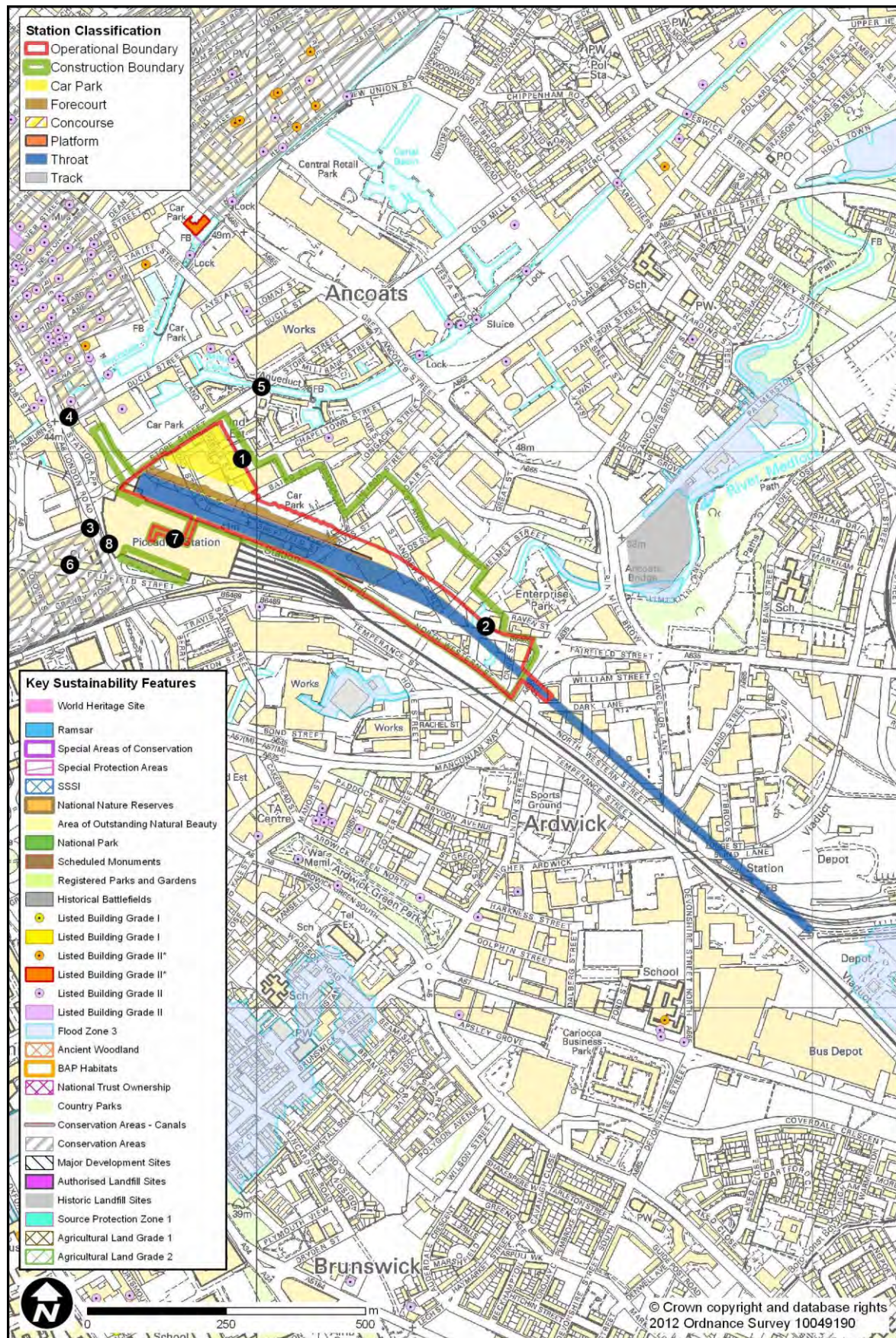
6.2. HSM26: Ardwick (Y) to Manchester Piccadilly (MP)

- 6.2.1. The route section between Ardwick and Manchester Piccadilly would be 1.5km (0.9 mile) long. It would connect south of Ardwick with HSM25 from Mobberley, HSM28B from Rostherne, or HSM31B from Carrington. The route section would include Manchester Piccadilly Station.
- 6.2.2. The route section would pass under the WCML Ardwick branch in cutting and then rise up onto viaduct to the east of North Western Street and the existing railway. It would cross over Manchunian Way passing through an area of mainly light industrial and office development before terminating at Piccadilly Station. The new HS2 station would be located parallel and immediately to the north of the existing station.
- 6.2.3. HSM26 Figure 1 illustrates the route alignment and the principal sustainability features in the area.
- 6.2.4. The potential for mitigation was limited at this early stage of station design. However, care was taken to minimise direct impact on the Grade II listed station and surrounding buildings of architectural merit.
- 6.2.5. **Population and settlements** The route section would result in the loss of an estimated 47 dwellings due to the demolition of one building on ① Chapel Town Street. Two community buildings on ② Fairfield Street (a medical practice and a community hall) would also be demolished. It would also require the demolition of 29 commercial properties.
- 6.2.6. **Noise** Modelling of noise impacts from the operational station will be undertaken as designs are progressed. They would be influenced by plant and PA systems, generated road traffic, and the frequency and speed of trains.
- 6.2.7. **Health and well-being** Approximately 350 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
- 6.2.8. **Access issues** This station would offer direct interchange with the National Rail network and the Metrolink at Piccadilly, and is within walking distance of Oxford Road Station. It would create new opportunities for pedestrian routes through the undercroft, reducing severance, and would open up the northern end of the station with a new access road.
- 6.2.9. **Jobs and houses** The works would potentially displace businesses providing an estimated 1,900 jobs. However, an estimated 29,700 jobs would be supported through development around the station generated as a result of HS2. Of these up to 2,970 would be in areas of relatively higher deprivation. There would be an estimated 3,100 housing units supported, of which up to 310 would be in areas of relatively higher deprivation.



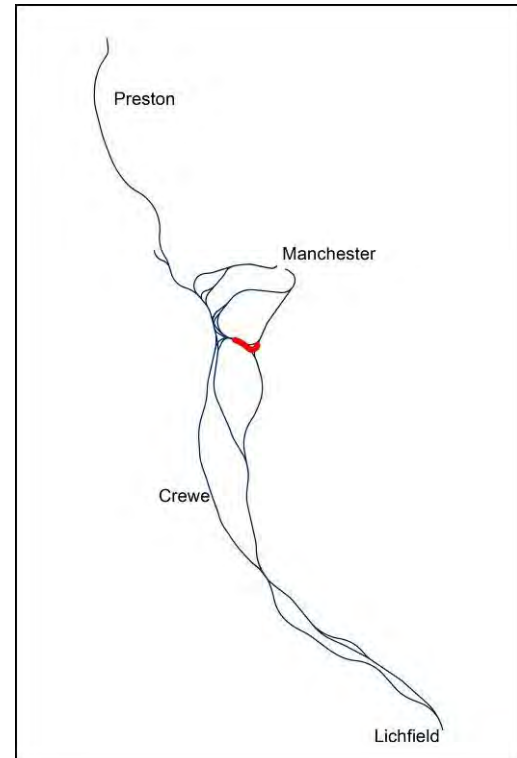
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| 6.2.10. | Planning and development | The station would support local policies in the Core Strategy (Public Consultation version, 2011), including the development of the key Mayfield site, the site of the former Mayfield Railway Station. It would also encourage the development of the eastern gateway to the city; and could increase the density and quality of local development, thereby maximising the opportunities of Piccadilly Station in line with the Strategic Plan for Manchester City Centre (2009-2012). |
| 6.2.11. | Landscape, townscape and cultural heritage | <p>The new station would be sited on land currently occupied by a mix of offices, light industrial and railway related uses. It would have elevated platforms at about 9m above ground with a roof line at approximately the same height as the existing station. In general, the station development and throat would fit well with the existing townscape in terms of height and scale. However, some views would be adversely affected; for example, the northern façade of the existing listed station being largely obscured by the new station building and the southern façade being partly obscured by the new train crew building. The overall impact on townscape is expected to be low.</p> <p>There would be no direct impacts on conservation areas, although the setting of the ③ Whitworth Street Conservation Area to the west, and to some extent the ④ Stevenson Square Conservation Area to the north, would be affected by the new station structure. ⑤ The Store Street Aqueduct and the ⑥ Police and Fire Station (both Grade II*) are 100m and 90m respectively from the station. The impact on their setting would be minor. The Police and Fire Station is shielded from the new station by the existing station building and the aqueduct is too far away with other development shielding views.</p> <p>The Grade II listed ⑦ train shed at Piccadilly Station would be affected by internal works to the fabric of the building and breaking through of the undercroft. There would also be a major adverse impact to the setting of the train shed from the location of the new train crew building on the southern façade, which would result in a minor impact on setting of the Grade II ⑧ former goods office.</p> |
| 6.2.12. | Biodiversity and wildlife | The route section would pass within 4.8km of the Rochdale Canal SAC. However, the HRA screening confirms that there would be no likely significant effects on this site. |
| 6.2.13. | Water resources and flood risk | The route section would have no significant impacts on water resources or flooding. |
| 6.2.14. | Land use resources | The route section would affect no key land use resources. |
| 6.2.15. | Waste and material use | <p>It is estimated that the route section would result in a surplus of 515,305m³ of excavated material.</p> <p>Estimated quantities of bulk building materials for this section comprise 500 tonnes of steel and 1,500 tonnes of concrete. The station would require an additional 321,100 tonnes of concrete; estimated quantities of steel are not provided at this stage.</p> |

HSM26 Figure 1



6.3. HSM27: M56 Junction 7 Rostherne (P) to Thorns Green (X)

- 6.3.1. The route section between the M56 junction 7 Rostherne and Thorns Green would be 5.3km (3.3 miles) long. It would be used for moving empty coaches between a rolling stock depot and the Piccadilly Station option. At Thorns Green the route section would continue north on HSM25 to Ardwick. It would connect to the west with HSM20 to Warburton.
- 6.3.2. Describing the route section from west to east, it would pass largely at grade along the shallow valley of Sugar Brook, diverging from the M56, before rising on embankment to cross over the Altringham to Chester railway and turning northwards towards Thorns Green.
- 6.3.3. HSM27 Figure 1 illustrates the route alignment and the principal sustainability features in the area.
- 6.3.4. No additional mitigation has been incorporated into the route section at this stage.

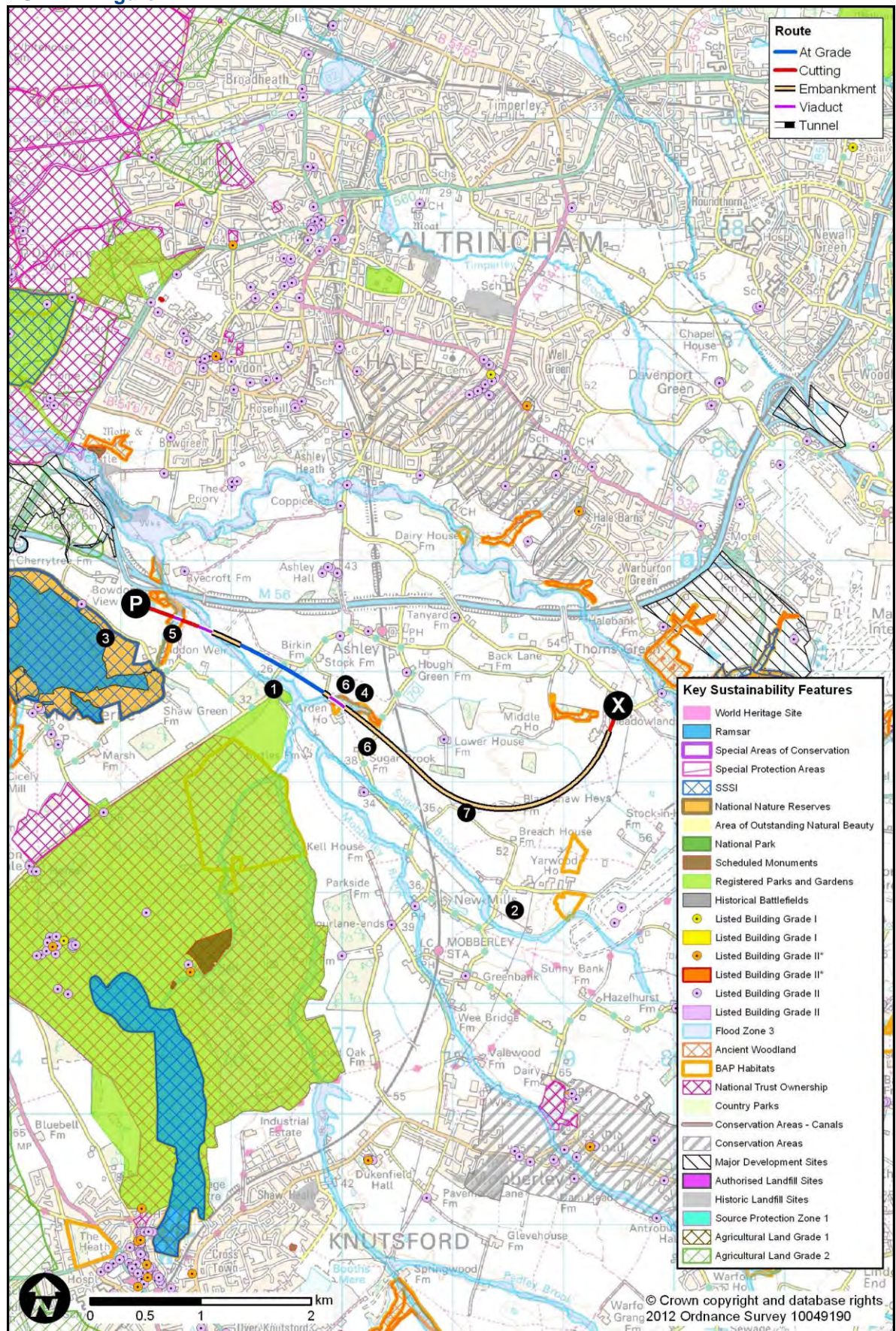


- 6.3.5. Population and settlements The route section would result in the demolition of an estimated four dwellings.
- 6.3.6. Noise Noise from HS2 trains would result in annoyance for six people (equivalent to about three dwellings). This would represent one person per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.
In terms of noise insulation, one dwelling along the route section would be expected to qualify.
- 6.3.7. Health and well-being An estimated six dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
- 6.3.8. Access issues No promoted recreational routes would be crossed by the route section.
- 6.3.9. Landscape, townscape and cultural heritage The route section would cross a small stream on a short viaduct close to the M56, then run at grade, rising onto embankment on the slopes north-east of Sugar Brook before returning to grade further east. It would pass the northern tip of ❶ Tatton Park (National Trust and a Grade II* Registered Park and Garden). However, the eastern side of the park is well-wooded and the ground drops gently towards the route. Consequently impacts on the setting of the park and key views from it would be negligible.
Further east, the embanked section is likely to have moderate visual impacts on the countryside ❷ north of Mobberley (a conservation area) and possibly on more distant views from ❶ Tatton Park, as the embankment here would be around 1.5km long and up to 15m high. There would also be direct impacts on two valley woodlands (see also

biodiversity and wildlife).

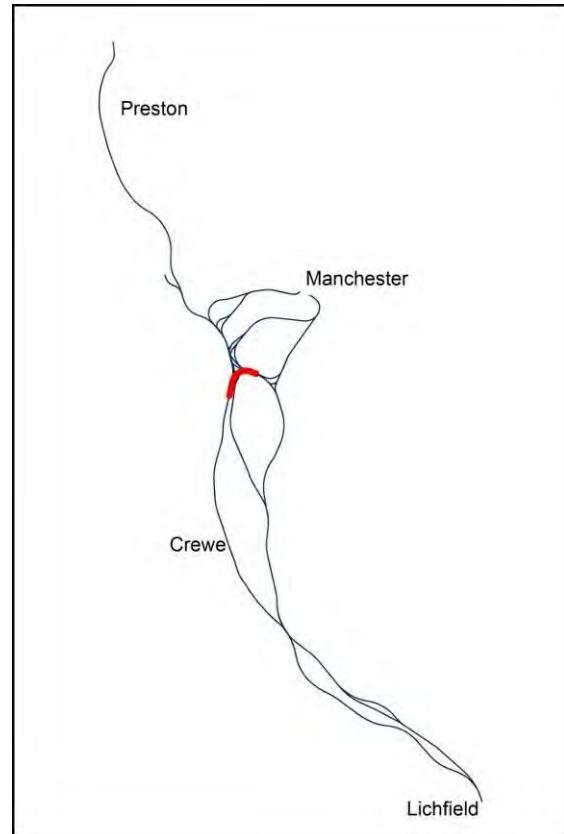
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| 6.3.10. | Biodiversity and wildlife | <p>The route section would pass within 10km of three Natura 2000 wildlife sites. The potential for significant effects at one of these sites, ③ Rostherne Mere Ramsar site, cannot be discounted at this stage. Further details are described in an HRA screening report for Rostherne Mere, which acknowledges the need for more detailed analysis. There is a potential for disturbance to the wintering birds at the site. Wintering birds are not a qualifying feature of the Ramsar, so although potential impact to them would be relevant to the NNR and SSSI designation, it would not affect the qualifying interest and integrity of the Ramsar site. The route section would directly affect two ancient woodlands, ④ Arden House Wood and ⑤ Hancocks Bank, both of which are also wet woodland BAP habitat.</p> |
| 6.3.11. | Water resources and flood risk | <p>The route section may require the diversion of three minor rivers, namely the ⑥ Middle House Brook in two locations and ⑦ Sugar Brook tributary. Continuing scheme design would seek to avoid or minimise these impacts.</p> <p>The route section would cross an estimated 250m of Flood Zone 3.</p> |
| 6.3.12. | Land use resources | <p>The route section would cross an estimated 1.5km of green belt.</p> |
| 6.3.13. | Waste and material use | <p>It is estimated that the route section would result in a deficit of - 848,761m³ of excavated material.</p> <p>Estimated quantities of bulk building materials for this section comprise 3,300 tonnes of steel and 10,400 tonnes of concrete.</p> |

HSM27 – Figure 1



6.4. HSM28A: Winterbottom (H) to Rostherne (Z)

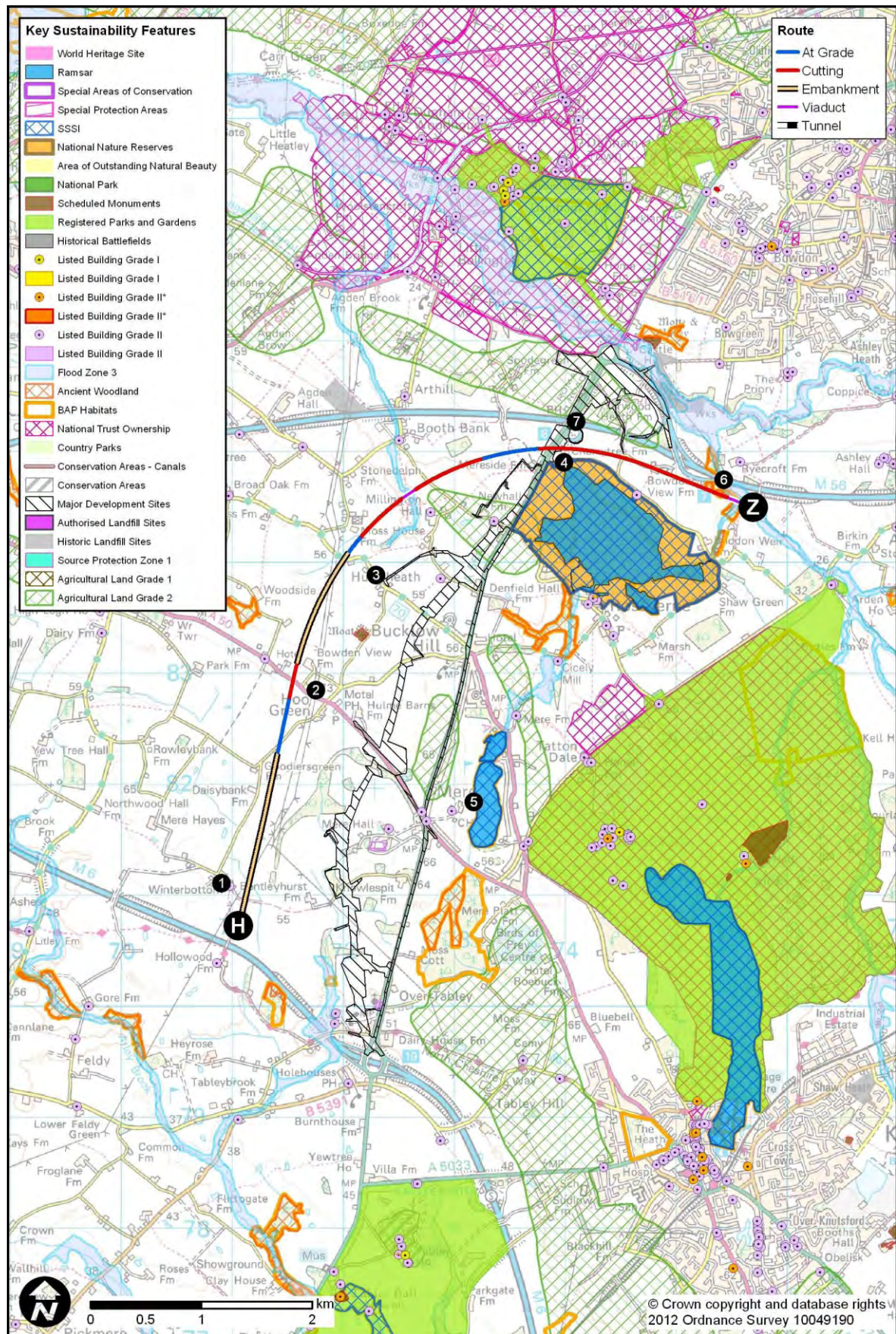
- 6.4.1. The route section between Winterbottom and Rostherne would be 13.4km (8.3 miles) long. It would connect south of Winterbottom with either HSM10 from Hough or HSM11 from Pickmere. At Rostherne, the route would continue along section HSM28B to Ardwick.
- 6.4.2. The route section would commence on embankment just north of the M6 and would broadly follow the route of an overhead power line for about 3km before turning eastwards in cutting beneath the A566 and passing just north of Rostherne Mere. The alignment would rise on viaducts over Blackburn Brook and Birkin Brook.
- 6.4.3. HSM28A Figure 1 illustrates the route alignment and the principal sustainability features in the area.
- 6.4.4. Specific mitigation included within the route section comprises a number of localised realignments to reduce noise impacts at the residential areas of Bucklow Hill and Mere. Additional mitigation included horizontal realignment to reduce isolation of Booth Bank and vertical realignment to avoid the impact on the aquifers connected to Rostherne Mere and the Mere, Mere. The potential for mitigation at the station was limited at this stage. However, care was taken to minimise impact on the surrounding settlements and landscape features.
- 6.4.5. Population and settlements The route section would result in the demolition of an estimated three dwellings.
- 6.4.6. Noise Noise from HS2 trains would result in annoyance for an estimated 24 people (equivalent to the occupants of some 11 dwellings). This would represent about two people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be substantially less than this.
- The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ① Winterbottom, ② Hoo Green and ③ Hulseheath.
- In terms of noise insulation, approximately six dwellings would be expected to qualify. This is equivalent to approximately one dwelling per km of route section.
- 6.4.7. Health and well-being Approximately 13 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
- 6.4.8. Access No promoted recreational routes would be crossed by the route section.



issues

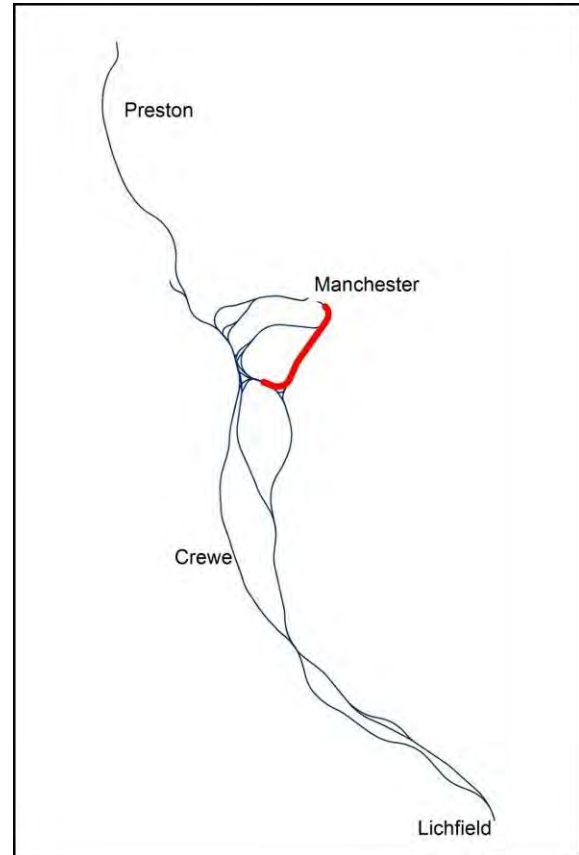
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| 6.4.9. | Planning and development | The route section would pass through the ⑦ Knutsford to Bowdon Roads Improvement scheme (A556). The Highways Agency intends to improve the A556 trunk road between junction 19 of the M6 near Knutsford, and Junction 7 of the M56 near Bowdon. The proposals are, at time of writing, in the pre-application stage and the Highways Agency intends to submit a Development Consent Order application in 2012. |
| 6.4.10. | Landscape, townscape and cultural heritage line of route | <p>The part of the route section north of the M6 near Mere Hall would be on embankment across open farmland, close to existing overhead power lines. There would be some impact on landscape character and visual impact on the hamlet of ① Winterbottom, but overall impacts would be fairly minor. Continuing north, there would be visual impacts on the hamlets of ② Hoo Green and ③ Hulseheath and adverse impact on the landscape character, although the existing parallel overhead power lines would limit the impact.</p> <p>The route section would run from close to the southern edge of the M56 north of Tatton Park, which would be about 780m away at its closest point. Of the 5 or so listed buildings near the route, all would be likely to have only negligible impacts on their settings.</p> |
| 6.4.11. | Biodiversity and wildlife | <p>The route section would pass within 10km of four Natura 2000 wildlife sites. The potential for significant effects at two of these sites, ④ Rostherne Mere Ramsar site (also SSSI and NNR), and ⑤ The Mere, Mere SSSI, which is a component of the Midland Meres and Mosses (Phase 1) Ramsar site, cannot be discounted at this stage. Further details are described in an HRA screening report for Rostherne Mere and the HRA screening sheet for Midland Meres and Mosses, which acknowledges the need for more detailed analysis.</p> <p>One further SSSI would be within 2km of the route section. Adverse effects on this site are considered to be unlikely.</p> <p>The route would directly affect one ancient woodland, ⑥ Hancocks Bank, which is also an area of wet woodland BAP habitat. Two further but unnamed BAP habitats would also be affected.</p> |
| 6.4.12. | Water resources and flood risk | The route would cross some 230m of Flood Zone 3. |
| 6.4.13. | Land use resources | The route section would cross an estimated 13.4km of green belt. |
| 6.4.14. | Waste and material use | <p>It is estimated that the route section would result in a surplus of 608,302m³ of excavated material.</p> <p>Estimated quantities of bulk building materials for this section comprise 4300 tonnes of steel and 13,300 tonnes of concrete.</p> |

HSM28A Figure 1



6.5. HSM28B: Rostherne (Z) to Ardwick (Y), including N/S airport station

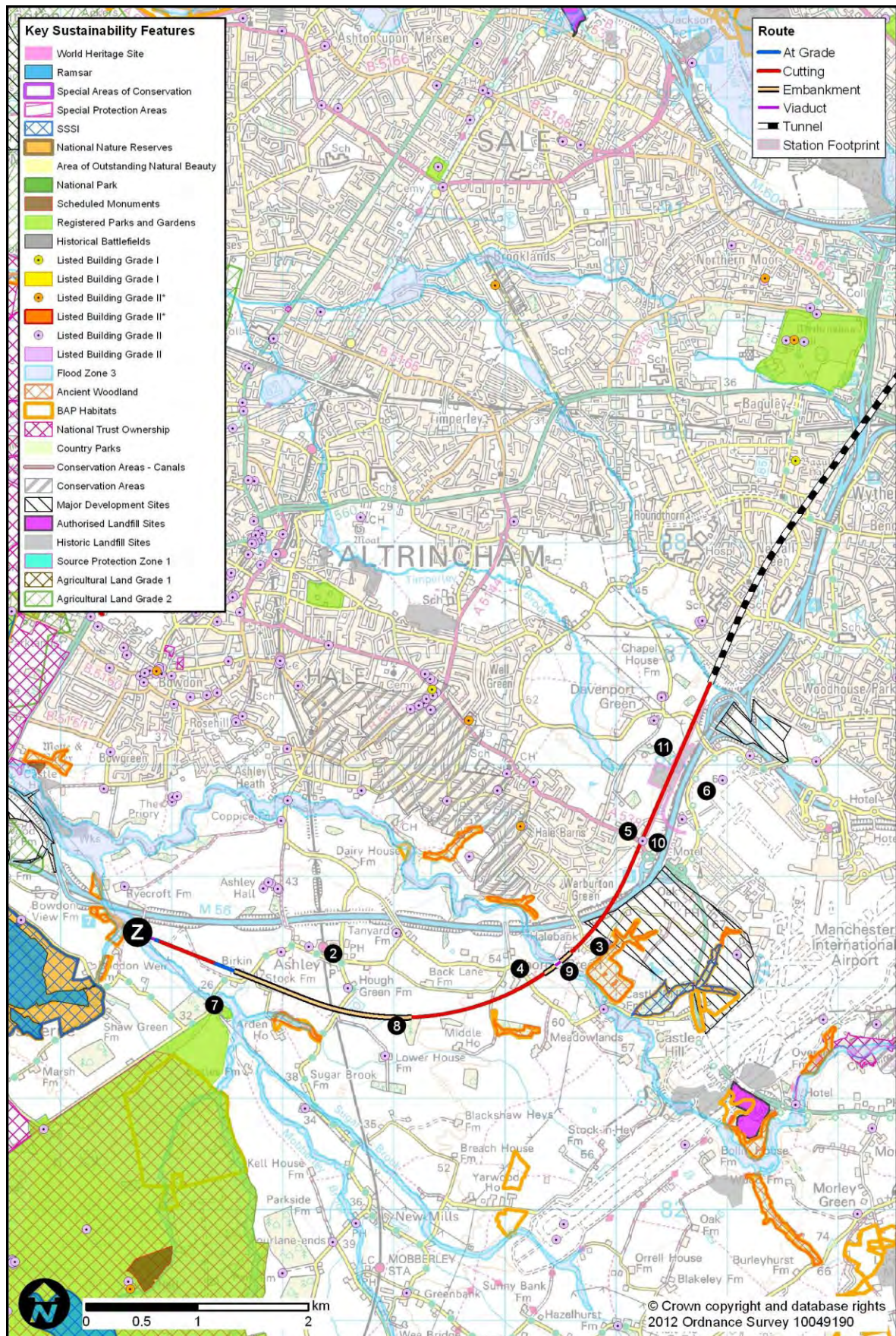
- 6.5.1. The route section between Rostherne and Ardwick would be 19.2km (11.9 miles) long. It would connect south of Rostherne with either HSM28A from Winterbottom or HSM29 from Mere Hall. At Ardwick the route would continue along section HSM26 to the station at Piccadilly.
- 6.5.2. The route section would rise onto embankment between Tatton Park and Ashley, where it would cross the existing Altrincham to Chester railway. The route section would then generally use cutting as it curves around Warburton Green and goes under the M56, although a short viaduct would be required over the River Bollin. The route section would enter a tunnel just by junction 5 of the M56 and remain below ground until surfacing at just north of Longsight alongside the existing railway into Piccadilly.
- 6.5.3. The route section includes an interchange station for Manchester Airport, which includes two four-track sections. The station would be located on greenfield land north-west of Manchester Airport, parallel to the M56. The station concourse would be broadly at grade with the platforms in cutting below.
- 6.5.4. HSM28B Figures 1 to 3 illustrate the route alignment and the principal sustainability features in the area.
- 6.5.5. Specific mitigation included within the route section comprises a number of localised realignments that have sought to reduce isolation at Booth Bank and vertical realignment to avoid impacts on the aquifers that connect to Rostherne Mere and the Mere, Mere. The potential for mitigation of noise impacts at the station was limited at this stage. However, care was taken to minimise impact on the surrounding settlements and landscape features.
- 6.5.6. **Population and settlements** The route section would result in the demolition of an estimated 23 dwellings. These include a cluster at ❶ West Gorton. Of the total, 17 demolitions would be in areas of relatively high deprivation. The inclusion of the station within this section does not increase the number of demolitions associated with the line of route.
Potential isolation would affect two dwellings at ❷ Ashley.
- 6.5.7. **Noise** Noise from HS2 trains would result in annoyance for an estimated 28 people (equivalent to the occupants of some 12 dwellings). This would represent about two people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.
The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential



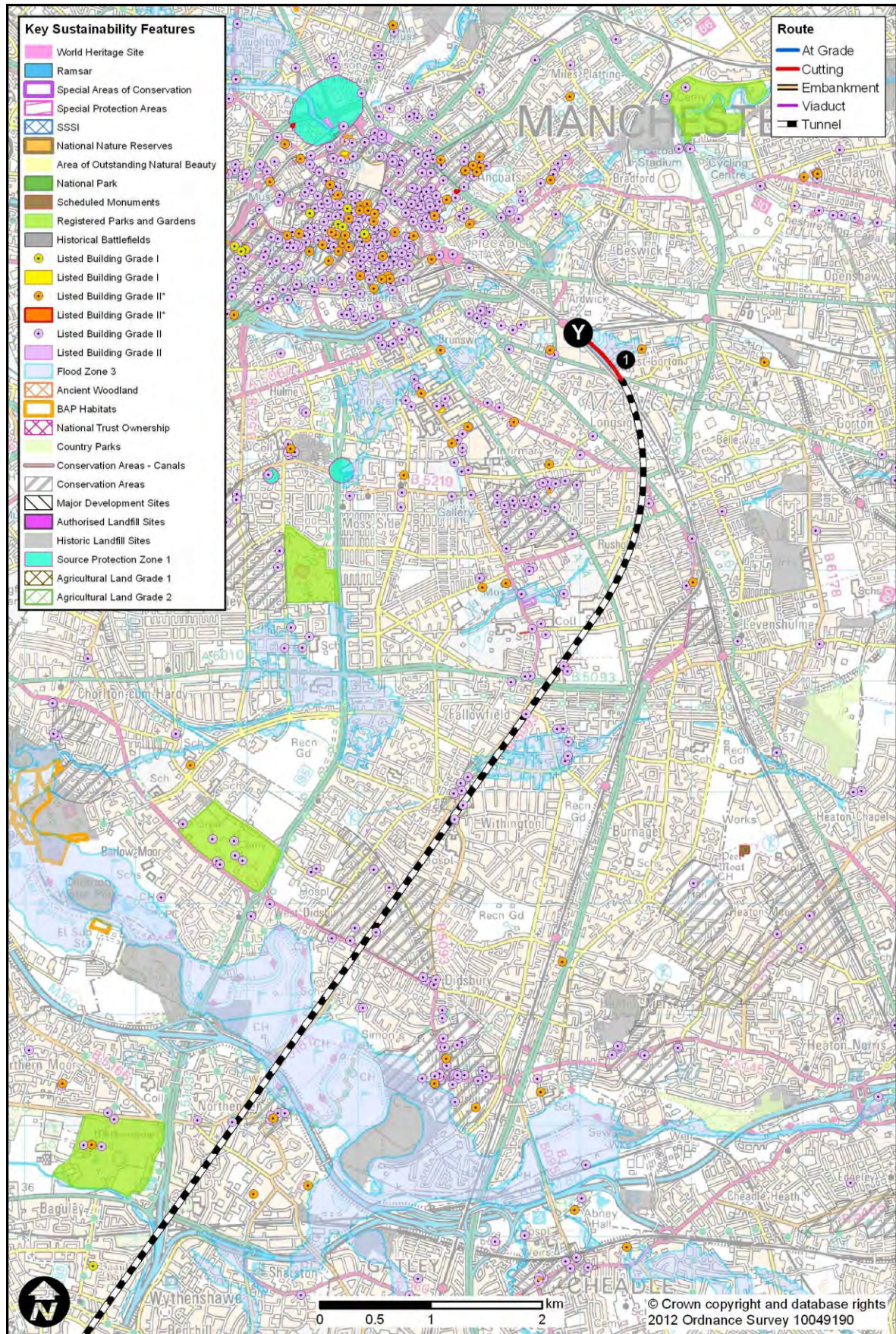
		<p>noise impacts. These settlements are located at or near to ② Ashley, ④ Thorns Green, ⑤ Hale Barns and ① West Gorton.</p> <p>Approximately, 34 dwellings would potentially qualify for noise insulation, particularly at ④ Thorns Green, ⑤ Hale Barns and ① West Gorton. This is equivalent to approximately two dwellings per km of route section.</p> <p>Noise impacts from the operational station are yet to be modelled. This would be influenced by plant and PA systems, generated road traffic; and the frequency and speed of trains.</p>
6.5.8.	Health and well-being	Approximately 80 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
6.5.9.	Access issues	<p>No promoted recreational routes would be crossed by the route section.</p> <p>The station would offer a potential interchange with the M56 and Manchester Airport and its associated interchange opportunities, such as rail and Metrolink.</p>
6.5.10.	Jobs and houses	It is estimated that approximately 300 jobs would be supported at the station.
6.5.11.	Planning and development	The proposed station would occupy land designated as both 'Countryside land outside the Green Belt at Davenport Green' (policy R4) and 'Rural Park in Green Belt' under the Trafford core strategy (adopted January 2012). With the nearby designation of the Manchester Airport Enterprise Zone the proposed interchange station would support the enterprise zone objectives of private sector growth and wider regeneration. However, the station would also conflict with the green belt designation (see Land use resources).
6.5.12.	Landscape, townscape and cultural heritage - line of route	<p>The route section would run from close to the southern edge of the M56 north of ⑦ Tatton Park, which would be about 300m away at its closest point. It would cut across an area of relatively unspoilt countryside, with direct impacts on a number of farmsteads and hamlets, notably ④ Thorns Green and ③ Halebank. Open southerly views from ② Ashley to ⑦ Tatton Park would be interrupted by the embankment, which might also be visible from parts of the park (Registered Park and Garden Grade II*), but overall, impacts on the setting of the park are expected to be minor at most. The short viaduct crossing of the ⑨ River Bollin near Halebank would have localised visual impact and a minor direct impact on valley-side woodland but would avoid a larger area of ancient wet woodland to the east. Six areas of woodland would be directly affected in total by the route section.</p> <p>From here the route section would run into cutting beneath the M56 and along the south-east edge of Warburton Green and Hale Barns, where visual impacts would be negligible, before passing into tunnel. The tunnel portals, in cutting at the extreme south and northern ends of the route, might have some direct impacts on farmland and on school grounds and a residential area respectively.</p>

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| 6.5.13. | Landscape, townscape and cultural heritage - station | <p>The station is located on greenfield land to the immediate west of the M56. Views from the north would be contained to some degree by ❶ existing woodland along Timperley Brook obstructing westward views. It would cause moderate visual intrusion to residents on the northern edge of ❹ Hale Barns and would also be clearly visible to motorway users. Overall the townscape impacts are tempered by the close proximity of the motorway. There would be a moderate impact on the landscape character due to the loss of a significant part of a distinctive woodland along ❶ Timperley Brook. The station would require the demolition of the Grade II listed ❿ Buckhall (now part of the Marriott Hotel).</p> |
| 6.5.14. | Biodiversity and wildlife | <p>The route section would pass within 10km of five Natura 2000 wildlife sites. However, an HRA screening confirms that there would be no likely significant effects on these sites.</p> <p>Two SSSIs would be within 2km of the route section. Adverse effects on these are considered to be unlikely.</p> |
| 6.5.15. | Water resources and flood risk | <p>❸ Sugar Brook tributary, a minor river, may be diverted. Continuing scheme design would seek to avoid or minimise this impact.</p> <p>The route would cross some 510m of Flood Zone 3, the majority of which would be in cutting and therefore at risk of flooding. The station and four-track footprint would occupy about 30m² of Flood Zone 3.</p> |
| 6.5.16. | Land use resources | <p>The route section would cross an estimated 5.8km of green belt. The station footprint would occupy an additional 6ha of green belt.</p> |
| 6.5.17. | Waste and material use | <p>It is estimated that the route section would result in a surplus of 5,238,509m³ of excavated material. This includes 2,032,400m³ of tunnel excavated material.</p> <p>Estimated quantities of bulk building materials for this section comprise 5,700 tonnes of steel and 17,800 tonnes of concrete. The station would require an additional 185,900 tonnes of concrete; estimated quantities of steel are not provided at this stage.</p> |

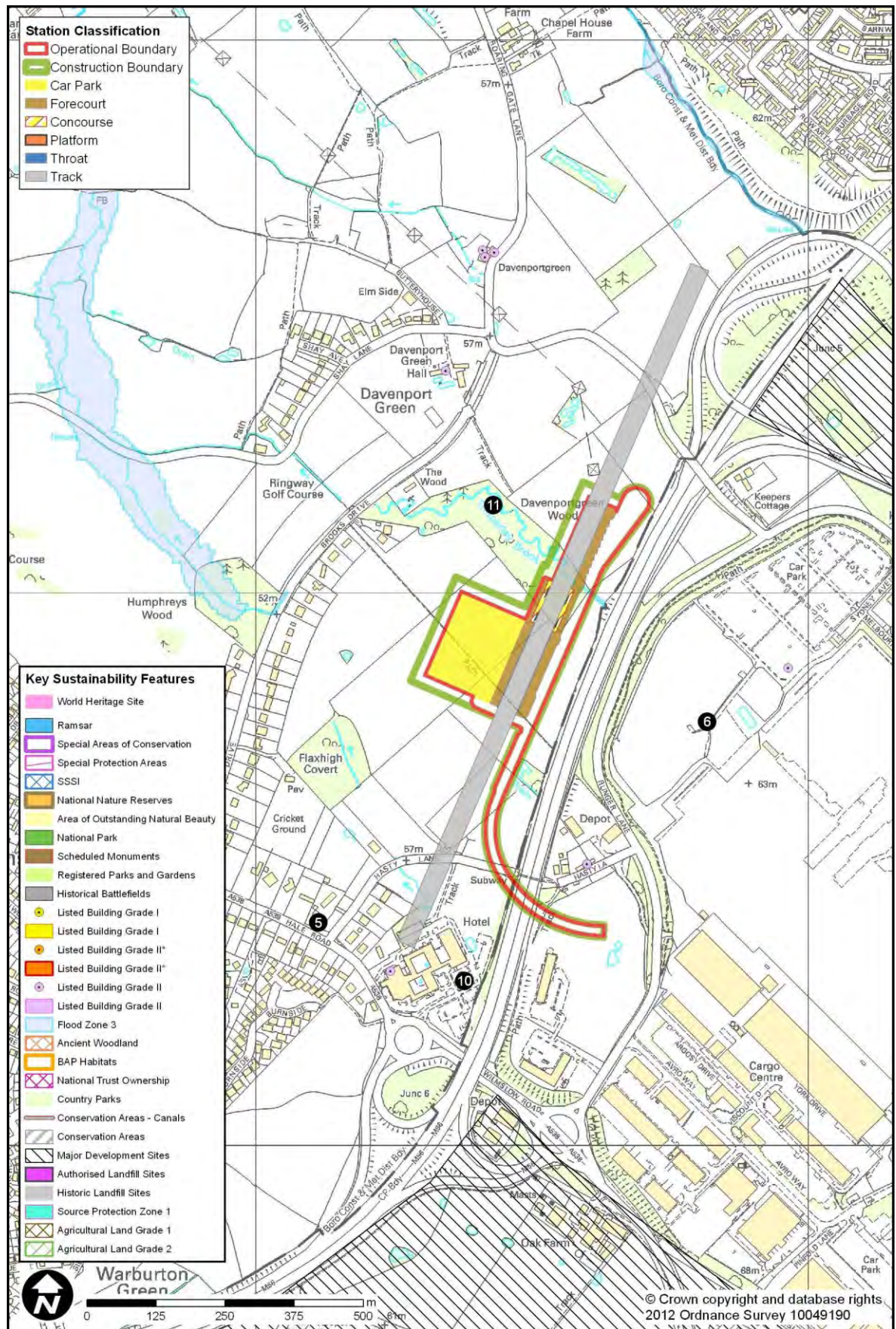
HSM28B - Figure 1 of 3



HSM28B - Figure 2 of 3

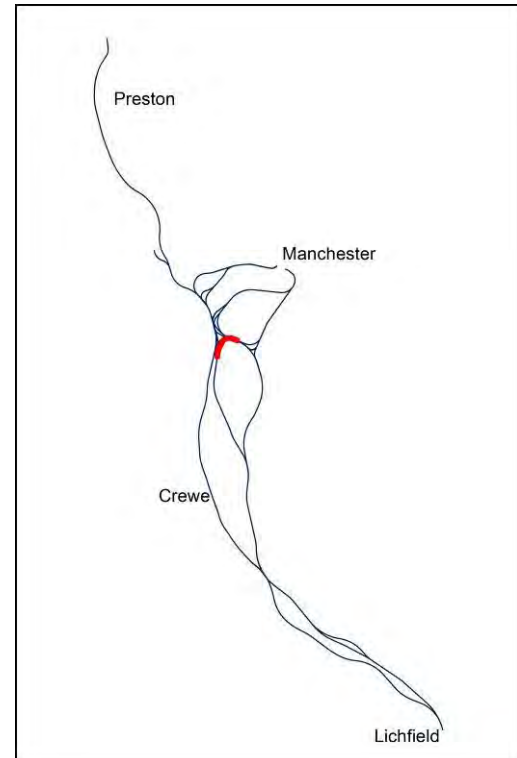


HSM28B - Figure 3 of 3



6.6. HSM29: Mere (N) to Rostherne (Z)

- 6.6.1. The route section between Mere and Rostherne would be 6.2km (3.9 miles) long. It would connect south of Mere with HSM13 from Shrayleybrook. East of Rostherne the route section would continue along section HSM28B to Ardwick (and then to Manchester Piccadilly).
- 6.6.2. The route section would be almost entirely in cutting broadly parallel and about 500m west of the A566, before turning east and passing beneath the A566. It would continue south of the M56, just north of Rostherne Mere.
- 6.6.3. HSM29 Figure 1 illustrates the route alignment and the principal sustainability features in the area.
- 6.6.4. Specific mitigation included within the route section comprises horizontal realignment to reduce isolation of Booth Bank and vertical realignment to avoid the impact on the aquifers connected to Rostherne Mere and the Mere, Mere.



- 6.6.5. Population and settlements The route section would result in the demolition of an estimated seven dwellings. In addition, an estimated two commercial properties would also be demolished.
- 6.6.6. Noise Noise from HS2 trains would result in annoyance for an estimated nine people (equivalent to the occupants of some four dwellings). This would represent two people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.

Approximately five dwellings would potentially qualify for noise insulation along the route section. This is equivalent to one dwelling per km of route section.
- 6.6.7. Health and well-being Approximately six dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
- 6.6.8. Access issues No promoted recreational routes would be crossed by the route section.
- 6.6.9. Planning and development The route section would pass through the ❶ Knutsford to Bowdon Roads Improvement scheme (A556). The Highways Agency intends to improve the A556 trunk road between junction 19 of the M6 motorway, near Knutsford, and junction 7 of the M56 motorway, near Bowdon. The proposals are in the pre-application stage and the Highways Agency intends to submit a Development Consent Order application in 2012.
- 6.6.10. Landscape, townscape and cultural heritage The route section would run north-east from near Hoo Green before turning east alongside the M56 near Rostherne Mere. At its southern end, the route section would have direct landscape and visual impacts on the woodland and parkland surrounding ❷ Mere Hall, part of the wider

designed landscape around Tatton Park Grade II*Registered Park and Garden. ③ Tatton Park itself is some 870m away at its closest point; impacts on the setting of these grounds would be negligible.

The route section would pass ④ Hoo Green in cutting with little or no visual impact but there would be some visual impact on the hamlet of ⑤ Hulseheath to the north, where it would run at grade. Further north and east any landscape or visual impacts would be relatively minor due to the route section being in cutting close to the motorway.

Two woodlands would be directly affected by the route section (see also *biodiversity and wildlife*), with minor impacts on the landscape.

There is the potential for impact on the setting of the scheduled site at ⑥ Hough Hall Moated Site. The route section would pass to the east of the monument in cutting and at grade across predominantly arable farmland, with little screening provided by existing trees and hedges.

6.6.11. Biodiversity and wildlife

The route section would pass within 10km of four Natura 2000 wildlife sites. The potential for significant effects at two of these sites, ⑦ Rostherne Mere Ramsar site, and ⑧ The Mere, Mere, which is a component of the Midland Meres and Mosses (Phase 1) Ramsar site, cannot be discounted at this stage. Further details are described in the HRA screening report for Rostherne Mere and the HRA screening sheet for Midland Meres and Mosses.

The route section would directly affect one ancient woodland, ⑨ Hancocks Bank, which is also an area of wet woodland BAP habitat. Two further but un-named BAP habitats would also be affected.

6.6.12. Water resources and flood risk

The route section would cross some 140m of Flood Zone 3.

6.6.13. Land use resources

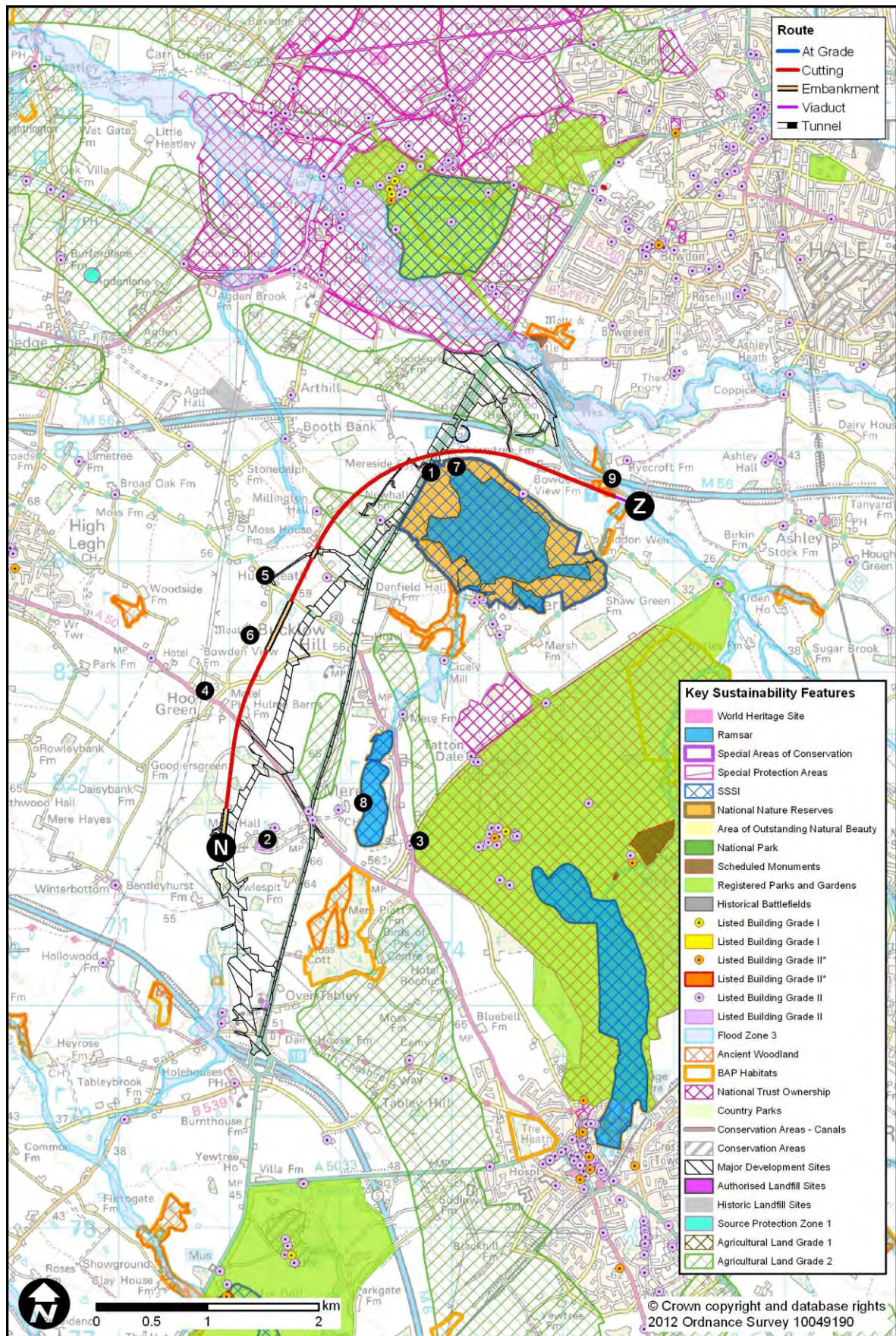
The route would cross about 620m of Grade 2 agricultural land. It would cross about 1.3km of green belt.

6.6.14. Waste and material use

It is estimated that the route section would result in a surplus of 1,860,353m³ of excavated material.

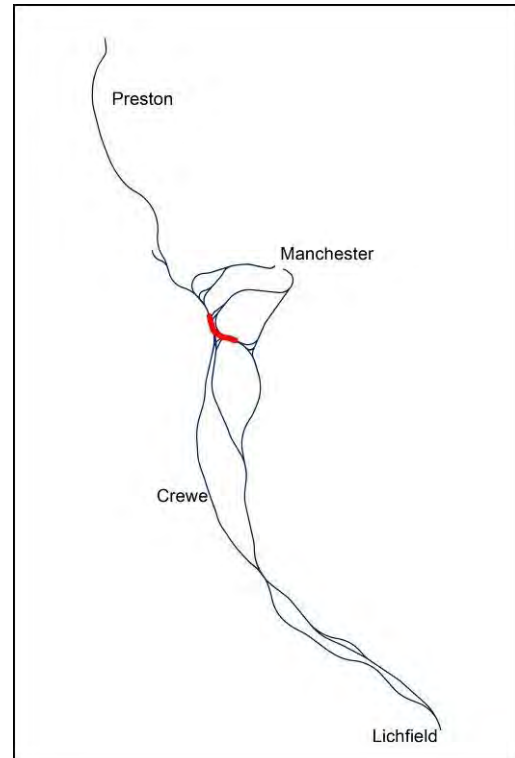
Estimated quantities of bulk building materials for this section comprise 4,000 tonnes of steel and 12,300 tonnes of concrete.

HSM29 - Figure 1



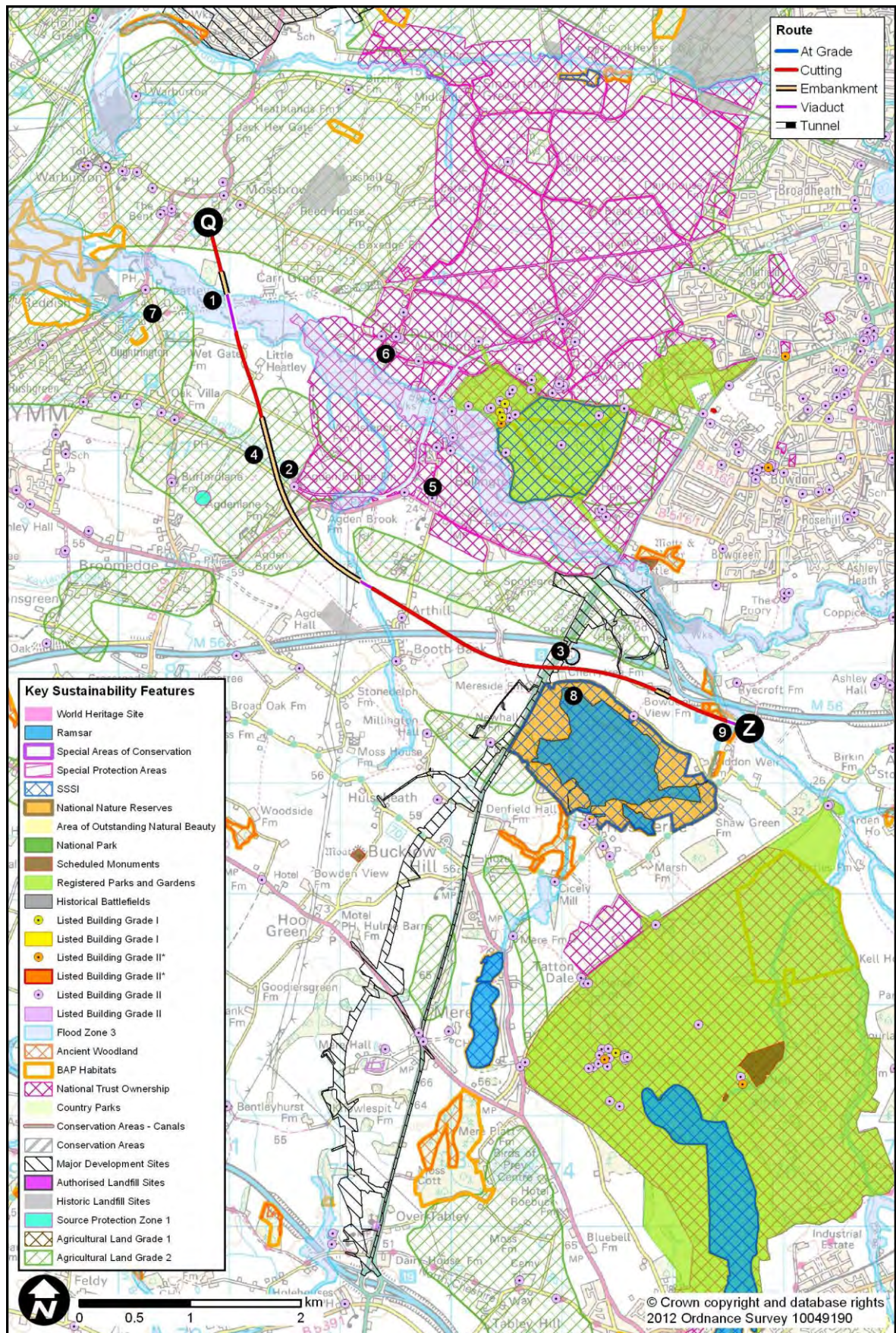
6.7. HSM30: Rostherne (Z) to Warburton (Q)

- 6.7.1. The route section between Rostherne and Warburton would be 7.4km (4.6 miles) long. It would be used for moving empty coaches between a rolling stock depot and the Piccadilly Station option. It would connect to the east with HSM28B to Ardwick. To the west it would connect with HSM21 to Lowton.
- 6.7.2. Having crossed Blackburns Brook on a short viaduct, the route section would go into cutting for some 3km to pass north of Rostherne Mere and cross beneath the A556 and M56, where it would begin to bear north-west. It would then rise to cross the Agden Brook on a short viaduct and would continue turning northwards on embankment bridging over the Bridgwater Canal and River Bollin, with a short section of cutting between these two.
- 6.7.3. HSM30 Figure 1 illustrates the route alignment and the principal sustainability features in the area.
- 6.7.4. No additional mitigation has been incorporated into the route section at this stage.
- 6.7.5. **Population and settlements** The route section would result in the demolition of an estimated four dwellings.
- 6.7.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 15 people (equivalent to the occupants of some seven dwellings). This would represent about two people per km of route. With ambient road noise, also taken into account noise impacts from HS2 would be expected to be less than this.
- In terms of noise insulation, approximately five dwellings would be expected to qualify scattered along the route section. This is equivalent to one dwelling per km of route section.
- 6.7.7. **Health and well-being** Approximately 18 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
- 6.7.8. **Access issues** Two promoted recreational routes would be crossed by the route section, namely the ① Trans Pennine Trail and ② Cheshire Ring Canal Walk. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.
- 6.7.9. **Planning and development** The route section would pass through the ③ Knutsford to Bowdon Roads Improvement scheme (A556). The Highways Agency intends to improve the A556 trunk road between junction 19 of the M6 motorway, near Knutsford, and junction 7 of the M56 motorway, near Bowdon. The proposals are in the pre-application stage and the Highways Agency intends to submit a Development Consent Order application in 2012.



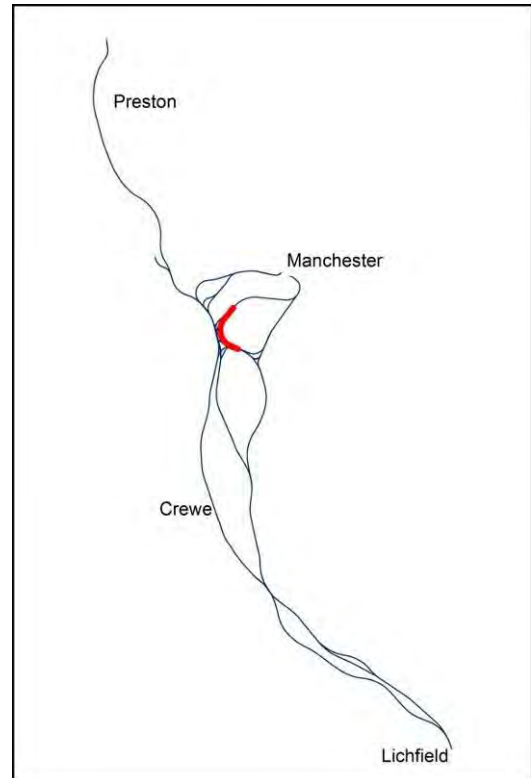
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| 6.7.10. | Landscape, townscape and cultural heritage | <p>Initially in cutting and close to the M56, the route section would result in few landscape and visual impacts. However, there would be some minor or moderate landscape impacts on character just north and south of the ④ Bridgewater Canal bridge, and on the visual amenity of recreational users of the canal and the ② Cheshire Ring Canal Walk. The viaduct crossing of the River Bollin would also have a minor visual impact on users of the ① Transpennine Trail nearby. Visual impacts on the villages of ⑤ Little Bollington and ⑥ Dunham Woodhouses are unlikely, but it is possible that there might be a minor visual impact on residents at ⑦ Heatley, west of the River Bollin crossing. North of the River Bollin, the route section would go to cutting through farmland, with limited landscape or visual impact apart from a small direct impact on woodland.</p> <p>No listed buildings would be directly affected, and of the six Grade II listed structures near the route, all would be subject negligible impacts on their settings.</p> |
| 6.7.11. | Biodiversity and wildlife | <p>The route section would pass within 10km of four Natura 2000 wildlife sites. The potential for significant effects at one of these sites, ⑧ Rostherne Mere Ramsar site, cannot be discounted at this stage. Further details are described in an HRA screening report for Rostherne Mere, which acknowledges the need for more detailed analysis. Wintering birds are not a qualifying feature of the Ramsar, so although potential impact to them would be relevant to the NNR and SSSI designation, it would not affect the qualifying interest and integrity of the Ramsar site.</p> <p>One further SSSI would be within 2km of the route section, although the risk of impact is considered to be low and adverse impacts are unlikely. There would be a minor impact on ⑨ Hancocks Bank, which is an ancient woodland and BAP habitat.</p> |
| 6.7.12. | Water resources and flood risk | <p>The route section would cross some 440m of Flood Zone 3.</p> |
| 6.7.13. | Land use resources | <p>The route would cross about 1.7km of Grade 2 agricultural land. It would cross about 7.4km of green belt.</p> |
| 6.7.14. | Waste and material use | <p>It is estimated that the route section would result in a surplus of 806,963m³ of excavated material.</p> <p>Estimated quantities of bulk building materials for this section comprise 3,800 tonnes of steel and 11,900 tonnes of concrete.</p> |

HSM30 - Figure 1



6.8. HSM31A: M56 Junction 7 Rostherne (P) to Carrington (W)

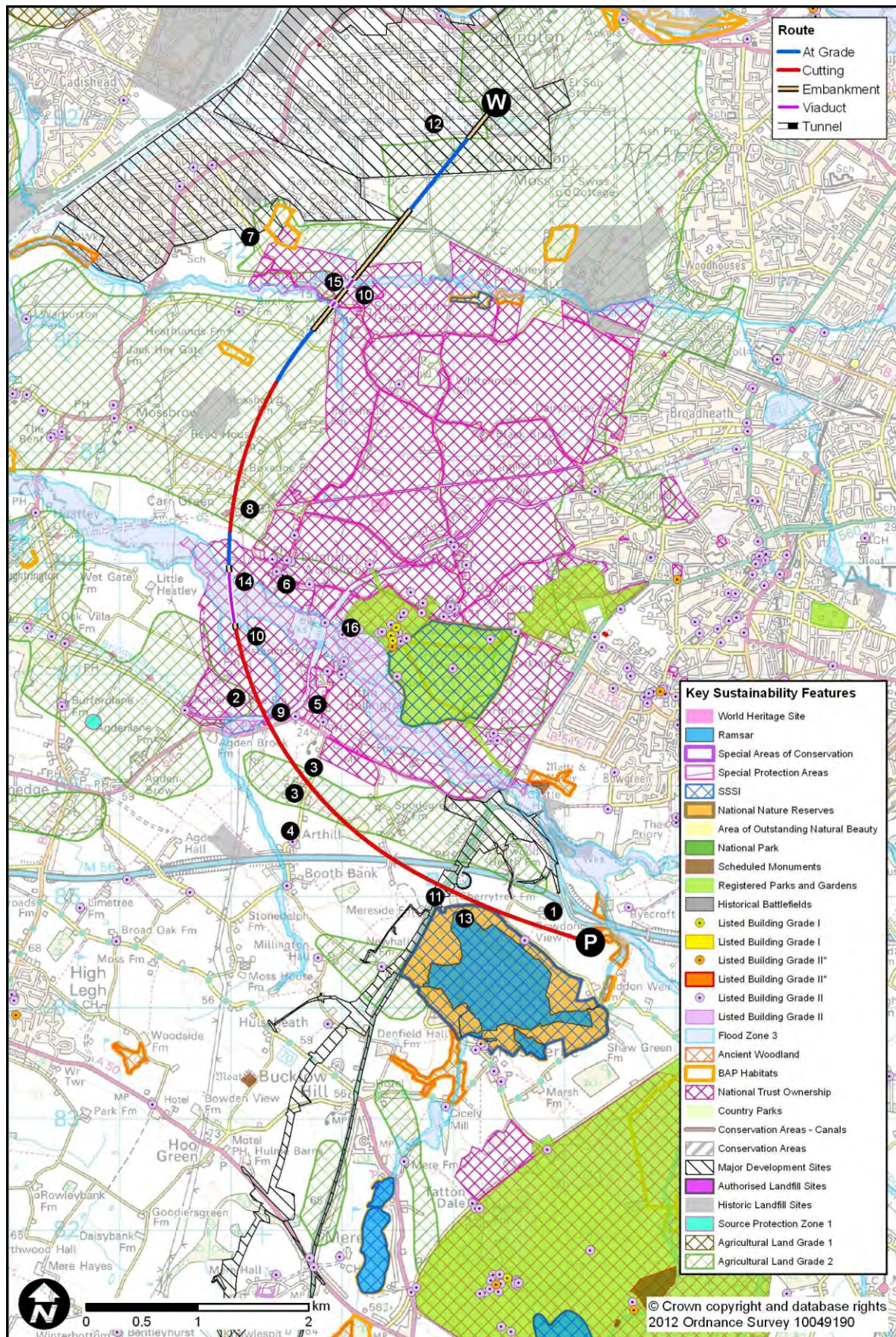
- 6.8.1. The route section between the M56 junction 7 Rostherne and Carrington would be about 10km (11 miles) long. It would connect south of Rostherne with either HSM19 (which includes an airport interchange station) or HSM18 (which has no interchange station) from Mobberley. North of Carrington it would connect with HSM31B to Ardwick.
- 6.8.2. The route section would pass just to the north of Rostherne Mere in cutting and continue beneath the A556 and M56, bearing northwards and west of the Dunham Estate. It would rise to cross the River Bollin on viaduct, then bear north-east across the gently undulating terrain west of Sinderland Green and into the industrial outskirts of Carrington.
- 6.8.3. HSM31A Figure 1 illustrates the route alignment and the principal sustainability features in the area.
- 6.8.4. No additional mitigation has been incorporated into the route section at this stage.
- 6.8.5. **Population and settlements** The route section would result in the demolition of an estimated ten dwellings. Potential isolation would occur at two locations, affecting an estimated three dwellings north of ❶ Rostherne and three dwellings east of ❷ Agden. Potential severance would affect an estimated five dwellings around ❸ Arthill.
- 6.8.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 25 people (equivalent to the occupants of some 11 dwellings). This would represent about two people per km of route. With ambient road noise also taken into account, noise impacts from HS2 would be expected to be less than this.
- The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ❹ Arthill, ❺ Little Bollington, ❻ Dunham Woodhouses.
- In terms of noise insulation, approximately nine dwellings would be expected to qualify, located in ❹ Arthill and ❻ Dunham Woodhouses. This is equivalent to approximately one dwelling per km of route section.
- 6.8.7. **Health and well-being** Approximately 20 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.



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| 6.8.8. | Access issues | <p>Two promoted recreational route would be crossed by the route section, namely the ⑧ Trans Pennine Trail and the ⑨ Cheshire Ring Canal Walk. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.</p> <p>In addition, 4km of National Trust owned land would be crossed by the route section at the western edge of the ⑩ Dunham Estate, although this would be some distance from Dunham Park itself (see <i>landscape, townscape and cultural heritage</i>).</p> |
| 6.8.9. | Planning and development | <p>The route section would pass through the ⑪ Knutsford to Bowdon Roads Improvement scheme (A556). The Highways Agency intends to improve the A556 trunk road between junction 19 of the M6 motorway, near Knutsford, and junction 7 of the M56 motorway, near Bowdon. The proposals are in the pre-application stage and the Highways Agency intends to submit a development consent order application in 2012.</p> <p>The route section would also pass through a strategic location in ⑫ Carrington. The Trafford Core Strategy (adopted January 2012) locates Carrington as Strategic Location SL5, with the vision of encouraging regeneration that would provide 1,560 dwellings, 75 hectares of employment use land, new infrastructure and community and leisure facilities.</p> |
| 6.8.10. | Landscape, townscape and cultural heritage | <p>In cutting south of the M56, near ⑬ Rostherne Mere, there would be little or no landscape or visual impact. The route section would then continue, around the western outskirts of Altrincham. Its passage in cutting along most of this length would effectively limit its landscape and visual impacts, but viaduct crossings of the ⑭ River Bollin and ⑮ Red Brook and adjoining lengths of route at grade would be more visible. The route section would pass approximately 900m west of ⑯ Dunham Park Grade II* Registered Park and Garden and 500m west of the villages of ⑤ Little Bollington and ⑥ Dunham Woodhouses, the latter a conservation area. It would have little or no visual impact on Dunham Park or Little Bollington due to the fact that it would be mainly in cutting close to these receptors. However, the part of the route section closest to ⑥ Dunham Woodhouses would be at grade or on a low viaduct and therefore there could be a moderate visual impact on residents of the village and on some recreational receptors.</p> <p>The route section would then run at grade north-east near Partington to Carrington. There would be some visual intrusion from the route section where it crosses the open moorland landscape east of ⑦ Partington.</p> |
| 6.8.11. | Biodiversity and wildlife | <p>The route section would pass within 10km of four Natura 2000 wildlife sites. The potential for significant effects at one of these sites, ⑬ Rostherne Mere Ramsar site, cannot be discounted at this stage. Further details are described in an HRA screening report for Rostherne Mere, which acknowledges the need for more detailed analysis. Wintering birds are not a qualifying feature of the Ramsar, so although potential impact to them would be relevant to the NNR and SSSI designation, it would not affect the qualifying interest and integrity of the Ramsar site.</p> <p>Risks to two other SSSIs within 2km of the route section are low and adverse impacts are considered unlikely.</p> |

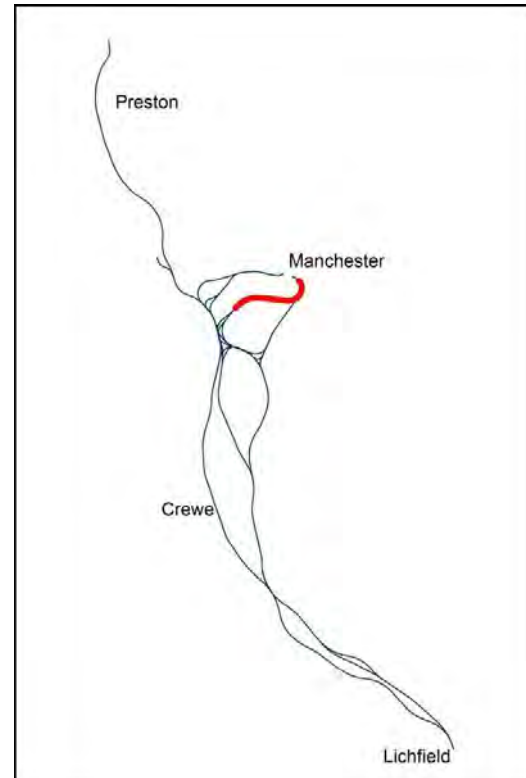
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| 6.8.12. | Water resources and flood risk | The route section crosses some 1.1km Flood Zone 3. |
| 6.8.13. | Land use resources | The route would cross about 8.4km of Grade 2 agricultural land. It would cross about 21km of green belt. |
| 6.8.14. | Waste and material use | <p>It is estimated that the route section would result in a surplus of 3,080,341 m³ of excavated material.</p> <p>Estimated quantities of bulk building materials for this section comprise 5,800 tonnes of steel and 17,600 tonnes of concrete.</p> |

HSM31A - Figure 1



6.9. HSM31B: Carrington (W) to Ardwick (Y)

- 6.9.1. The route section between Carrington and Ardwick would be about 15.5km (9.7 miles) long. It would connect south of Carrington with HSM31A, HSM33 or HSM34. North of Ardwick it would connect with HSM26, which includes Manchester Piccadilly Station.
- 6.9.2. The route section would pass at grade through the industrial outskirts of Carrington. A long viaduct would carry the route section over the wide Mersey Valley, before descending into tunnel and passing east beneath Stretford and the southern outskirts of Manchester. The tunnel would turn north beneath Rusholme and emerge just north of Longsight alongside the existing railway into Piccadilly.
- 6.9.3. HSM31B Figures 1 to 2 illustrate the route alignment and the principal sustainability features in the area.
- 6.9.4. No additional mitigation has been incorporated into the route section at this stage.
- 6.9.5. **Population and settlements** The route section would result in the demolition of an estimated 17 dwellings. These include a cluster at ① West Gorton. All 17 demolitions would be in areas of relatively high deprivation. In addition, an estimated four commercial properties would also be demolished.
- 6.9.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 68 people (equivalent to the occupants of some 29 dwellings). This would represent about five people per km of route. With ambient road noise also taken into account, noise impacts from HS2 would be expected to be less than this.
- The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ⑤ Carrington, ② Urmston, ③ Stretford, ④ Sale, and ① West Gorton.
- In terms of noise insulation, approximately 25 dwellings would be expected to qualify, located in ① West Gorton. This is equivalent to approximately two dwellings per km of route section.
- 6.9.7. **Health and well-being** Approximately 120 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
- 6.9.8. **Access issues** No promoted recreational routes would be crossed by the route section.



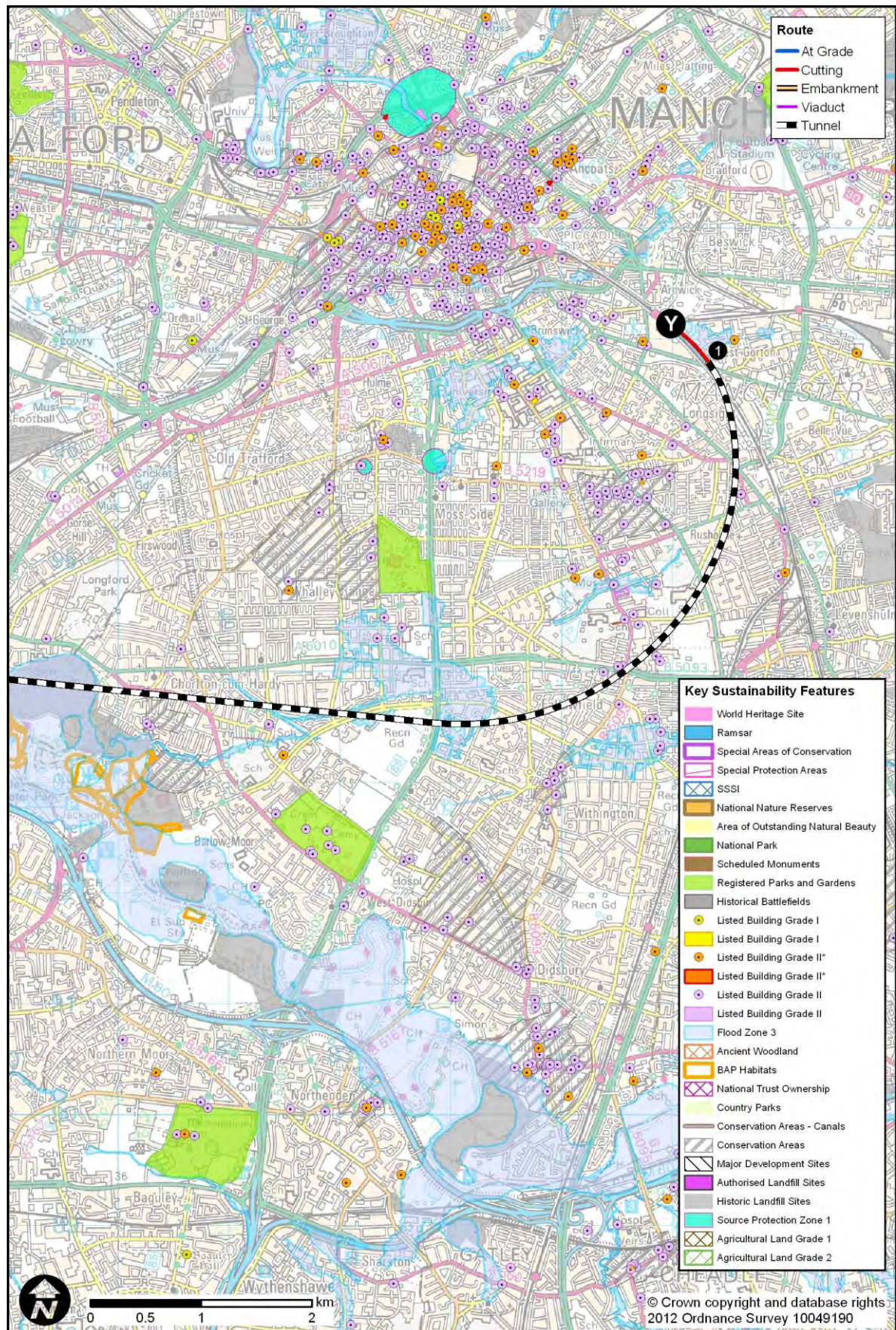
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| 6.9.9. | Planning and development | <p>The route section would pass through a strategic location in ⑥ Carrington. The Trafford Core Strategy (adopted January 2012) locates Carrington as Strategic Location SL5, with the vision of encouraging regeneration that would provide 1,560 dwellings, 75 hectares of employment use land, new infrastructure and community and leisure facilities</p> |
| 6.9.10. | Landscape, townscape and cultural heritage | <p>The route section would run north-east from Carrington initially at grade and then on a long viaduct over and along the Mersey Valley before going into tunnel. There would be some visual intrusion from the route section where it crosses the ⑦ Mersey Valley on viaduct. The viaduct section, although mainly low and alongside a line of pylons, would directly impact a number of small woodlands and intrude on a relatively unspoilt section of the ⑦ Mersey Valley south of Urmston. Here the impacts on recreational receptors would be moderate, as the river and meadows are popular for recreation. Moderate or major visual impacts are also likely on residential properties at ⑧ Flixton, ② Urmston and ③ Stretford, as the line in these areas would rise onto embankment and then onto high viaduct to cross the M60 before going into a tunnel.</p> <p>Emerging from tunnel just north of Longsight, the route section would be in cutting along the line of an existing railway, and would have negligible landscape and visual impact.</p> <p>Three woodlands would be directly affected by the route, all of which would be in the ⑦ Mersey Valley, with minor impacts on the valley's landscape character.</p> |
| 6.9.11. | Biodiversity and wildlife | <p>The route section would pass within 10km of five Natura 2000 wildlife sites. However, an HRA screening confirms that there would be no likely significant effects on these sites.</p> <p>Risks to three SSSIs within 2km of the route section are low, and adverse impacts are considered unlikely.</p> <p>The route would cross several areas of coastal and floodplain grazing marsh BAP habitat in the ⑧ Mersey Valley, although careful location of viaduct piers would minimise impacts to most of these.</p> |
| 6.9.12. | Water resources and flood risk | <p>Diversions of two minor rivers, the ⑨ Old Eea Brook and ⑩ Ousel Brook tributary at the M60, may be required. Continuing scheme design would seek to avoid or minimise this impact.</p> <p>The route section crosses some 2.1km Flood Zone 3, about 400m of which would be in cutting and therefore at risk of flooding.</p> |
| 6.9.13. | Land use resources | <p>The route would cross about 1.2km of Grade 2 agricultural land. It would cross about 4.6km of green belt.</p> <p>Four landfill sites at ⑪ Urmston and ⑫ Stretford would be directly affected. The design would require further work to minimise risks to people and the environment from these impacts.</p> |

- 6.9.14. Waste and material use
- It is estimated that the route section would result in a surplus of 2,901,767 m³ of excavated material. This includes 1,951,000m³ of tunnel excavated material.
- As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.
- Estimated quantities of bulk building materials for this section comprise 5000 tonnes of steel and 15,400 tonnes of concrete.

HSM31B - Figure 1 of 2

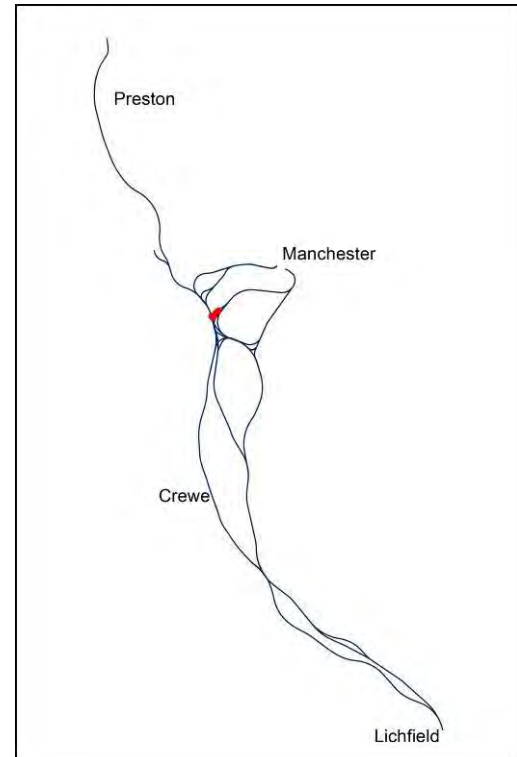


HSM31B - Figure 2 of 2



6.10. HSM32: Mossbrow (AF) to Partington (AE)

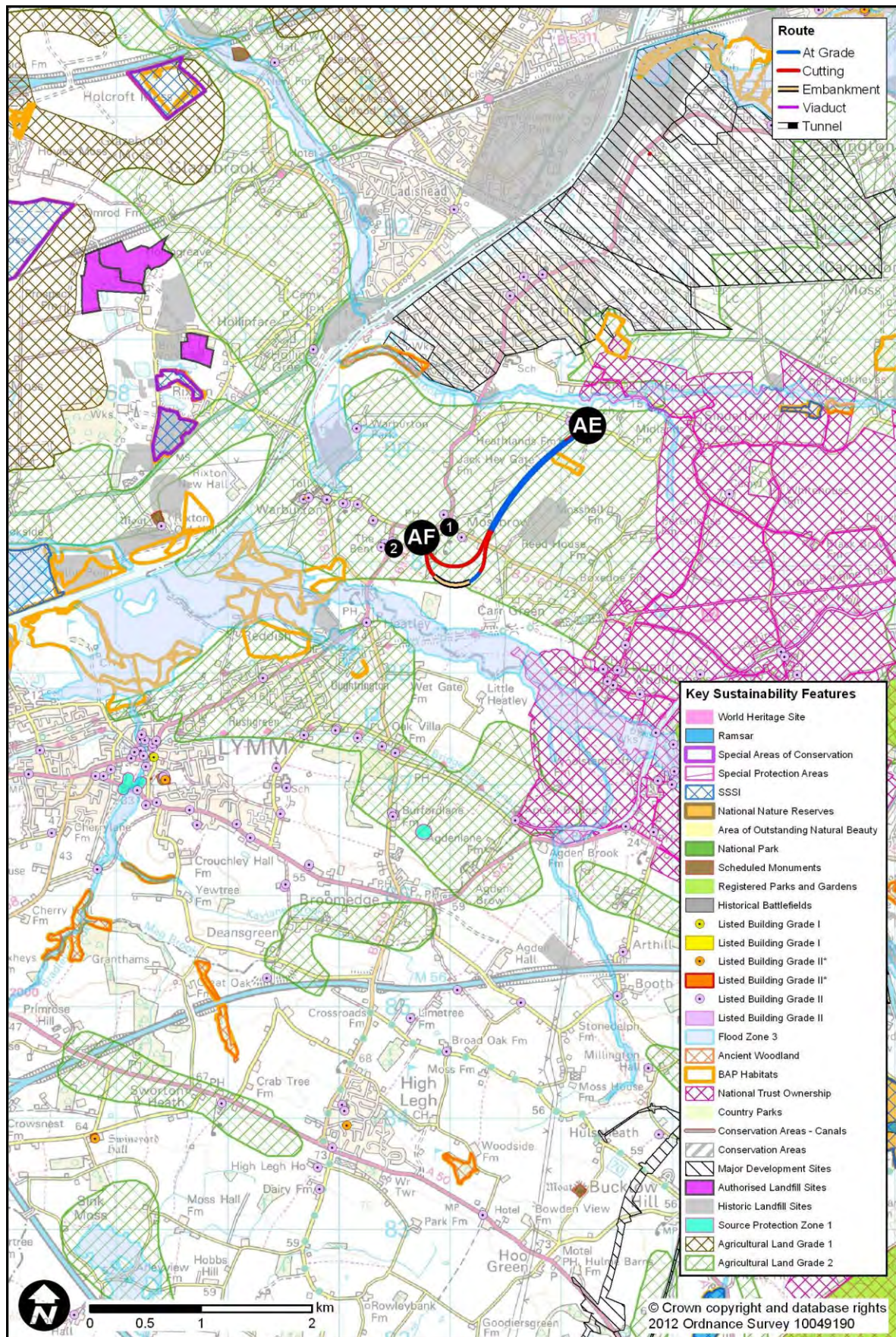
- 6.10.1. The route section between Mossbrow and Partington would be 2.5km (1.6 miles) long. It would be used for moving empty coaches between a rolling stock depot and the Piccadilly Station option. The route section would link with HSM33 to Carrington. To the west it would connect with HSM21 to Lowton.
- 6.10.2. From east to west, two separate northern spur lines would be at grade across a flat farmland following overhead power lines. The lines would then curve south of the hamlet of Mossbrow, before connecting back into the main high speed line to head north.
- 6.10.3. HSM32 Figure 1 illustrates the route alignment and the principal sustainability features in the area.
- 6.10.4. No additional mitigation has been incorporated into the route section at this stage.



- 6.10.5. Population and settlements The route section would result in the demolition of one dwelling. Potential isolation would occur affect an estimated 13 dwellings at ❶ Mossbrow.
- 6.10.6. Noise Noise from HS2 trains would result in annoyance for one person, and given ambient road noise, even this minor impact may be reduced. It is not expected that any dwellings would qualify for noise insulation along the route section.
- 6.10.7. Health and well-being Approximately one dwelling would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
- 6.10.8. Access issues No promoted recreational routes would be crossed by the route section.
- 6.10.9. Landscape, townscape and cultural heritage The route section would pass south of ❶ Mossbrow resulting in localised slight or moderate visual impact on a small number of residents. Further north the route section would pass at grade across a flat and open agricultural landscape following overhead power lines.
The route section would pass near six Grade II listed structures. Five of these, at ❶ Mossbrow and ❷ The Bent, all by John Douglas, would be divided by the route section, adversely affecting their coherence and resulting in a moderate impact on their settings.
- 6.10.10. Biodiversity and wildlife The route section would pass within 10km of four Natura 2000 wildlife sites. However HRA screening confirms that there would be no likely significant effects on these sites.
There would be one SSSI within 2km of this route section, although the risk of impact is considered to be low.
The route would directly affect one lowland raised bog BAP habitat.

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| 6.10.11. | Water resources and flood risk | The route section would have no significant impacts on water resources or flooding. |
| 6.10.12. | Land use resources | The route would cross about 2.5km of Grade 2 agricultural land. It would cross about 2.5km of green belt. |
| 6.10.13. | Waste and material use | <p>It is estimated that the route section would result in a surplus of 226,815m³ of excavated material.</p> <p>Estimated quantities of bulk building materials for this section comprise 1,500 tonnes of steel and 4,600 tonnes of concrete.</p> |

HSM32 - Figure 1



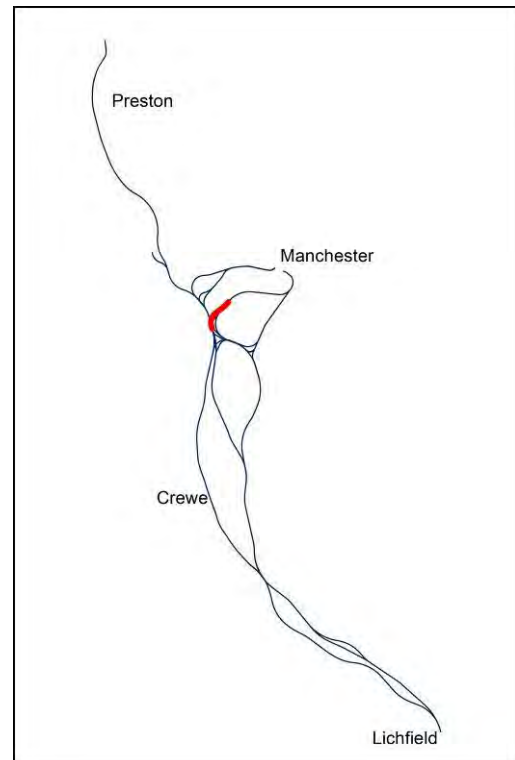
6.11. HSM33: Little Bollington (S) to Carrington (W)

6.11.1. The route section between Little Bollington and Carrington would be 6.5km (4 miles) long. It would connect south of Little Bollington with HSM12 to Winterbottom. At Carrington the route would continue along section HSM34 to Ardwick (and Manchester Piccadilly).

6.11.2. The route section would commence with an embanked section and viaduct over the River Bollin and would then go to grade as it turns north-east towards the south of Partington. Another viaduct and embankment would carry it over Red Brook. It would then continue at grade through Carrington Moss.

6.11.3. HSM33 Figure 1 illustrates the route alignment and the principal sustainability features in the area.

6.11.4. Specific mitigation included within the route section comprises localised realignments that have sought to reduce noise and visual impacts at the residential area of Little Bollington and Dunham Woodhouses. The realignment also sought to reduce impacts on Dunham Massey.

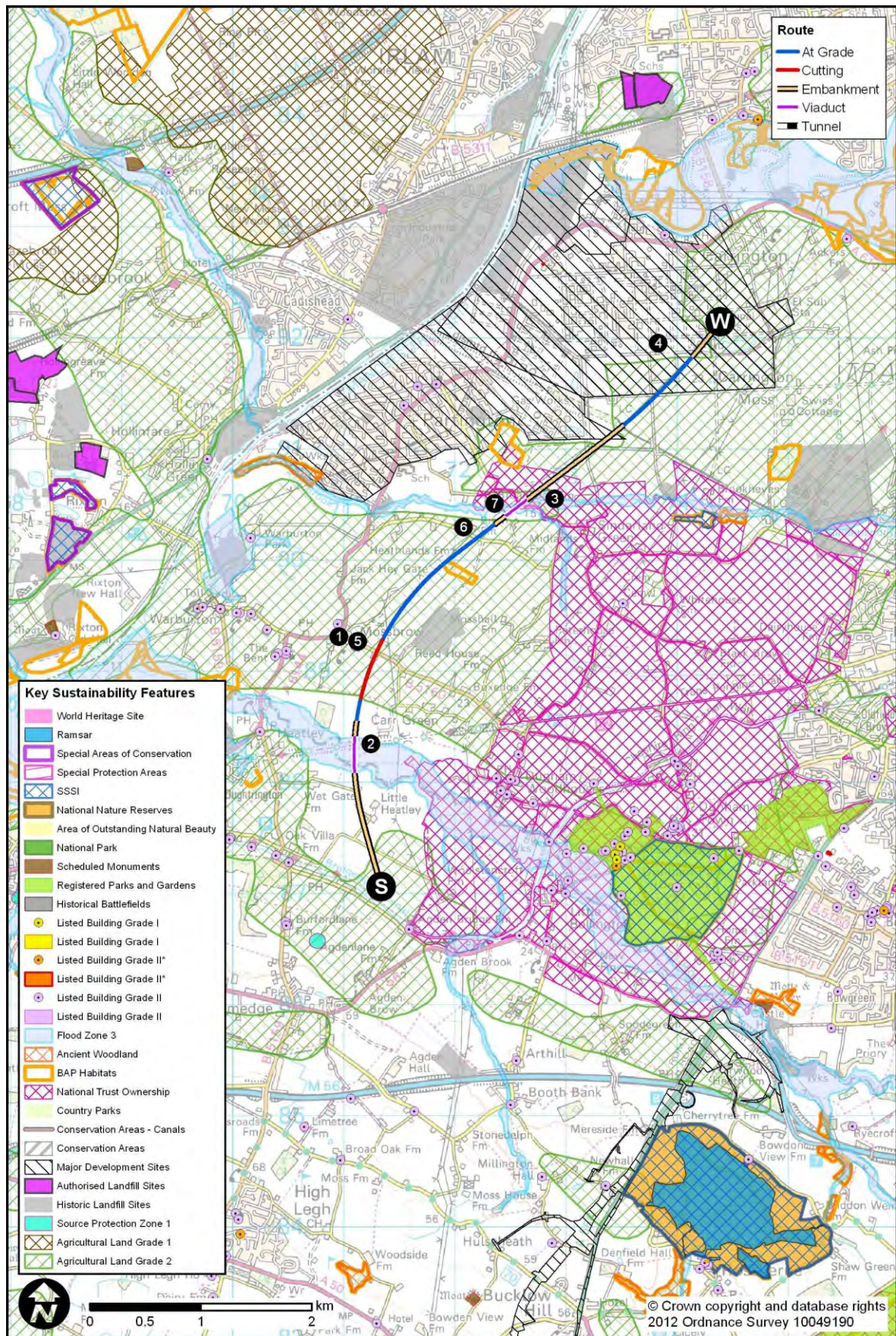


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| 6.11.5. | Population and settlements | <p>The route section would result in the demolition of an estimated four dwellings.</p> <p>Potential isolation would affect an estimated 13 dwellings at ① Mossbrow.</p> |
| 6.11.6. | Noise | <p>Noise from HS2 trains would result in annoyance for an estimated 11 people (equivalent to the occupants of some five dwellings). This would represent about two people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.</p> <p>Approximately four dwellings would potentially qualify for noise insulation along the route section. This is equivalent to approximately one dwelling per km of route section.</p> |
| 6.11.7. | Health and well-being | <p>Approximately 10 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.</p> |
| 6.11.8. | Access issues | <p>One promoted recreational route would be crossed by the route section, namely the ② Trans Pennine Trail. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.</p> <p>About 600m of ③ National Trust owned land would be crossed by the route section to the north of the Dunham Massey Estate, although this would be some distance from Dunham Park itself.</p> |

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| 6.11.9. | Planning and development | The route section would pass through a Strategic Location in ④ Carrington. The Trafford Core Strategy (adopted January 2012) locates Carrington as a Strategic Location (SL5) with the vision of encouraging regeneration that would provide 1,560 dwellings, 75 hectares of employment use land, new infrastructure and community and leisure facilities. |
| 6.11.10. | Landscape, townscape and cultural heritage | The route section, running from east of Lymm would be on a 10m high embankment and viaduct across the Bollin Valley. This would result in impacts on landscape character and the users of the ② Trans Pennine Trail. It would enter cutting, then follow mainly at grade to near Partington across the flat, open mosslands and industrial land of Carrington Moss, causing some impact on the mossland character. No listed structures would be directly affected. Two Grade II listed structures, a ⑤ school in Mossbrow and a ⑥ barn to the south-east of Birch Farmhouse, would have moderate impacts on their settings. |
| 6.11.11. | Biodiversity and wildlife | The route section would pass within 10km of four Natura 2000 wildlife sites. However, an HRA screening confirms that there would be no likely significant effects on these sites.
Two SSSI would be within 2km of the route section, but adverse impacts to these are considered unlikely.
The route section would directly affect one area of lowland raised bog BAP habitat; the impacts would be largely periphery. |
| 6.11.12. | Water resources and flood risk | ⑦ Red Brook, a minor river, may be diverted. Continuing scheme design would seek to avoid or minimise this impact.
The route section would cross some 440m of Flood Zone 3. |
| 6.11.13. | Land use resources | The route would cross about 8.1km of Grade 2 agricultural land. It would cross about 8.8km of green belt. |
| 6.11.14. | Waste and material use | It is estimated that the route section would result in a deficit of - 446,939m ³ of excavated material.

Estimated quantities of bulk building materials for this section comprise 4,000 tonnes of steel and 12,400 tonnes of concrete. |

HSM33 - Figure 1



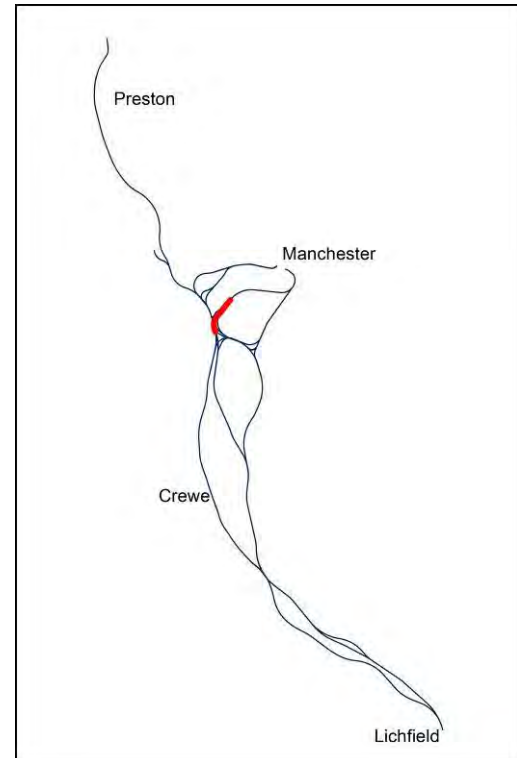
6.12. HSM34: Broomedge (T) to Carrington (W)

6.12.1. The route section between Broomedge and Carrington would be 7.3km (4.5 miles) long. It would connect south of Broomedge with HSM16 from Mere. At Carrington the route would continue along section HSM31B to Ardwick.

6.12.2. The route section would pass to the east of Broomedge, using a series of embankments and viaducts to cross the Bridgewater Canal, the River Bollin and Sinderland Brook. The route section would drop to grade, passing north-eastwards through Carrington Moss.

6.12.3. HSM34 Figure 1 illustrates the route section and the principal sustainability features in the area.

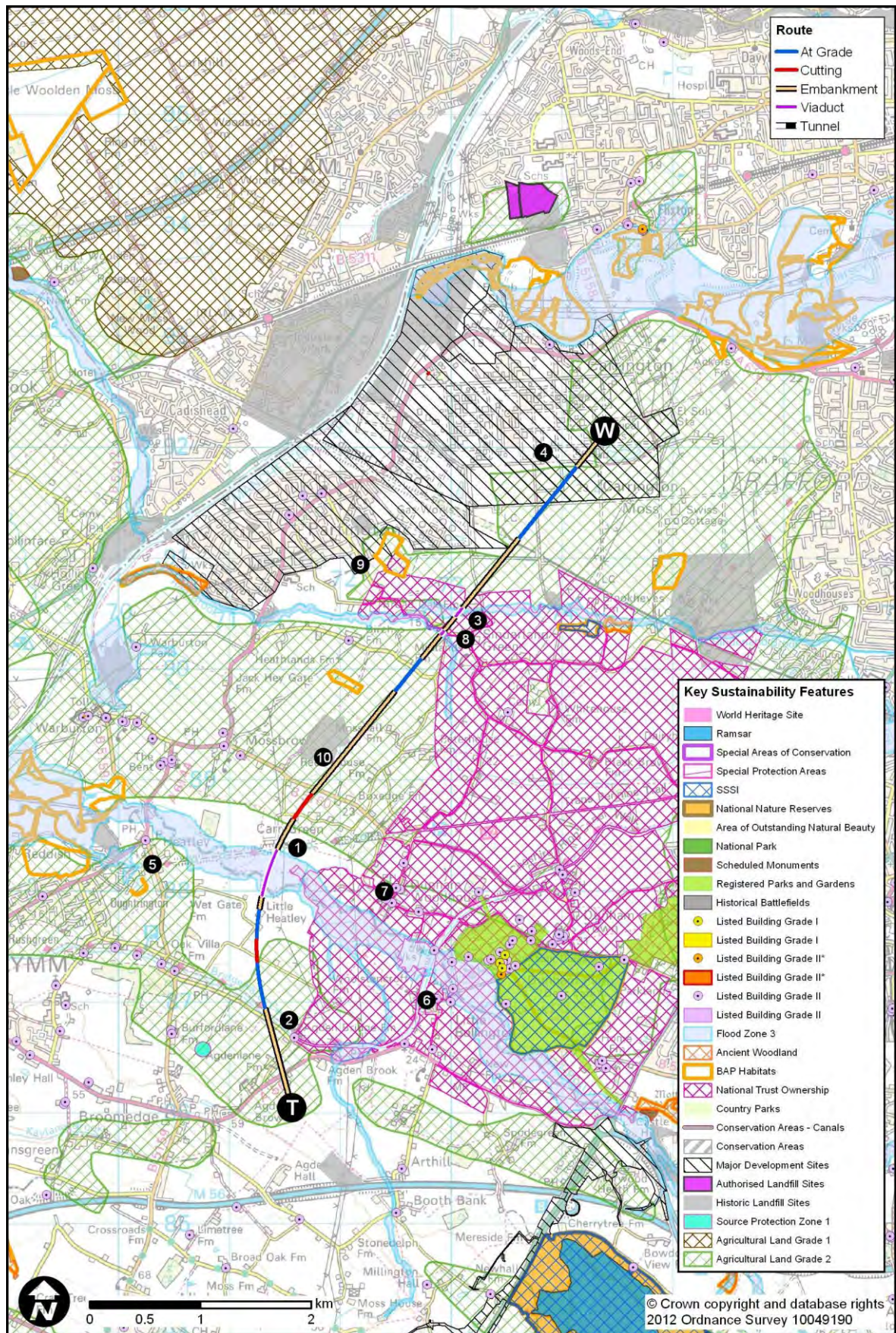
6.12.4. Specific mitigation included within the route section comprises localised realignments that have sought to reduce noise and visual impacts at the residential area of Little Bollington and Dunham Woodhouses. The realignment also sought to reduce impacts on Dunham Massey.



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| 6.12.5. | Population and settlements | The route section would result in the demolition of an estimated eight dwellings. |
| 6.12.6. | Noise | <p>Noise from HS2 trains would result in annoyance for an estimated 29 people (equivalent to the occupants of some 13 dwellings). This would represent about four people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.</p> <p>In terms of noise insulation, approximately seven dwellings would be expected to qualify, scattered along the route section. This is equivalent to approximately one dwelling per km of route section.</p> |
| 6.12.7. | Health and well-being | Approximately 13 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity. |
| 6.12.8. | Access issues | <p>Two promoted recreational routes would be crossed by the route section, namely the ① Trans Pennine Trail and the ② Cheshire Ring Canal Walk. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.</p> <p>In addition, ③ 420m of National Trust owned land would be crossed by the route section to the north of the Dunham Massey Estate, although this would be some distance from Dunham Park itself.</p> |
| 6.12.9. | Planning and development | The route section would pass through a Strategic Location in ④ Carrington. The Trafford Core Strategy (adopted January 2012) locates |

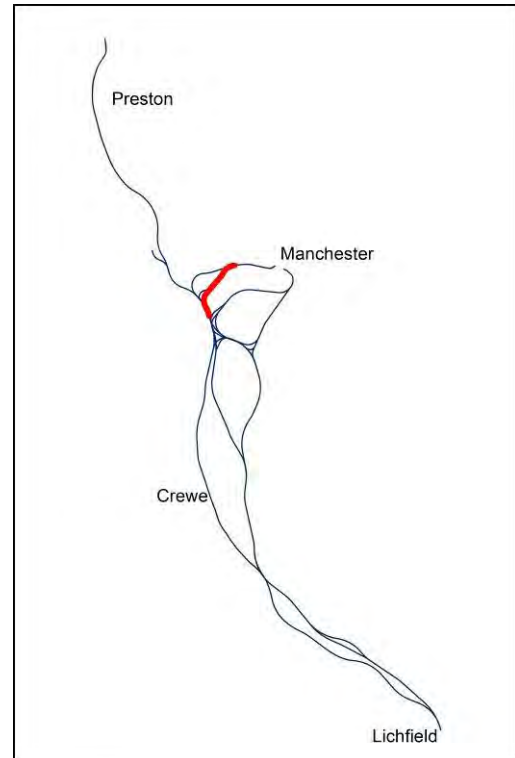
	Carrington as a Strategic Location (SL5) with the vision of encouraging regeneration that would provide 1,560 dwellings, 75 hectares of employment use land, new infrastructure and community and leisure facilities.
6.12.10. Landscape, townscape and cultural heritage	<p>Crossing a fairly flat, open, mainly agricultural landscape, the lengthy embankments and viaduct river crossing would give rise to moderate impacts on landscape character as well as visual impacts on recreational users of the ② Cheshire Ring Canal Walk (and Bridgewater Canal) and the ① Trans Pennine Trail. Any visual impacts on the villages of ⑤ Heatley, ⑥ Little Bollington and ⑦ Dunham Woodhouses would be minor, but residents of a number of hamlets (notably ⑧ Sinderland Green) and isolated dwellings might experience moderate or even major impacts. There would be some visual intrusion from the route where it crosses the open mossland landscape east of ⑨ Partington. One woodland would be directly affected by the route section.</p> <p>No listed buildings would be directly affected, and impacts on the setting of the one Grade II listed structure close to the route section would be negligible.</p>
6.12.11. Biodiversity and wildlife	<p>The route would pass within 10km of four Natura 2000 wildlife sites. However, an HRA screening confirms that there would be no likely significant effects on these sites.</p> <p>In addition, two SSSIs would be within 2km, although the risk of impact to all of them is considered to be low.</p>
6.12.12. Water resources and flood risk	The route section would cross some 500m of Flood Zone 3.
6.12.13. Land use resources	<p>The route would cross about 9.6km of Grade 2 agricultural land. It would cross about 11km of green belt.</p> <p>One landfill site near ⑩ Mossbrow would be directly affected. The design would require further work to minimise risks to people and the environment from these impacts.</p>
6.12.14. Waste and material use	<p>It is estimated that the route section would result in a surplus of 2,660,749m³ of excavated material. This includes 1,951,000m³ of tunnel excavated material.</p> <p>As a result of the route section impacting on the landfill site, it is possible that some of the waste material arising in the route section would be hazardous.</p> <p>Estimated quantities of bulk building materials for this section comprise 4,000 tonnes of steel and 12,200 tonnes of concrete.</p>

HSM34 - Figure 1



6.13. HSM35: Warburton (Q) to Winton (U)

- 6.13.1. The route section between Warburton and Winton would be 12.3km (7.6 miles) long. It would form one of three options serving Salford between Warburton and Winton, the others being HSM39 and HSM40. The route section would connect south of Warburton with either HSM12 from Winterbottom, HSM16 from Mere or HSM20 from M56 junction 7 Rostherne. At Winton the route would continue along section HSM36 to M602 junction 3.
- 6.13.2. The route section would use a very high viaduct over the Manchester Ship Canal and a second short viaduct over Glaze Brook and the Manchester to Warrington railway, before aligning at grade close alongside the M62 for about 5km. It would then bear east to join the alignment of the Liverpool to Manchester railway before passing beneath the railway in tunnel and rising onto a bridge over the M60.
- 6.13.3. HSM35 Figure 1 illustrates the route section and the principal sustainability features in the area.
- 6.13.4. Specific mitigation included within the route section comprises localised realignments that have sought to reduce noise and visual impacts at the residential areas of Glazebrook, Hollins Green and Cadishead.
- 6.13.5. **Population and settlements** The route section would result in the demolition of an estimated ten dwellings.
- Potential isolation would occur at two locations, affecting an estimated 43 dwellings in ① south Glazebrook and ② one dwelling west of Irlam. Potential severance would affect an estimated 95 dwellings ③ on the south eastern side of Glazebrook.
- 6.13.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 143 people (equivalent to the occupants of some 61 dwellings), equating to about 12 people per km of route. With ambient road noise also taken into account, noise impacts from HS2 would be expected to be substantially less than this.
- The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ④ Mossbrow, ⑤ Warburton, ⑪ Partington, ⑥ Hollins Green, ⑦ Glazebrook, ⑧ Cadishead, ⑨ Irlam, ⑩ Eccles and other scattered dwellings.
- In terms of noise insulation, approximately 48 dwellings would be expected to qualify, particularly at ⑦ Glazebrook, ⑨ Irlam and ⑩ Eccles. This is equivalent to approximately four dwellings per km of route section.



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| 6.13.7. | Health and well-being | Approximately 400 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity. |
| 6.13.8. | Access issues | No promoted recreational routes would be crossed by the route section. |
| 6.13.9. | Landscape, townscape and cultural heritage | <p>The high viaduct over the Manchester Ship Canal would give rise to significant visual intrusion for residents at 11 Partington, 6 Hollins Green and 8 Cadishead, as well as motorists on the A57 beneath it. Visual impact from the Glaze Brook viaduct would affect residents at 8 Cadishead and 7 Glazebrook and cause direct impact on woodland at 12 New Moss Wood, one of two woods affected (see <i>biodiversity and wildlife</i>), and of local recreational value.</p> <p>Running alongside the southern side of the M62, its impact on landscape character would be more limited, but it would cause visual intrusion at the edge of 9 Irlam area where it would run past a residential area for over 1km.</p> <p>At 13 Barton Moss, where it would diverge from the motorway and join an existing rail corridor up to the western edge of 10 Eccles, impacts would be limited, but visual intrusion could affect residents at 14 Peel Green.</p> |
| 6.13.10. | Biodiversity and wildlife | <p>The route section would pass within 10km of four Natura 2000 wildlife sites. The potential for significant effects at one of these sites, 15 Manchester Mosses SAC (Holcroft Moss SSSI is the closest component of the SAC), cannot be discounted at this stage. Further details are described in an HRA screening report.</p> <p>One of the other Natura 2000 sites, 16 Rixton Clay Pits SAC, is also an SSSI and would be located within 2km of the route section. Risks to the site would be low and adverse effects are unlikely.</p> <p>The route section would cross 17 Coroners Wood, an ancient woodland and upland oakwoods BAP habitat at the edge of Partington, although it is possible that this could be avoided by careful location of viaduct piers.</p> |
| 6.13.11. | Water resources and flood risk | The route section would cross some 440m Flood Zone 3. |
| 6.13.12. | Land use resources | <p>The route section would cross about 14.1km of Grade 1 agricultural land and about 8km of Grade 2 agricultural land. It would cross about 22.2km of green belt.</p> <p>Two landfill sites would be directly affected at 18 Salford and 19 Hollins Green. The design would require further work to minimise risks to people and the environment from these impacts.</p> |

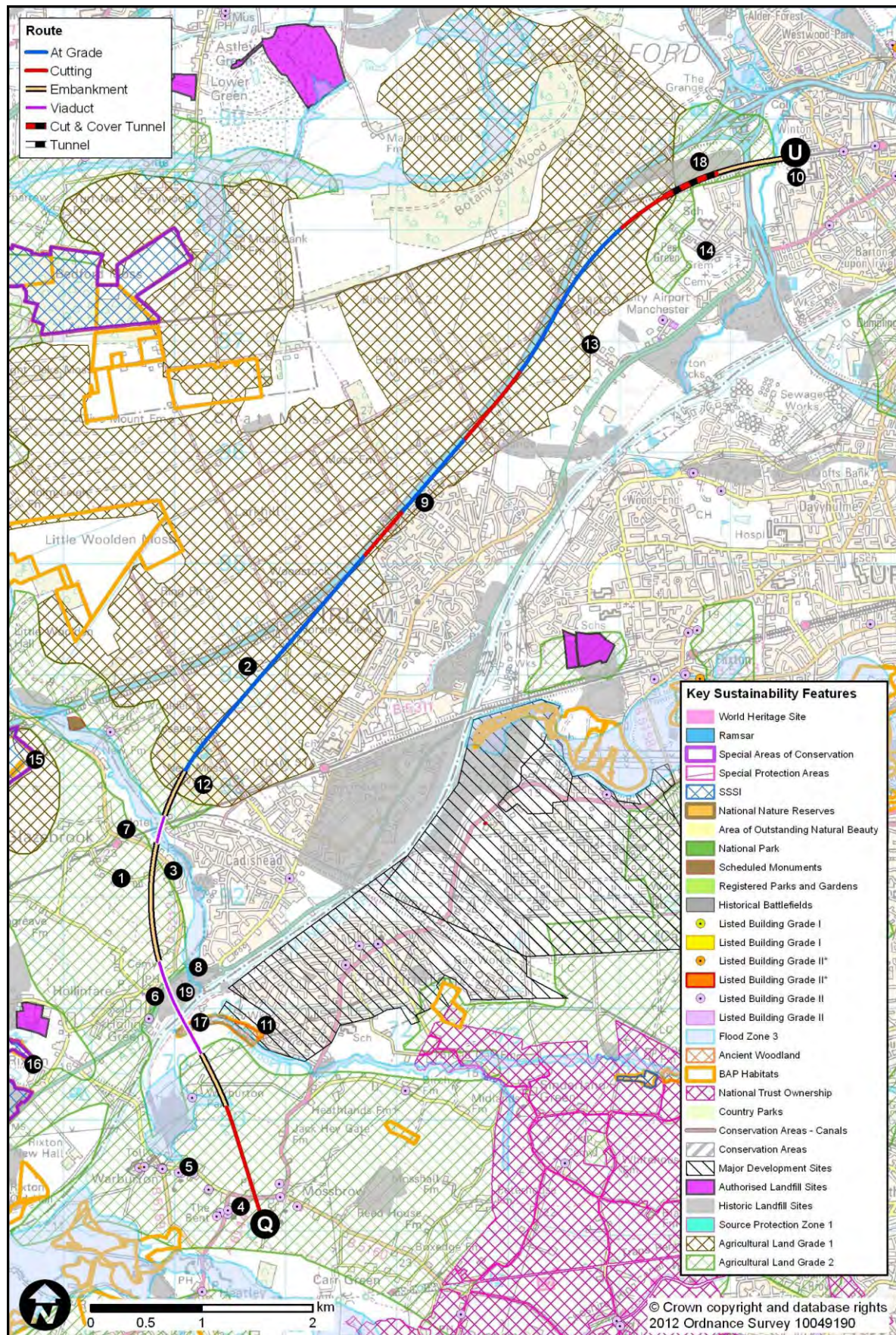
6.13.13. Waste and material use

It is estimated that the route section would result in a deficit of - 181,734m³ of excavated material.

As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.

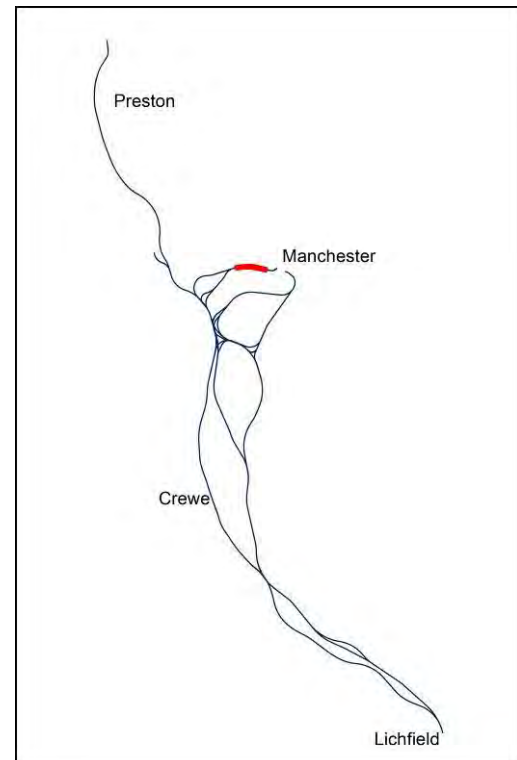
Estimated quantities of bulk building materials for this section comprise 7,900 tonnes of steel and 24,300 tonnes of concrete

HSM35 - Figure 1



6.14. HSM36: Winton (U) to M602 Junction 3 (V)

- 6.14.1. The route section between Winton and the M602 junction 3 would be 5.5km (3.4 miles) long. It would connect south of Winton with either HSM35, HSM39 or HSM40 from Warburton. At M602 junction 3 the route would continue along section HSM37 to Salford Middlewood or HSM38 to Salford Central.
- 6.14.2. Alongside the Liverpool to Manchester railway, the route section would go from embankment into cutting before entering tunnel to pass beneath Albert Road in Salford.
- 6.14.3. HSM36 Figure 1 illustrates the route section and the principal sustainability features in the area.
- 6.14.4. No additional mitigation has been incorporated into the route section at this stage.



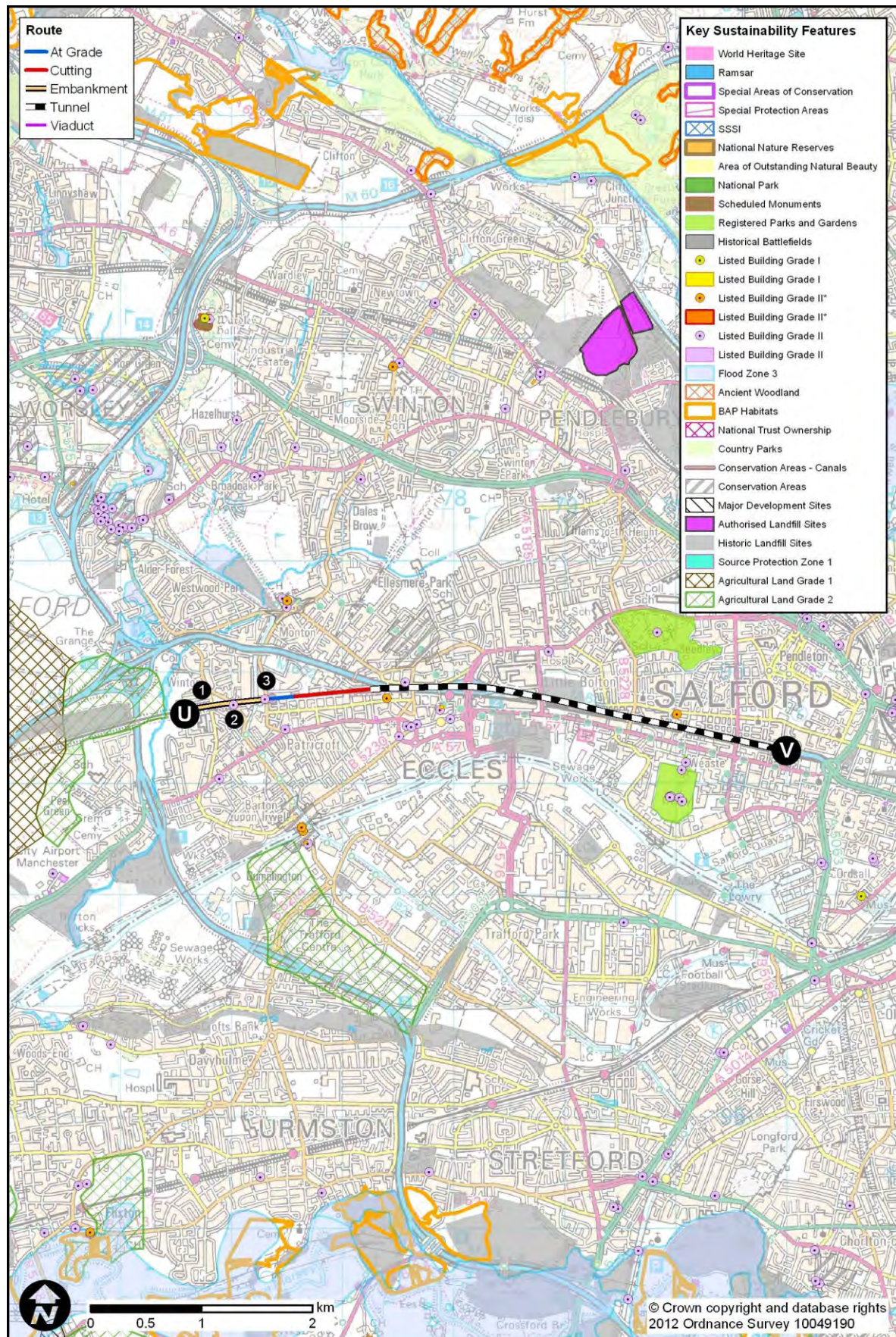
- 6.14.5. Population and settlements
The route section would result in the demolition of an estimated 93 dwellings. These include a cluster at ① Winton (Eccles). Of the total, 52 demolitions would be in areas of relatively high deprivation. In addition, 11 commercial properties would also be demolished.
- 6.14.6. Noise
Noise from HS2 trains would result in annoyance for an estimated 84 people (equivalent to the occupants of some 36 dwellings). This would represent about 16 people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.

The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near ① Winton.
In terms of noise insulation, approximately 235 dwellings would be expected to qualify, particularly at ① Winton. This is equivalent to approximately 43 dwellings per km of route section.
- 6.14.7. Health and well-being
Approximately 750 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
- 6.14.8. Access issues
No promoted recreational routes would be crossed by the route section.
- 6.14.9. Landscape, townscape and cultural heritage
As well as its direct impacts on school playing fields and housing north of the line in ① Winton (Eccles), the embanked section would bring some increase in visual impact, although this would be limited, as the existing railway in this section is already embanked.

The route section would require the demolition of the Grade II listed ② Stephenson railway bridge on Worsley Road and the ③ Queen's Arms

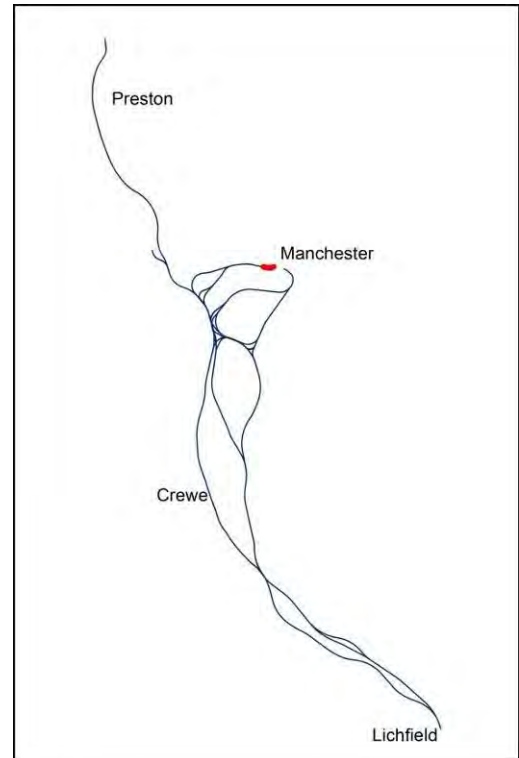
		pub on Green Lane, both in Patricroft. The loss of these would be at least a moderate impact.
6.14.10.	Biodiversity and wildlife	The route passes within 10km of one Natura 2000 wildlife site. However, an HRA screening confirms that there would be no likely significant effects on this site.
6.14.11.	Water resources and flood risk	The route section would have no significant impacts on water resources and flooding.
6.14.12.	Land use resources	The route is not predicted to have significant impacts on key land use resources.
6.14.13.	Waste and material use	<p>It is estimated that the route section would result in a surplus of 1,584,974m³ of excavated material. This includes 556,600m³ of tunnel excavated material.</p> <p>Estimated quantities of bulk building materials for this section comprise 3,500 tonnes of steel and 10,900 tonnes of concrete.</p>

HSM36 - Figure 1



6.15. HSM37: M602 Junction 3 (V) to Salford Middlewood (SM)

- 6.15.1. The route section between M602 junction 3 and Salford Central would be 2km (1.2 mile) long. The section of route would connect south of M602 junction 3 with HSM36 from Winton. The route section includes Salford Middlewood Station option.
- 6.15.2. The route section would emerge from a tunnel portal west of Windsor Street in Salford, and run east, parallel to Liverpool Street before rising over the Bolton to Bury railway on viaduct to Middlewood Locks. The new HS2 station would be located within the railway triangle at Middlewood Locks and would require the removal of the recently restored section of the Bolton and Bury Canal.
- 6.15.3. HSM37 Figure 1 illustrates the route section and the principal sustainability features in the area.
- 6.15.4. The potential for mitigation was limited at this early stage of station design. However, care was taken to minimise impact on surrounding property including the Islington Estate, and on council plans to upgrade the area.
- 6.15.5. **Population and settlements** The route section would result in the demolition of an estimated 225 dwellings on ① Middlewood Street and ② Chapel Street, and the ③ Victory Outreach Church on Liverpool Street. It would also require the demolition of six commercial properties. All of these demolitions would be in areas of relatively high deprivation.
- 6.15.6. **Noise** Modelling of noise impacts from the operational station will be undertaken as designs are progressed. They would be influenced by plant and PA systems, generated road traffic, and the frequency and speed of trains.
- 6.15.7. **Health and well-being** Approximately 400 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
- 6.15.8. **Access issues** This station would offer limited direct interchange opportunities, although it is within 15 minutes' walk of Salford Central Station.
- 6.15.9. **Jobs and houses** The works would potentially displace businesses which provide an estimated 100 jobs. However, an estimated 13,600 jobs would be supported through development around the station (generated as a result of HS2), of which between about 2,720 and 4,080 would be in areas of relatively high deprivation.
There would be an estimated 2,100 housing units supported, of which between 420 and 630 would be in areas of relatively high deprivation.
- 6.15.10. **Planning and development** The station would support the strategic growth of Greater Manchester due to its location within the core of the region.
It would encourage some growth and development at Salford as promoted by the UDP (June 2006) and Core Strategy (pre-publication



version 2011), although such growth may be constrained by the location south of Salford Central with limited links to Manchester. It would also compromise the comprehensive development of Middlewood Locks and regeneration of Salford (as promoted by The Salford Central Development Framework 2009). The station design would support proposals for a riverside park by relocating Trinity Way.

The local authority has secured outline planning consent for a masterplan to redevelop Salford city centre. The station footprint would conflict with some uses identified in this outline planning consent. However, there is potential to incorporate the station into the masterplan design. The station footprint would also conflict with approval for the redevelopment and change of use of the former Brown Brothers building into a hotel.

6.15.11. Landscape, townscape and cultural heritage

The station would be located on ④ Middlewood Locks. The new station building and car park would be larger and higher than existing structures giving rise to some visual intrusion, accentuated by the difference in height between the new and existing viaducts. Although fit with landscape character is likely to improve over time if high rise development takes place in the surrounding area, as is envisaged in the Salford Central Development Framework. Views may be affected for the high-rise development in ⑤ Rodney Street.

There would also be adverse impacts from the loss of the restored canal and the leisure potential this may have offered as part of future development. However, the relocation of Trinity Way would remove traffic from the River Irwell and facilitate the creation of attractive open space and potentially improve connectivity with Manchester. The impact on townscape overall would be moderate adverse.

There would be no direct impacts on conservation areas. The station roof may be visible from the ⑥ Adelphi and Bexley Square; and ⑦ Castlefield Conservation Areas. However, this impact should be minor due to the heights and densities of existing developments.

The Grade II listed former ⑧ Royal Bank of Scotland building would be demolished. There would also be a moderate impact on the setting and views of the Grade I listed ⑨ Railway Bridge (which runs from Salford, over the River Irwell and up to the former Liverpool Road Station) due to location and massing of the new station structure.

6.15.12. Biodiversity and wildlife

The route section would pass within 10km of one Natura 2000 wildlife sites. However, an HRA screening confirms that there would be no likely significant effects on this site.

6.15.13. Water resources and flood risk

The station would remove the restored ④ Middlewood Locks section of the recently restored Bolton and Bury Canal. Provided the link with the Irwell is properly managed there would be no impact to the River Irwell. The construction boundary would intersect 2,000m² of SPZ2. It is unlikely to have a significant impact on the abstraction at Strangeways (200m³/day).

6.15.14. Land use resources

The route section would cross no agricultural land or green belt.

Two landfill sites in Salford, at ⑩ Windsor Street and at ⑪ Oldfield Road, would be directly affected. The design would require further work to minimise risks to people and the environment from these impacts.

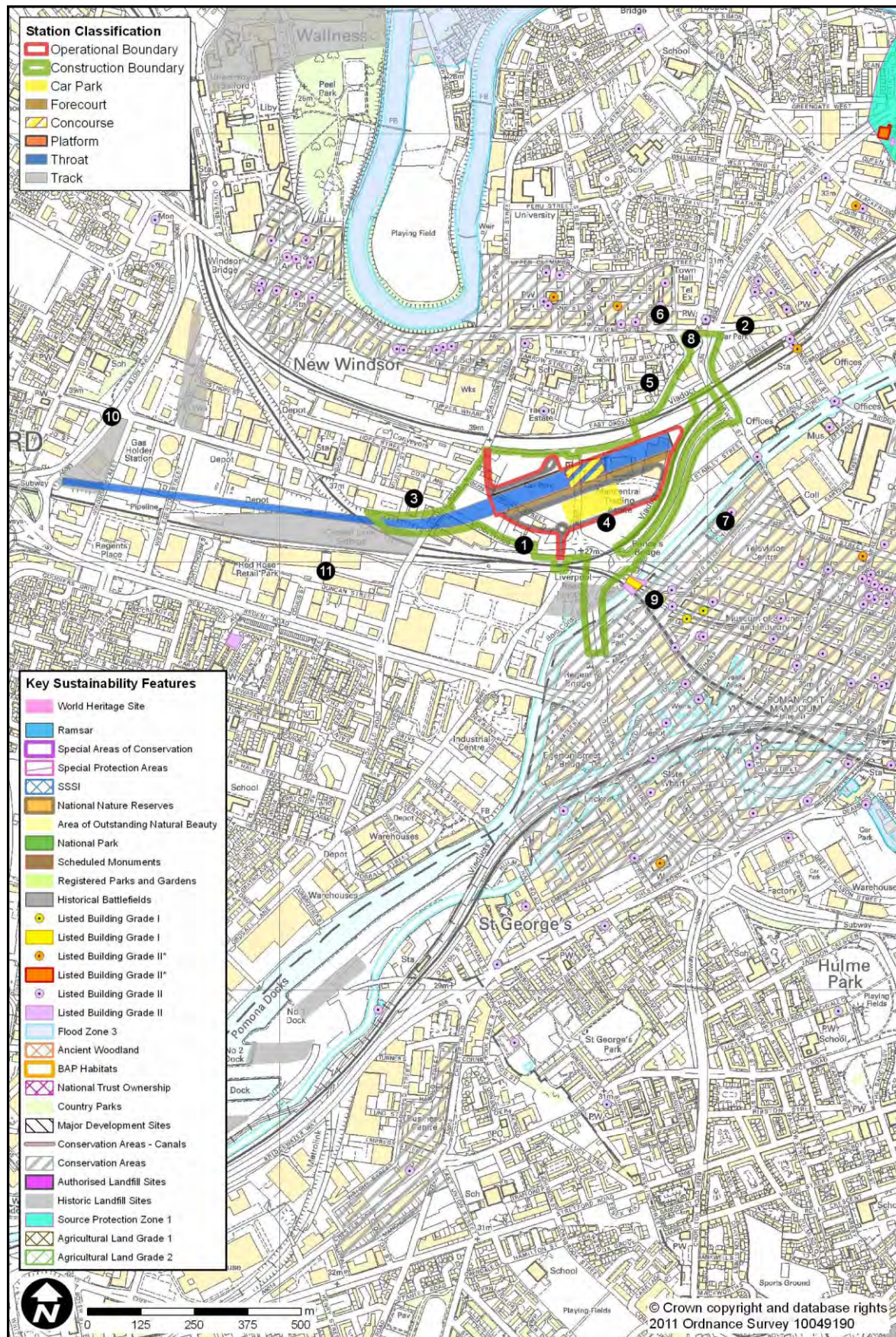
6.15.15. Waste and material use

It is estimated that the route section would result in a surplus of 226,239m³ of excavated material.

As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.

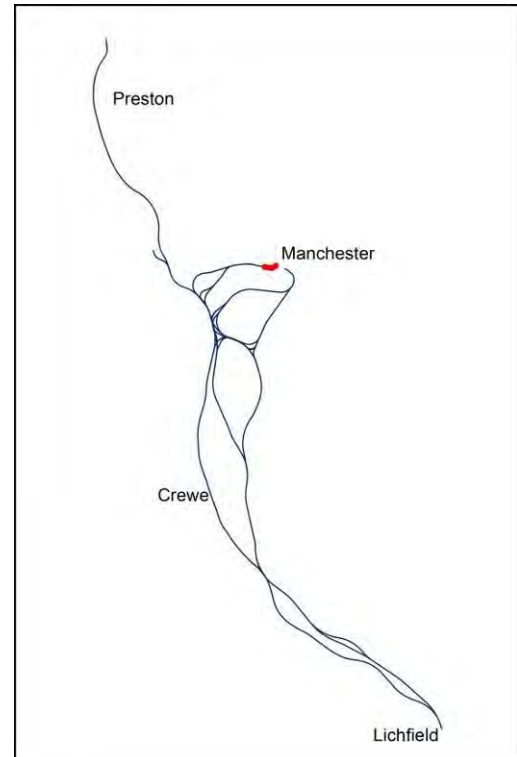
Estimated quantities of bulk building materials for this section comprise 500 tonnes of steel and 1,500 tonnes of concrete. The station would require an additional 321,300 tonnes of concrete; estimated quantities of steel are not provided at this stage.

HSM37 Figure 1



6.16. HSM38: M602 Junction 3 (V) to Salford Central (SC)

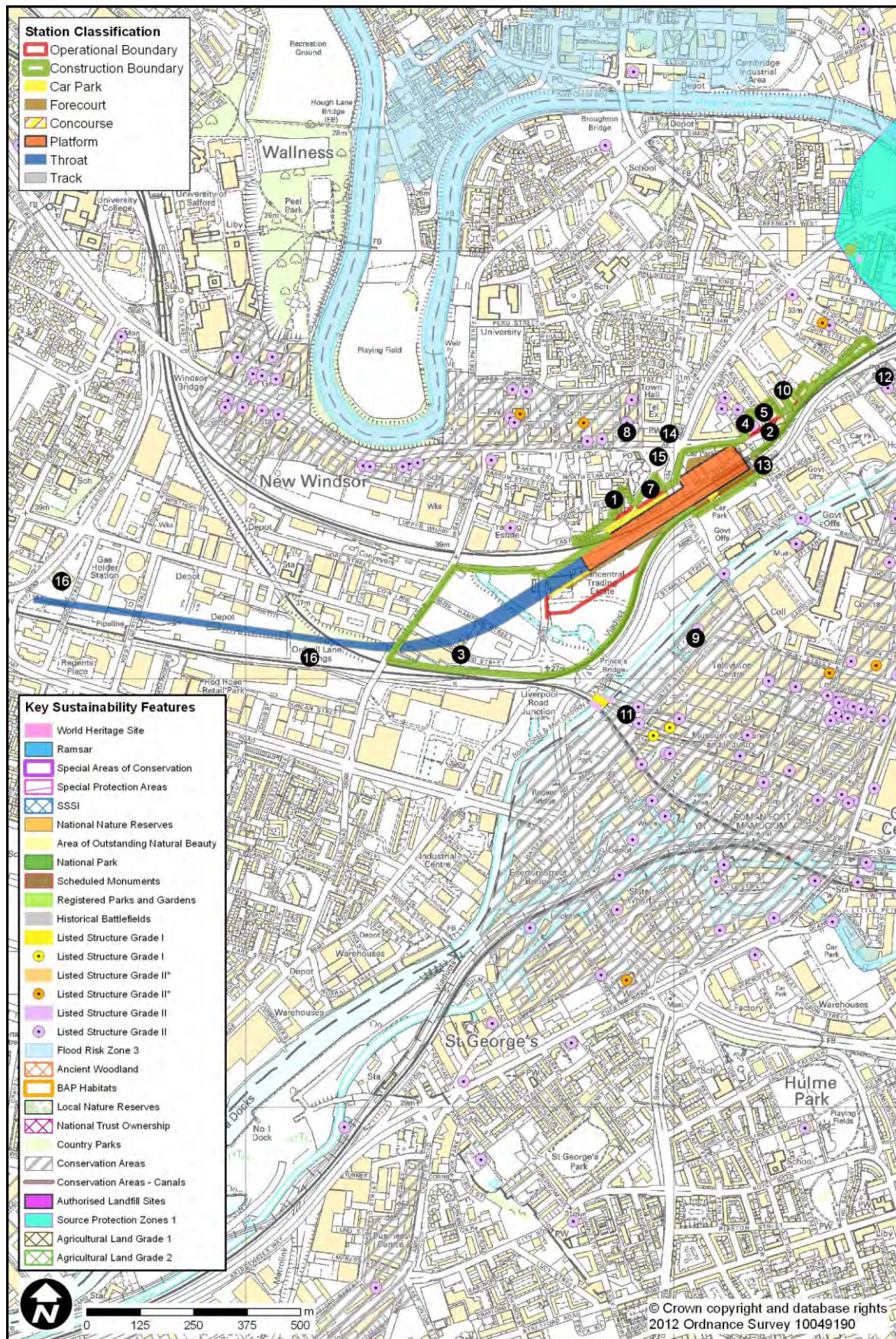
- 6.16.1. The route section between M602 junction 3 and Salford Central would be 2.3km (1.4 miles) long. The section of route would connect south of M602 junction 3 with HSM36 down to Winton. The route section includes Salford Central Station option.
- 6.16.2. The route section would emerge from a tunnel portal west of Windsor Street in Salford and run east, parallel to Liverpool Street before rising over the existing Bolton to Bury railway on viaduct across Middlewood Locks to the existing Salford Central Station, which would need to be completely remodelled. The new HS2 station would be located between the existing tracks at Salford Central Station with one set of tracks realigned north.
- 6.16.3. HSM38 Figure 1 illustrates the route alignment and the principal sustainability features in the area.
- 6.16.4. The potential for mitigation was limited at this early stage of station design. However, care was taken to minimise impact on the Islington Estate, surrounding property and Salford City Council plans to upgrade the area. The station structure was also set back from the Grade II* listed viaducts to the east.
- 6.16.5. **Population and settlements** The route section would result in the demolition of an estimated 363 dwellings located on ① Rodney Street, ② Chapel Street and ③ Middlewood Street. Of these, 221 residential demolitions would be in areas of relatively high deprivation. Demolition of the ④ Hope United Reform Church and a ⑤ doctor's surgery and 14 commercial properties would also be required.
- 6.16.6. **Noise** Modelling of noise impacts from the operational station will be undertaken as designs are progressed. They would be influenced by plant and PA systems, generated road traffic, and the frequency and speed of trains.
- 6.16.7. **Health and well-being** Approximately 1,400 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
- 6.16.8. **Access issues** This station would have direct interchange with national rail and would be within 15 minutes' walk of a Metrolink stop. It would also create new opportunities for pedestrian routes with the opening up of the existing viaduct structure.
- 6.16.9. **Jobs and houses** The works would potentially displace businesses which provide an estimated 500 jobs. However, an estimated 20,000 jobs would be supported through development around the station (generated as a result of HS2), of which between 4,000 and 6,000 would be in areas of relatively high deprivation.
There would be an estimated 2,900 housing units supported, of which between 580 and 870 would be in areas of relatively high deprivation.



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| 6.16.10. Planning and development | <p>The station would support the strategic growth of Greater Manchester due to its location within the core of the region.</p> <p>The UDP (June 2006) and Core Strategy (pre-publication version 2011) set out a framework for high residential growth and large scale office development around the station.</p> <p>Due to its location within the core of the region the station option would compromise the comprehensive development of Middlewood Locks and regeneration of Salford (as promoted by The Salford Central Development Framework 2009). The local authority has secured outline planning consent for a masterplan to redevelop Salford city centre. The station footprint would conflict with some uses identified in this outline planning consent. However, there is potential to incorporate the station footprint into the masterplan design.</p> <p>The station would conflict with approval for the redevelopment and change of use of the former 7 Brown Brothers building into a hotel.</p> |
| 6.16.11. Landscape, townscape and cultural heritage | <p>The station would be located on the site of the existing Salford Central Station between the two existing railway lines. It would reinforce and lengthen the existing visual separation between Manchester and Salford centres. It would also adversely affect views from high rise flats in 1 Rodney Street. Benefits would include improved north-south pedestrian connectivity and the potential for the raised station building to integrate well with Local Authority plans to increase development intensity in the area. Overall, the station would have a moderate adverse impact on townscape.</p> <p>There would be no direct impacts on conservation areas. The station roof may be visible from the 8 Adelphi and Bexley Square and 9 Castlefield conservation areas, although this impact is likely to be negligible due to the heights and densities of existing developments.</p> <p>Two Grade II listed buildings would be demolished (4 Chapel Street Hope and United Reform Church and the 10 Chester's Salford Brewery). There would be a minor impact on the setting of the Grade I listed 11 Railway Bridge over the River Irwell to the former Liverpool Road Station (which runs from Salford, over the River Irwell and up to the former Liverpool Road Station) due to potential views of the new viaduct structure.</p> <p>The setting of the Grade II* 12 Church of the Sacred Trinity may be affected, although it would be partly screened by the existing railway viaduct. The new station structure would be immediately adjacent to the Grade II* 13 Southern Railway Viaduct and Colonnade, although with careful design the impact would be limited. The slewing of existing tracks to the north and the new station structure would affect the setting of four Grade II listed structures (14 the Independent Chapel, 13 The Central Railway Viaduct, 13 the Northern Railway Viaduct and 15 the former Royal Bank of Scotland).</p> |
| 6.16.12. Biodiversity and wildlife | <p>The route section would pass within 10km of one Natura 2000 wildlife sites. However, the HRA screening confirms that there would be no likely significant effects on this site.</p> |

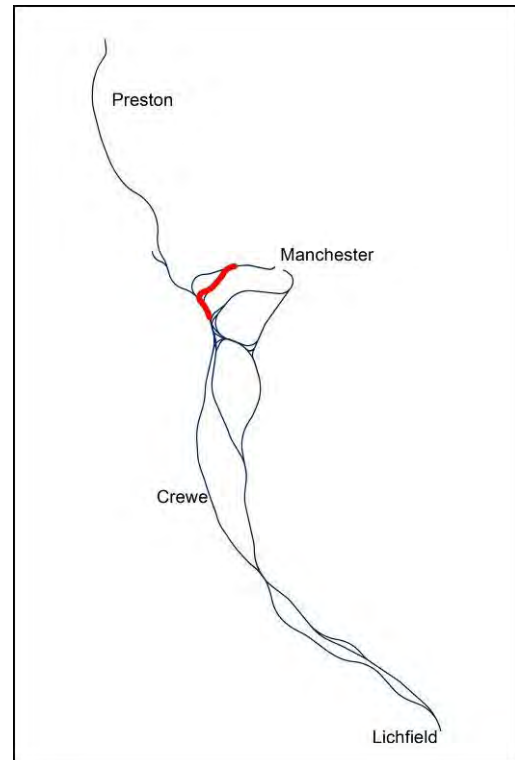
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| 6.16.13. Water resources and flood risk | <p>The elevated section of the throat would pass over the recently restored Middlewood Locks section of the disused Bolton and Bury Canal, which is disused but subject to restoration. The viaduct would need to be at least 2.4m above normal water level to allow navigation of the canal if it is to remain viable.</p> <p>The construction boundary would intersect 29,000m² of SPZ2. It is unlikely to have a significant impact on the abstraction at Strangeways abstraction (200m³/day)</p> |
| 6.16.14. Land use resources | <p>Two landfill sites at 16 Salford would be directly affected. The design would require further work to minimise risks to people and the environment from these impacts.</p> |
| 6.16.15. Waste and material use | <p>It is estimated that the route section would result in a surplus of 217,016m³ of excavated material.</p> <p>As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.</p> <p>Estimated quantities of bulk building materials for this section comprise 600 tonnes of steel and 1,800 tonnes of concrete. The station would require an additional 320,800 tonnes of concrete; estimated quantities of steel are not provided at this stage.</p> |

HSM38 Figure 1



6.17. HSM39: Warburton (Q) to Winton (U)

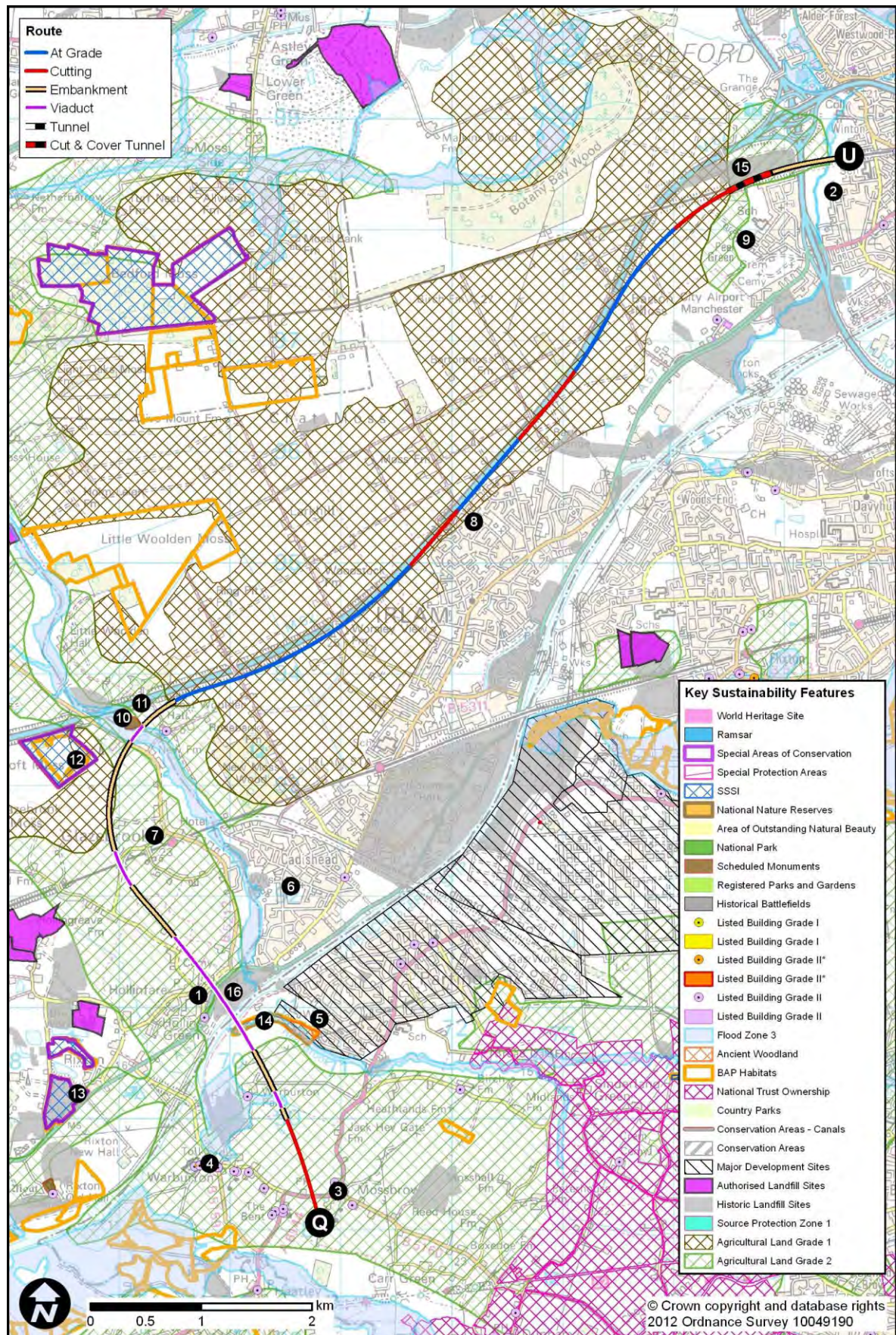
- 6.17.1. The route section between Warburton and Winton would be about 13km (8.1 miles) long. It would form one of three Salford approach options between Warburton and Winton, the others being HSM35 and HSM40. The route section would connect to the south of Warburton with either HSM12 from Winterbottom, HSM16 from Mere or HSM20 from M56 junction 7 Rostherne. At Winton the route would continue along section HSM36 to M602 junction 3.
- 6.17.2. The route section would use a high viaduct to cross the Manchester Ship Canal and two further viaducts over the Manchester to Warrington railway and Glaze Brook, before aligning at grade alongside the M62 for about 7km. It would bear east to join the alignment of the Liverpool to Manchester railway before passing beneath the railway in tunnel and rising onto a bridge over the M60.
- 6.17.3. HSM39 Figure 1 illustrates the route alignment and the principal sustainability features in the area.
- 6.17.4. Specific mitigation included within the route section comprises a number of localised realignments that have sought to move the scheme further from Rixton Clay Pits and Risley Moss to reduce impact on landscape, ecology and hydrology, Glazebrook, Iron Age Promontory fort at Great Woollen Hall Farm and Holcroft.
- 6.17.5. **Population and settlements** The route section would result in the demolition of an estimated seven dwellings.
- 6.17.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 474 people (equivalent to the occupants of some 201 dwellings). This would represent about 37 people per km of route. With ambient road noise also taken into account, noise impacts from HS2 would be expected to be less than this.
- The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ③ Mossbrow, ④ Warburton, ⑤ Partington, ① Hollins Green, ⑥ Cadishead, ⑦ Glazebrook, ⑧ Irlam, ② Eccles and other scattered dwellings.
- In terms of noise insulation, approximately 124 dwellings would be expected to qualify, particularly at ① Hollins Green, ⑧ Irlam and ② Eccles. This is equivalent to approximately 10 dwellings potentially qualifying per km of route section.
- 6.17.7. **Health and well-being** An estimated 434 dwellings would be located within 100m of the route section and would be at greater risk of disturbance from construction activity.



6.17.8.	Access issues	No promoted recreational routes would be crossed by the route section.
6.17.9.	Landscape, townscape and cultural heritage	<p>The high viaduct over the Manchester Ship Canal would give rise to significant visual intrusion for residents at ⑤ Partington, ① Hollins Green and ⑥ Cadishead, as well as motorists on the A57 beneath it. The embankment and viaduct over the Liverpool-Manchester railway would result in visual impact at ⑦ Glazebrook. Residents at the western edge of ⑥ Cadishead would have impacts from more distant views of the embankment and viaduct over the Glaze Brook.</p> <p>Running alongside the southern side of the M62, its impact on landscape character would be more limited, but it would cause visual intrusion at the edge of ⑧ Irlam where it would run past a residential area for over 1km. At Barton Moss, where it would diverge from the motorway and join an existing rail corridor up to the western edge of Eccles, impacts would be limited, but visual intrusion could affect residents at ⑨ Peel Green.</p> <p>Two woodlands would be directly affected by the route section (see also <i>biodiversity and wildlife</i>).</p> <p>The route section would pass very close to the scheduled Iron Age Promontory of the Fort at ⑩ Great Woolden Hall Farm. Great care would be needed during construction to avoid direct impacts on this feature. The setting of this structure would be greatly affected by the proposed viaduct over the ⑪ Glaze Brook.</p>
6.17.10.	Biodiversity and wildlife	<p>The route passes within 10km of four Natura 2000 wildlife sites. The potential for significant effects at one of these sites, ⑫ Manchester Mosses SAC, cannot be discounted at this stage. Further details are described in an HRA screening report.</p> <p>One of the other Natura 2000 sites, ⑬ Rixton Clay Pits SAC, is also an SSSI and would be located within 2km of the route section. Risks to the site would be low and adverse effects are unlikely.</p> <p>The route section would cross ⑭ Coroners Wood, an ancient woodland and upland oakwoods BAP habitat at the edge of Partington, although it is possible that this could be avoided by careful location of viaduct piers</p>
6.17.11.	Water resources and flood risk	<p>⑪ Glaze Brook tributary at Great Woolden Hall, a minor river, may be diverted. Continuing scheme design would seek to avoid or minimise this impact.</p> <p>The route section would cross some 410m of Flood Zone 3.</p>
6.17.12.	Land use resources	<p>The route would cross about 14.9km of Grade 1 agricultural land and about 7.3km of Grade 2 agricultural land. It would cross about 22km of green belt.</p> <p>Two landfill sites at ⑮ west of Salford and ⑯ east of Hollins Green would be directly affected. The design would require further work to minimise risks to people and the environment from these impacts.</p>
6.17.13.	Waste and material use	<p>It is estimated that the route section would result in a deficit of - 758,914m³ of excavated material.</p> <p>As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.</p>

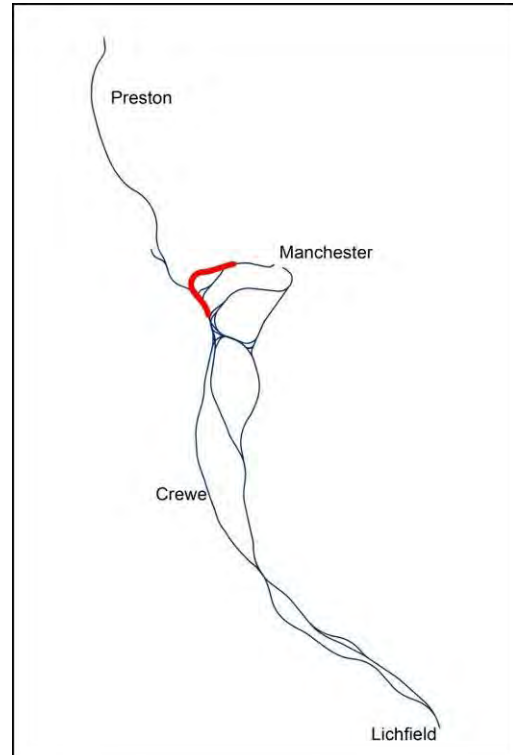
Estimated quantities of bulk building materials for this section comprise 7,600 tonnes of steel and 23,400 tonnes of concrete.

HSM39 - Figure 1



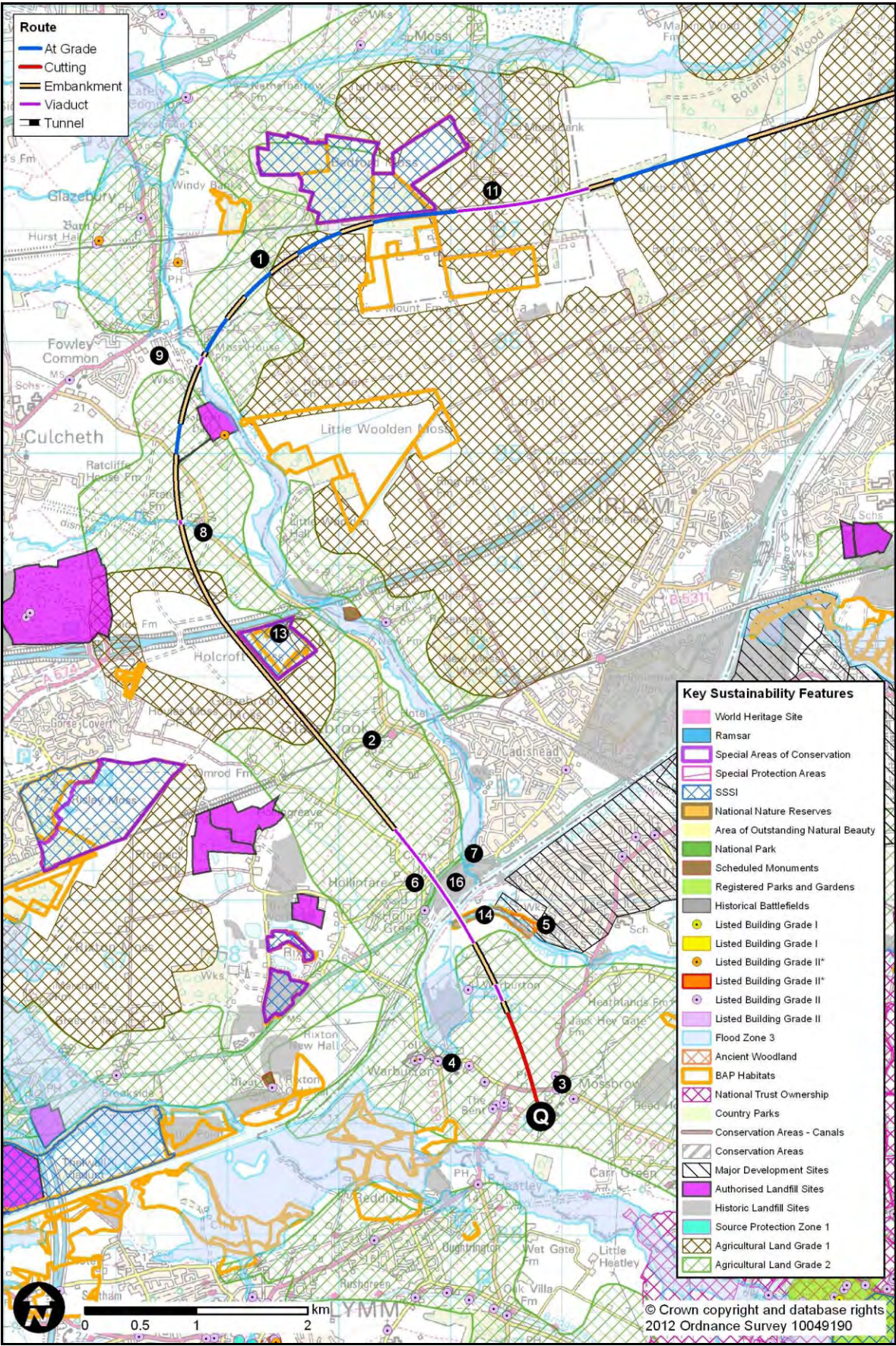
6.18. HSM40: Warburton (Q) to Winton (U)

- 6.18.1. The route section between Warburton and Winton would be about 16.3km (10.1 miles) long. It would form one of three Salford approach options between Warburton and Winton, the others being HSM35 and HSM39. The route section would connect south of Warburton with either HSM12 from Winterbottom, HSM16 from Mere or HSM20 from M56 junction 7 Rostherne. At Winton the route would continue along section HSM36 to M602 junction 3.
- 6.18.2. The route section would use a high viaduct to cross the Manchester Ship Canal and would remain on embankment for several kilometres to cross first the Manchester to Warrington railway and then the M62 before turning northwards and over the Glaze Brook on viaduct. The route section would pass at grade through the flat peatlands of Chat Moss, aligning with the Liverpool to Manchester railway for several kilometres into Winton.
- 6.18.3. HSM40 Figures 1 to 2 illustrate the route section and the principal sustainability features in the area.
- 6.18.4. Specific mitigation included within the route section comprises a number of localised realignments that have sought to move the scheme further from Rixton Clay Pits and Risley Moss to reduce impact on landscape, ecology and hydrology, Glazebrook, Iron Age Promontory Fort at Great Woollen Hall Farm and Holcroft.
- 6.18.5. **Population and settlements** The route section would result in the demolition of an estimated eight dwellings. Potential isolation would affect an estimated four dwellings south-east of ① Glazebury.
- 6.18.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 451 people (equivalent to the occupants of some 192 dwellings). This would represent about 28 people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.
- The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ③ Mossbrow, ④ Warburton, ⑤ Partington, ⑥ Hollins Green, ⑦ Cadishead, ② Glazebrook, ⑧ Willow Brook, ⑨ Fowley Common and ⑩ Eccles.
- In terms of noise insulation, approximately 109 dwellings would be expected to qualify, particularly at ⑥ Hollins Green, ⑨ Fowley Common and ⑩ Eccles. This is equivalent to approximately seven dwellings per km of route section.

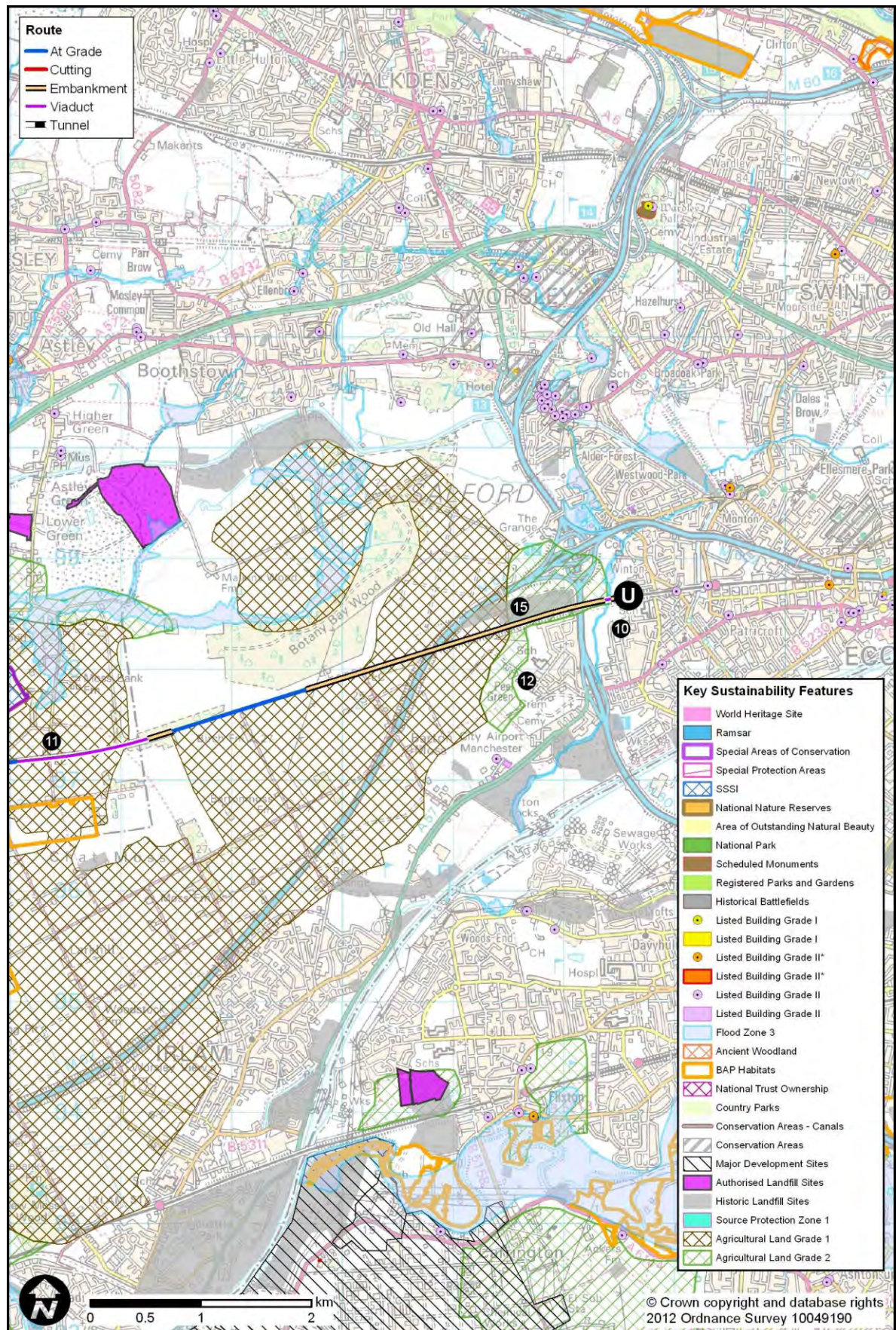


6.18.7.	Health and well-being	Approximately 184 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
6.18.8.	Access issues	No promoted recreational routes would be crossed by the route section.
6.18.9.	Landscape, townscape and cultural heritage	<p>The high viaduct over the Manchester Ship Canal would give rise to significant visual intrusion for residents at ⑤ Partington, ⑥ Hollins Green and ⑦ Cadishead, as well as motorists on the A57 beneath it. The impacts at ⑥ Hollins Green and ⑦ Cadishead would persist from the embankment that would continue to the north-west.</p> <p>The route section would continue on embankment to a bridge over the M62, continuing on embankment and grade. The principal landscape and visual impacts of the route section would be near ② Glazebrook and ⑨ Fowley Common in the west, where residents would have views of the embankment. There would also be more limited visual impacts from embankments along the route of the existing railway in the ⑪ Astley Moss and ⑫ Peel Green areas. There would be direct impacts on the edges of a number of existing woodlands that adjoin the route, six of which would be directly affected (see also <i>biodiversity and wildlife</i>).</p>
6.18.10.	Biodiversity and wildlife	<p>The route section would pass within 10km of four Natura 2000 wildlife sites. The potential for significant effects at one of these sites, ⑬ Manchester Mosses SAC, cannot be discounted at this stage. Further details are described in an HRA screening report.</p> <p>The route section would cross ⑭ Coroners Wood, an ancient woodland and upland oakwoods BAP habitat at the edge of Partington, although it is possible that this could be avoided by careful location of viaduct piers.</p>
6.18.11.	Water resources and flood risk	The route section would cross some 300m of Flood Zone 3.
6.18.12.	Land use resources	<p>The route section would cross about 11.3km of Grade 1 agricultural land, and approximately 11km of Grade 2 agricultural land. It would cross about 27.6km of green belt.</p> <p>Two landfill sites at ⑮ west of Salford and ⑯ east of Hollins Green would be directly affected. The design would require further work to minimise risks to people and the environment from these impacts.</p>
6.18.13.	Waste and material use	<p>It is estimated that the route section would result in a deficit of - 516,335m³ of excavated material.</p> <p>As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.</p> <p>Estimated quantities of bulk building materials for this section comprise 9,400 tonnes of steel and 29,000 tonnes of concrete.</p>

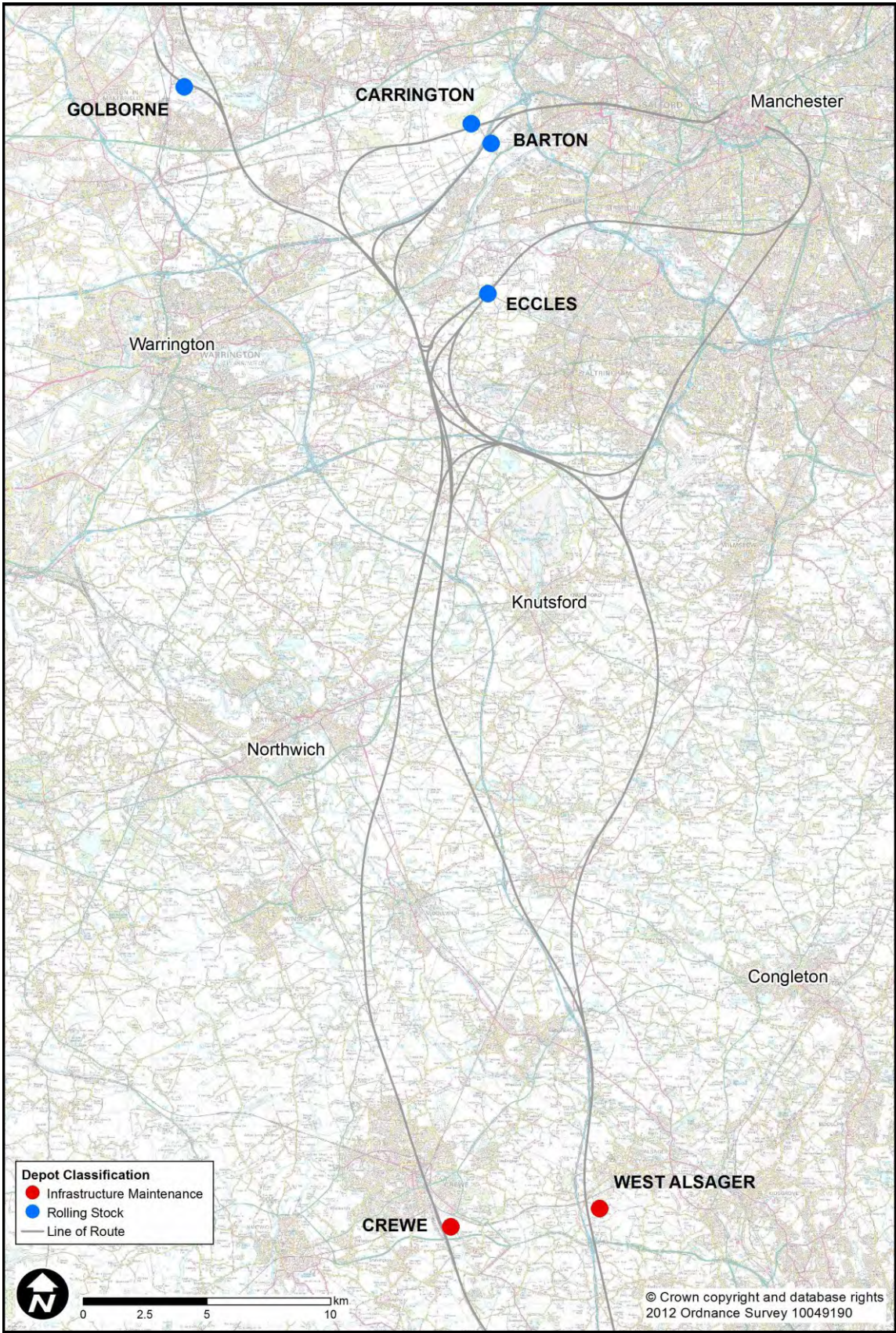
HSM40 - Figure 1 of 2



HSM40 - Figure 2 of 2



7. Manchester route: depots

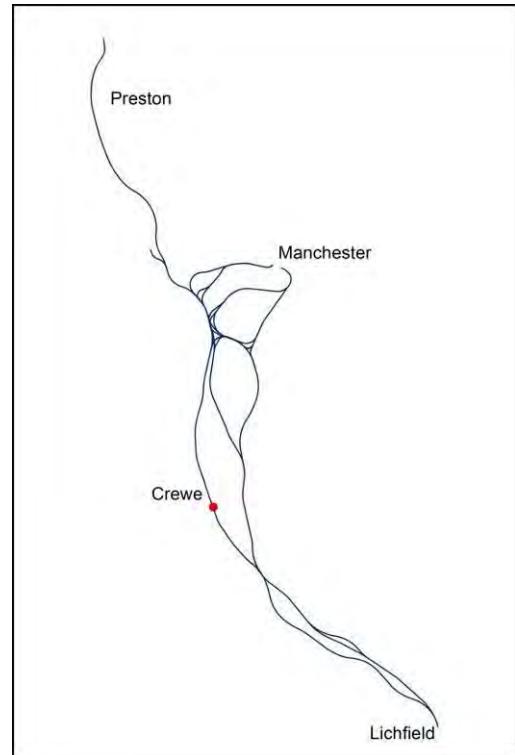


7.1. Crewe Infrastructure Maintenance Depot

7.1.1. The Crewe IMD option would be located on farmland south of Crewe between the A500 and Crewe Green. The depot option would be double ended and connect with the WCML connection route section (HSM09) and the Crewe to Kidsgrove railway using embankments to carry the depot approaches over the railway just south of its tunnel beneath Crewe. A separate connection with the existing Crewe to Kidsgrove railway would be provided just east of Stowford. A new road access would be from a nearby roundabout on the A500.

7.1.2. Crewe IMD Figure 1 illustrates the depot and rail approach and the principal sustainability features in the area.

7.1.3. The potential for mitigation was limited at this early stage of depot design. However, care was taken to minimise impact on the surrounding landscape, property, historic assets and water resources.



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| 7.1.4. | Population and settlements | One commercial property at ❶ Dairy House off Weston Lane would be demolished.
Potential isolation would affect two dwellings at ❷ Basford Hall and one dwelling at ❸ Croatia Mill Farm. |
| 7.1.5. | Noise | Modelling of noise impacts from the operational depot has not been undertaken. Noise impacts would be influenced by plant, generated road traffic, and the frequency and speed of trains travelling into the depot. |
| 7.1.6. | Health and well-being | Approximately six dwellings would be located within 100m of the depot and rail approach that could be at greater risk of disturbance from construction activity. |
| 7.1.7. | Access issues | The depot option would not cross any promoted recreational routes. |
| 7.1.8. | Jobs | It is estimated that approximately 100 jobs would be created by the depot. |
| 7.1.9. | Planning and development | The depot site falls within land allocated by Cheshire East Council as a strategic site (Basford East) for major industrial and business development and would therefore be in compliance with this policy. The depot would conflict with local development policies (Borough of Crewe and Nantwich Replacement Local Plan and emerging LDF) as it lies within green belt. |
| 7.1.10. | Landscape, townscape and cultural heritage | The depot site is in an area of open, flat farmland close to existing railway sidings and industrial land. Therefore, the depot and associated works would generally adjoin similar existing development. Landscape and visual impacts would be minor, or moderate at worst. The principal visual receptors would be motorists on the A500, and there might be limited views from the village of ❹ Weston, which lies close to the proposed |

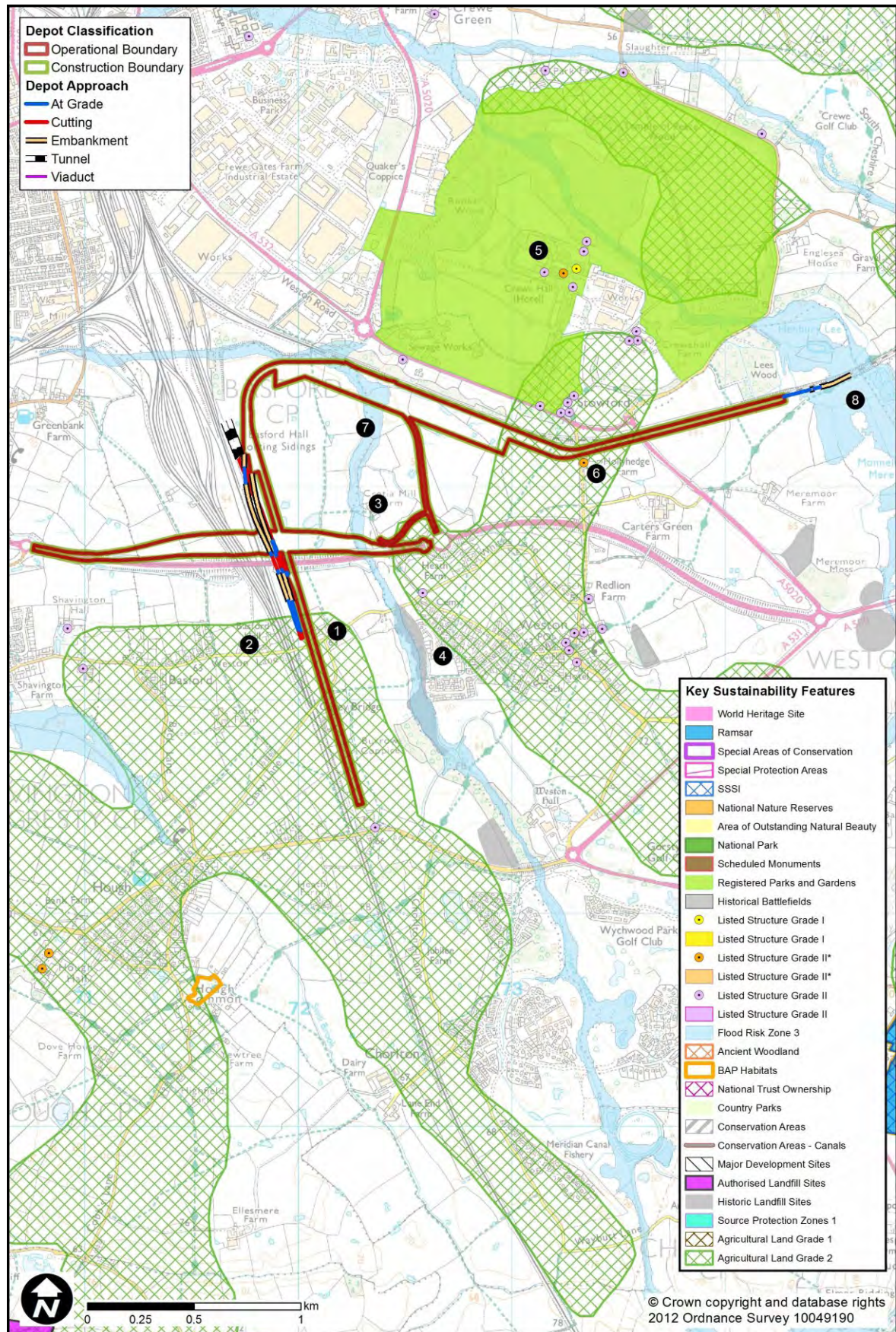
access road.

⑤ Crewe Hall with its Grade II Registered Park and Garden is located close to the north. In the summer it would be well screened by dense woodland around the parkland edge, but in the winter impacts on its setting would be moderate.

⑥ Hollyhedge Farmhouse a Grade II* listed structure is very close to the operational boundary of the depot and, in the flat open landscape, would have a moderate impact on its setting.

7.1.11.	Biodiversity and wildlife	The route passes within 10km of three Natura 2000 wildlife sites. However, HRA screening confirms that there would be no likely significant effects on these.
7.1.12.	Water resources and flood risk	The depot spans the entire floodplain (Flood Zone 3) of the ⑦ Basford Brook and part of the floodplain of the ⑧ Englesea Brook. Significant in-channel works or possible diversion would be required to convey flows past the depot.
7.1.13.	Land use resources	The depot and approach would occupy approximately 7.6ha of Grade 2 agricultural land. They would occupy about 4.7ha of green belt.
7.1.14.	Waste and material use	It is estimated that the route section would result in a surplus of 32,400m ³ of excavated material. The construction of the depot and approach would require approximately 500 tonnes of steel and 1,500 tonnes of concrete.

Crewe IMD Figure 1

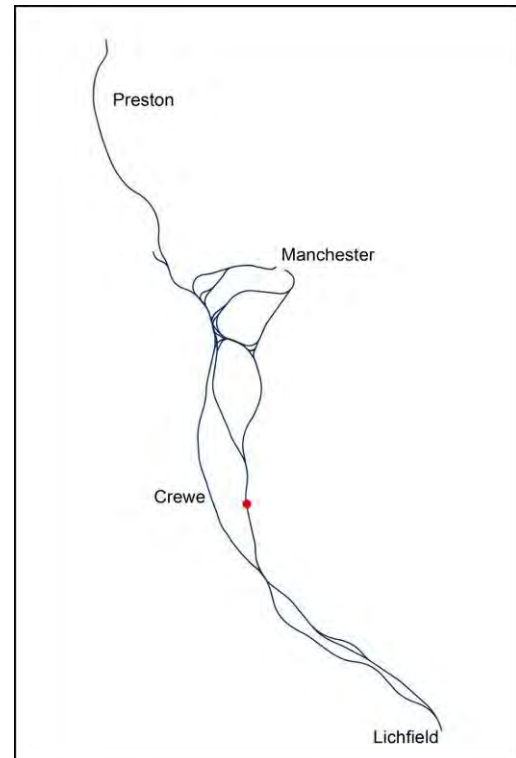


7.2. West Alsager Infrastructure Maintenance Depot

7.2.1. The West Alsager IMD option would be located on farmland close to Radway Green to the south of Alsager adjacent to Radway Green Business Centre. Road access would be from Radway Green Road (B5077), which provides existing access to the business centre. The southern approach line would be on embankment alongside the M6 with a bridge over the A500. This option would be double ended with connections from the west to route sections HSM 13 and 17 and from the east to the Crewe to Kidsgrove railway.

7.2.2. West Alsager IMD Figure 1 illustrates the depot and rail approach and the principal sustainability features in the area.

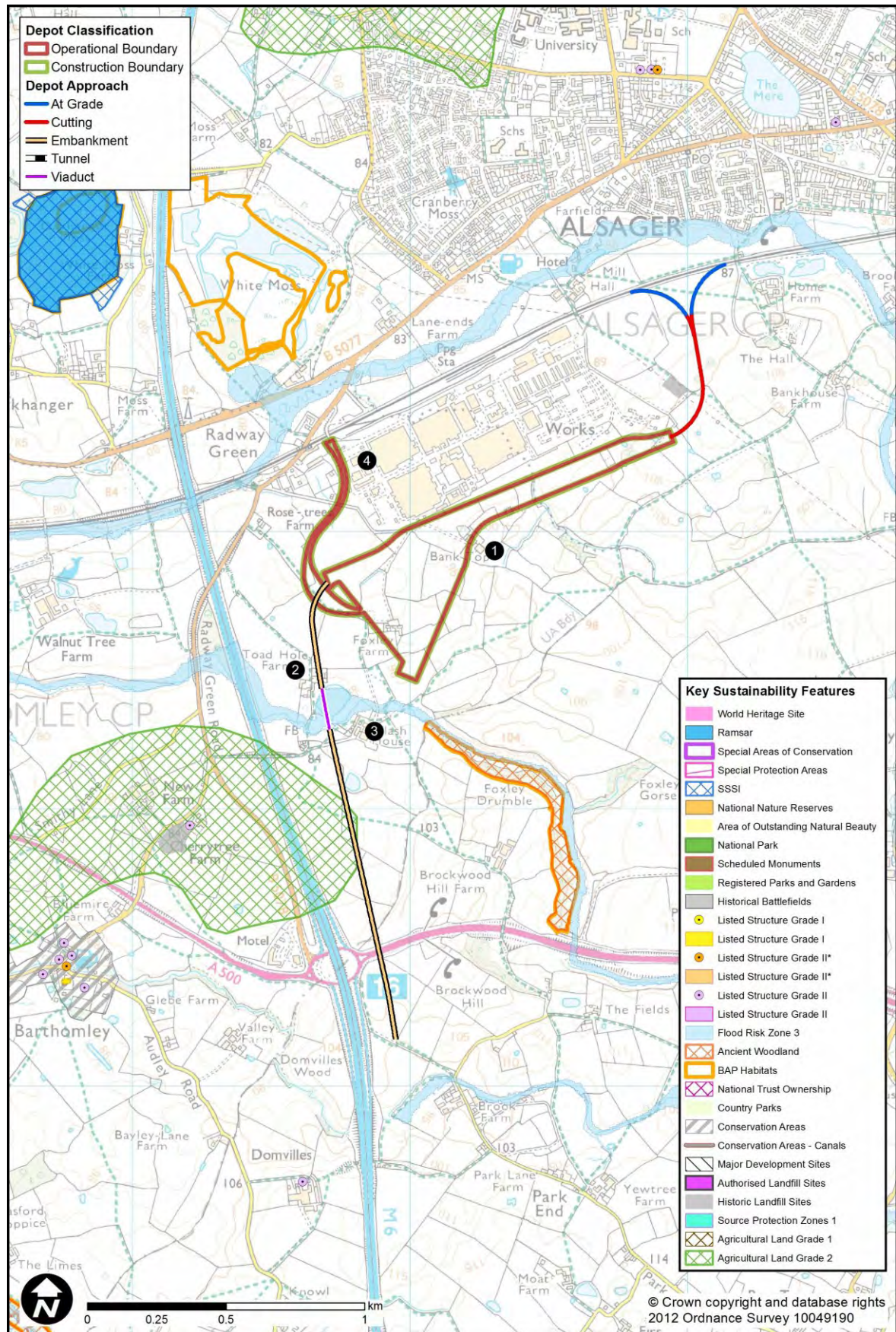
7.2.3. The potential for mitigation was limited at this early stage of depot design. However care was taken to minimise impact on the surrounding landscape, property and water resources.



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| 7.2.4. | Population and settlements | The depot site would result in the demolition of an estimated one dwelling at ① Bank Top, Radway Green. The depot approach would result in the demolition of one dwelling at ② Toad Hole Farm House, Radway Green. Potential isolation would occur at two locations, affecting an estimated one dwelling at ③ Flash House, Radway Green Road and two dwellings at ④ Radway Green Industrial Estate. |
| 7.2.5. | Noise | Modelling of noise impacts from the operational depot has not been undertaken. Noise impacts would be influenced by plant, generated road traffic, and the frequency and speed of trains travelling into the depot. |
| 7.2.6. | Health and well-being | Approximately 21 dwellings would be located within 100m of this option that could be at greater risk of disturbance from construction activity. |
| 7.2.7. | Access issues | This depot option would not cross any promoted recreational routes. |
| 7.2.8. | Jobs | Works for this depot option would result in displacement of up to 20 jobs. However some 100 jobs would be created by the depot. |
| 7.2.9. | Planning and development | The depot would conflict with local development policies (Borough of Crewe and Nantwich Replacement Local Plan and emerging LDF) as it lies within green belt. |

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| 7.2.10. | Landscape, townscape and cultural heritage | <p>The depot option would occupy open farmland on the southern outskirts of Alsager with the M6 lying to the west of the site. Visual impacts would be relatively minor as there are few visual receptors in the vicinity except for isolated farmsteads.</p> <p>The depot approach from the south would be alongside the M6 on high embankment with a bridge over the A500 and a tributary of Valley Brook. As it diverges from the M6 its landscape impact would increase and result in local visual impact for residents and motorists. North of the depot, the depot approach would mainly be in cutting and landscape impacts would generally be minor.</p> |
| 7.2.11. | Biodiversity and wildlife | <p>The depot and approach would be within 10km of three Natura 2000 sites. However, an HRA screening confirms that there would be no likely significant effects on these sites. One SSSI Oakhanger Moss (which is also part of the Midland Meres and Mosses (Phase 2) Ramsar site) is within 2km of the depot and its approach. Due to distance and the intervening M6 any impacts are considered unlikely.</p> |
| 7.2.12. | Water resources and flood risk | <p>The depot and approach would require no river diversions and negligible impacts are predicted on rivers, floodplains and source protection zones. Minor impacts are predicted on good yield and poor quality aquifers which the depot would partially intersect.</p> |
| 7.2.13. | Land use resources | <p>The depot and approach option would occupy approximately 1.8ha of Grade 2 agricultural land and approximately 22.7 ha of green belt.</p> |
| 7.2.14. | Waste and material use | <p>It is estimated that the route section would result in a deficit of - 282,400m³ of excavated material.</p> <p>The construction of the depot and approach would require approximately 800 tonnes of steel and 2,400 tonnes of concrete.</p> |

West Alsager IMD Figure 1

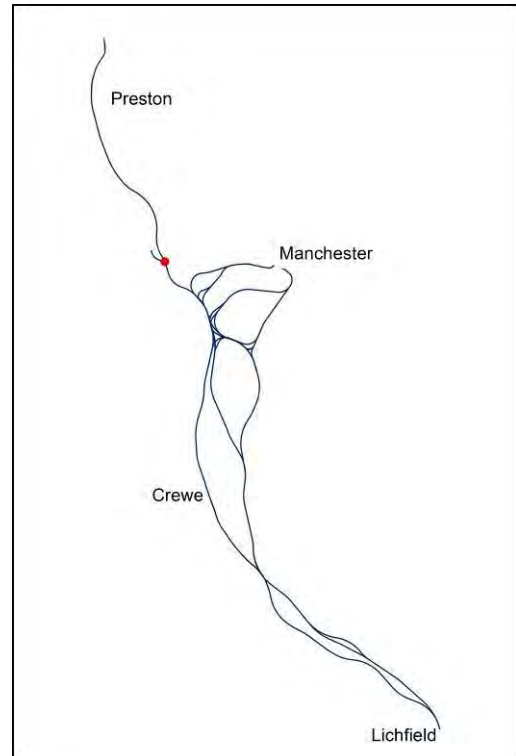


7.3. Golborne Rolling Stock Depot

7.3.1. The Golborne RSD option would be and located on open farmland between Golborne and Abram, west of Pennington Flash Country Park with sidings running roughly east-west. The depot option would be double ended connecting with route section HSM22 and all Manchester station options and at its northern end with the WCML. There would be new road connections with the A573 at two locations, one in Abram and one just north of Golborne. On its east side, it would also connect with a minor road at the edge of the country park.

7.3.2. Golborne RSD Figure 1 illustrates the depot and rail approach and the principal sustainability features in the area.

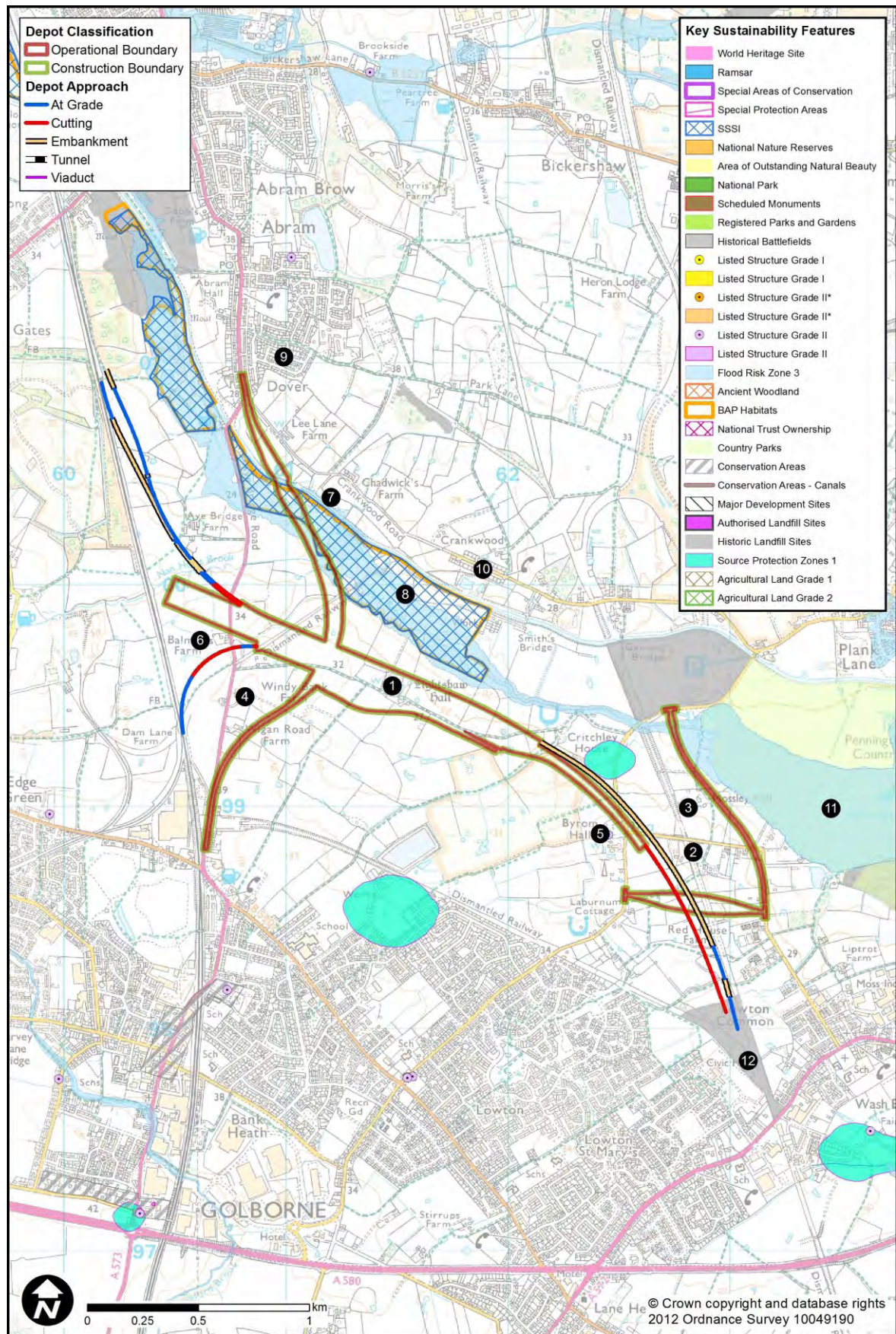
7.3.3. The potential for mitigation was limited at this early stage of depot design. However, care was taken to avoid direct impact on Lightshaw Hall a Grade II* listed building and associated buildings as well as the surrounding landscape, settlements and ecological sites.



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| 7.3.4. | Population and settlements | <p>This depot option would result in the demolition of an estimated two dwellings ② Saddletree Fold Farm on Byrom Lane.</p> <p>Potential isolation would affect 15 dwellings at ③ Mossley Hall off Byrom Lane, four dwellings at ④ Windy Bank Farm off Wigan Road, six dwellings at ⑤ Byrom Hall, Slag Lane, and one dwelling at ⑥ Balmer's Farm off Wigan Road.</p> |
| 7.3.5. | Noise | <p>Modelling of noise impacts from the operational depot has not been undertaken. Noise impacts would be influenced by plant, generated road traffic, and the frequency and speed of trains travelling into the depot.</p> |
| 7.3.6. | Health and well-being | <p>Approximately 174 dwellings would be located within 100m of this depot option that could be at greater risk of disturbance from construction activity.</p> |
| 7.3.7. | Access issues | <p>The depot would not cross any promoted recreational routes although it would cross the ⑦ Leeds and Liverpool Canal and potentially sever the canal and towpath. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.</p> |
| 7.3.8. | Jobs | <p>Works would result in the displacement of approximately 20 jobs, all associated with farm demolitions at ② Saddletree Fold Farm. However some 100 jobs would be created by the depot.</p> |
| 7.3.9. | Planning and development | <p>The depot would conflict with local development policies (Wigan Unitary Development Plan and emerging LDF) on green belt.</p> |

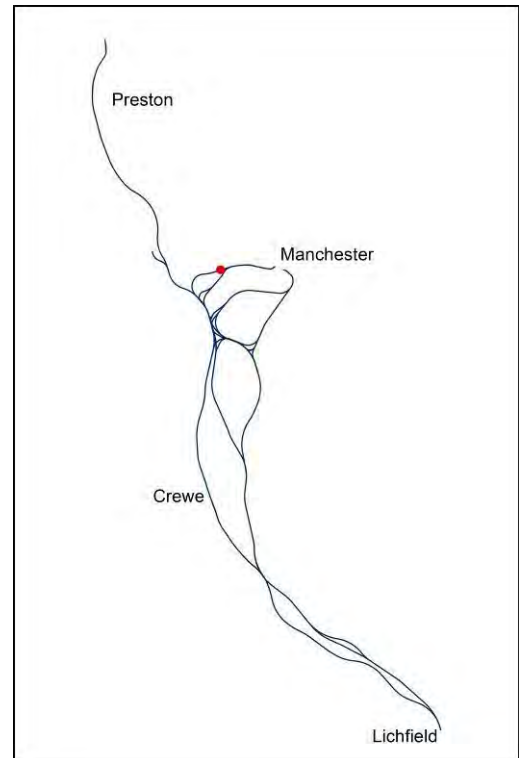
7.3.10.	Landscape, townscape and cultural heritage	<p>This depot option would greatly fragment an area of open countryside between Golborne and Abram. The north-south road connection would have a major impact on landscape character through its crossing of the ⑦ Leeds and Liverpool Canal and ⑧ Abram Flashes SSSI. Although partly in cut, the depot would form an intrusive feature affecting long views of canal users and residents of ⑨ Dover and ⑩ Crankwood to the north, and the ⑪ Pennington Flash Country Park to the east. High embankments for the depot approaches on the east and west sides of the depot would also be particularly intrusive within the floodplain landscape and for recreational users of the canal.</p> <p>The depot option would be designed to avoid a direct physical impact on the Grade II* Listed ① Lightshaw Hall. However the impact on its setting would remain.</p> <p>The depot approach would have a moderate impact on the setting of the Grade II listed ⑤ Byrom Hall.</p>
7.3.11.	Biodiversity and wildlife	<p>The route passes within 10km of two Natura 2000 wildlife sites. However, HRA screening confirms that there would be no likely significant effects on these.</p> <p>⑧ Abram Flashes SSSI, would be crossed by the proposed road access to the depot and would be likely to have a direct impact on the site. In addition to direct habitat loss and fragmentation it is potentially vulnerable to pollution, changes in hydrology and disturbance. The depot would also directly affect fens BAP habitat within ⑧ Abram Flashes SSSI. It is likely that further detailed design would avoid a direct impact on the SSSI.</p>
7.3.12.	Water resources and flood risk	<p>The depot and approach would require three river diversions. Continuing scheme design would seek to avoid or minimise this impact.</p> <p>The depot and approach would intersect about 21.4ha of SPZ2 and may affect groundwater flow towards Slag Lane abstraction point (7,728m³/day).</p> <p>The depot would occupy an estimated 2.6ha of Flood Zone 3.</p>
7.3.13.	Land use resources	<p>The depot approach would occupy approximately 45.5ha of green belt. One landfill site at ⑫ Lowton would be directly affected and the design would require further work to minimise risks to people and the environment.</p>
7.3.14.	Waste and material use	<p>It is estimated that the route section would result in a surplus of 1,014,500m³ of excavated material.</p> <p>As a result of the depot option impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.</p> <p>Estimated quantities of bulk building materials for this section comprise 800 tonnes of steel and 2,500 tonnes of concrete.</p>

Golborne RSD Figure 1



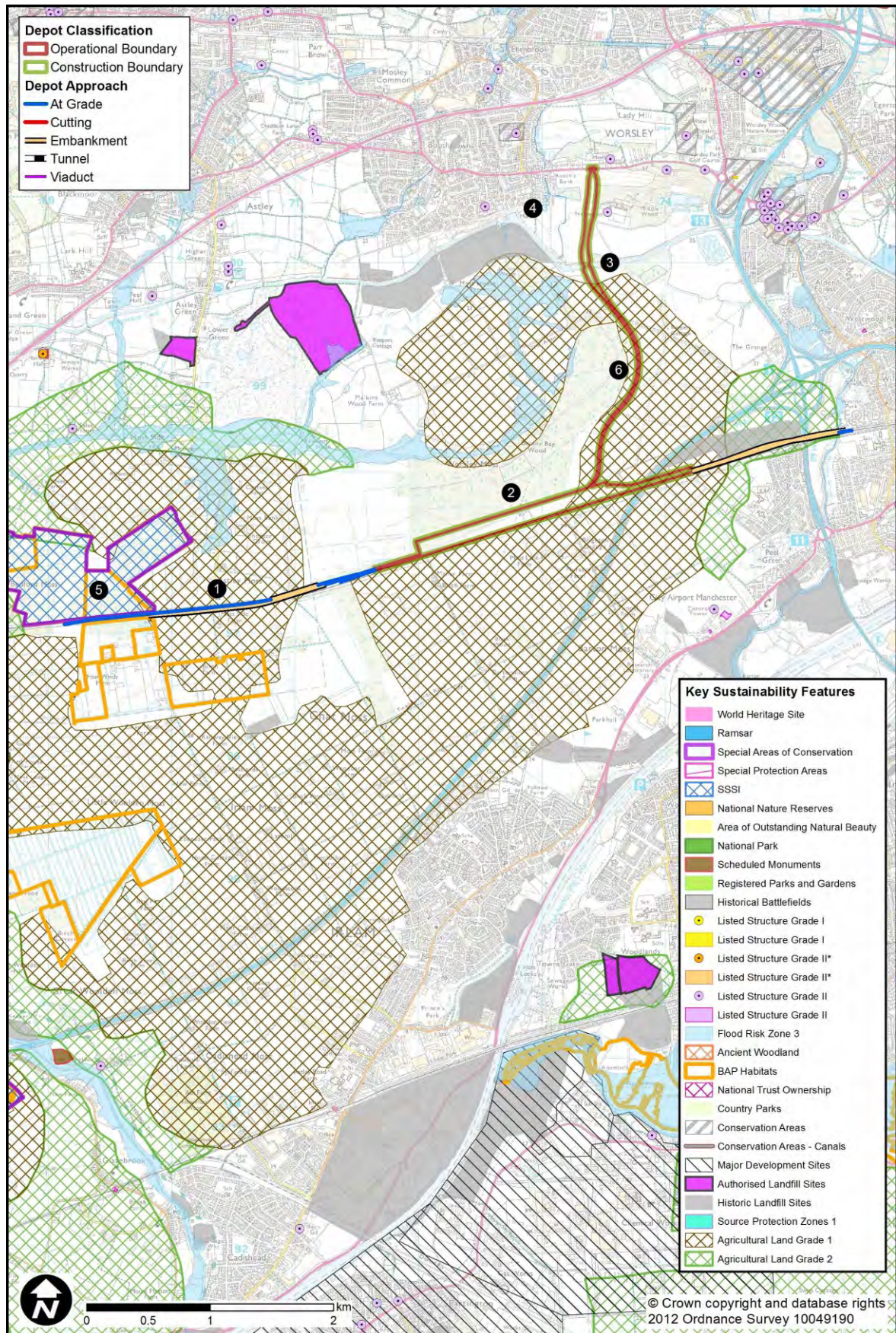
7.4. Eccles Rolling Stock Depot

- 7.4.1. The Eccles RSD option would be located on the northern edge of the existing Liverpool to Manchester railway line to the west of Eccles and the M62. Road access is proposed to the north from the A572 at Worsley and would need to cross the Bridgewater Canal. The depot approach route would follow the existing railway line mostly on surface to the west and to the east the line would run on embankment north of the existing rail line crossing the M60. The depot option would be double ended and would connect with the HSM 40 route section and the Salford city centre station options and the Liverpool to Manchester railway.
- 7.4.2. Eccles RSD Figure 1 illustrates the depot and rail approach and the principal sustainability features in the area.
- 7.4.3. The potential for mitigation was limited at this early stage of depot design. However, care was taken to minimise impact on the surrounding landscape, property and water resources.
- 7.4.4. **Population and settlements** The depot approach would result in the demolition of an estimated one dwelling at ① Rindle Road, Astley Moss. One commercial property would also be demolished at ② Woodside Farm.
- 7.4.5. **Noise** Modelling of noise impacts from the operational depot has not been undertaken. Noise impacts would be influenced by plant, generated road traffic, and the frequency and speed of trains travelling into the depot.
- 7.4.6. **Health and well-being** Approximately 107 dwellings would be located within 100m of the option that could be at relatively greater risk of disturbance from construction activity.
- 7.4.7. **Access issues** The depot option would not cross any promoted recreational routes.
- 7.4.8. **Jobs** Approximately 100 jobs would be created by the depot.
- 7.4.9. **Planning and development** The depot would conflict with local development policies (Salford Unitary Development Plan and emerging LDF) on green belt.
- 7.4.10. **Landscape, townscape and cultural heritage** There would be a relatively narrow set of sidings which would be enclosed to the north by woodland and although there might be some woodland loss, there should be little or no visual impact, except from construction of a wider railway bridge over the M62 to the east. The road connection from the A572 would be likely to have a direct impact on a considerable length of woodland, but as the road is peripheral to the woodland areas it may be possible to avoid these impacts. Impacts overall are expected to be moderate at worst with the road crossing of the ③ Bridgewater Canal being the most sensitive location. There would be visual impacts on canal users and on residents of ④ Boothstown, around 400m north-west from the elevated canal crossing.



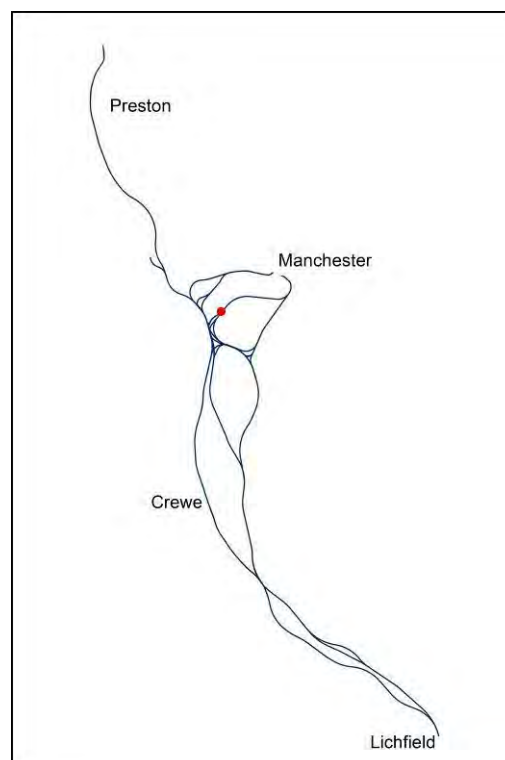
		Eight woodlands would be directly impacted by the depot option which may have a moderate adverse impact on landscape character.
7.4.11.	Biodiversity and wildlife	The depot and approach would be within 10km of two Natura 2000 sites. The potential for significant effects at one of these sites, ⑤ Manchester Mosses SAC, cannot be discounted at this stage. Further details are described in an HRA screening report.
7.4.12.	Water resources and flood risk	A ⑥ tributary of the Shaw Brook, a minor river, would require diversion. Continuing scheme design would seek to avoid or minimise this impact.
7.4.13.	Land use resources	The depot and approach option would occupy approximately 5.6ha of Grade 1 agricultural land. It would also occupy approximately 19.7ha of green belt.
7.4.14.	Waste and material use	It is estimated that the route section would result in a deficit of - 675,300m ³ of excavated material. The construction of the depot and approach would require approximately 1,200 tonnes of steel and 3,800 tonnes of concrete.

Eccles RSD Figure 1



7.5. Carrington rolling stock depot

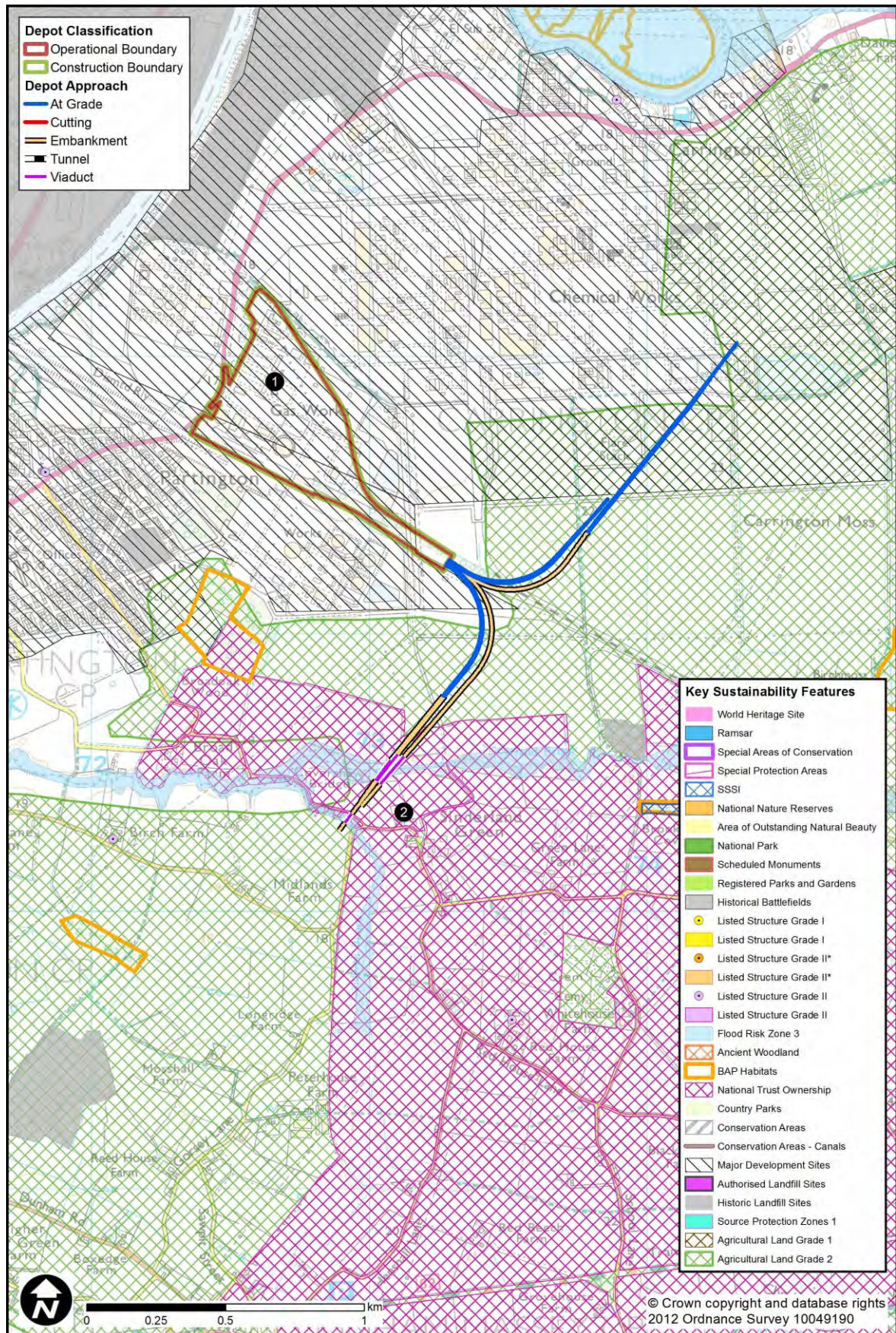
- 7.5.1. The Carrington RSD option would be located on former industrial and disused railway land, in Carrington to the north-east of Partington. Road access is proposed from Manchester Road (A6144). This option would be single ended and connect in both directions to route section HSM31 to the Manchester Piccadilly Station option.
- 7.5.2. Carrington RSD Figure 1 illustrates the depot and rail approach and the principal sustainability features in the area.
- 7.5.3. The potential for mitigation was limited at this early stage of depot design. However care was taken to minimise impact on the surrounding landscape, property and water resources.



- 7.5.4. Population and settlements No residential dwellings would be demolished or isolated along this depot option or this approach.
- 7.5.5. Noise Modelling of noise impacts from the operational depot has not been undertaken. Noise impacts would be influenced by plant, generated road traffic, and the frequency and speed of trains travelling into the depot.
- 7.5.6. Health and well-being No dwellings would be located within 100m of this option, which would otherwise be at relatively greater risk of disturbance from construction activity.
- 7.5.7. Access issues The depot option would not cross any promoted recreational routes.
- 7.5.8. Jobs Works would result in displacement of up to 50-100 jobs. However some 100 jobs would be created by the depot.
- 7.5.9. Planning and development The depot would conflict directly with local planning policy as it is designated in Trafford's Core Strategy as a key strategic location for major mixed use development and also lies within green belt. The depot option would also conflict directly with one extant planning consent for 95,000m² commercial space on ① National Grid land.
- 7.5.10. Landscape, townscape and cultural heritage Due to the siting of the depot on former industrial and disused railway land any landscape or visual issues should be very limited. The nearest visual receptors, dwellings around 200m to the west, are separated from the site by woodland and a large embankment, and the road connection would generate limited impacts as existing roads would be used. There would be a minor visual impact on the hamlet of ② Sinderland Green, around 150m away from a viaduct over Sinderland Brook, but otherwise any landscape or visual impacts should be limited as there are few

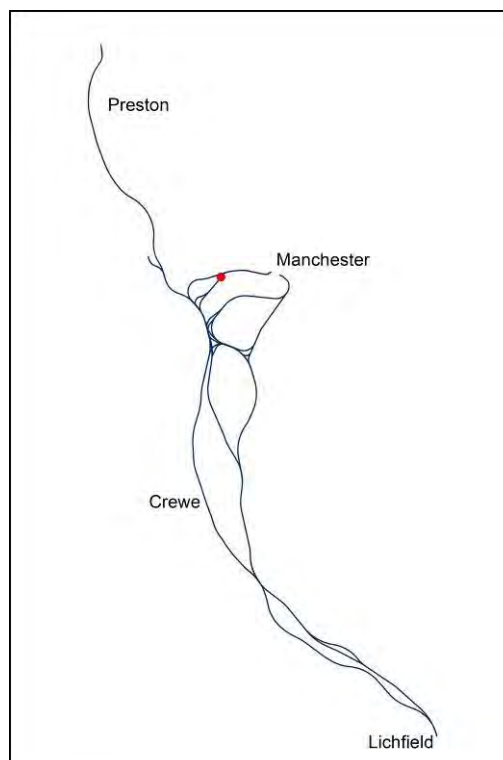
		receptors and the line would be seen in the context of existing industrial development.
7.5.11.	Biodiversity and wildlife	<p>The depot and approach would be within 10km of four Natura 2000 sites. However, HRA screening confirms that there would be no likely significant effects on this site.</p> <p>One SSSI is within 2km of the depot and its approach. However, any impacts are unlikely due to distance and lack of hydrological connectivity.</p>
7.5.12.	Water resources and flood risk	The depot option would have no significant impact on water resources or flood risk.
7.5.13.	Land use resources	The depot approach option would occupy approximately 51.3ha of Grade 11.3 agricultural land. The depot approach would occupy approximately 11ha of green belt.
7.5.14.	Waste and material use	<p>It is estimated that the route section would result in a deficit of - 189,000m³ of excavated material. However, given the presence on the site of gas works, there are likely to be issues of land contamination that would need to be addressed.</p> <p>The construction of the depot and approach would require approximately 800 tonnes of steel and 2,400 tonnes of concrete.</p>

Carrington Rolling Stock Depot Figure 1



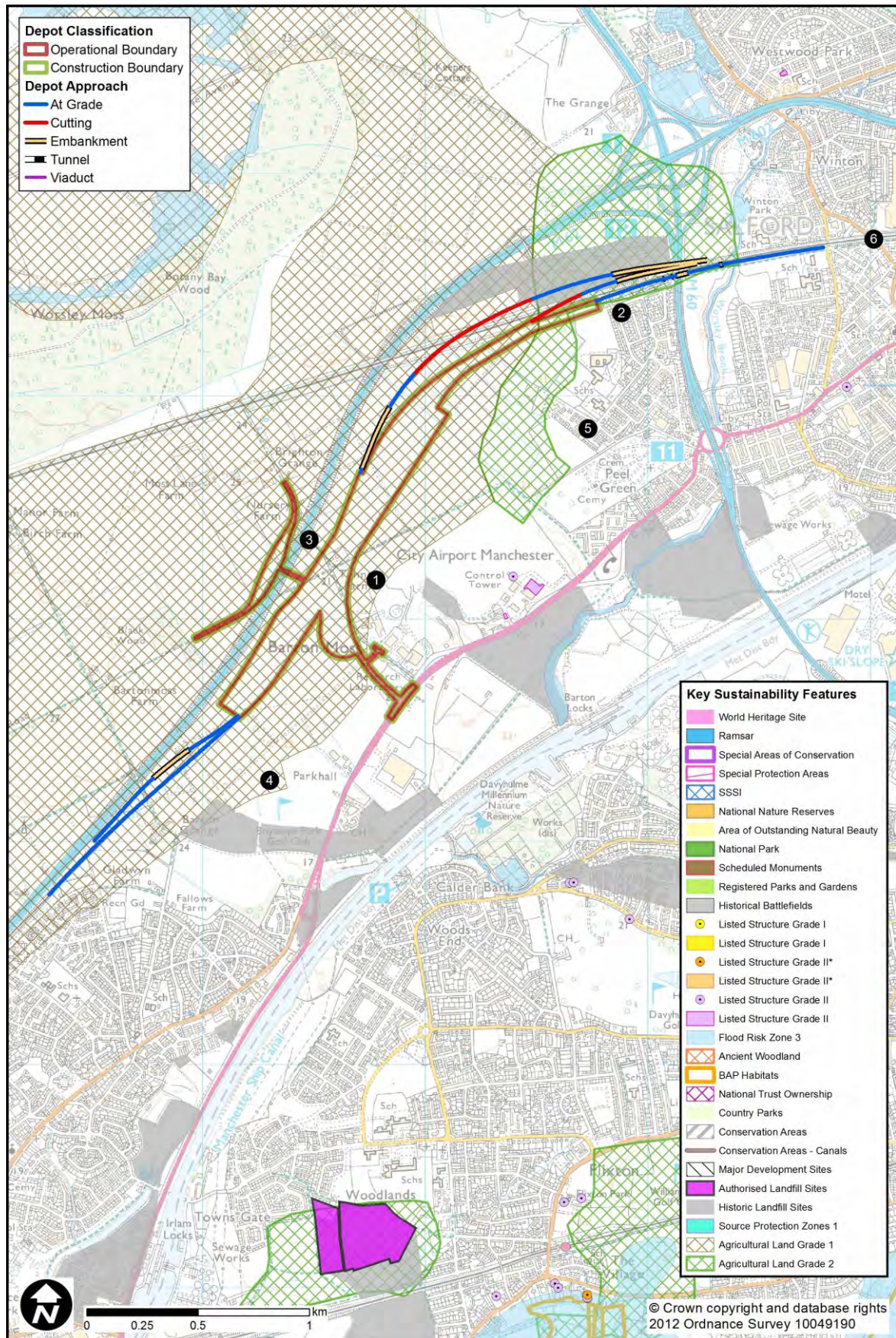
7.6. Barton rolling stock depot

- 7.6.1. The Barton RSD option would be located principally on farmland north of Barton Green golf course, between Barton Aerodrome (City Airport Manchester) and the M62, west of Peel Green. There would be road connections to the east onto the A57 near Barton Aerodrome and to the west on to local roads via a bridge over the motorway. Access would be provided in both directions to the HS2 spurs (HSM35 and HSM39) to the Salford Station options and in the Manchester direction on the Liverpool to Manchester railway. New lines would pass beneath the existing railway, before rising on embankment over the M60 and converging with it west of Patricroft Station.
- 7.6.2. Barton RSD Figure 1 illustrates the depot site and its approach together with the principal sustainability features in the area.
- 7.6.3. The potential for mitigation was limited at this early stage of depot design. However, care was taken to minimise impact on the surrounding landscape, settlements and ecological sites.
- 7.6.4. **Population and settlements** This option would result in the demolition of two dwellings at ① Tunnel Farm and ② Stannard Road at Peel Green. The demolition at Tunnel Farm would be in an area of relatively high deprivation.
- 7.6.5. **Noise** Modelling of noise impacts from the operational depot has not been undertaken. Noise impacts would be influenced by plant, generated road traffic, and the frequency and speed of trains travelling into the depot.
- 7.6.6. **Health and well-being** Approximately 360 dwellings would be located within 100m of the depot option that could be at greater risk of disturbance from construction activity.
- 7.6.7. **Access issues** The depot option would not cross any promoted recreational routes.
- 7.6.8. **Jobs** Works would result in displacement of up to 20 jobs. However, some 100 jobs would be created by the depot.
- 7.6.9. **Planning and development** The depot would conflict with existing policy in the Salford UDP (June, 2006) notably Policy A14 Barton Aerodrome, Policy EN11 Mosslands and Policy EN1 Green Belt.
- The depot would conflict directly with one extant planning consent for the drilling of two exploratory boreholes for coal bed methane appraisal and production. The permission includes: construction of a new access road off ③ Barton Moss Road; the installation of wells; production and power generating facilities; the extraction of coal bed methane and the subsequent restoration of the site.

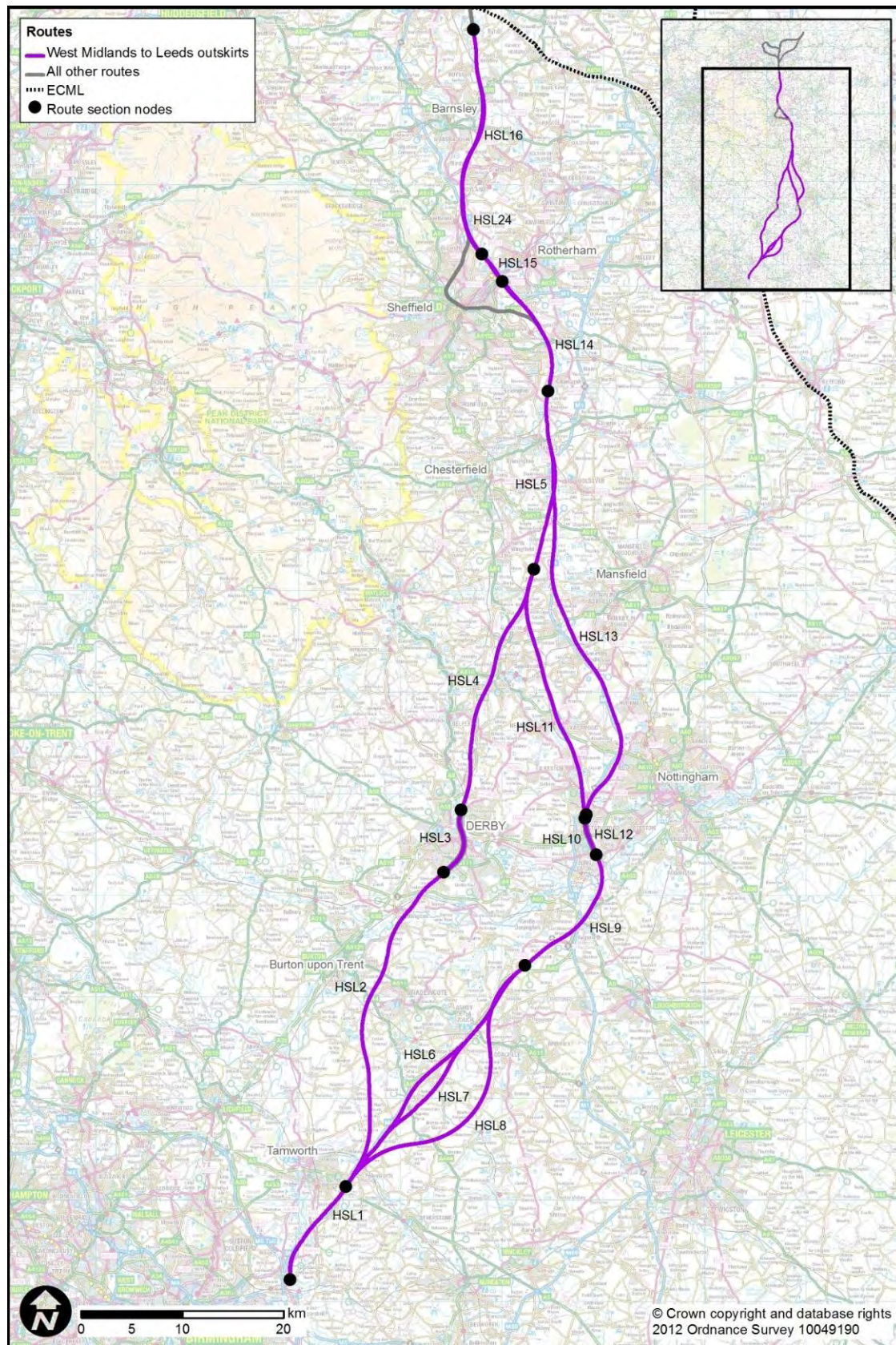


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| 7.6.10. | Landscape, townscape and cultural heritage | <p>The depot would run south-west to north-east on moss land designated in the Salford UDP for its landscape value. Although slightly elevated above the moss, the depot would have limited impact on landscape character given the existing railway and motorways in the vicinity. Only minor visual impacts are likely to affect the edge of ④ Barton Green golf course to the south and the western edge of ⑤ Peel Green. South of the depot the approach would be generally at ground level very close to the M62. North of the depot the approach would pass in cutting beneath an existing railway line, then rise onto embankment north of the existing embankment railway and Peel Green to cross the M60. Any landscape or visual impacts would be minor.</p> <p>One woodland would be directly affected by the depot approach resulting in a very minor impact on landscape character.</p> <p>The impact on the setting of the nearby Grade II listed ⑥ Railway Bridge over Worsley Road near Patricroft Station would be negligible.</p> |
| 7.6.11. | Biodiversity and wildlife | <p>Two Natura 2000 sites are within 10km of the depot. The potential for significant effects at one of these sites, Manchester Mosses SAC, cannot be discounted at this stage. Further details are described in the HRA screening report for Manchester Mosses SAC.</p> |
| 7.6.12. | Water resources and flood risk | <p>The depot and its approach would have no significant impacts on water resources and flooding.</p> |
| 7.6.13. | Land use resources | <p>The depot and approach options would occupy approximately 18.9ha of Grade 1 agricultural land. The depot approach would occupy approximately 19.1ha of green belt.</p> <p>One historic landfill site south of the M62 and west of the M60 at junction 12 would be directly affected.</p> |
| 7.6.14. | Waste and material use | <p>It is estimated that the route section would result in a surplus of 142,000m³ of excavated material.</p> <p>As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.</p> <p>Estimated quantities of bulk building materials for this section would comprise 1,100 tonnes of steel and 3,300 tonnes of concrete.</p> |

Barton RSD Figure 1

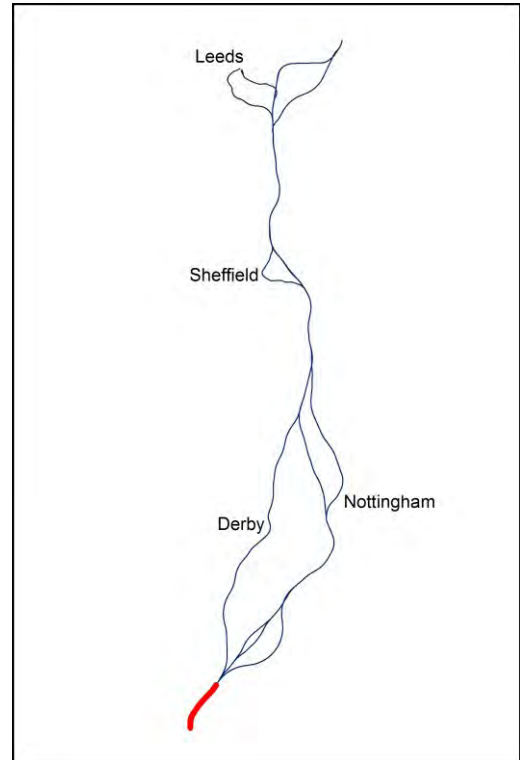


8. Leeds route: West Midlands to Leeds outskirts



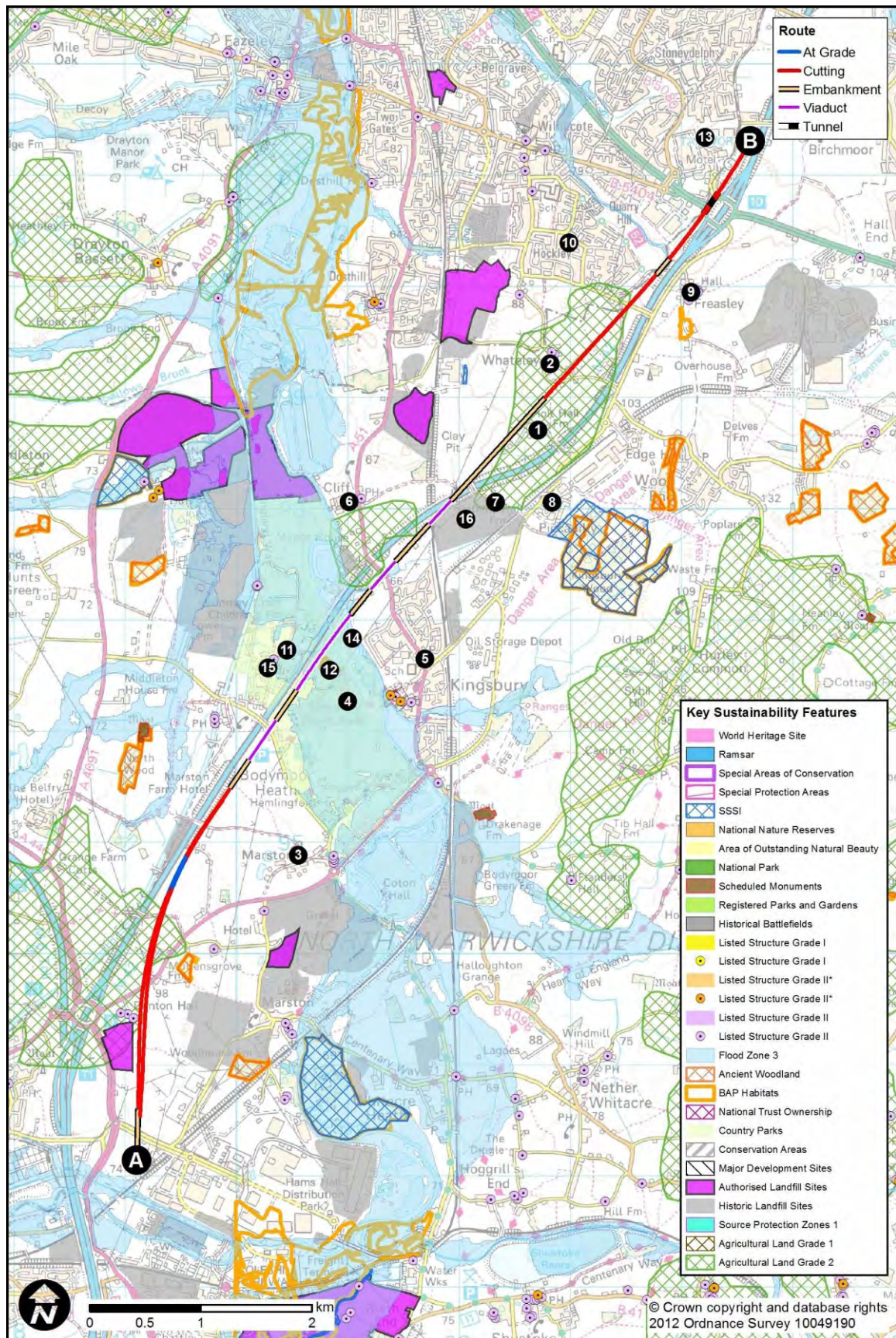
8.1. HSL01: Water Orton (A) to Birchmoor (B)

- 8.1.1. The route section between Water Orton and Birchmoor would be 11km (6.8 miles) long. It is the first Leeds route section and would connect from Phase 1. At Birchmoor, the route would continue north along HSL02 to Sunny Hill, or HSL06, HSL07 or HSL08 to Tonge.
- 8.1.2. The route section would follow the corridor of the M42. It would require lengthy sections of cutting at its northern and southern ends, but would also require a central elevated section of several kilometres in order to cross the River Tame, Kingsbury Water Park, the A51, the Birmingham to Derby railway and the M42. On aligning to the west of the M42, it would then descend to cutting as it passed along the eastern edge of Tamworth close to junction 10 of the motorway.
- 8.1.3. HSL01 Figure 1 illustrates the route alignment and the principal sustainability features in the area.
- 8.1.4. Specific mitigation included within the route section comprises a number of localised realignments that have sought to reduce residential demolitions at Westfields and to reduce noise and visual impacts at Tamworth.
- 8.1.5. **Population and settlements** The route section would result in the demolition of an estimated six dwellings. In addition, an estimated 17 commercial properties would also be demolished.
- Potential isolation would affect an estimated four dwellings at ❶ Holt Hall Farm. Potential severance would affect an estimated 10 dwellings at ❷ Whateley.
- 8.1.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 322 people (equivalent to the occupants of some 137 dwellings). This would represent about 30 people per km of route section. With ambient road noise also taken into account noise impacts from HS2 would be expected to be substantially less than this.
- The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ❸ Marston, ❹ Bodymoor Heath, ❺ Kingsbury, ❻ Cliff, ❼ Slateley Hall, ❽ Piccadilly, ❷ Whateley, ❾ Freasley, ❿ Hockley and other scattered dwellings.
- In terms of noise insulation, approximately 75 dwellings would be expected to qualify, particularly at ❹ Bodymoor Heath, ❺ Kingsbury, ❼ Slateley Hall, ❷ Whateley, ❾ Freasley and ❿ Hockley. This is equivalent to approximately seven dwellings per km of route section.
- 8.1.7. **Health and well-being** Approximately 18 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.



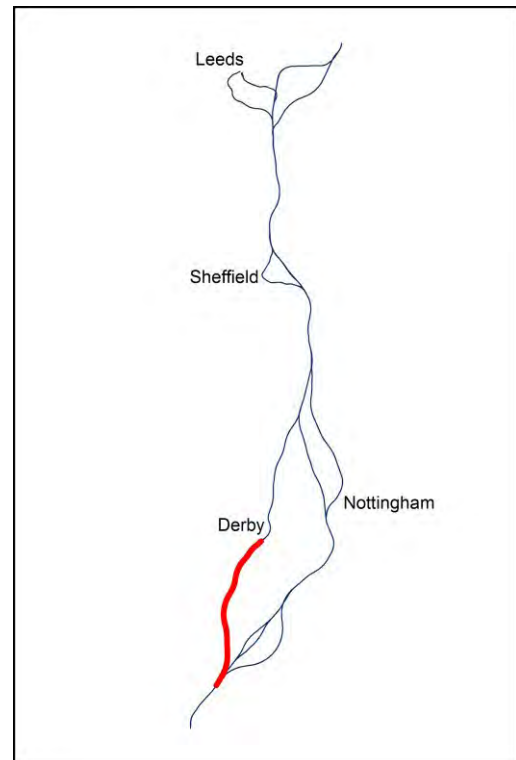
8.1.8.	Access issues	One promoted recreational route would be crossed by the route section, namely the 11 Heart of England Way. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.
8.1.9.	Landscape, townscape and cultural heritage	Close alignment with the M42 would ensure that there would generally be limited visual impact. The route section would run east of the M42 on embankment and viaduct across 12 Kingsbury Water Park (Country Park), resulting in landscape impacts through loss of woodland. It would pass near the village of 5 Kingsbury, resulting in moderate visual impact on parts of the village. It would then cross on high viaduct to the west side of the M42. Further north, visual impact should be limited through the use of cutting past 13 Tamworth.
8.1.10.	Biodiversity and wildlife	<p>The route section would pass within 10km of one Natura 2000 wildlife site. However, HRA screening confirms that there would be no likely significant effects on this site.</p> <p>Three SSSIs would be within 2km of the route section, but the risk of adverse impact to all of them is considered to be low.</p> <p>The route would directly affect one area of fen BAP habitat at 12 Kingsbury Water Park.</p>
8.1.11.	Water resources and flood risk	<p>14 The Kingsbury Water Park Drain minor river may be diverted. Continuing scheme design would seek to avoid or minimise this impact.</p> <p>The route section would cross some 800m of Flood Zone 3.</p>
8.1.12.	Land use resources	<p>The route would cross about 3.3km of high quality Grade 2 agricultural land. It would cross about 11km of green belt.</p> <p>Two landfill sites, near 15 Bodymoor Heath and 16 north of Kingsbury, would be directly affected. The design would require further work to minimise risks to people and the environment from these impacts.</p>
8.1.13.	Waste and material use	<p>It is estimated that the route section would result in a surplus of 1,371,678m³ of excavated material.</p> <p>As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.</p> <p>Estimated quantities of bulk building materials for this section comprise 4,500 tonnes of steel and 13,800 tonnes of concrete.</p>

HSL01 - Figure 1



8.2. HSL02: Birchmoor (B) to Sunny Hill (C)

- 8.2.1. The route section between Birchmoor and Sunny Hill would be 34km (21.1 miles) long. It would connect south of Birchmoor with HSL01 from Water Orton. At Sunny Hill the route section would continue through the Derby Station option, HSL25, to Breadsall.
- 8.2.2. The route section would run from the east of Tamworth following the M42 corridor, crossing the motorway on viaduct on two occasions. It would cross the River Anker on viaduct, where it would diverge west of the motorway. The undulating terrain south of the River Mease would require various cuttings and embankments. The route section would cross the Mease on viaduct and would then continue in various cuttings and embankments passing between Swadlincote and Burton upon Trent, including a short tunnel section near Burton upon Trent. It would curve eastward crossing the River Trent and Trent and Mersey Canal on viaduct, until picking up the Birmingham to Derby railway leading to the outskirts of Derby.



- 8.2.3. HSL02 Figures 1 to 4 illustrate the route alignment and the principal sustainability features in the area.
- 8.2.4. Specific mitigation included within the route section comprises a number of localised realignments that have sought to move the scheme further from Alvecote Pools (SSSI), reduce impact to Pooley Country Park and reduce noise and visual impacts at Repton and Burton upon Trent.
- 8.2.5. **Population and settlements** The route section would result in the demolition of an estimated 35 dwellings. These include a cluster at ❶ Sunny Hill, Derby. In addition, an estimated three commercial properties and one community property (community centre) would also be demolished. There is the potential for isolation at one location, affecting an estimated two dwellings west of ❷ Polesworth. An area of potential severance at ❸ Stanton would affect an estimated 13 dwellings and one community property (Trinity Church).
- 8.2.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 827 people (equivalent to the occupants of some 351 dwellings). This would represent about 25 people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.
- The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ❹ Birchmoor, ❺ Polesworth, ❻ Shuttington, ❼ Seckington, ❽ Newton Regis, ❾ Clifton Campville, ❿ Linton, ❸ Stanton, ⓫ Newhall, ⓬ Repton, ⓭ Willington, ⓮ Findern, ⓯ Stenson Fields, ❶ Sunny Hill, ⓰ Sinfin and other scattered dwellings.

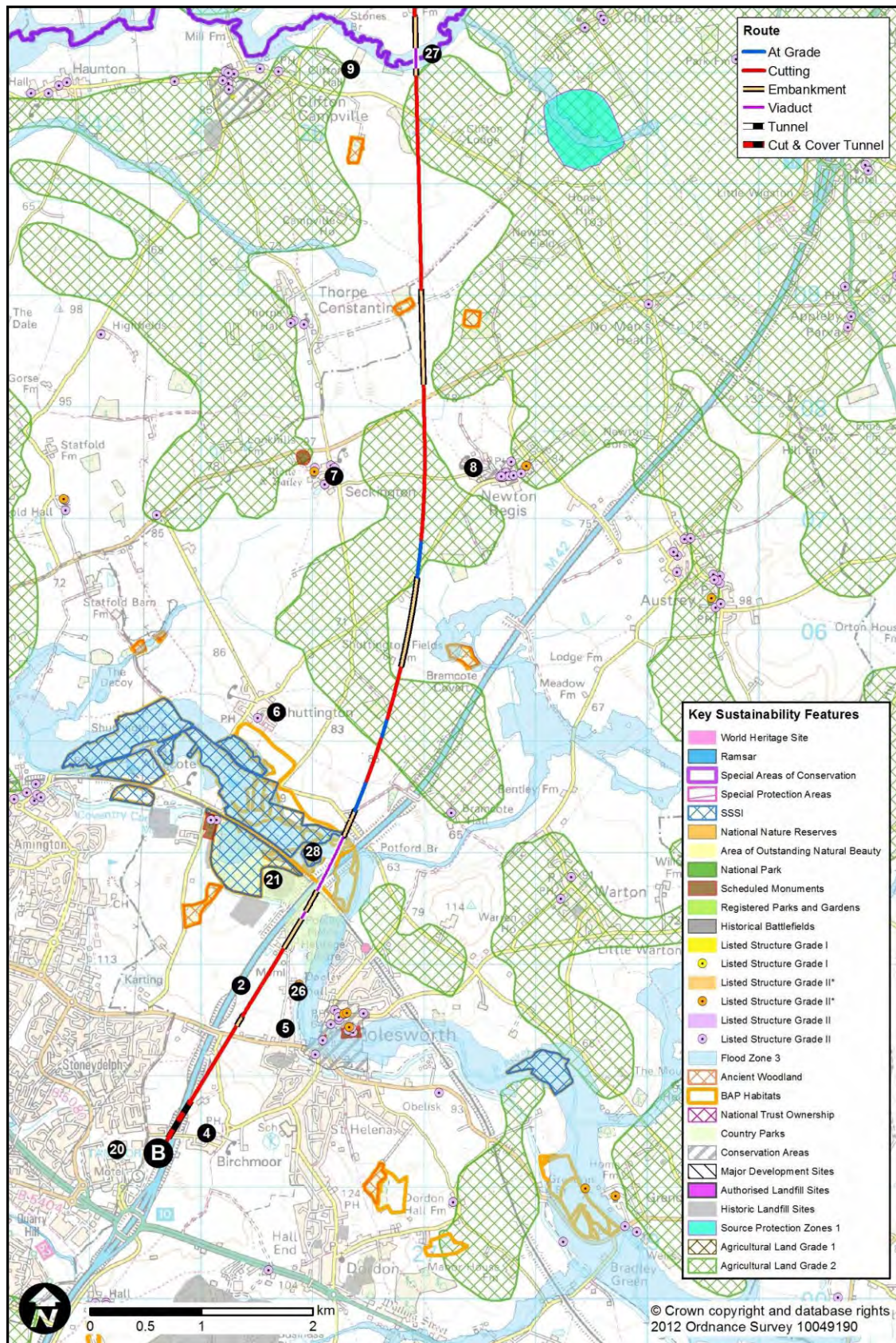
		Approximately 291 dwellings would potentially qualify for noise insulation particularly at ⑤ Polesworth, ①⑦ Grangewood, ①⑧ Botany farm, ③ Stanton, ①③ Willington and ① Sunny Hill. This is equivalent to approximately nine dwellings per km of route section.
8.2.7.	Health and well-being	Approximately 470 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
8.2.8.	Access issues	No promoted recreational routes would be crossed by the route section.
8.2.9.	Planning and development	The route section would pass through the edge of ①⑨ Willington Power Station where Willington C Power Station is proposed, a Nationally Significant Infrastructure Project. Permission was granted for a power station under Section 36 of the Electricity Act in December 2009. In addition a new gas pipeline is required to transport natural gas fuel. The proposed gas pipeline has not yet been granted development consent, and a Development Consent Order Application, is expected to be submitted in June 2012.
8.2.10.	Landscape, townscape and cultural heritage	<p>The viaduct crossing of the M42 motorway near Tamworth would give rise to visual intrusion for residents on the outskirts of ②① Tamworth and ⑤ Polesworth, as well as users of ②① Pooley Country Park. The route section would then run north across rolling and relatively empty countryside on low embankment and shallow cutting, with a minor or moderate impact on landscape character, although it would generally be well separated from, and have little visual impact on, surrounding villages. There would be direct impacts on a number of woodlands and unregistered parklands (notably ②② Coton Park) near Swadlincote. Between Swadlincote and Burton upon Trent the route section would run north-eastwards to the A50 just south of Derby. Initially fairly close to grade, it would briefly tunnel through a ridge past Burton on Trent, then run in deep cutting and rise onto viaduct (4.5km long, 10-15m high) to cross the Trent Valley, the Birmingham to Derby railway and the A50 before running onto embankment at its northern end. The principal impacts would be disruption to landscape character due to the viaduct, visual impacts on ①② Repton (which is also a conservation area), ①③ Willington, ②④ Stenson and the Derby suburb of ①⑥ Sinfen and impacts on the character and landscape setting of the ②③ Trent Valley and the ②④ Trent and Mersey Canal, which is popular for recreation.</p> <p>The route section would lie within 1km of the Grade II Registered Park and Garden of ②⑤ Bretby Hall (Grade II*), but this would have a negligible impact.</p> <p>The setting of the Grade II* listed ②⑥ Pooley Hall would be near the route section. This could result in minor impacts on its setting.</p>
8.2.11.	Biodiversity and wildlife	<p>The route section would cross the ②⑦ River Mease SAC. The potential for significant effects at this site cannot be discounted at this stage. Further details are described in an HRA screening report, which acknowledges the need for more detailed analysis.</p> <p>One SSSI would potentially be directly affected by the route section. ②⑧ Alvecote Pools SSSI would be crossed for about 60m. Designated for its aquatic and wetland plants, invertebrates and breeding and wintering wetland birds, there is a high risk of impact to the site.</p> <p>The SSSI includes four areas of BAP habitats, including fens and three</p>

- areas of coastal and floodplain grazing marsh. Six further areas of coastal and floodplain grazing marsh BAP habitat would be affected where the route would cross the River Trent floodplain on viaduct.
- 8.2.12. Water resources and flood risk 29 Stanton Brook, a minor river, may be diverted. Continuing scheme design would seek to avoid or minimise this impact.
The route section would cross some 2.8km of Flood Zone 3.
- 8.2.13. Land use resources The route would cross about 10.1km of Grade 2 agricultural land. It would cross about 4.3km of green belt.
Two landfill sites near the Swadlincote suburb of 30 Newhall would be directly affected. The design would require further work to minimise risks to people and the environment from these impacts.
- 8.2.14. Waste and material use It is estimated that the route section would result in a surplus of 4,284,622m³ of excavated material. This includes 70,700m³ of tunnel excavated material.

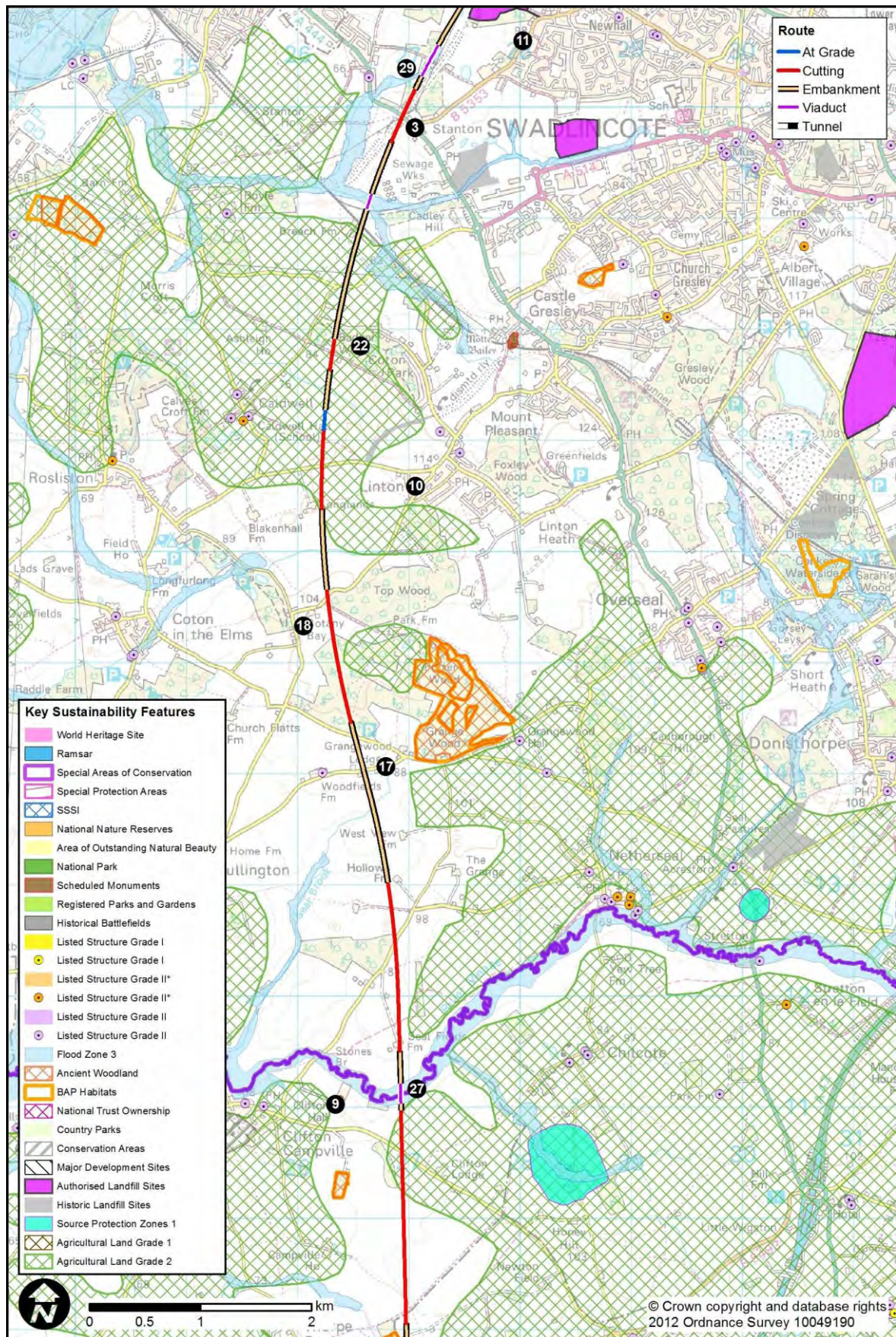
As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.

Estimated quantities of bulk building materials for this section comprise 11,000 tonnes of steel and 33,600 tonnes of concrete.

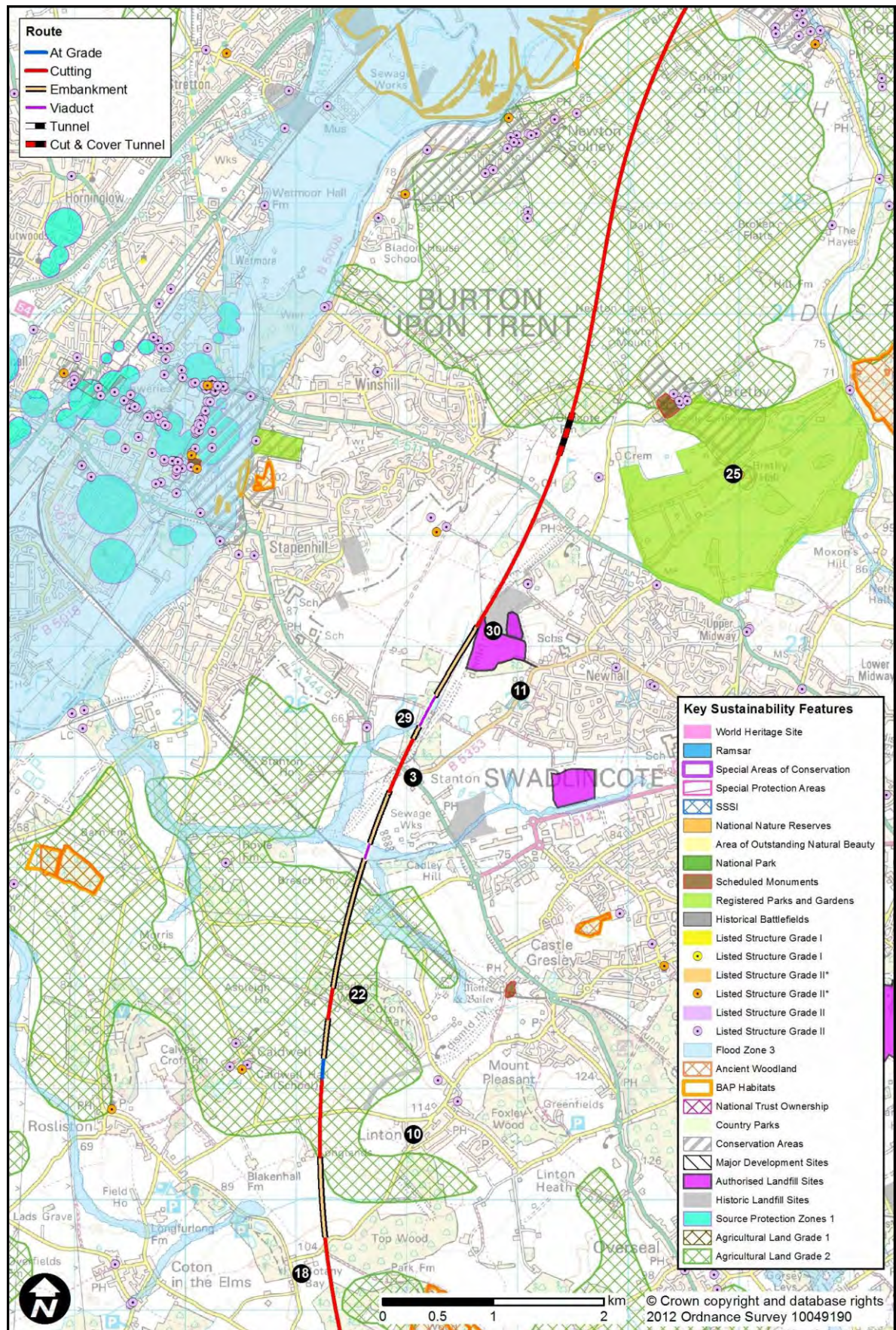
HSL02 - Figure 1 of 4



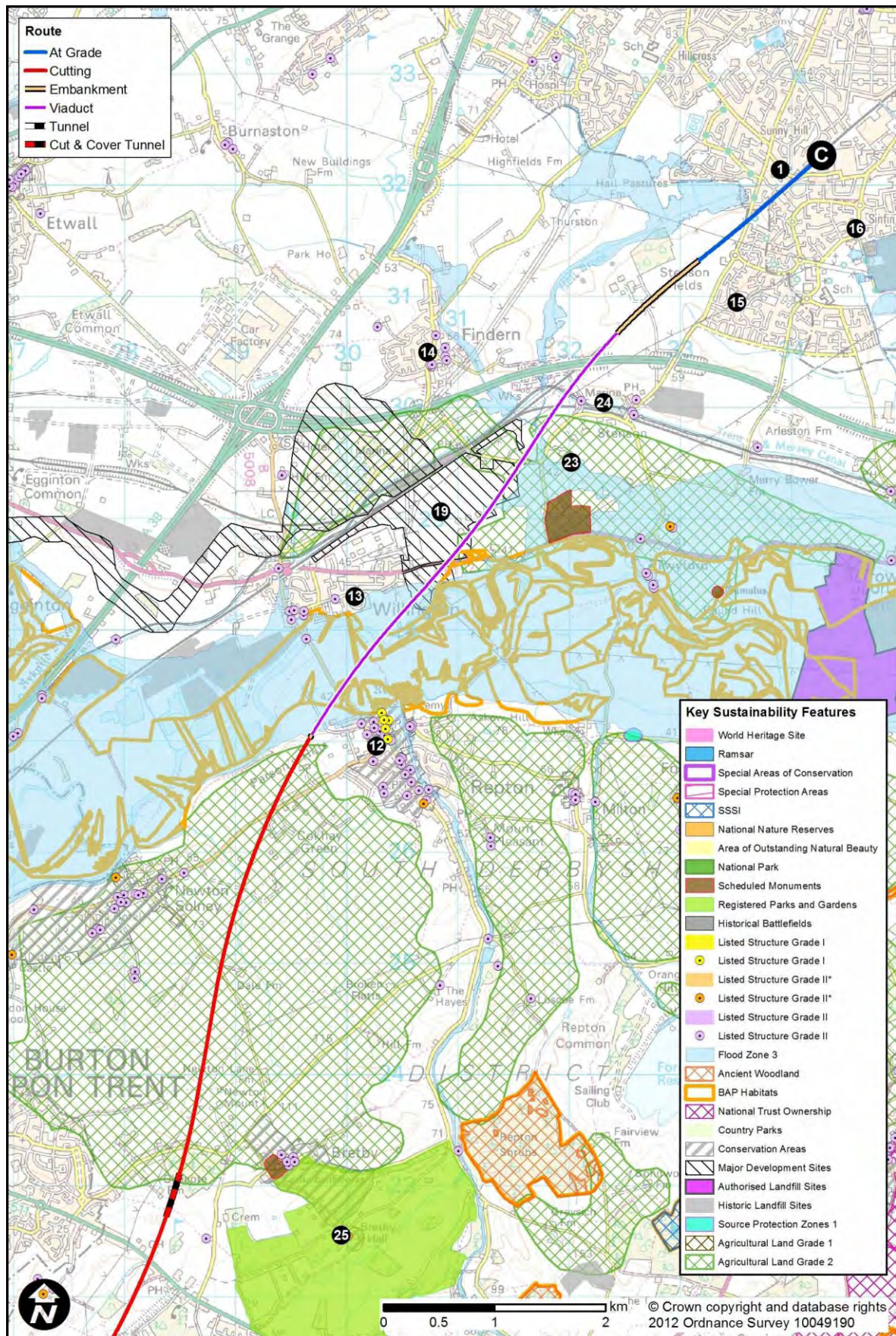
HSL02 - Figure 2 of 4



HSL02 - Figure 3 of 4

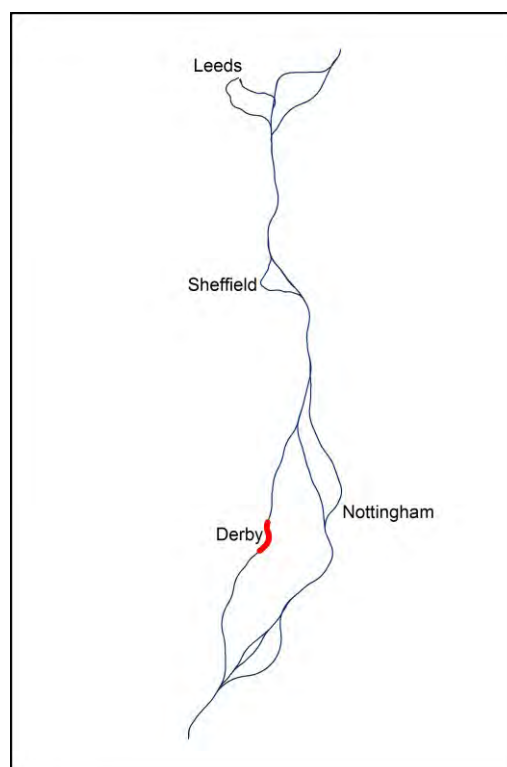


HSL02 - Figure 4 of 4



8.3. HSL03: Sunny Hill (C) to Breadsall (D)

- 8.3.1. HSL03 is a route section between Sunny Hill and Breadsall through Derby city centre. The route section that includes the Derby interchange station is route section HSL25. This is described in Section 10.1.



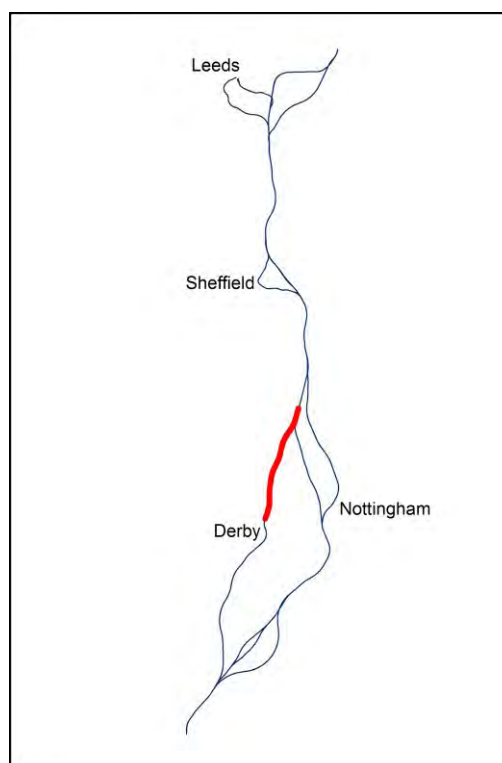
8.4. HSL04: Breadsall (D) to Tibshelf (E)

8.4.1. The route section between Breadsall and Tibshelf would be 25.1km (15.6 miles) long. It would connect to the south with either HSL03 or HSL25 from Sunny Hill (and the proposed Derby Station). At Tibshelf the route would continue north along section HSL05 to Killamarsh.

8.4.2. From Breadsall, the route section would follow the Derwent Valley before crossing over the A61 and then entering a long tunnel alongside and beneath the A38. It would use a mix of cutting and embankment across the undulating terrain. The route section would then curve gently east using viaducts across the rivers north of Alfreton and the Erewash Valley Line (Nottingham to Sheffield railway) east of Stonebroom, before finishing on embankment north of Tibshelf.

8.4.3. HSL04 Figures 1 to 3 illustrate the route alignment and the principal sustainability features in the area.

8.4.4. No additional mitigation has been incorporated into the route section at this stage.



8.4.5. **Population and settlements** The route section would result in the demolition of an estimated 15 dwellings. In addition, an estimated four commercial properties would also be demolished.

Potential isolation would occur at four locations, affecting an estimated 28 dwellings at ④ Coxbench, 27 dwellings at ① Cinderhill, one dwelling at ② Morley Park and five dwellings east of ③ Pentrich, as well as a Coxbench nursing home and hall. Potential severance would occur at ⑤ Sitwell Grange affecting an estimated eight dwellings.

8.4.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 1,178 people (equivalent to the occupants of some 500 dwellings). This would represent about 47 people per km of route. With ambient road noise also taken into account, noise impacts from HS2 would be expected to be substantially less than this.

The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ⑥ Breadsall Hilltop, ⑦ Breadsall, ⑧ Allestree, ⑨ Alfreton Road, ⑩ Coxbench, ⑪ Holbrook Crossing, ⑫ Horsley, ⑬ Holbrook, ⑭ Lower Kilburn, ⑮ Kilburn, ⑯ Rawson Green, ⑰ Cinderhill, ⑱ Openwoodgate, ⑲ Upper Hartshay, ⑳ Ripley, ㉑ Pentrich, ㉒ Swanwick, ㉓ Alfreton, ㉔ Westhouses, ㉕ Blackwell, ㉖ Stonebroom, ㉗ Morton, ㉘ Tibshelf, ㉙ Doe Hill Lane, ⑤ Sitwell Grange, ㉚ Pilsley and other scattered dwellings.

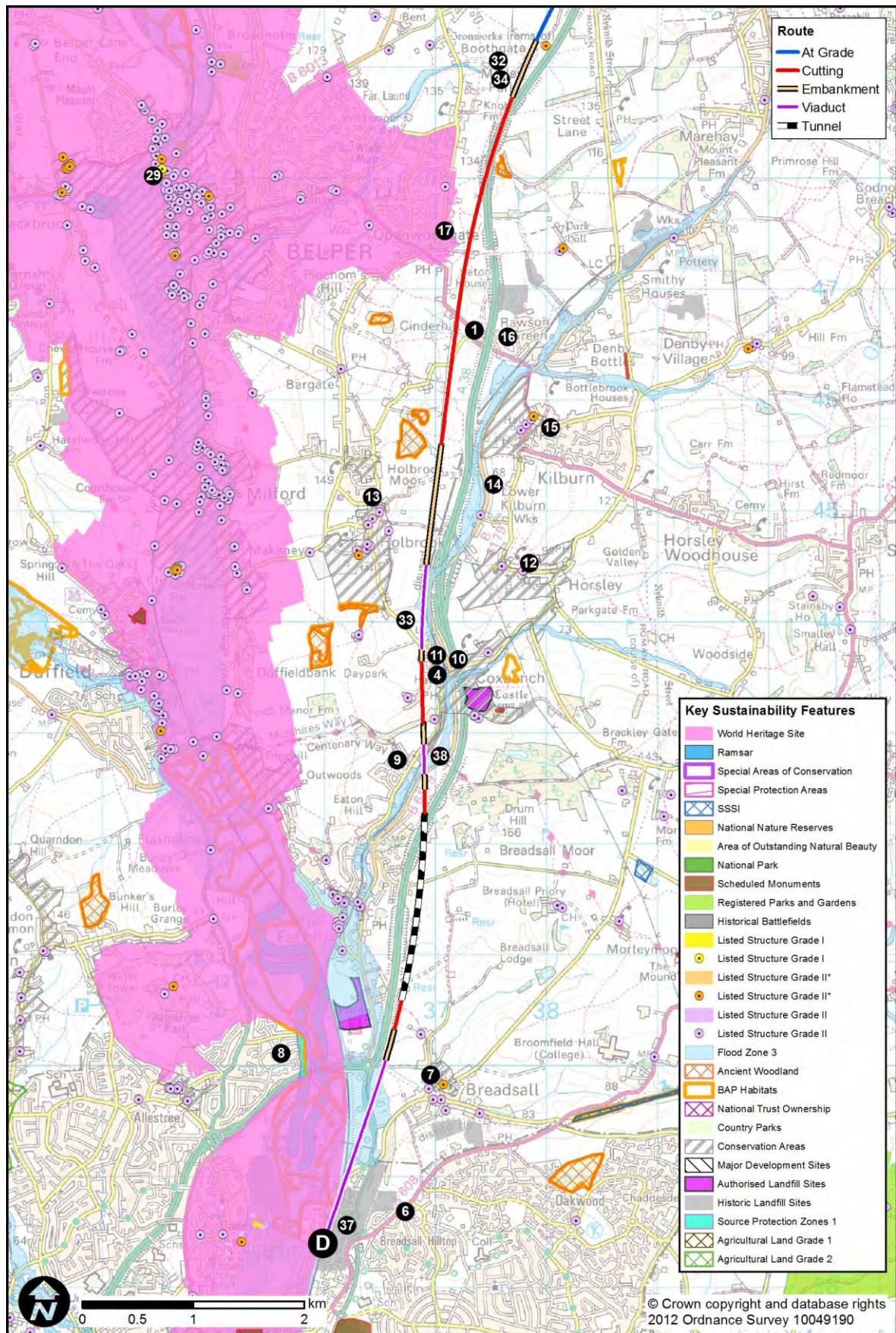
In terms of noise insulation, approximately 310 dwellings would be expected to qualify, particularly at ⑧ Allestree, ⑨ Alfreton Road, ⑪

		Holbrook Crossing, ① Cinderhill, ② Pentrich, ③ Alfreton, ④ Westhouses, ⑤ Tibshelf, ⑥ Doe Hill Lane, ⑦ Sitwell Grange, and ⑧ Pilsley. This is equivalent to approximately 13 dwellings per km of route section.
8.4.7.	Health and well-being	Approximately 89 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
8.4.8.	Access issues	No promoted recreational routes would be crossed by the route section.
8.4.9.	Landscape, townscape and cultural heritage	<p>North of Derby, the route section would cross the Derby to Chesterfield railway on high viaduct. It would intersect the designated buffer of the ⑨ Derwent Valley Mills World Heritage Site for some 600m. Given the largely modern industrial setting in this area, and the partial screening provided by buildings and trees, any landscape or visual impacts are expected to be minor or moderate at worst.</p> <p>The route section would initially pass on viaduct and then in tunnel below Breadsall Moor before following the A38 corridor, with limited visual impact, before diverging north beyond Alfreton. Visual impacts would affect residents at ⑩ Breadsall, ⑪ Outwoods and ⑫ Pentrich. High embankments and viaducts would also affect landscape character, particularly near ⑬ Alfreton Golf Club. North-west of Alfreton, the route would directly affect much of ⑭ Pond Wood and the small scale valley landscape.</p> <p>⑮ Coxbench Conservation Area would be crossed briefly, although, it could be avoided through route refinement.</p> <p>There would be minor impacts on the setting of the Grade I listed ⑯ Church of St Matthew in Pentrich and moderate impacts on the setting of the Grade II* listed furnaces at ⑰ Morley Park Ironworks. The Ironworks are also a scheduled monument. The route section would effectively cut the site off from the open country to the west and enclose it with the A38, resulting in moderate impacts on its setting.</p>
8.4.10.	Biodiversity and wildlife	The route would directly affect one ancient woodland, which is also a broad oak plantation BAP.
8.4.11.	Water resources and flood risk	<p>Five minor rivers may need to be diverted, namely ⑱ Bottle Brook, ⑲ Coppice Brook, ⑳ Hartshay Brook tributary at Asherfields, ㉑ Oakerthorpe Brook tributary at Swanwick and ㉒ Oakerthorpe Brook tributary at Ufton Fields. Continuing scheme design would seek to avoid or minimise these impacts.</p> <p>About 3.4km of the route section would be in cut or tunnel across aquifers of good yield and good quality.</p> <p>The route section would cross some 2.1km of Flood Zone 3.</p>
8.4.12.	Land use resources	<p>The route would cross about 12.4km of green belt.</p> <p>Three landfill sites, two at the Derby suburb of ㉓ Breadsall Hilltop and one south of ㉔ Coxbench would be directly affected. The design would require further work to minimise risks to people and the environment from these impacts.</p>

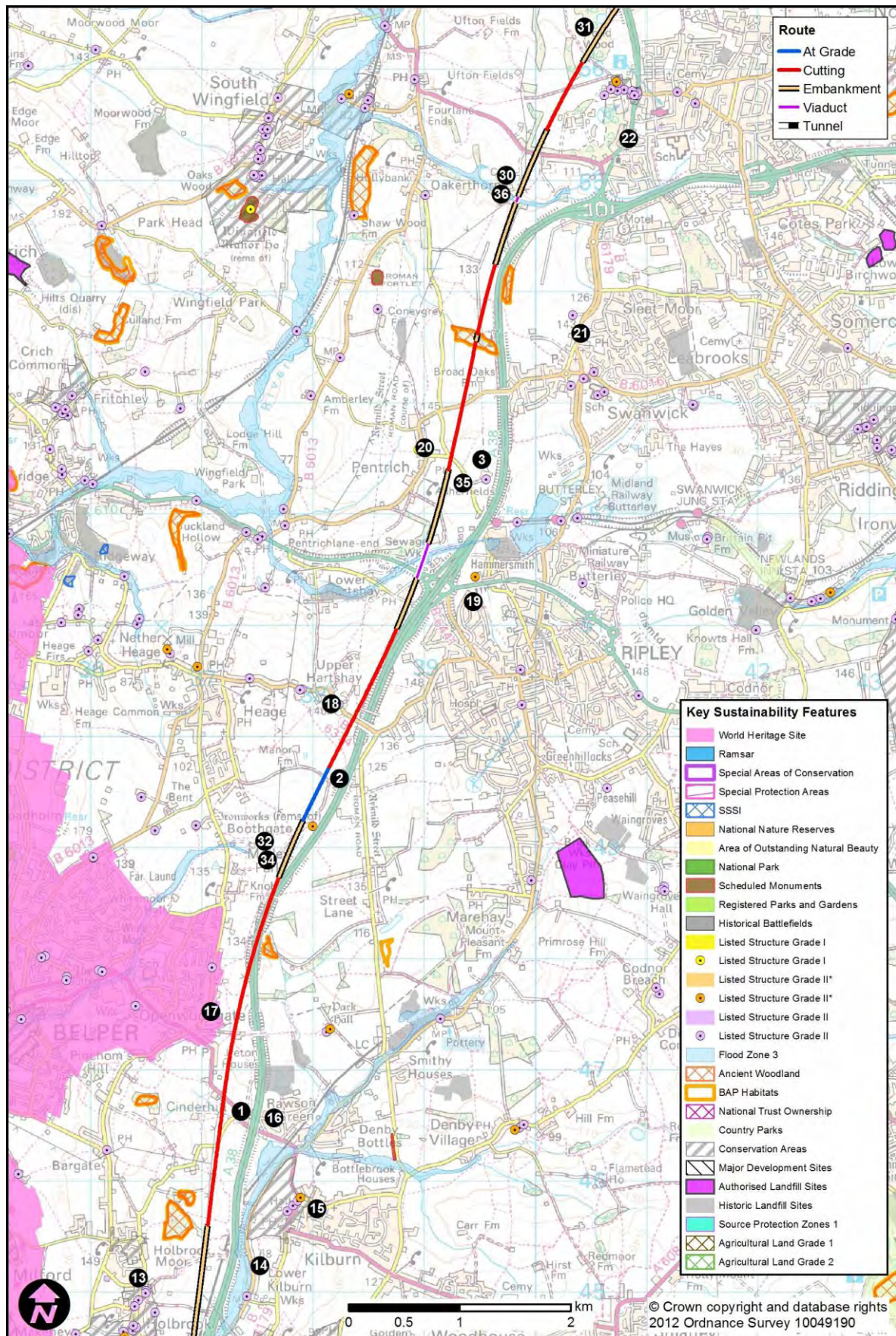
- 8.4.13. Waste and material use
- It is estimated that the route section would result in a surplus of 1,096,100m³ of excavated material. This includes 414,785m³ of tunnel excavated material. As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.

Estimated quantities of bulk building materials for this section comprise 8,000 tonnes of steel and 24,800 tonnes of concrete.

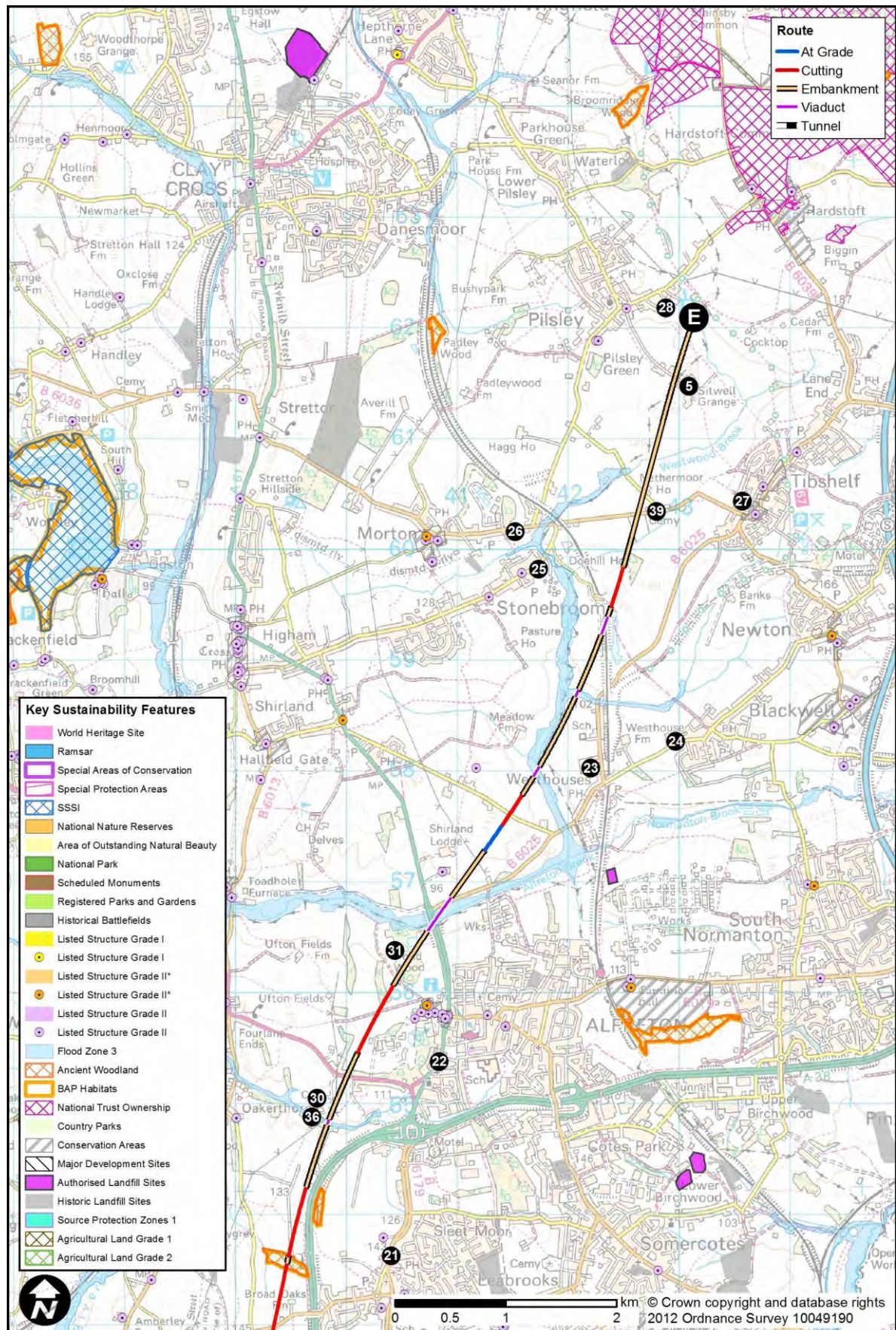
HSL04 - Figure 1 of 3



HSL04 - Figure 2 of 3



HSL04 - Figure 3 of 3



8.5. HSL05: Tibshelf (E) to Killamarsh (F)

8.5.1. The route section between Tibshelf and Killamarsh would be 17.9km (11.1 miles) long. It would connect to the south with HSL04 from Breadsall or HSL11 from Sandiacre. At Killamarsh, the route would continue north along HSL14 to Tinsley (assuming a station at Meadowhall) or HSL24 to Cold Hiendley (assuming a station at Sheffield Victoria).

8.5.2. The route section would use cutting and then short embankments and a viaduct before entering tunnel beneath Heath. The route would pass Sutton Scarsdale in cutting before twice crossing over the M1. Approaching the Chesterfield to Rotherham railway north of Staveley, it would pass onto viaducts over the River Doe Lea and the River Rother north of Renishaw.

8.5.3. HSL05 Figures 1 and 2 illustrate the route alignment and the principal sustainability features in the area.

8.5.4. Specific mitigation included within the route section comprises a number of localised realignments that have sought to move the scheme further from Sutton Scarsdale Conservation Area and avoiding multiple crossings of the River Doe Lea and the River Rother. Other mitigation measures include providing a cut and cover tunnel at Heath.

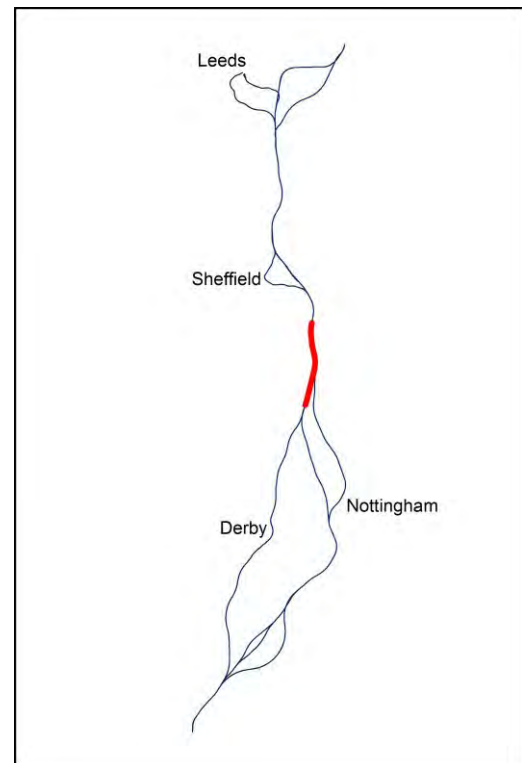
8.5.5. **Population and settlements** The route section would result in the demolition of an estimated nine dwellings. Of the total, two demolitions would be in areas of relatively high deprivation. In addition, an estimated three commercial properties would also be demolished.

There is the potential for isolation of an estimated eight dwellings north-west of ① Renishaw.

8.5.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 722 people (equivalent to the occupants of some 306 dwellings). This would represent about 41 people per km of route. With ambient road noise also taken into account, noise impacts from HS2 would be expected to be substantially less than this.

The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ② Pilsley, ③ Hardstoft, ④ Astwith, ⑤ Common End, ⑥ Holmewood, ⑦ Heath, ⑧ Sutton Scarsdale, ⑨ Carr Vale, ⑩ Long Duckmanton, ⑪ Duckmanton, ⑫ Poolsbrook, ⑬ Staveley, ⑭ Mastin Moor, ⑮ Renishaw and other scattered dwellings.

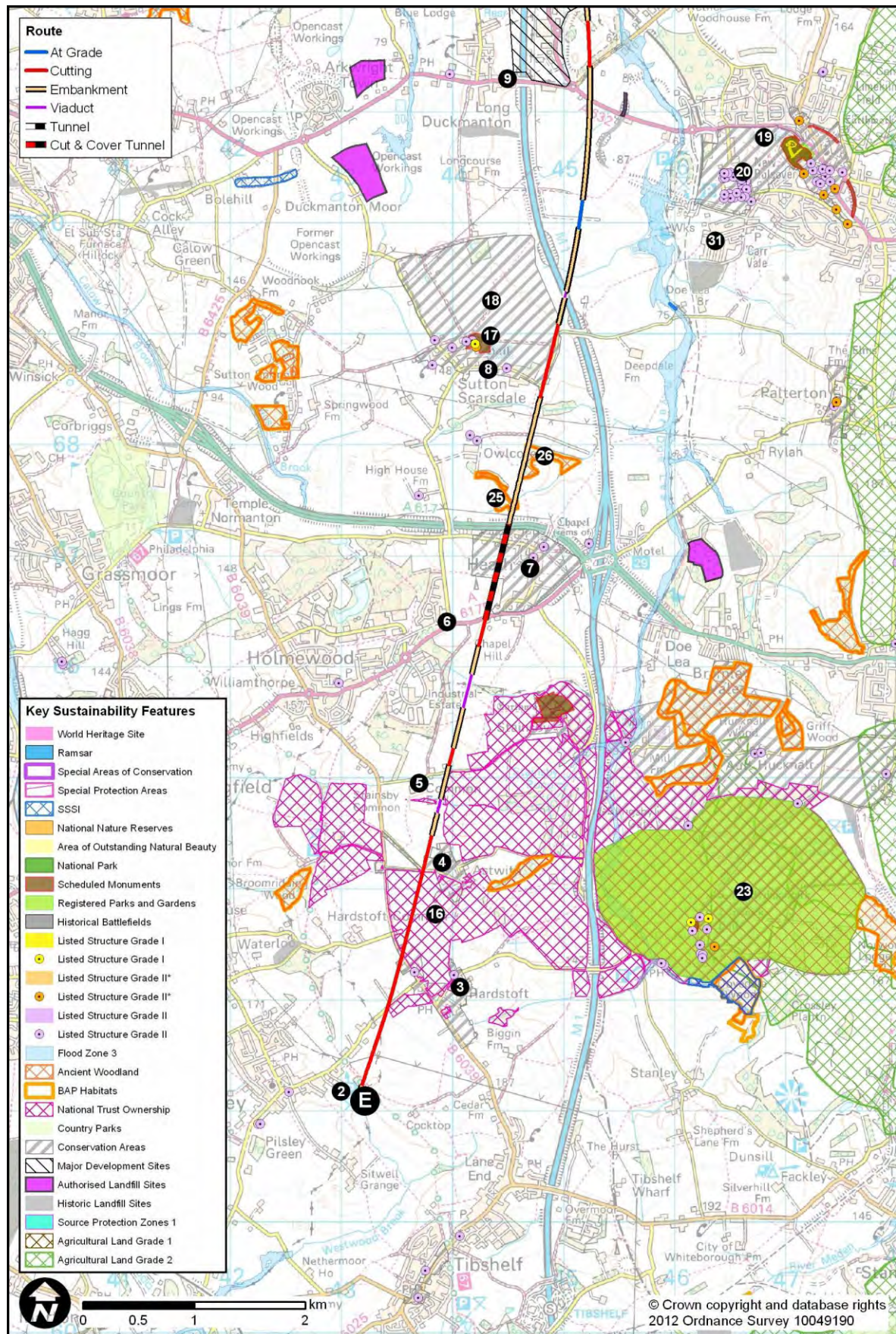
In terms of noise insulation, approximately 244 dwellings would be expected to qualify, particularly at ⑤ Common End, ⑦ Heath, ⑪ Staveley, ⑫ Mastin Moor and ⑮ Renishaw. This is equivalent to approximately 14 dwellings potentially qualifying per km of route section.



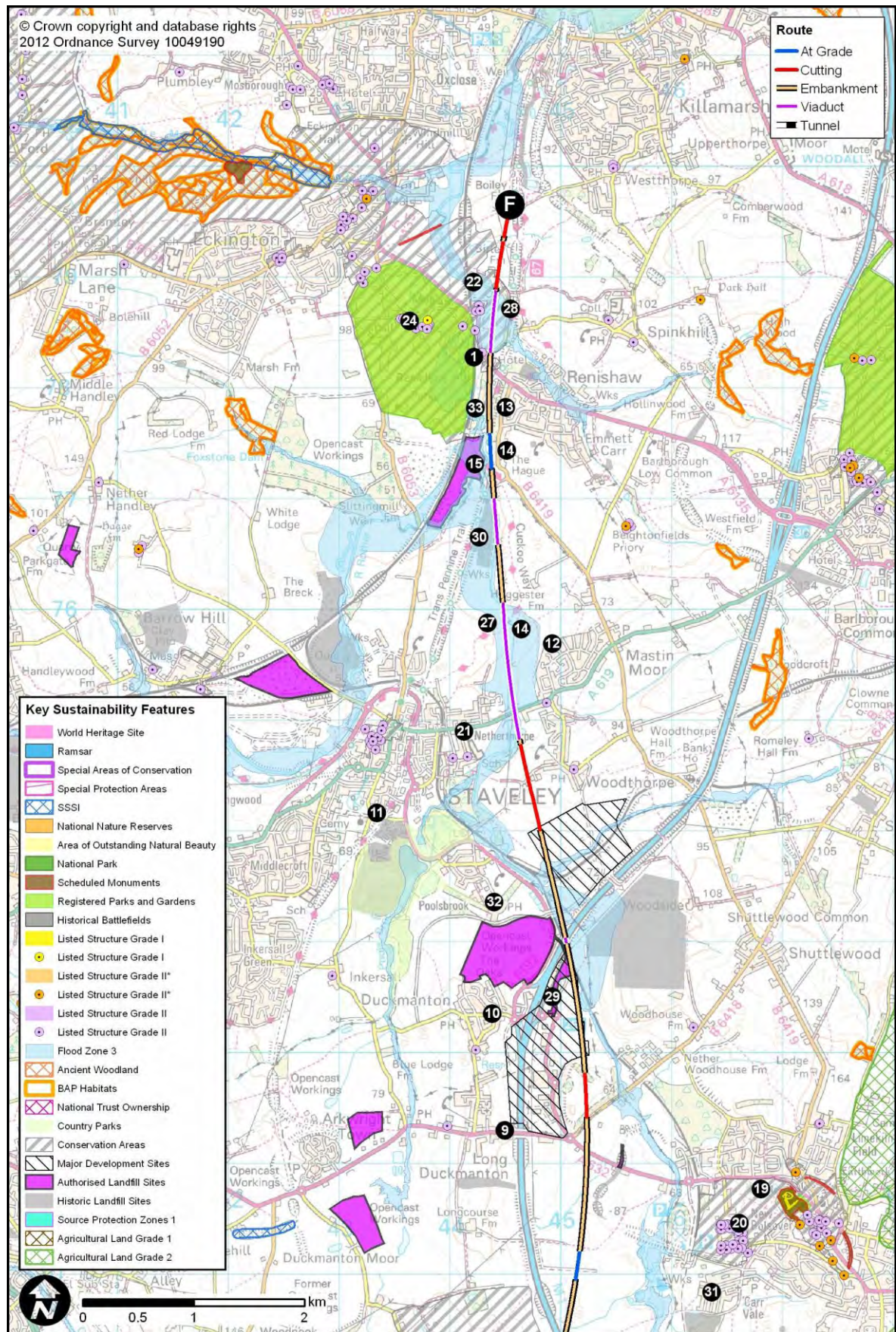
- | | | |
|--------|--|--|
| 8.5.7. | Health and well-being | Approximately 70 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity. |
| 8.5.8. | Access issues | <p>Two promoted recreational routes would be crossed by the route section, namely the 14 Cuckoo Way (in two locations) and the 15 Trans Pennine Trail. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.</p> <p>One area of National Trust Land at 16 Hardwick Hall (although outside the designated registered park land - see <i>landscape, townscape and cultural heritage</i>) would be intersected by the route section for about 900m.</p> |
| 8.5.9. | Landscape, townscape and cultural heritage | <p>The southern part of the route section would mainly be in cutting, limiting visual impact on the nearby villages of 2 Pilsley, 3 Hardstoft and 4 Astwith. Further north, it would rise onto embankment on the slopes south-east of Sutton Scarsdale. The alignment would largely avoid direct impacts on 18 Sutton Scarsdale Conservation Area. However, because the route would run through an area of undulating topography, with sections of deep cutting and high embankment, it would have a disruptive effect on landscape character. It would also result in some loss of woodland (see also <i>biodiversity and wildlife</i>). Between the route section and the M1 motorway, parts of the village of 7 Heath could have some adverse visual impact from the high embankment to the north. The route would be visible from 23 Hardwick Hall Grade I Registered Park and Garden (also a National Trust property and country park) but at a distance of over 2km the impact would be minor.</p> <p>The route section would continue north in cutting and be visible from 17 Sutton Scarsdale Hall where it crosses the M1 on embankment and viaduct, although the visual impact would be reduced by the close relationship between the route section and the motorway. There would be views of the embankment from 19 Bolsover Castle and 20 Bolsover Conservation Area, but impacts on views and on the setting of the castle would be attenuated by distance.</p> <p>Between 21 Netherthorpe and 12 Mastin Moor localised visual impact would affect residents. North of Mastin Moor the route section would mainly be on embankment or viaduct and would have a moderate adverse visual impact where it would cross the River Rother and floodplain. The route section would pass through the 22 Eckington and Renishaw Park Conservation Area. 24 Renishaw Hall Grade II* Registered Park and Garden lies on rising ground to the west, although separated from the route by woodland and existing railway embankment. There would be a direct impact on a large area of woodland that forms an important part of the setting of the park and garden, although the impact on the setting of the park and garden would be negligible. The area is very well-used for recreation and the 15 Trans Pennine Trail follows the valley and would be crossed by the route. Overall both the landscape and visual impacts on the landscape are likely to be moderate or higher. Of the five conservation areas directly intersected by the route section, impacts on 3 Hardstoft, 4 Astwith and 7 Heath could be major. However, if existing access roads are diverted to avoid severance of these conservation areas, impacts could be reduced to minor. At 18</p> |

		Sutton Scarsdale and 22 Eckington and Renishaw conservation areas the impact would be moderate.
8.5.10.	Biodiversity and wildlife	<p>Two SSSIs would be located within 2km. Impacts on both are considered unlikely.</p> <p>25 Heath Wood and 26 Owlcotes Wood would be directly affected by the route section. Owlcotes Wood is an ancient wood and wet woodland BAP habitat. Heath Wood is an ancient wood and lowland mixed deciduous woodland BAP habitat.</p>
8.5.11.	Water resources and flood risk	<p>27 The River Doe Lea and the 28 River Rother, both major rivers, may require diversion. A 33 tributary of the River Doe Lea, a minor river may also require diversion. Continuing scheme design would seek to avoid or minimise these impacts.</p> <p>The route section would cross some 2.7km of Flood Zone 3.</p>
8.5.12.	Land use resources	<p>The route would cross about 4.1km of green belt.</p> <p>Two landfill sites at 29 Duckmanton and another at 30 The Hague, near Renishaw, would be directly affected. The design would require further work to minimise risks to people and the environment from these impacts.</p>
8.5.13.	Waste and material use	<p>It is estimated that the route section would result in a deficit of - 136,068m³ of excavated material.</p> <p>As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.</p> <p>Estimated quantities of bulk building materials for this section comprise 5,600 tonnes of steel and 17,700 tonnes of concrete.</p>

HSL05 -Figure 1 of 2



HSL05 - Figure 2 of 2



8.6. HSL06: Birchmoor (B) to Tonge (G)

8.6.1. The route section between Birchmoor and Tonge would be 28.2km (17.5 miles) long. It would connect to the south with HSL01 from Water Orton. The route section would form one of three options from Birchmoor to Tonge (the others being HSL07 and HSL08) that provide different options for passing the River Mease, a European protected habitat. At Tonge, the route would continue north along HSL09 to Long Eaton.

8.6.2. Having crossed beneath the M42 in tunnel just east of Tamworth, the route section would remain on the east side of the M42/A42, following this dual carriageway past Measham, Packington, Ashby-de-la-Zouch and Worthington. Although mainly in cutting, occasional viaducts and embankments would be required to pass over the River Anker, the River Mease the Ramsley Brook and the A42 just south of Tonge.

8.6.3. HSL06 Figures 1 to 3 illustrate the route alignment and the principal sustainability features in the area.

8.6.4. Specific mitigation included within the route section comprises changes in horizontal realignment around Measham, River Mease and Appleby Magna to reduce noise impacts and impact to the River Mease.

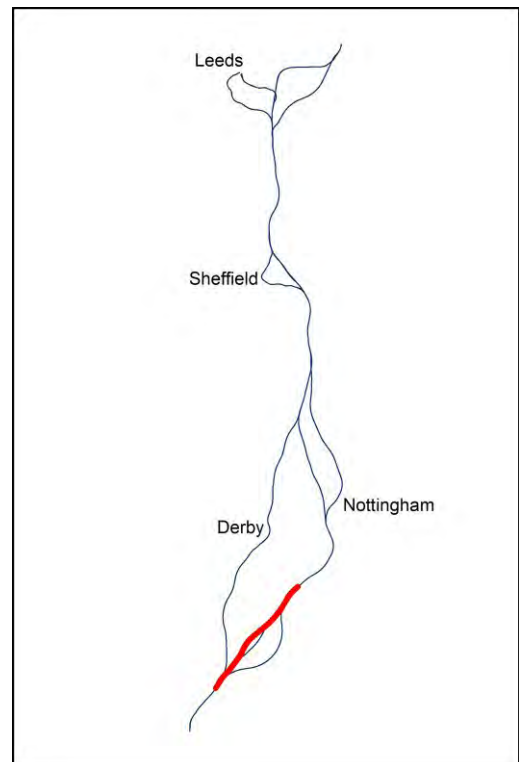
8.6.5. **Population and settlements** The route section would result in the demolition of an estimated three dwellings. In addition, an estimated 13 commercial properties would also be demolished.

Potential for isolation at four locations would affect an estimated two dwellings between ① Polesworth and the M42, one dwelling north-east of ② Measham, five dwellings west of ③ Worthington and one dwelling south-east of ④ Breedon on the Hill.

8.6.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 578 people (equivalent to the occupants of some 245 dwellings). This would represent about 21 people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be substantially less than this.

The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ⑦ Birchmoor, ②⑧ Polesworth, ⑤ Austrey, ⑧ No Man's Heath, ⑨ Appleby Magna/Parva, ②② Measham, ⑩ Oakthorpe, ⑪ Packington, ⑥ Ashby de la Zouch, ②⑦ Lount, ⑫ Newbold, ②⑨ Worthington, ⑩⑧ Breedon on the Hill and ⑬ Tonge.

In terms of noise insulation, approximately 36 dwellings would be expected to qualify, particularly at ②⑧ Polesworth, ②② Measham and ⑬ Tonge. This is equivalent to approximately two dwellings per km of route

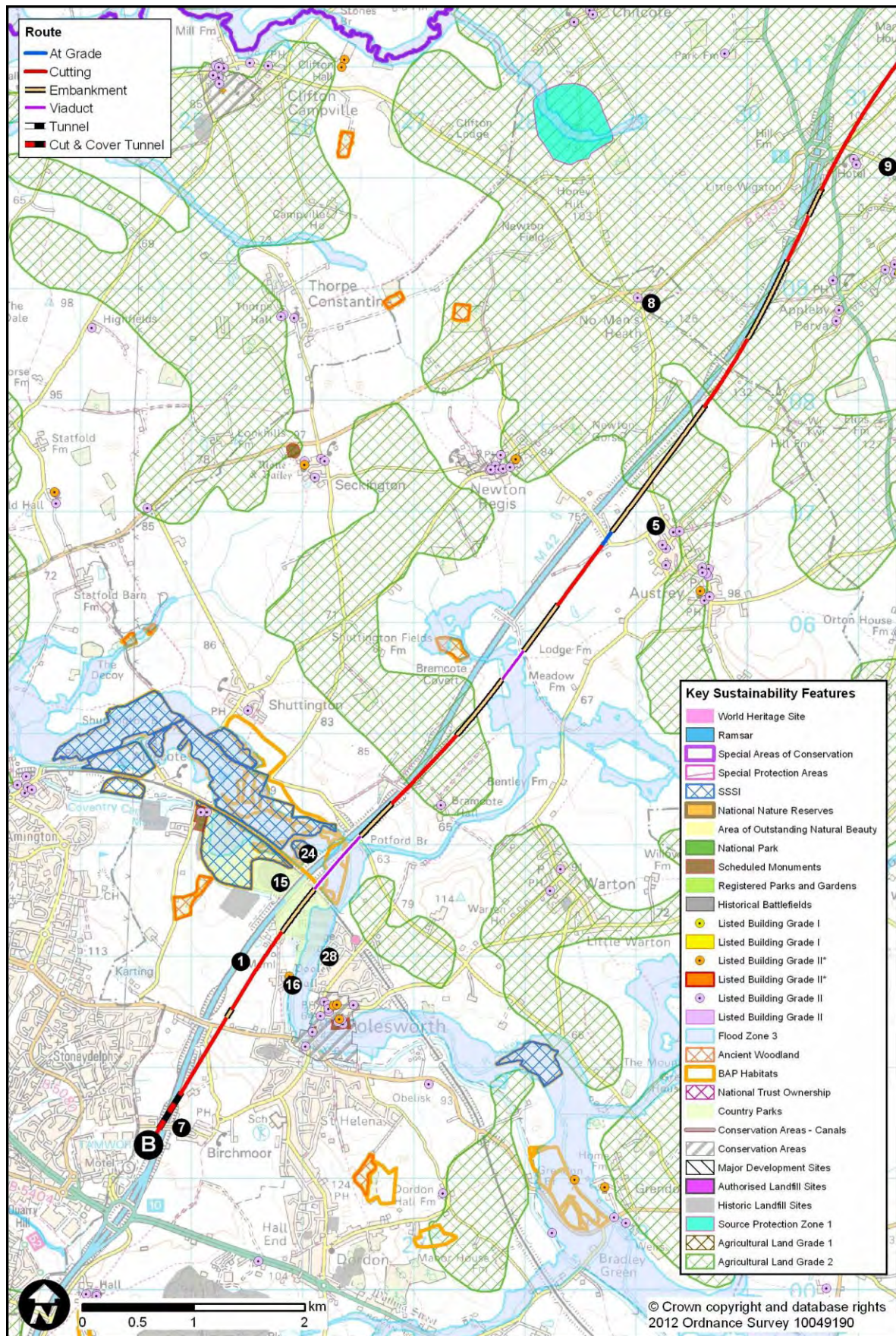


		section.
8.6.7.	Health and well-being	Approximately 113 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
8.6.8.	Access issues	One promoted recreational route would be crossed by the route section in two places, namely the 14 Ivanhoe Way. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.
8.6.9.	Landscape, townscape and cultural heritage	<p>Having passed beneath the M42, the route section would rise onto viaduct over the Tamworth to Atherstone railway, the River Anker and the Coventry Canal, and pass through 15 Pooley Country Park just west of Polesworth. The elevated structure would cause visual intrusion at both the 15 country park and the 28 village. There would be only a minor impact on the setting of the Grade II* Listed 16 Pooley Hall and its attached former chapel and farmhouse, which are well screened by other buildings and trees.</p> <p>Continuing north, it would cut through the undulating land, but impacts on landscape character would be reduced due to the proximity to the M42, except near 28 Polesworth itself where the route section would be on embankment causing visual intrusion (to 28 Polesworth). It would continue between the motorway and local villages. Embankment or short viaduct close to 5 Austrey, 22 Measham and 11 Packington would cause visual impact on residents at the edges of these villages. In general, due to the route being in cutting and close to the road corridor, it would have limited landscape and visual impacts. There may be exceptions where existing dense planting would be affected, for example, two woodlands would be directly affected.</p> <p>The route section would remain mainly in cutting through a hilly section of country north-east of Ashby-de-la-Zouch. The main landscape impact would be the deep cut and embankment through the woodland at 17 Rough Park. In addition the route would pass within 350m of the village of 29 Worthington and there would be potential for visual intrusion on part of the village. Further north the route would cross the A42 on high viaduct close to 18 Breedon on the Hill and 13 Tonge with potential visual impact on these small settlements, both of which are conservation areas.</p> <p>Three areas of scheduled coal mining remains south of 19 Smoile Farm, would potentially have their settings affected by the route section, which would pass nearby on embankment or at ground level to the west of these monuments. Collectively, the designated areas include above and below ground remains of medieval and later coal mining preserved in woodland. The proposed route section may have some impact on their setting, most noticeably on the 19 Birch Coppice designated area, although this will likely be reduced by the screening afforded by woodland.</p> <p>Impacts on the setting of the Grade II* Registered Parks and Gardens of 20 Coleorton Park would be negligible, as they would be for the Grade II* listed 21 Staunton Harold Hall.</p> <p>The Grade II listed 22 Meer Bridge could be directly affected. However, the route section would be on viaduct and it is possible that any physical impact might be avoided. However, its setting would certainly be</p>

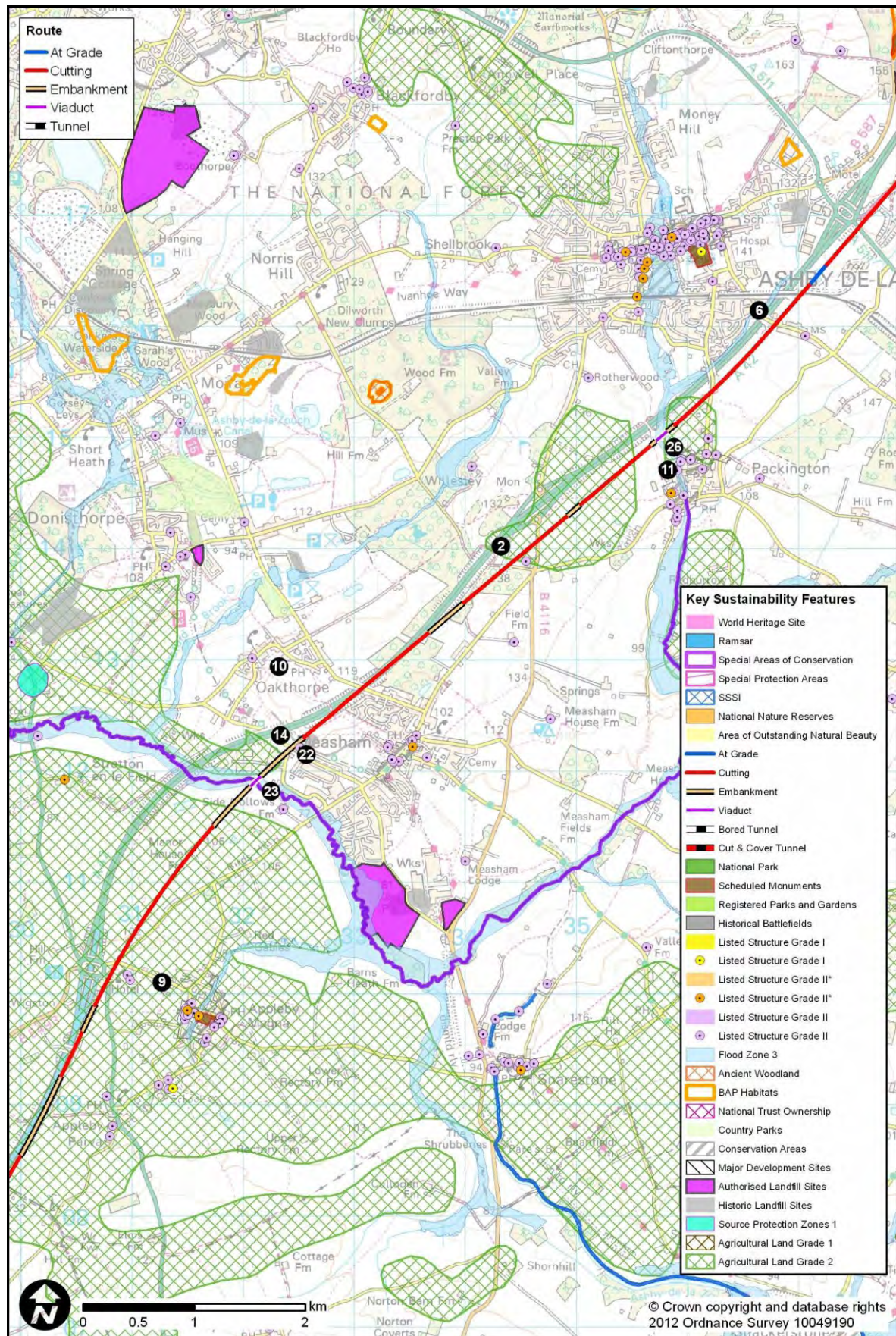
affected.

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| 8.6.10. | Biodiversity and wildlife | <p>The route section would cross the 23 River Mease SAC. The potential for significant effects at this site cannot be discounted at this stage. Further details are described in an HRA screening report, which acknowledges the need for more detailed analysis.</p> <p>There are five SSSIs that would be within 2km of the route section that could be affected indirectly. Whilst impacts on three of these are considered unlikely, there is a risk that airborne pollution could affect 24 Alvecote Pools SSSI and 25 Lount Meadows SSSI, which are 150m and 50m from the route section at their closest points, respectively. Best practice would be used during construction to reduce these risks. Additional risk of bird strike by HS2 trains at 24 Alvecote Pools would require further consideration as part of a more detailed assessment.</p> <p>The route would directly affect three areas of coastal and floodplain grazing marsh BAP habitat.</p> |
| 8.6.11. | Water resources and flood risk | <p>One minor river may require diversion, namely 26 Gilwiskaw Brook. Continuing scheme design would seek to avoid or minimise this impact.</p> <p>The route section would cross some 890m of Flood Zone 3.</p> |
| 8.6.12. | Land use resources | <p>The route would cross about 11.2km of Grade 2 agricultural land.</p> <p>Two landfill sites at 22 Measham would be directly affected and the design would require further work to minimise risks to people and the environment.</p> |
| 8.6.13. | Waste and material use | <p>It is estimated that the route section would result in a surplus of 3,065,792m³ of excavated material.</p> <p>As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.</p> <p>Estimated quantities of bulk building materials for this section comprise 9,100 tonnes of steel and 28,000 tonnes of concrete.</p> |

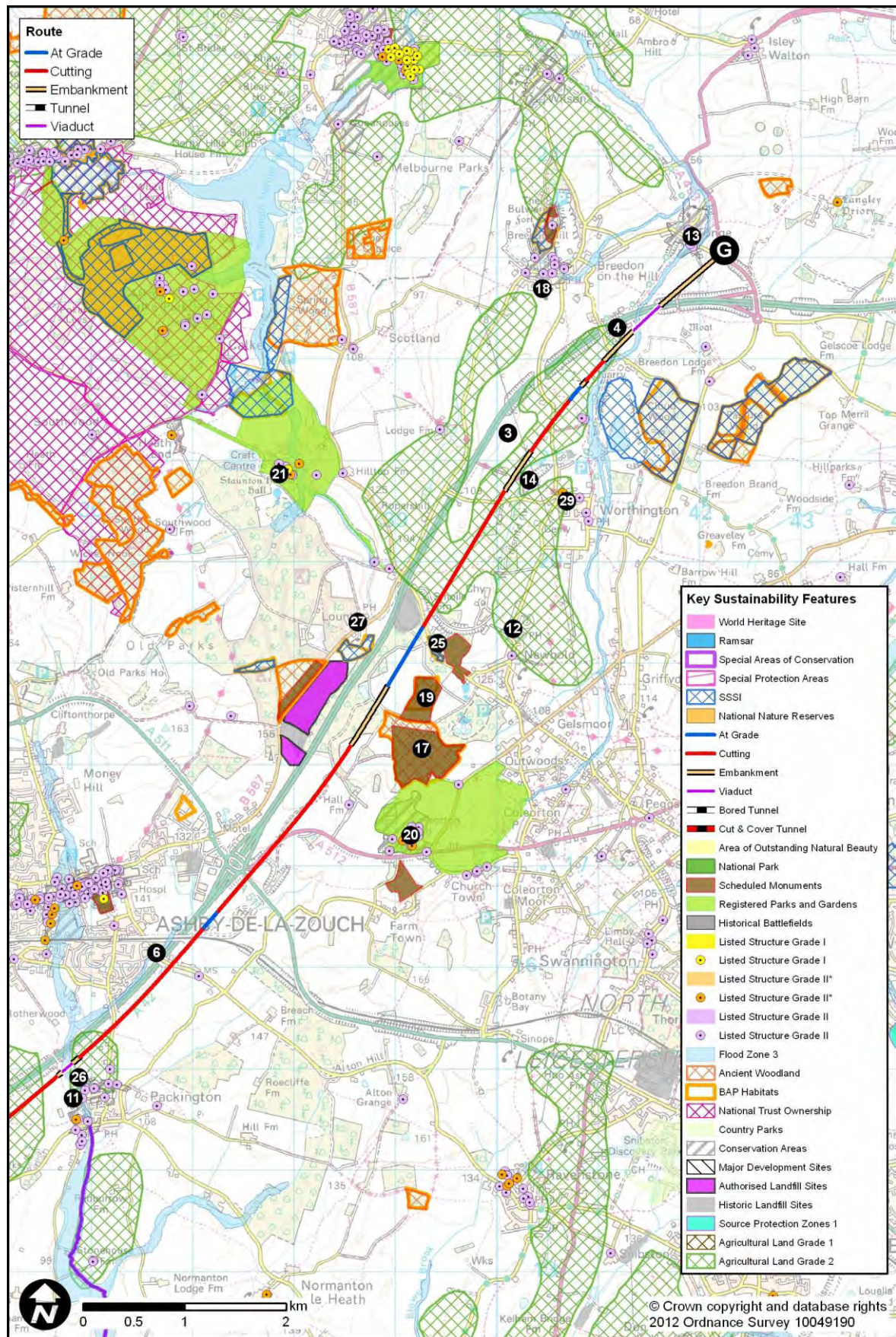
HSL06 - Figure 1 of 3



HSL06 - Figure 2 of 3



HSL06 – Figure 3 of 3



8.7. HSL07: Birchmoor (B) to Tonge (G)

8.7.1. The route section between Birchmoor and Tonge would be 28.2km (17.5 miles) long. It would connect to the south with HSL01 from Water Orton. The route section would form one of three options from Birchmoor to Tonge (the others being HSL06 and HSL08) that provide different options for passing the River Mease, a European protected habitat. At Tonge, the route would continue north along HSL09 to Long Eaton.

8.7.2. The route section would commence at Tamworth, crossing under the M42 in tunnel and following the M42 corridor to Appleby Magna, and the A42 corridor past Ashby-de-la-Zouch as far as Breedon on the Hill. The route would be predominantly in cutting and on embankment with a number of viaducts and bridges across roads.

8.7.3. HSL07 Figures 1 to 3 illustrate the route alignment and the principal sustainability features in the area.

8.7.4. Specific mitigation included within the route section comprises horizontal realignment around Measham, River Mease and Appleby Magna to reduce noise impacts and impact to the River Mease.

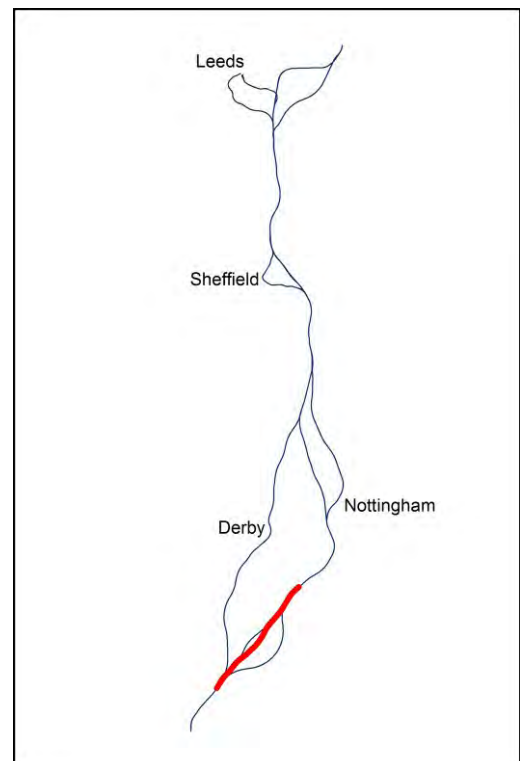
8.7.5. **Population and settlements** The route section would result in the demolition of an estimated three dwellings. In addition, an estimated three commercial properties and two community properties (electricity substation and park) would also be demolished.

Potential isolation would occur at three locations, affecting an estimated two dwellings between ① Polesworth and the M42, five dwellings ② west of Worthington and one dwelling ③ south-east of Breedon on the Hill.

8.7.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 841 people (equivalent to the occupants of some 357 dwellings). This would represent about 31 people per km of route. With ambient road noise also taken into account, noise impacts from HS2 would be expected to be substantially less than this.

The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ④ Birchmoor, ⑤ Polesworth, ⑥ Austrey, ⑦ Appleby Magna/Parva, ⑧ Measham, ⑨ Packington, ⑩ Ashby de la Zouch, ⑪ Lount, ⑫ Newbold, ⑬ Breedon on the Hill and ⑭ Tonge.

In terms of noise insulation, approximately 107 dwellings would be expected to qualify, particularly at ⑤ Polesworth, ⑦ Appleby Magna/Parva, ⑧ Measham, ⑨ Packington and ⑭ Tonge. This is equivalent to approximately four dwellings per km of route section.



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| 8.7.7. | Health and well-being | Approximately 73 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity. |
| 8.7.8. | Access issues | One promoted recreational route would be crossed in two places by the route section, namely the 15 Ivanhoe Way. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme. |
| 8.7.9. | Landscape, townscape and cultural heritage | <p>Having passed beneath the M42, the route section would rise onto viaduct over the Tamworth to Atherstone railway, the River Anker and the Coventry Canal, and pass through 16 Pooley Country Park just west of Polesworth. The elevated structure would cause visual intrusion at both the 16 country park and the 5 village. There would be a minor impact on the setting of the Grade II* Listed 22 Pooley Hall and its attached former chapel and farmhouse, which is well screened by other buildings and trees.</p> <p>Further north, it would continue through undulating land using high embankment and deep cutting, causing visual impact on nearby residents at 6 Austrey, 17 Appleby Parva, 8 Measham and 9 Packington, and causing a minor effect on the setting of 9 Packington Conservation Area.</p> <p>Where the route section diverges from the A42 corridor across open countryside, there would be a landscape impact. North-east of Ashby-de-la-Zouch the deep cutting and embankment would pass through woodland at 21 Rough Park. The route would pass within 350m and cause visual impact at 12 Worthington. Further north the route would cross the A42 on high viaduct close to 13 Breedon on the Hill and 14 Tonge with potential visual impact on these small settlements, both of which are conservation areas.</p> <p>Three areas of medieval and later coal mining remains south of 19 Smoile Farm are each designated as scheduled monuments. The route section would be in cutting or low embankment west of all three. They include both above and below ground remains which are preserved in woodland and under pasture. Impacts on the settings of the remains at 18 Birch Coppice are likely to be greatest owing to their proximity to the route section.</p> <p>There would be minor impacts on a Grade I listed structure, the 20 Sir John Moore Church of England, near Appleby Magna, and on the setting of the Grade II* listed 23 Church of the Holyrood. A further 34 Grade II listed structures would be near the route and subject to impacts on their setting. Nine of these in 24 Appleby Magna Conservation Area and six in 9 Packington Conservation Area would be subject to minor impacts on setting. Impacts on the settings of the other listed structures would be negligible.</p> <p>Two Grade II* registered parks and gardens within 1km of the route section would have negligible impacts, namely 25 Coleorton Hall and 26 Staunton Harold Hall.</p> |
| 8.7.10. | Biodiversity and wildlife | The route would pass across the 27 River Mease SAC. The potential for significant effects at this site cannot be discounted at this stage. Further details are described in an HRA screening report, which acknowledges the need for more detailed analysis. |

There are six SSSIs that would be within 2km of the route section that could be affected indirectly. Although impacts on four of these are considered unlikely, there is a risk that airborne pollution could affect 28 Alvecote Pools SSSI and 29 Lount Meadows SSSI, which are 150m and 50m from the route section at their closest points, respectively. Best practice would be used during construction to reduce these risks. Additional risk of bird strike by HS2 trains at 28 Alvecote Pools would require further consideration as part of a more detailed assessment. The route would directly affect three areas of coastal and floodplain grazing marsh BAP habitat.

8.7.11. Water resources and flood risk

The route section would cross some 1.5km of Flood Zone 3.

8.7.12. Land use resources

The route would cross about 9.6km of high quality Grade 2 agricultural land.

One landfill site at 30 Measham would be directly affected. The design would require further work to minimise risks to people and the environment from this impact.

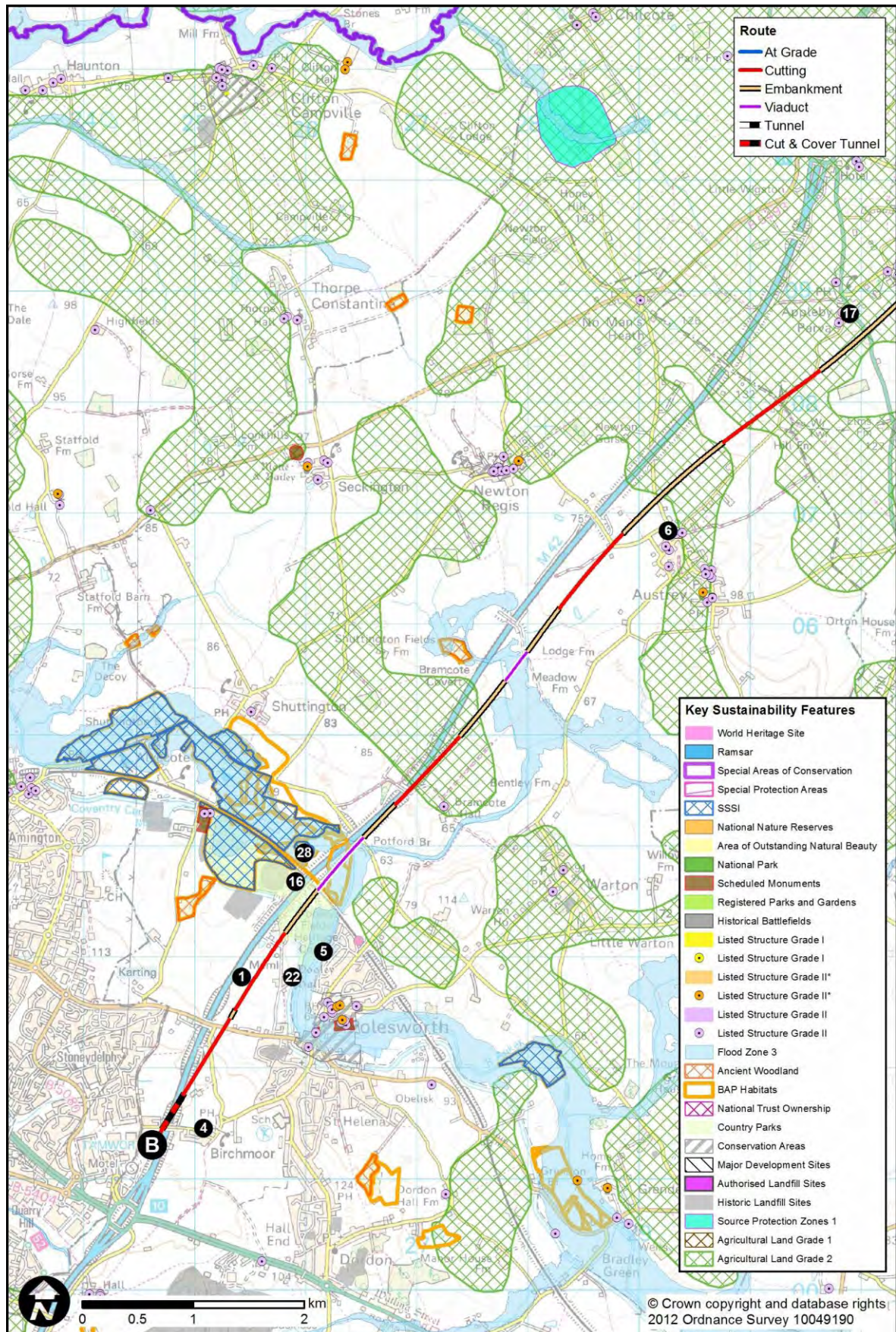
8.7.13. Waste and material use

It is estimated that the route section would result in a surplus of 1,786,804m³ of excavated material.

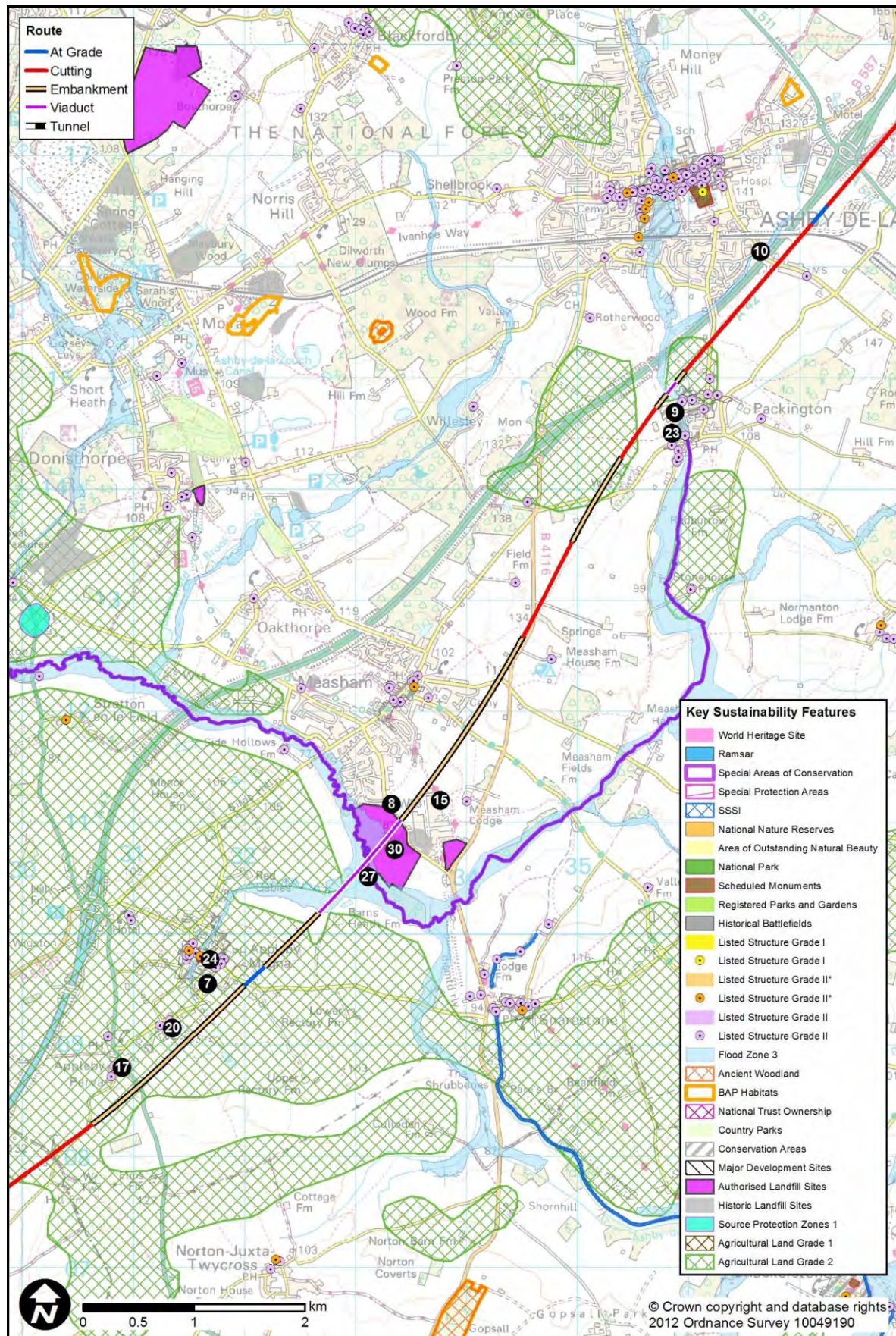
As a result of the route section impacting on the landfill site, it is possible that some of the waste material arising in the route section would be hazardous.

Estimated quantities of bulk building materials for this section comprise 9,100 tonnes of steel and 28,000 tonnes of concrete.

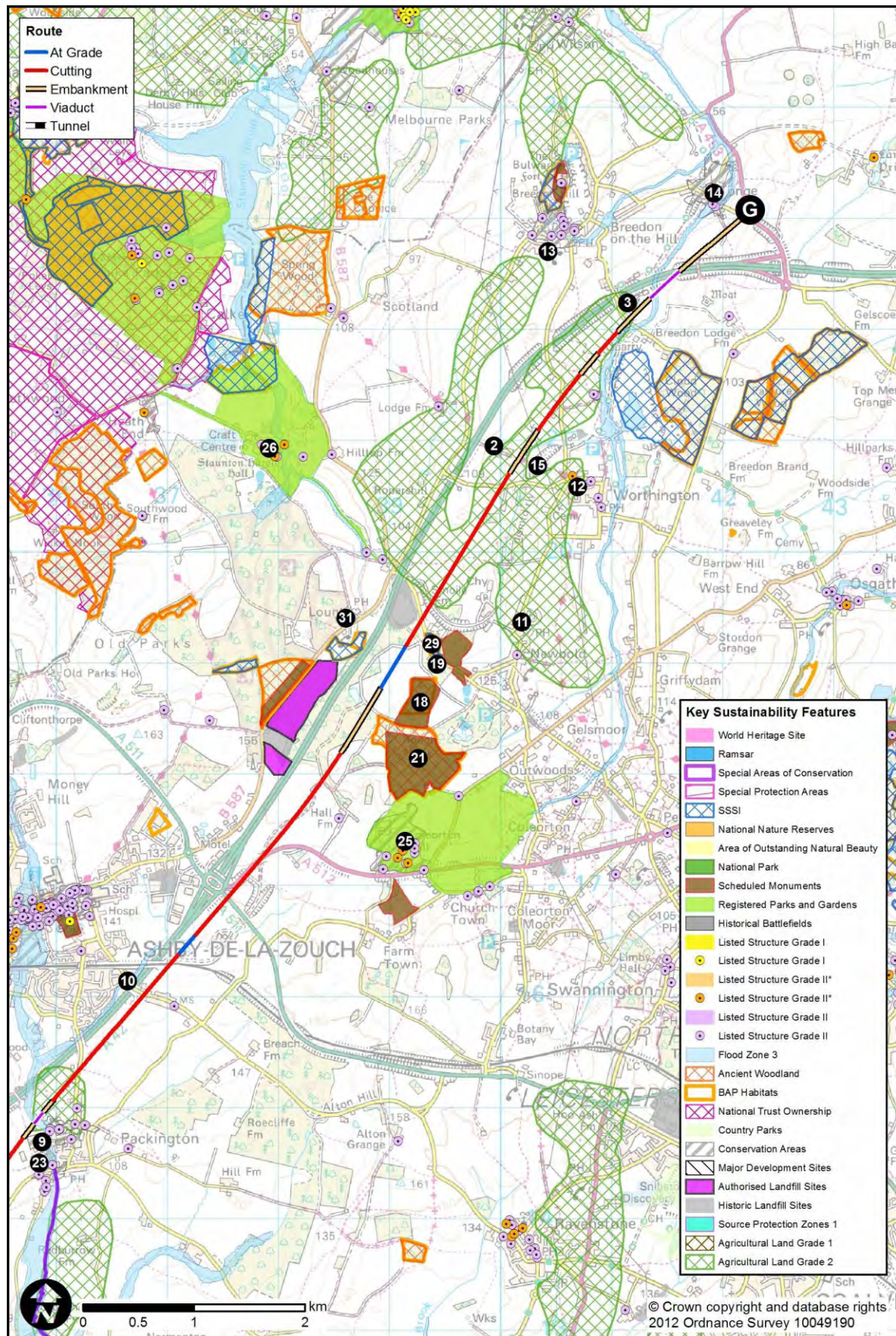
HSL07 - Figure 1 of 3



HSL07 - Figure 2 of 3



HSL07 – Figure 3 of 3



8.8. HSL08: Birchmoor (B) to Tonge (G)

8.8.1. The route section between Birchmoor and Tonge would be 31.1km (19.3 miles) long. It would connect to the south with HSL01 from Water Orton. The route section would form one of three options from Birchmoor to Tonge (the others being HSL06 and HSL07). HSL08 would not cross the River Mease. At Tonge, the route would continue north along HSL09 to Long Eaton.

8.8.2. From Tamworth, the route section would pass under the M42 in tunnel and then follow the motorway corridor past Polesworth and then over the existing Tamworth to Atherstone railway on viaduct. The route would diverge eastward from the M42 corridor to cross gently undulating land in a mix of cutting and embankment and pass over the Ashby Canal on viaduct. The route would remain in cutting for several kilometres as it curves northwards, before rising onto viaduct over the A511 and the Leicester to Burton upon Trent railway. The route section would pass largely in cutting as it joined the corridor of the A42 near Lount.

8.8.3. HSL08 Figures 1 to 4 illustrate the route alignment and the principal sustainability features in the area.

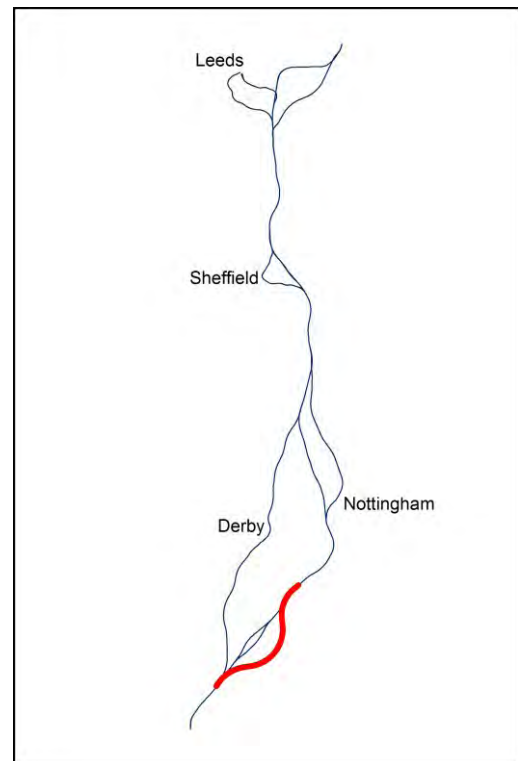
8.8.4. Specific mitigation included within the route section comprises a number of localised realignments that have sought to move the route further from Coleorton Hall and its registered park and garden, reducing noise and visual impacts at Polesworth, and reducing the impact on the River Anker. Vertical realignment has sought to reduce the noise impacts at Heather.

8.8.5. Population and settlements The route section would result in the demolition of an estimated eight dwellings. In addition, an estimated nine commercial properties would also be demolished and two parks directly affected.

Potential isolation at two locations would affect an estimated two dwellings and the Pooley Fields Heritage Centre (community) north-west of ❶ Polesworth and four dwellings west of ❷ Worthington, as well as the Pooley Fields Heritage Centre.

8.8.6. Noise Noise from HS2 trains would result in annoyance for an estimated 468 people (equivalent to the occupants of some 199 dwellings). This would represent about 17 people per km of route. With ambient road noise also taken into account, noise impacts from HS2 would be expected to be substantially less than this.

The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ❸ Birchmoor, ❹ Polesworth, ❺ Warton, ❻ Austrey, ❼ Shackerstone, ❽ Newton Burgoland, ❾ Heather, ❿ Ravenstone, ⓫ Lount, ⓬ Newbold, ⓭ Worthington, ⓮ Breedon on the Hill, ⓯ Tonge and other scattered



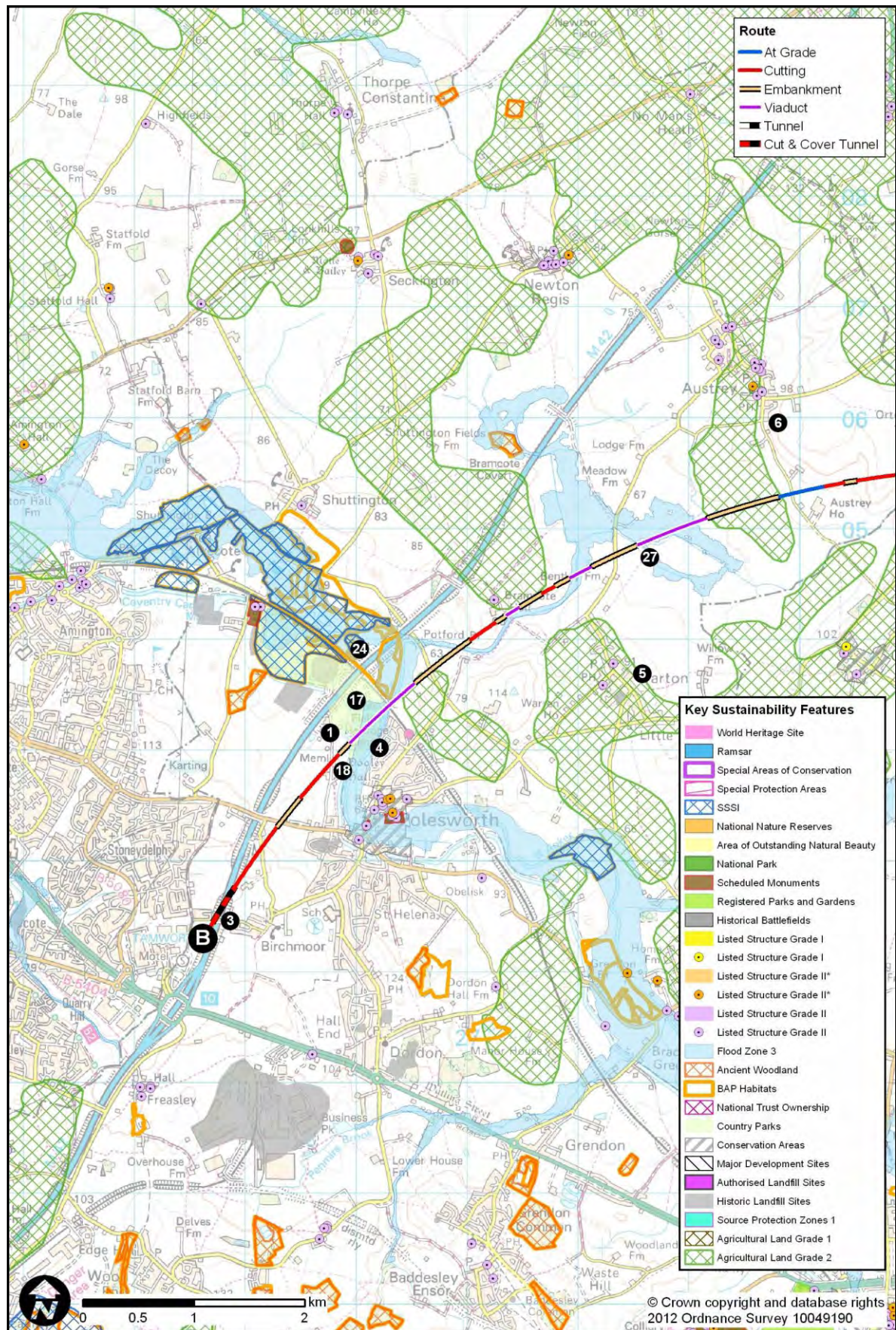
dwellings.

In terms of noise insulation, approximately 91 dwellings would be expected to qualify, particularly at ④ Polesworth and ⑮ Tonge. This is equivalent to approximately four dwellings per km of route section.

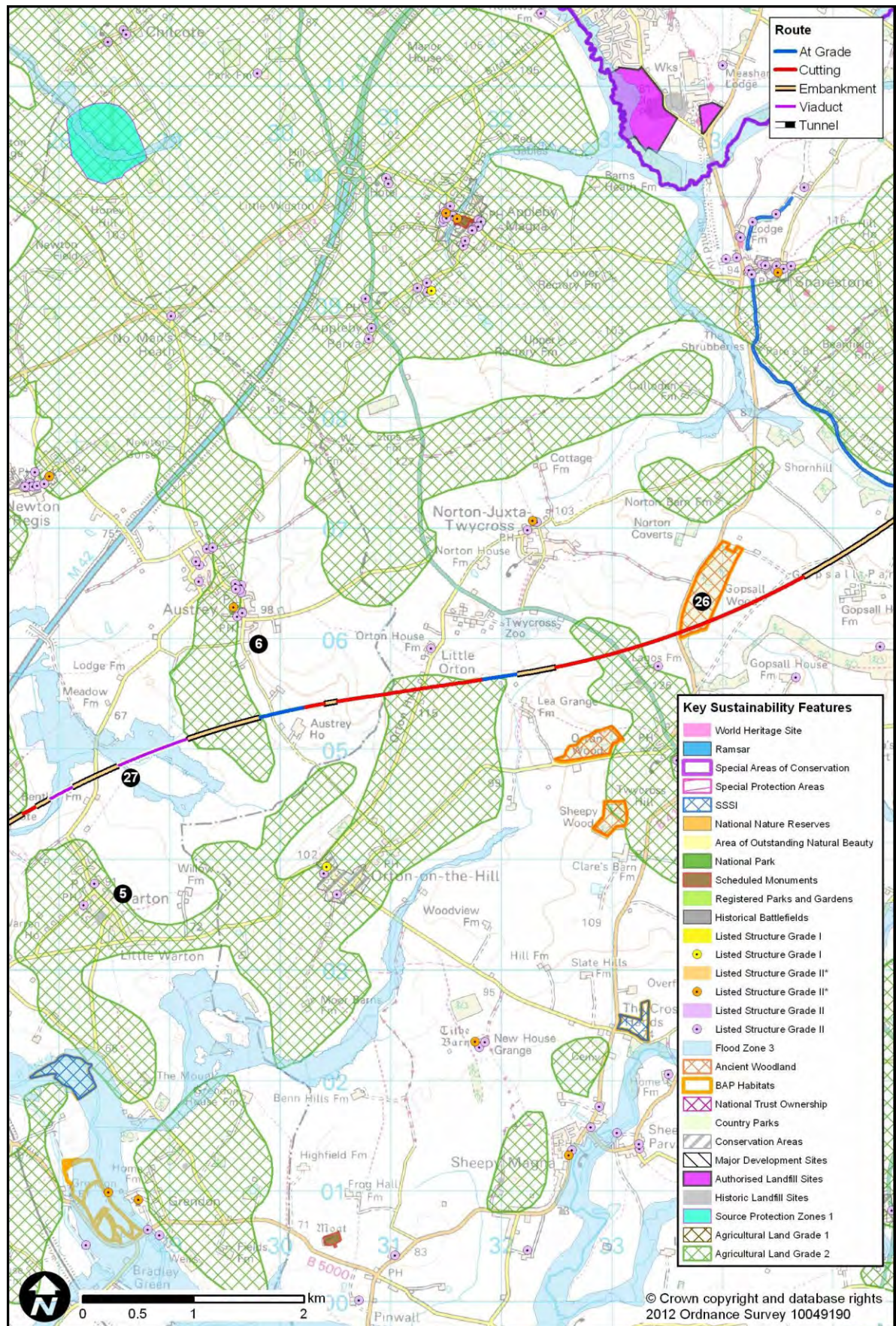
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| 8.8.7. | Health and well-being | Approximately 73 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity. |
| 8.8.8. | Access issues | The ⑯ Ivanhoe Way promoted recreational route would be crossed twice by the route section. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme. |
| 8.8.9. | Landscape, townscape and cultural heritage | <p>Initially in cutting close to the M42 corridor, the route section would then veer east to cross the River Anker at Polesworth on viaduct, resulting in landscape impacts on the character of ⑰ Pooley Country Park and visual impacts at ④ Polesworth where the high viaduct would be close to part of the village. The setting of the Grade II* listed ⑱ Pooley Hall, its attached former chapel and Pooley Hall farmhouse would be moderately impacted. The route section would cross an area of undulating topography between Polesworth and Orton on the Hill, resulting in further landscape impact. The route section would cross the Ashby Canal (a conservation area) on viaduct and low embankment, resulting in moderate impacts of the setting on this ⑲ conservation area.</p> <p>The route section would run northwards in cutting and on embankment through hilly land east and north-east of Ashby-de-la-Zouch. Between the Gopsall Park area and Ashby-de-la-Zouch a loss of woodland would result in further landscape impact.</p> <p>It would pass in cutting within 50m west of ⑳ Coleorton Hall Grade II* Registered Park and Garden, which would limit impacts on its setting, and would avoid most of ㉑ Rough Park. Impacts on the setting of the Grade II* ㉒ Staunton Harold Hall some 1km to the west would be negligible.</p> <p>The route section would cross the A42 on viaduct resulting in moderate visual impacts at ⑭ Breedon on the Hill and ⑮ Tonge, both of which are conservation areas.</p> <p>Three sites of medieval and later coal mine workings near the route section are designated scheduled monuments. The route section would be in cutting or low embankment west of all three areas. They include both above and below ground remains which are preserved in woodland and under pasture. Impacts on the settings of the sites at ㉓ Birch Coppice and ㉑ Rough Park are likely to be greatest owing to their proximity to the route section.</p> |

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| 8.8.10. | Biodiversity and wildlife | <p>The route would pass within 10km of one Natura 2000 wildlife site. However, HRA screening confirms that there would be no likely significant effects on this site.</p> <p>The 19 Ashby Canal SSSI would be crossed by the route section for a short distance. There would be a risk of impact from shading to the aquatic plant communities and invertebrates for which the canal is designated.</p> <p>In addition, there are seven other SSSIs within 2km of the route section that could be affected indirectly. Although, impacts on five of these are considered unlikely, there is a risk that bird strike by HS2 trains could affect 24 Alvecote Pools SSSI and water and airborne pollution could affect 25 Lount Meadows SSSI, which are 500m and 120m from the route section at their closest points, respectively. Best practice would be used during construction to reduce these risks. The risk of bird strike at 24 Alvecote Pools would require further consideration as part of a more detailed assessment.</p> <p>The route would directly affect three areas of BAP habitat, including one area of coastal and floodplain grazing marsh and two areas of wet woodland that also include pockets of ancient wood (26 Gopsall Wood and 21 Rough Park).</p> |
| 8.8.11. | Water resources and flood risk | <p>27 Austrey Brook and 28 River Sence tributary at Newton Burgoland, both minor rivers, may be diverted. Continuing scheme design would seek to avoid or minimise these impacts.</p> <p>The route would cross some 1.5km of Flood Zone 3.</p> |
| 8.8.12. | Land use resources | <p>The route would cross about 6.9km of Grade 2 agricultural land.</p> <p>One landfill site south-west of 29 Worthington would be directly affected. The design would require further work to minimise risks to people and the environment from these impacts.</p> |
| 8.8.13. | Waste and material use | <p>It is estimated that the route section would result in a surplus of 4,116,299m³ of excavated material.</p> <p>As a result of the route section impacting on the landfill site, it is possible that some of the waste material arising in the route section would be hazardous.</p> <p>Estimated quantities of bulk building materials for this section comprise 10,000 tonnes of steel and 30,800 tonnes of concrete.</p> |

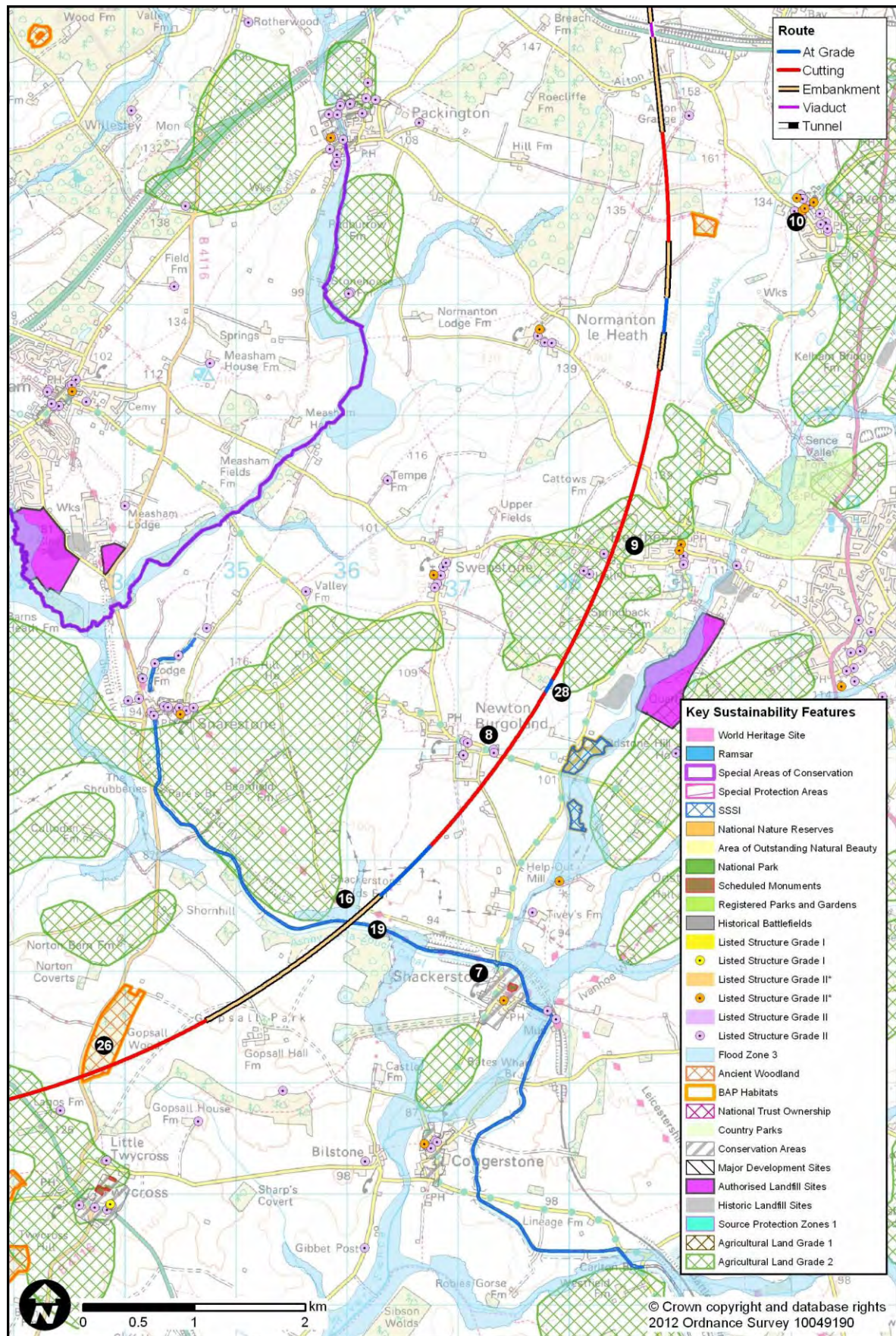
HSL08 - Figure 1 of 4



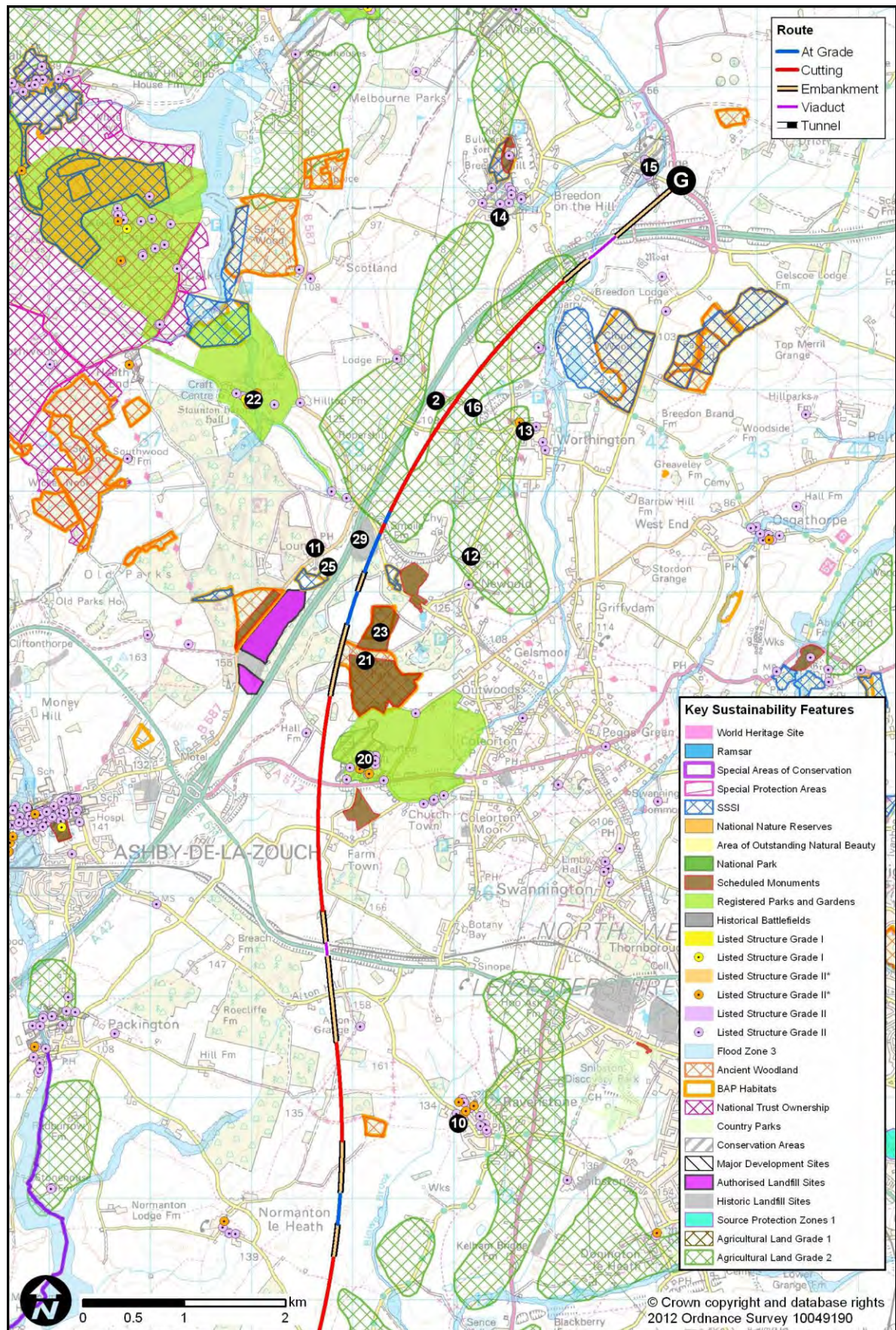
HSL08 - Figure 2 of 4



HSL08 - Figure 3 of 4

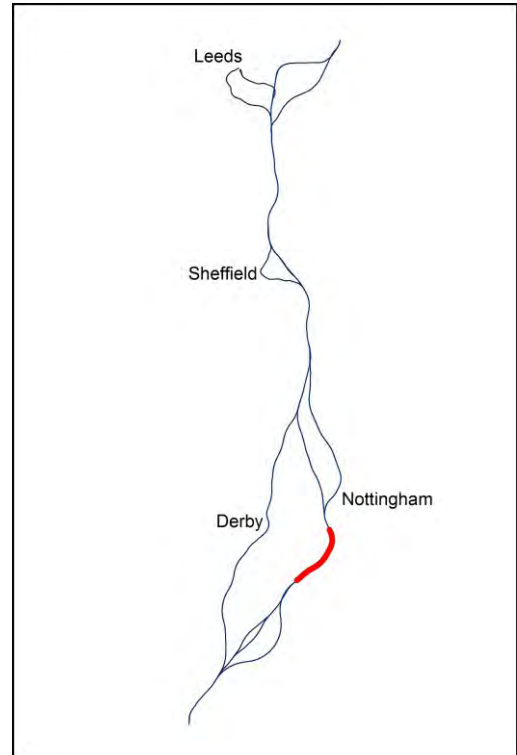


HSL08 - Figure 4 of 4



8.9. HSL09: Tonge (G) to Long Eaton (H)

- 8.9.1. The route section between Tonge and Long Eaton would be 14.3km (8.9 miles) long. It would connect to the south with three possible options past or across the River Mease, namely HSL06, HSL07 or HSL08, all from Birchmoor. At Long Eaton, the route would continue north along either HSL26 to Sandiacre or HSL27 to Trowell.
- 8.9.2. The route section would begin at Tonge and then pass north-east in tunnel under Nottingham East Midlands Airport and on a bridge over the M1. It would use long sections of viaduct across the flood plains of the River Soar and River Trent, with a short tunnel between the two taking it under Red Hill. It would enter Long Eaton where it would align with the Erewash Valley Line (Nottingham to Sheffield railway).
- 8.9.3. The route section would take over the position of an existing railway line which services movements to and from Toton Down Yard and freight services to and from the Erewash Valley to the Trent area, therefore works would be required to compensate for this. The proposed works will accommodate existing rail traffic (relocated from the tracks to be used by HS2), maintain connections to Toton Yard and serve the new conventional rail platforms at Toton Station. These works were subject to a high level appraisal of direct effects on property and key environmental features. They would require some property demolitions (as discussed below), but they would not directly affect any key environmental features.
- 8.9.4. HSL09 Figures 1 to 2 illustrate the route alignment and the principal sustainability features in the area.
- 8.9.5. Specific mitigation included within the route section comprises localised realignments that have sought to reduce the impact on Ratcliffe Cut (River Soar).
- 8.9.6. **Population and settlements** The route section would result in the demolition of an estimated 18 dwellings. Of these, seven demolitions would be in areas of relatively high deprivation. In addition, an estimated 29 commercial properties and one community property (Kingdom Hall) would also be demolished⁷. Potential isolation would affect dwellings at four locations, and comprise two dwellings ① north of Kegworth, four dwellings by ② East Midlands Parkway Station, two dwellings ③ east of Trentlock and six dwellings at ④ Long Eaton (east).

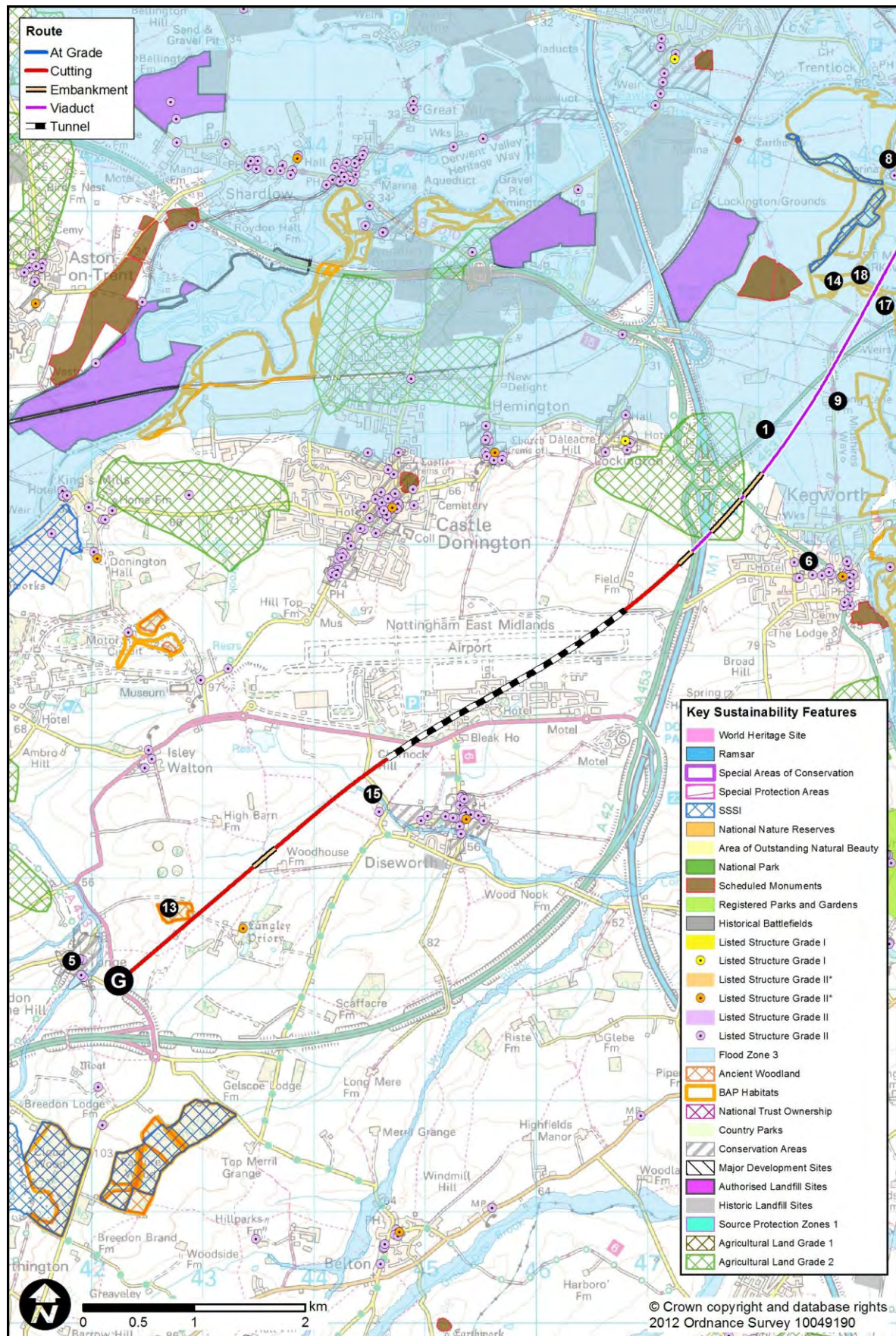


⁷ Demolition figures for HSL09 were calculated using a more detailed method in order to address the impacts of both the route section and the accommodation of classic services, which is described in more detail in HSL26 and HSL27.

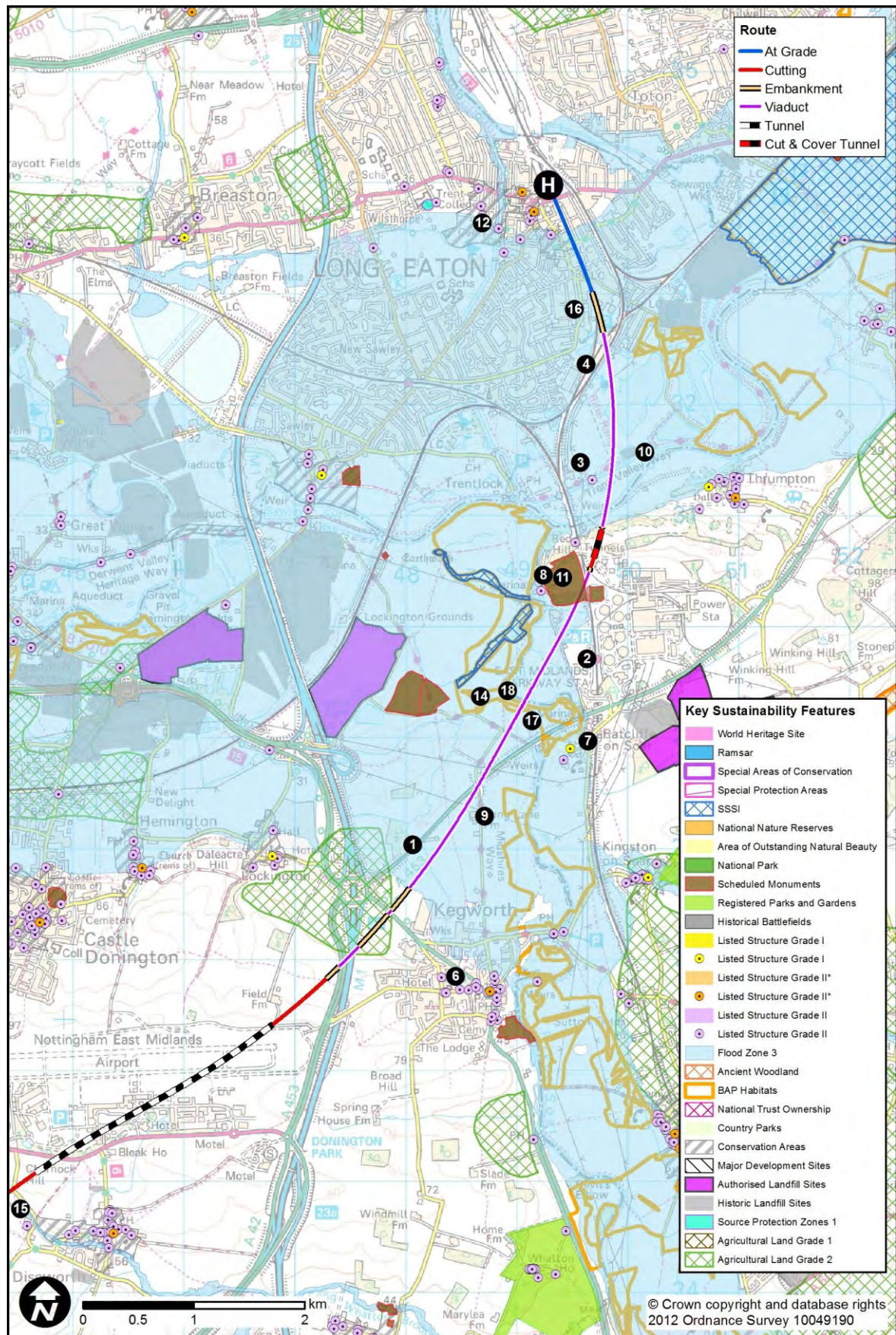
- 8.9.7. Noise
- Noise from HS2 trains would result in annoyance for an estimated 310 people (equivalent to the occupants of some 132 dwellings). This would represent about 22 people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be substantially less than this.
- The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ⑤ Tonge, ⑥ Kegworth, ⑦ Ratcliffe on Soar, ⑧ Red Hill, ⑫ Long Eaton and other scattered dwellings.
- In terms of noise insulation, approximately 210 dwellings would be expected to qualify, particularly ⑫ at Long Eaton. This is equivalent to approximately 15 dwellings potentially qualifying per km of route section.
- 8.9.8. Health and well-being
- Approximately 403 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
- 8.9.9. Access issues
- Two promoted recreational routes would be crossed by the route section, namely ⑨ Midshires Way and the ⑩ Trent Valley Way. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.
- 8.9.10. Landscape, townscape and cultural heritage
- The route section would run north-east across open countryside from Tonge mainly in deep cutting before passing under Nottingham East Midlands Airport in tunnel and crossing the River Soar on embankment north of Kegworth. The long embankment across the floodplain of the River Soar north of Kegworth is likely to give rise to moderate visual intrusion, especially affecting residents of ⑥ Kegworth and ⑦ Ratcliffe on Soar, as well as users of the ⑪ Ratcliffe Cut and the ⑬ River Soar. This is set within the context of East Midlands Parkway Station and a power station.
- Further north the route would cross the Trent Valley on high viaduct where it would have a moderate adverse impact on landscape character and visual impact on recreational users of the waterways (south east of Long Eaton) and the ⑨ Trent Valley Way. Passing through ⑫ Long Eaton along the line of the existing railway there would be some impact on townscape character in the centre of ⑫ Long Eaton Conservation Area and at least a minor visual impact on residents of dwellings close to the line and the townscape of the conservation area itself.
- The route section would have a direct impact on three woodlands (see also *biodiversity and wildlife*).
- The route would have a direct impact on one scheduled monument - a ⑪ Roman site on Red Hill at Ratcliffe on Soar. The proposed route would cross the designated area on viaduct resulting in potential impacts on various below ground remains. However, with no known above ground remains there would be no impact on setting.

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| 8.9.11. | Biodiversity and wildlife | <p>There would be five SSSIs within 2km of the route section that could be affected indirectly by it, but impacts on these are considered unlikely.</p> <p>The route section would potentially affect ¹³ Smooth Coppice, an area of replanted ancient woodland and low mixed deciduous woodland BAP habitat, although it could be avoided through route refinement. It would also directly affect two areas of ¹⁴ coastal and floodplain grazing marsh BAP habitat west of Ratcliffe on Soar.</p> |
| 8.9.12. | Water resources and flood risk | <p>¹⁵ Diseworth Brook tributary at Isley Walton, a minor river, may require diversion.</p> <p>About 6.3km of the route section would be in cut or tunnel across aquifer of good yield and good quality.</p> <p>The route section would cross some 5.5km of Flood Zone 3. About 1km of this would be cutting and therefore at risk of flooding.</p> |
| 8.9.13. | Land use resources | <p>The route would cross about 530m of Grade 2 agricultural land. It would cross about 3.3km of green belt.</p> |
| 8.9.14. | Waste and material use | <p>It is estimated that the route section would result in a surplus of 778,750m³ of excavated material. This includes 585,200m³ of tunnel excavated material.</p> <p>Estimated quantities of bulk building materials for this section comprise 4,600 tonnes of steel and 14,200 tonnes of concrete.</p> |

HSL09 - Figure 1 of 2

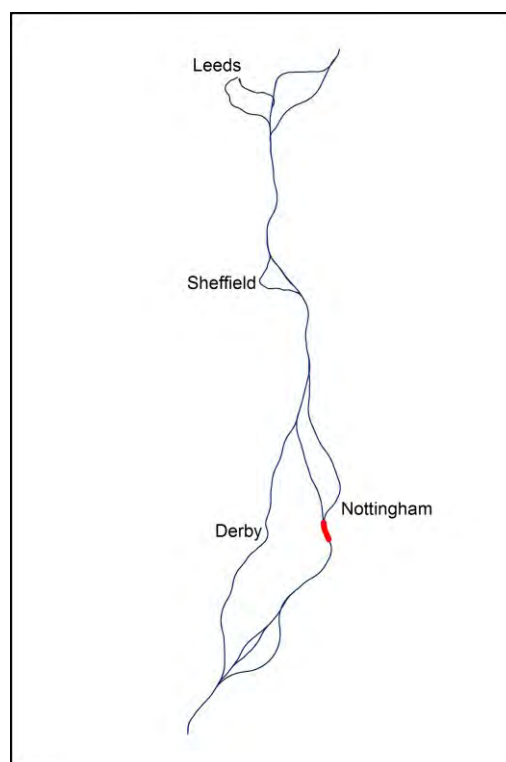


HSL09 - Figure 2 of 2



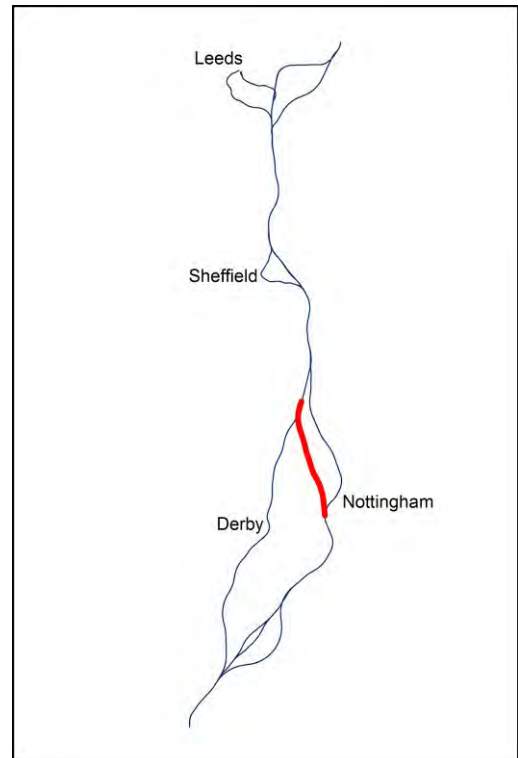
8.10. HSL10: Long Eaton (H) to Sandiacre (I)

- 8.10.1. HSL10 is a route section between Long Eaton and Sandiacre through Toton. Route section HSL26 encompasses the same route but includes the Toton interchange station. This is described in Section 10.2.



8.11. HSL11: Sandiacre (I) to Tibshelf (E)

- 8.11.1. The route section between Sandiacre and Tibshelf would be 25.5km (15.8 miles) long. It would connect to the south with HSL26 from Long Eaton. At Tibshelf, the route would continue north along section HSL05 to Killamarsh.
- 8.11.2. The route would pass along the River Erewash Valley for some 15km between Sandiacre and Ironville, using embankment for much of its alignment, which would be generally alongside the Erewash Valley Line (Nottingham to Sheffield railway) through this generally built up area to the west of Nottingham. It would emerge into farmland north of Alfreton using embankment and cuttings across the undulating terrain, but still generally within the rail corridor.
- 8.11.3. HSL11 Figures 1 to 3 illustrate the route alignment and the principal sustainability features in the area.
- 8.11.4. Specific mitigation included within the route section comprises a number of localised realignments that have sought to reduce impact on the River Erewash and to reduce demolitions at Pye Bridge.
- 8.11.5. **Population and settlements** The route section would result in the demolition of an estimated six dwellings. In addition, an estimated 24 commercial properties would also be demolished.
- There is the potential for isolation of dwellings at four locations, affecting an estimated eight dwellings at ② Stanton Gate, two dwellings at ③ Shipley Gate, 23 dwellings at ④ Lower Birchwood and two dwellings at ⑤ Carnfield Hall (Alfreton). An area of potential severance at ⑥ Sitwell Grange would affect an estimated nine dwellings.
- 8.11.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 3,525 people (equivalent to the occupants of some 1,494 dwellings). This would represent about 139 people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.
- The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ② Stanton Gate, ⑦ Stapleford, ⑧ Trowell, ⑨ Hallam Fields, ⑩ Little Hallam, ⑪ Larklands, ⑫ Ilkeston, ⑬ Cossall, ⑭ Cossall Marsh, ⑮ Awwsworth, ⑯ Cotmanhay, ⑰ Eastwood, ⑱ Heanor, ⑲ Stoneyford, ⑳ Brinsley, ㉑ Pye Hill, ㉒ Ironville, ㉓ Pye Bridge, ㉔ Lower Somercotes, ㉕ Lower Birchwood, ㉖ Alfreton, ㉗ South Normanton, ㉘ Westhouses, ㉙ Blackwell, ㉚ Stonebroom, ㉛ Morton, ㉜ Tibshelf, ㉝ Doe Hill Lane, ㉞ Sitwell Grange, ㉟ Pisley and other scattered dwellings.
- In terms of noise insulation, approximately 813 dwellings would be

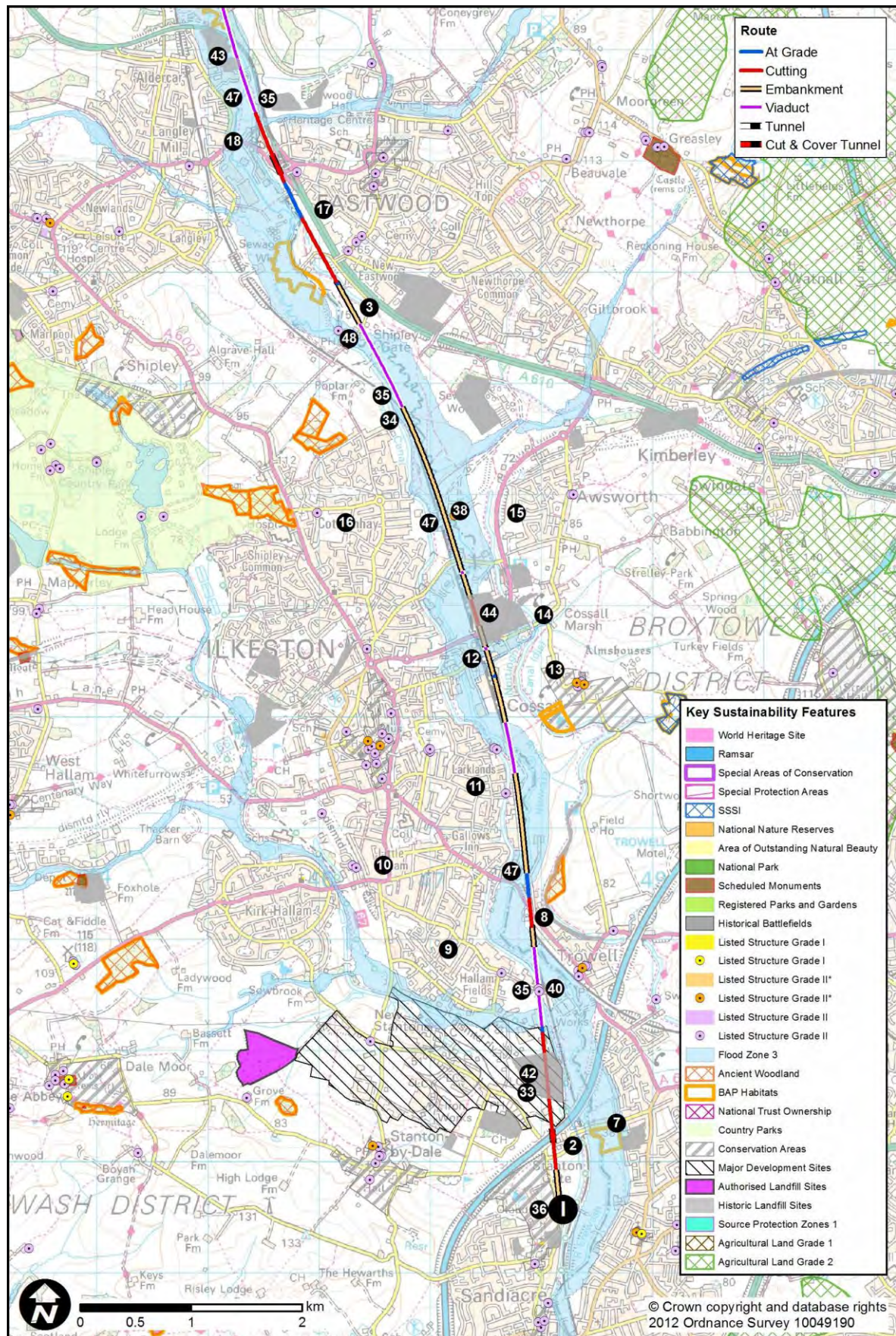


expected to qualify, particularly at ⑧ Trowell, ⑪ Larklands, ⑫ Ilkeston, ⑮ Cotmanhay, ③ Shipley Gate, ⑰ Eastwood, ⑱ Heanor, ⑲ Stoneyford, ⑳ Ironville, ㉓ Pye Bridge, ④ Lower Birchwood, ㉗ Westhouses, ㉚ Doe Hill Lane and ⑥ Sitwell Grange. This is equivalent to approximately 32 dwellings per km of route section.

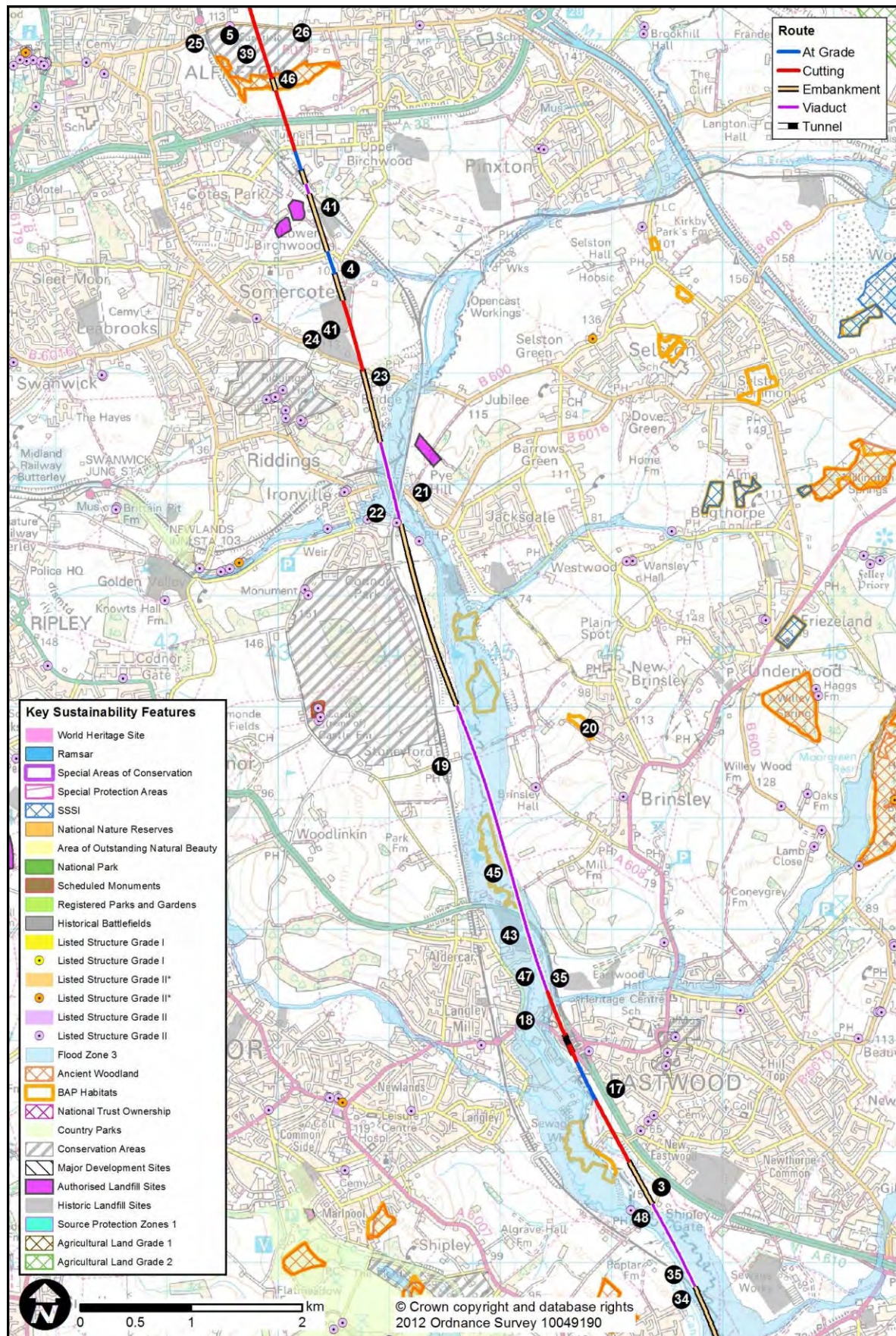
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| 8.11.7. | Health and well-being | Approximately 300 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity. |
| 8.11.8. | Access issues | No promoted recreational routes would be crossed by the route section. |
| 8.11.9. | Planning and development | The route section would pass ㉓ Stanton Ironworks Regeneration site. The area is allocated in the Erewash Borough Council Local Plan as a major regeneration area for employment development. The site is also allocated within the Erewash Core Strategy as a Sustainable Urban Extension to Ilkeston for housing development. Erewash Borough Council anticipates a planning application to be submitted in the summer 2012 for the Sustainable Urban Extension. |
| 8.11.10. | Landscape, townscape and cultural heritage | <p>The route section would run north through the Erewash Valley close to existing transport corridors - an existing rail line, the Erewash Canal and the A610. It would potentially cause significant landscape impacts on parts of the ㉔ Erewash Valley, which is an attractive landscape with many small scale historic features and is well-used for recreation. The route would repeatedly cross the river and canal on viaduct with cumulative impacts on landscape character. It might also cause visual impact on residents along the line where the new alignment is higher than the existing railway.</p> <p>North of Ironville the route section would cross an existing railway. The majority of the route section would be on embankment, with some limited sections of cutting, and a number of high viaducts, the longest of which would be at Ironville. As the line would not closely follow the existing railway it is likely to be quite disruptive to the underlying landform and townscape especially at ㉚ Ironville and ㉔ Somercotes where there would also be visual impacts on nearby residential areas. There would be direct impacts on a considerable length of woodland, including ancient woodland at ㉔ Carnfield Hall (see below). In total seven woodlands would be directly impacted by the route section (see also <i>biodiversity and wildlife</i>).</p> <p>Three conservation areas would be directly affected with moderate impacts. These comprise the ㉔ Erewash: Sandiacre Cloud Side Conservation Area, the ⑱ Amber Valley: Langley Mill, Great Northern Basin Conservation Area, and the ㉔ Bolsover: Carnfield Hall Conservation Area. The route section would pass the edge of the Amber Valley and could avoid it with further scheme refinement.</p> <p>The route section could have a direct impact on the two Grade II* listed elements that form the disused ㉔ Bennerley Viaduct. As currently designed, the route section would pass between the Bennerley Viaduct piers and so would avoid their demolition. However, care would be needed to avoid direct impacts. In any event, an impact on setting would remain.</p> <p>Three Grade II listed structures would be directly affected, namely the ㉔</p> |

- Hallam Fields Lock, 40 Hallam Fields Bridge and the 22 Lock to Cromford Canal. The context for these features has been greatly affected already by the existing railway and industrial premises, which would reduce the significance of this direct impact.
- Moderate impacts would affect the setting of the 5 Grade II* listed Carnfield Hall. Impacts on the settings of the 17 Grade II listed structures near the route section would be negligible.
- 8.11.11. Biodiversity and wildlife
- One SSSI would be located within 2km, but any adverse effects are considered unlikely.
- The route section would affect a significant area of lowland meadow BAP habitat and a second large area of fen and undetermined grassland at 45 Aldercar Western Meadows nature reserve and a smaller area to the north. In addition, 46 Carnfield Wood, an ancient wood and wet woodland BAP habitat would be directly affected.
- 8.11.12. Water resources and flood risk
- The 47 River Erewash, a major river, may require three diversions of up to about 1km each. 35 The Erewash canal would require three diversions. Three minor rivers may require diversion, namely part of the 22 River Erewash, a 48 River Erewash tributary and 37 Westwood Brook tributary at Sitwell Grange.
- About 4.5km of the route section would be in cut across aquifers of good yield and good quality.
- The route would cross about 8km Flood Zone 3, over 2km of which would be cutting and therefore at risk of flooding.
- 8.11.13. Land use resources
- The route would cross about 10.7km of green belt.
- Eight landfill sites, one at 42 Hallam Fields, two at 44 Cossall, two at 43 Langley Mill and three at 41 Somercotes, would be directly affected. The design would require further work to minimise risks to people and the environment from these impacts.
- 8.11.14. Waste and material use
- It is estimated that the route section would result in a deficit of - 490,212m³ of excavated material.
- As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.
- Estimated quantities of bulk building materials for this section comprise 8,200 tonnes of steel and 25,300 tonnes of concrete.

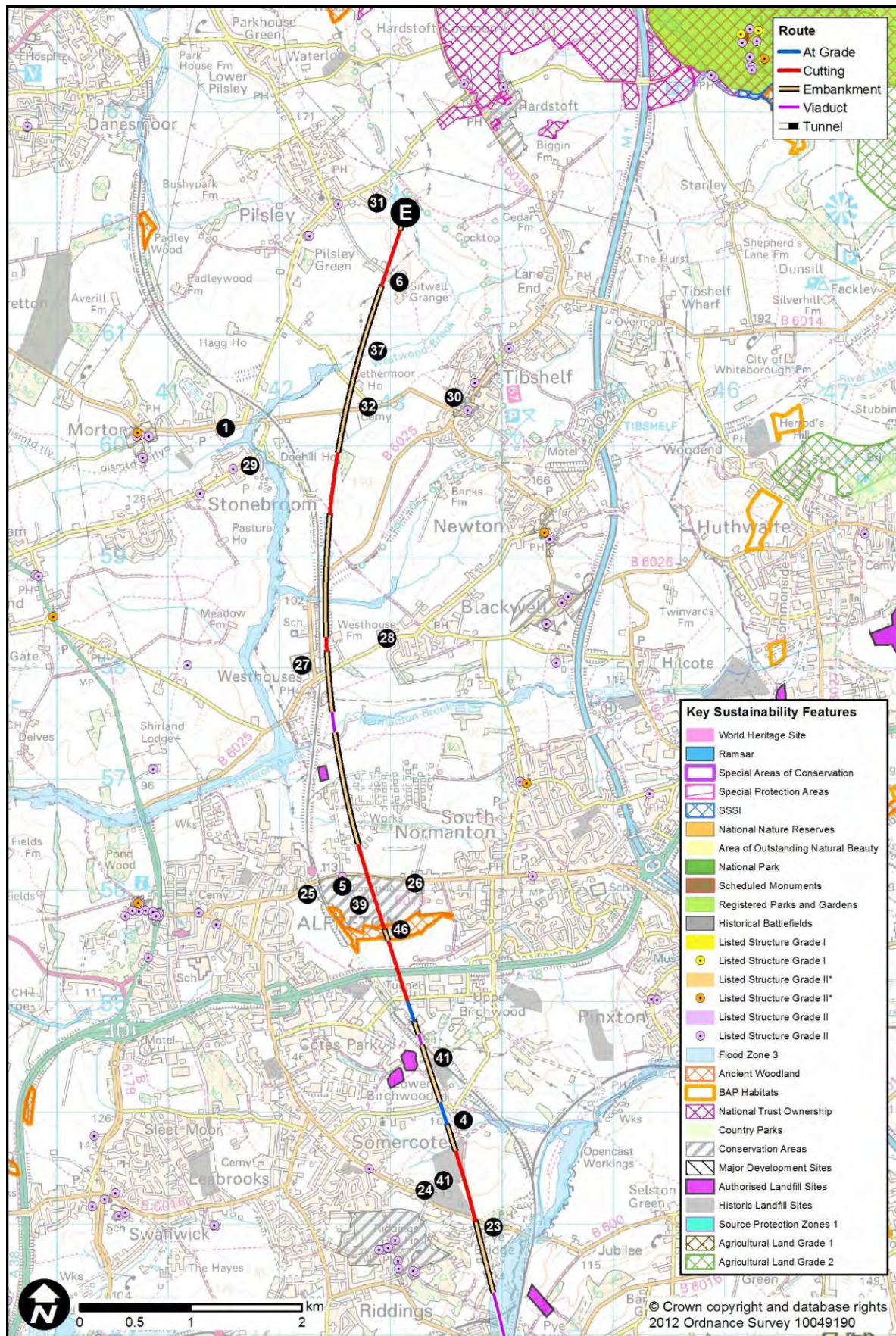
HSL11 - Figure 1 of 3



HSL11 - Figure 2 of 3

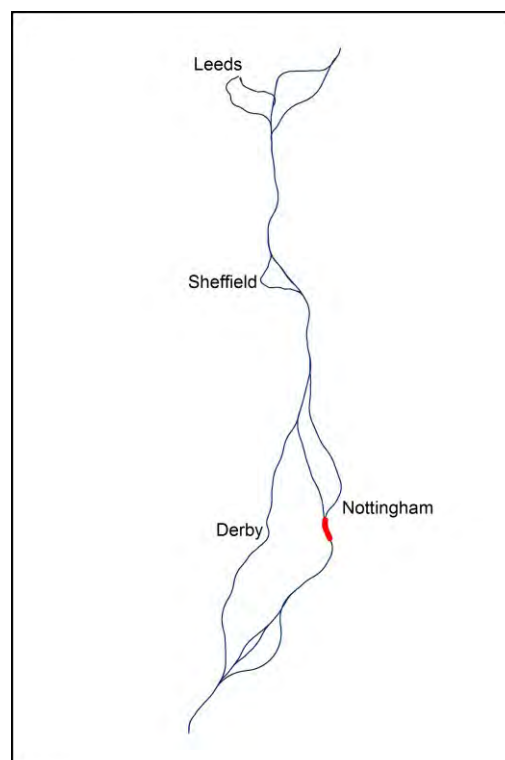


HSL11 - Figure 3 of 3



8.12. HSL12: Long Eaton (H) to Trowell (J)

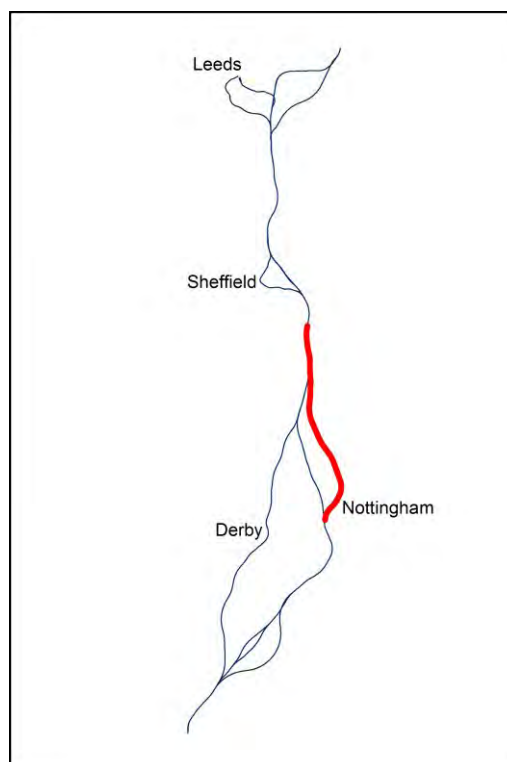
- 8.12.1. HSL12 is a route section between Long Eaton and Trowell through Toton. Route section HSL27 encompasses the same route but includes the Toton interchange station. This is described in Section 10.3.



8.13. HSL13: Trowell (J) to Killamarsh (F)

8.13.1. The route section between Trowell and Killamarsh would be 44.3km (27.5 miles) long. It would connect to the south with HSL12 or HSL27 from Long Eaton. At Killamarsh, the route would continue north along HSL14 to Tinsley.

8.13.2. The route section would largely follow the M1 corridor, using cuttings, embankments and viaducts to carry it through the complex landform and past the numerous roads and railways in the area. A tunnel would take it beneath Strelley on the western edge of Nottingham. It would follow the M1 corridor past Annesley Woodhouse, crossing either over or under several roads, and passing over the River Erewash and the Ironville to Kirby in Ashfield railway. It would pass under the A38 west of Sutton in Ashfield before crossing under the M1 north of Tibshelf. The route section would continue to follow the M1 corridor west of Hardwick Hall before rising onto embankment and viaduct over to the east side of the motorway, to the south-west of Bolsover. Another viaduct would carry it over the M1 for its third crossing of the motorway.



8.13.3. HSL13 Figures 1 to 4 illustrate the route alignment and the principal sustainability features in the area.

8.13.4. Specific mitigation included within the route section comprises a number of localised realignments for example to reduce residential demolitions at Stapleford, viaduct in place of embankment over Bogs Farm SSSI, realignment of the route section around Hardwick Hall and Sutton Scarsdale. In the area of Hardwick Hall and Sutton Scarsdale the route has been lowered to minimise the visual impacts.

8.13.5. **Population and settlements** The route section would result in the demolition of an estimated 29 dwellings. In addition, an estimated 24 commercial properties would also be demolished.

There is the potential for isolation of dwellings at three locations, affecting an estimated three at ② Trowell, two at ③ Annesley Woodhouse and eight ④ north-west of Renishaw.

8.13.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 1,391 people (equivalent to the occupants of some 590 dwellings), equating to about 33 people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be substantially less than this.

The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ③④ Stanton Gate, ⑥ Stapleford, ⑦ Trowell, ⑧ Nottingham, ⑨ Nuthall, ⑩ Hucknall, ⑪ Selston, ⑫ Pinxton, ⑬ Hilcote, ⑭ Huthwaite, ⑮ Newton, ⑯ Tibshelf, ⑰ Hardstoft, ⑱ Astwith, ⑲ Stainsby, ⑳ Doe Lea, ㉑ Heath, ㉒ Sutton

Scarsdale, 22 Carr Vale, 56 Long Duckmanton, 23 Duckmanton, 24 Poolsbrook, 5 Staveley, 25 Mastin Moor and 26 Renishaw.

In terms of noise insulation, approximately 293 dwellings would be expected to qualify, particularly at 8 Nottingham, 9 Nuthall, 12 Hucknall, 27 Annesley Woodhouse, 28 The Cliff, 14 Huthwaite, 19 Stainsby, 5 Staveley, 25 Mastin Moor and 26 Renishaw. This is equivalent to approximately seven dwellings potentially qualifying per km of route section.

8.13.7. Health and well-being

Approximately 150 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.

8.13.8. Access issues

Three promoted recreational routes would be crossed by the route section, namely 29 Robin Hood Way (two crossings), 30 Cuckoo Way (three crossings) and the 31 Trans Pennine Trail (one crossing). HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.

One area of National Trust Land at 32 Hardwick Hall (although outwith the registered park designated area - see *landscape, townscape and cultural heritage*) would be intersected by the route section for about 2.5km.

8.13.9. Landscape, townscape and cultural heritage

At 6 Stapleford, the route would be on high embankment or viaduct and might have moderate visual impacts on the setting of the conservation area at 33 Sandiacre and on residents of 34 Stanton Gate and north 6 Stapleford (all adjacent to the route section) as well as on the character of the 35 River Erewash and 36 Nottingham Canal. North of Hucknall a cutting through the ridgeline would directly impact plantation woodland and the landscape. At 12 Pinxton there would be visual impact from the very high viaduct crossing of the Erewash. The route would impact the sensitive landscape around 32 Hardwick Hall (National Trust and English Heritage properties and listed structures, Registered Park and Garden Grade I) where the line would be on high embankment or in cutting outside the boundary of the park, just to the west of the M1. Proximity to the M1 corridor in general but particularly in relation to 32 Hardwick would reduce impacts in the route section. Nonetheless, impacts are assessed as major, mainly reflecting the sensitivity of the landscape in the 32 Hardwick area.

Between Sutton Scarsdale and Staveley there would be some impact on views from 37 Sutton Scarsdale although, the route would be seen in conjunction with the motorway. There would also be impacts on views from 38 Bolsover Castle and its 38 conservation area from higher ground to the east, although these should be attenuated by distance. South of 5 Staveley the route would cross the M1 on a high viaduct where it should have limited impacts given the existing landscape context. There would be localised visual impact where the route passes close to 5 Staveley and 25 Mastin Moor.

The route would run north from Mastin Moor following the valley of the River Rother passing through the 41 Eckington and Renishaw Park Conservation Area. 42 Renishaw Hall (Registered Park and Garden Grade II*) lies on rising ground to the west, although separated from the route by woodland and existing railway embankment. There would be a

direct impact on a large area of woodland that forms an important part of the setting of the park and garden and the valley. Whilst the impact on the setting of the park and garden would be negligible, landscape and visual impacts on the attractive valley landscape are likely to be moderate or higher. The area is very well-used for recreation and the Trans Pennine Trail follows the valley and would be crossed by the route section.

Overall, 14 woodlands would be directly impacted by the route section (see also *biodiversity and wildlife*).

The route section would have a direct impact on the Grade II listed 43 Heath Old Church, although the significance of this on the ruins of this medieval church would be negligible.

The setting of the Grade I listed 44 Church of All Saints at Strelley would be affected. Impacts on the settings of the 12 Grade II listed structures near the route section would be minor at worst.

There would be minor impacts on the settings of the scheduled 45 fishponds near South Normanton and moderate impacts on the scheduled 46 Stainsby manorial complex, which would be close to the route section passing on embankment.

8.13.10. Biodiversity and wildlife

The route section would have a direct impact on two SSSIs. 47 Bulwell Wood would be intersected for 200m, resulting in habitat loss and potentially impacts from shading. 48 Bogs Farm Quarry SSSI would be crossed on viaduct which will avoid habitat loss and disturbance, however, permanent impacts on special interest features may arise from changes in hydrology and shading. The severity of these impacts is unknown and may be partially mitigable though design.

In addition, 12 other SSSIs would be located within 2km of the route section. The risk of impacts would be low to all but one of these. 49 Annesley Woodhouse Quarries SSSI is within 55m of the route section at its closest point. There would be a moderate risk of impact on hydrology where the route section would pass in cutting upslope of the site, and could adversely affect its designated grassland flora.

The route section would directly affect three ancient woodlands, namely 50 New Farm Wood (wet woodland BAP habitat), 47 Bulwell Wood (lowland mixed deciduous woodland BAP habitat) and 51 Watnall Coppice (wet woodland BAP habitat). The route section would also cross two areas of wet woodland and one lowland calcareous grassland BAP habitats.

8.13.11. Water resources and flood risk

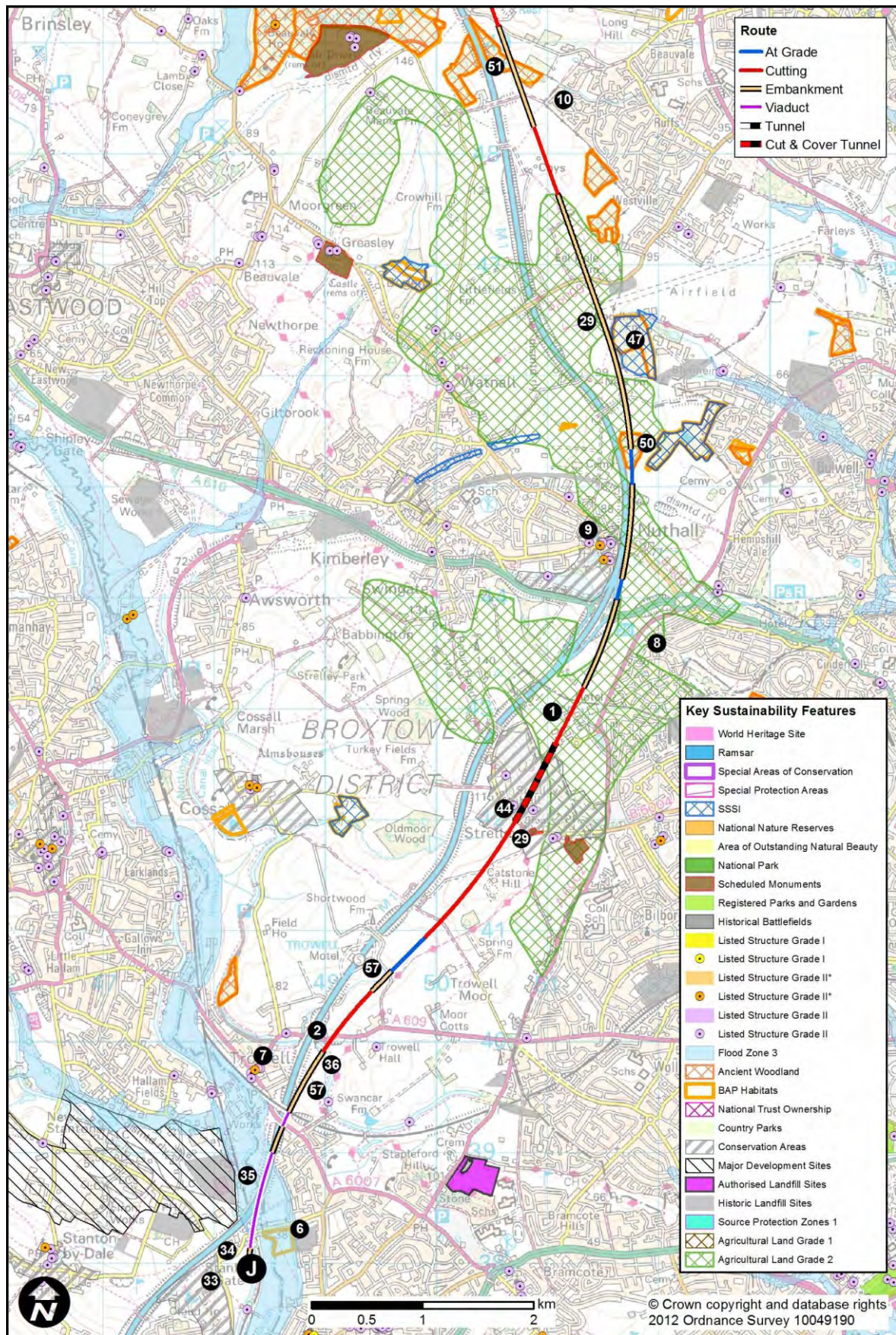
Two major river diversions may be required, affecting the 52 River Doe Lea and the 40 River Rother. Six diversions of minor rivers may be required, namely two diversions of the 57 River Erewash tributary, 58 Maghole Brook tributary at Hilcote, 59 Normanton Brook tributary at Tibshelf, 60 River Doe Lea and the 39 River Doe Lea tributary at The Hague. Continuing scheme design would seek to avoid or minimise this impact.

About 8.9km of the route section would be in cutting or tunnel across aquifers of good quality and good yield.

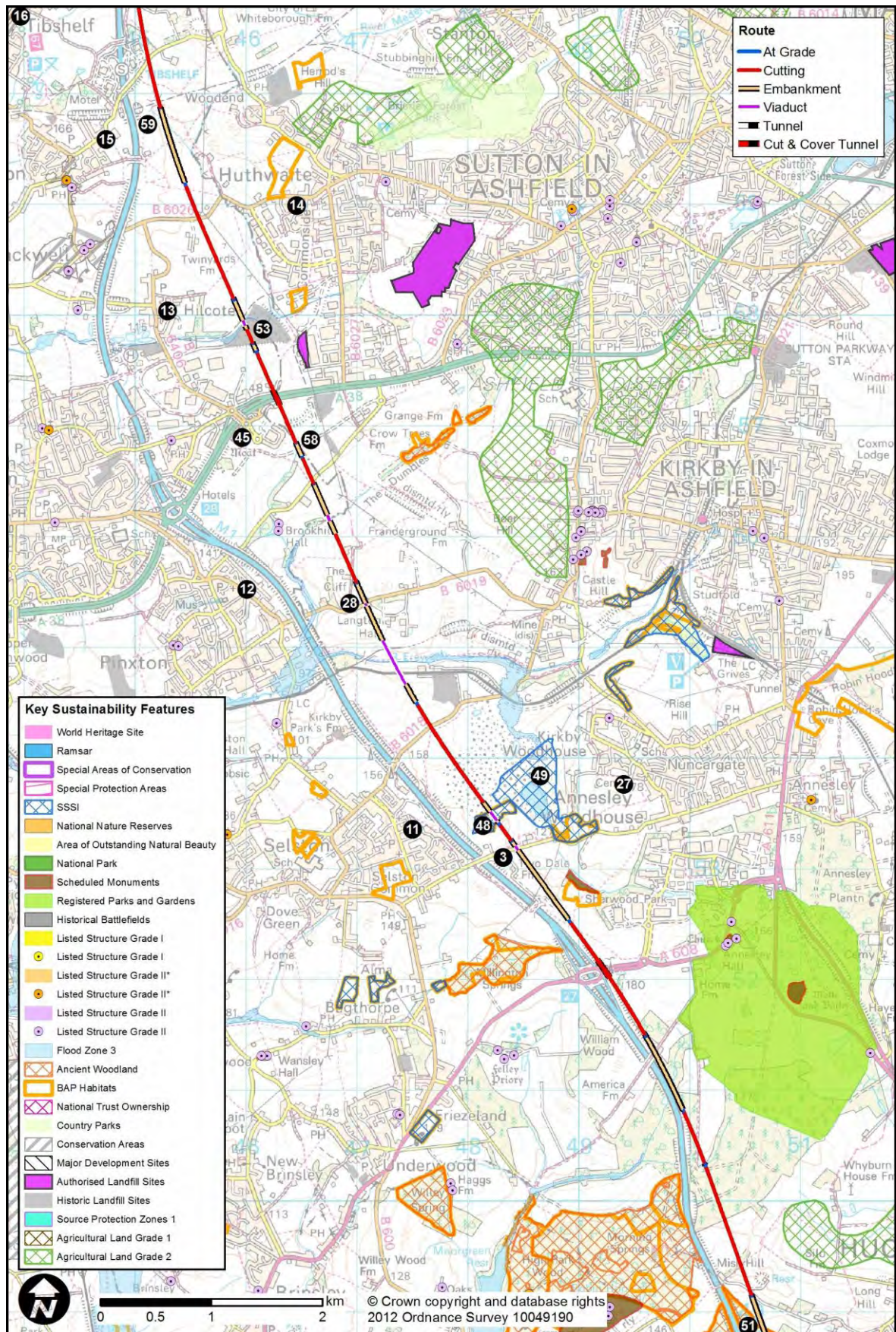
The route section would cross about 3.4km of Flood Zone 3.

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| 8.13.12. Land use resources | <p>The route section would cross about 3.5km of Grade 2 agricultural land. It would cross about 22km of green belt.</p> <p>Three landfill sites at 53 Hilcote, 54 Duckmanton and 55 The Hague, south-west of Renishaw, would be directly affected. The design would require further work to minimise risks to people and the environment from these impacts.</p> |
| 8.13.13. Waste and material use | <p>It is estimated that the route section would result in a surplus of 4,517,483m³ of excavated material.</p> <p>As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.</p> <p>Estimated quantities of bulk building materials for this section comprise 14,100 tonnes of steel and 43,800 tonnes of concrete.</p> |

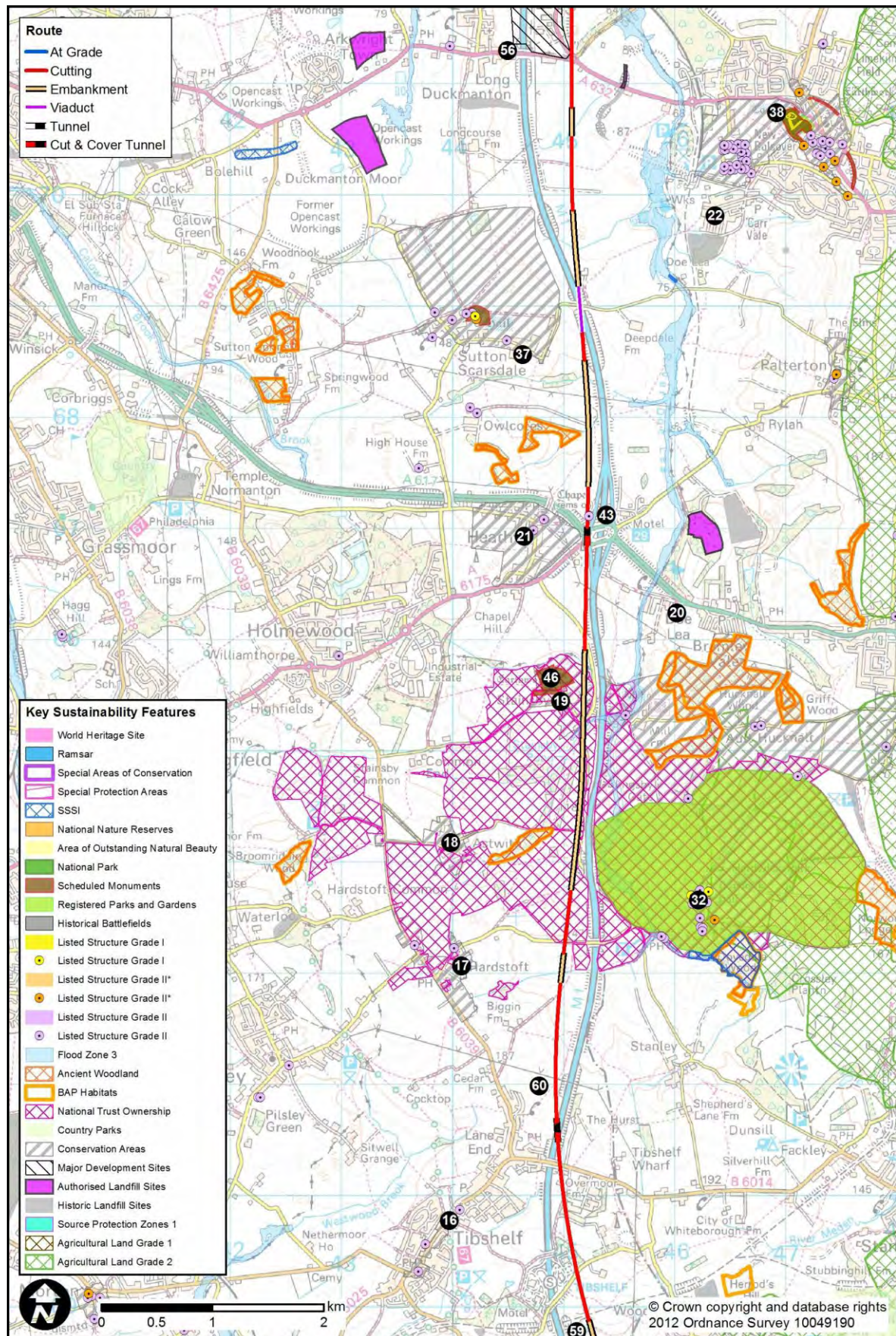
HSL13 - Figure 1 of 4



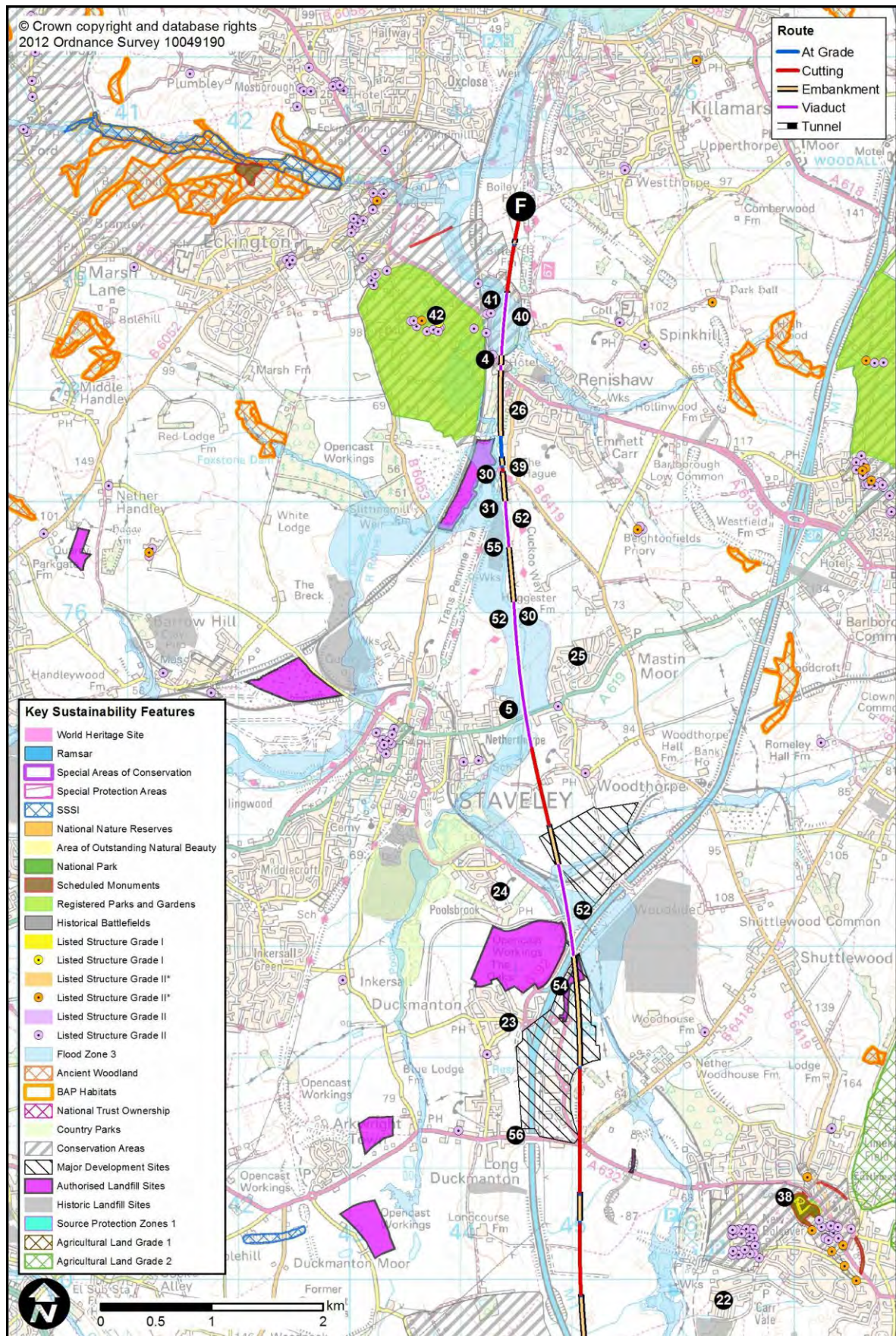
HSL13 - Figure 2 of 4



HSL13 - Figure 3 of 4

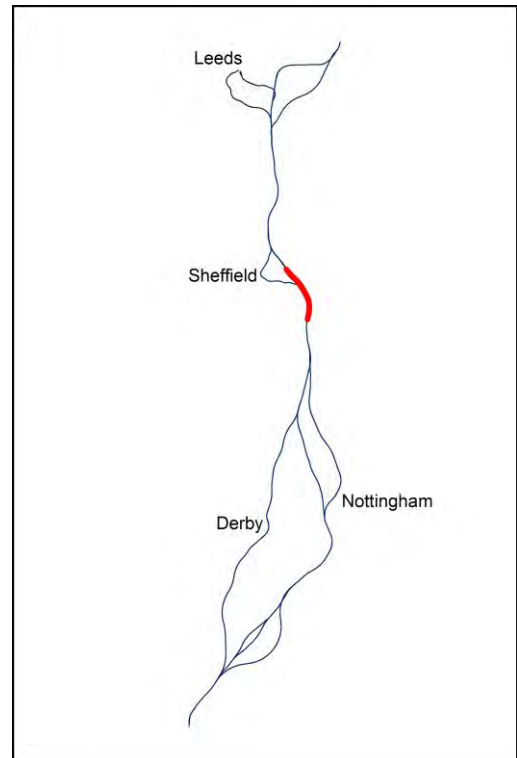


HSL13 - Figure 4 of 4



8.14. HSL14: Killamarsh (F) to Tinsley (K)

- 8.14.1. The route section between Killamarsh and Tinsley would be 12.4km (7.7 miles) long. It would connect to the south with HSL05 from Tibshelf or HSL13 from Trowell. At Tinsley, the route would continue north to HSL28 and a station option at Meadowhall. Were the station option at Sheffield Victoria (HSL29) to be developed instead of Meadowhall, HSL14 together with HSL28 and HSL16, would all be substituted with a single long route section, HSL24, which forms a through route option.
- 8.14.2. HSL14 Figures 1 and 2 illustrate the route alignment and the principal sustainability features in the area.
- 8.14.3. The route section would follow the Rother Valley for its entire length, running between the densely populated areas of Sheffield and Rotherham. It would largely be in cutting, although passing through much of the former opencast workings around Orgreave on viaduct or embankment. It would follow existing railways for much of its route and would align with the M1 having passed beneath the A630.
- 8.14.4. Specific mitigation included within the route section comprises a number of localised realignments that have sought to reduce the residential demolitions around Station Road and Killamarsh, and to avoid crossings of the River Doe Lea and the River Rother. Other mitigation measures include reducing speed through the Rother Valley area in order to reduce noise impacts.
- 8.14.5. **Population and settlements** The route section would result in the demolition of an estimated eight dwellings. In addition, an estimated nine commercial properties would also be demolished.
- There is the potential for isolation of dwellings at two locations, affecting an estimated 359 at ① Brinsworth and 546 at ② Catcliffe (in addition to three community properties; a community hall, a primary school and a community centre).
- 8.14.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 826 people (equivalent to the occupants of some 350 dwellings). This would represent about 67 people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.
- The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ③ Oxclose, ④ Killamarsh, ⑤ Halfway, ⑥ Westfield, ⑦ Sothall, ⑧ Beighton, ⑨ Swallownest, ⑩ Woodhouse Mill, ⑪ Treeton, ⑫ Catcliffe and ⑬ Tinsley.
- In terms of noise insulation, approximately 264 dwellings would be expected to qualify, particularly at ④ Killamarsh, ③ Oxclose, ⑤ Sothall, ⑦ Swallownest, ⑥ Beighton, ⑨ Treeton and ⑫ Catcliffe. This is



		equivalent to approximately 22 dwellings per km of route section.
8.14.7.	Health and well-being	Approximately 200 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
8.14.8.	Access issues	Three promoted routes are crossed by the route section, namely the Trans Pennine Trail and the Sheffield Country Walk which are both crossed several times between 12 Killamarsh and 13 Catcliffe and the 19 Cuckoo Way which is crossed twice. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.
8.14.9.	Planning and development	The route section would pass through a number of planned growth sites at 17 Orgreave, east of Sheffield. The site forms part of the Sheffield Enterprise Zone and has planning permission for the development of Waverley New Community. Waverley New Community includes 3,890 residential units, commercial development, finance and professional services, leisure and community uses. The scheme was granted outline permission March 2011, with a 30 year time limit on the consent. The masterplan for the site also includes the Waverley Advanced Manufacturing site.
8.14.10.	Landscape, townscape and cultural heritage	<p>Approaching 14 Rother Valley Country Park, it would rise onto a high viaduct and cross the River Rother, with some limited visual impact on users of part of the country park to the east. There would also be minor landtake to the park area itself. Further north it would follow the line of an existing railway in cutting, then rise onto viaduct across the river and railway near 15 Treeton Dyke, where there would be some visual impact on recreational users and some direct impact on informal open space. The route would then continue north-west away from the railway at Treeton and would cross former opencast workings on viaduct, potentially causing some visual impact on recreational users of 16 Catcliffe Flash and residents at 10 Catcliffe. The route section would also have visual impacts on users of the Trans Pennine Trail, which it would run broadly parallel with and then cross.</p> <p>There would be negligible impacts on 18 Renishaw Hall Grade II* Registered Park and Garden, which would be some 1km away.</p>
8.14.11.	Biodiversity and wildlife	<p>One SSSI would be within 2km of the route section, but impacts on it are unlikely.</p> <p>Three closely associated areas of BAP habitat would be directly affected, comprising two areas of wet woodland and an undefined area. One of these is also ancient woodland.</p>
8.14.12.	Water resources and flood risk	<p>The route section may require the diversion of 20 Beighton Mill Tail Goit, a minor river. Continuing scheme design would seek to avoid or minimise this impact.</p> <p>The route section would cross some 1.3km of Flood Zone 3.</p>
8.14.13.	Land use resources	<p>The route section would cross about 7.1km of green belt.</p> <p>Seven landfill sites between Killamarsh and Tinsley would be directly affected by the route section, and the design would require further work to minimise risks to people and the environment from these impacts.</p>

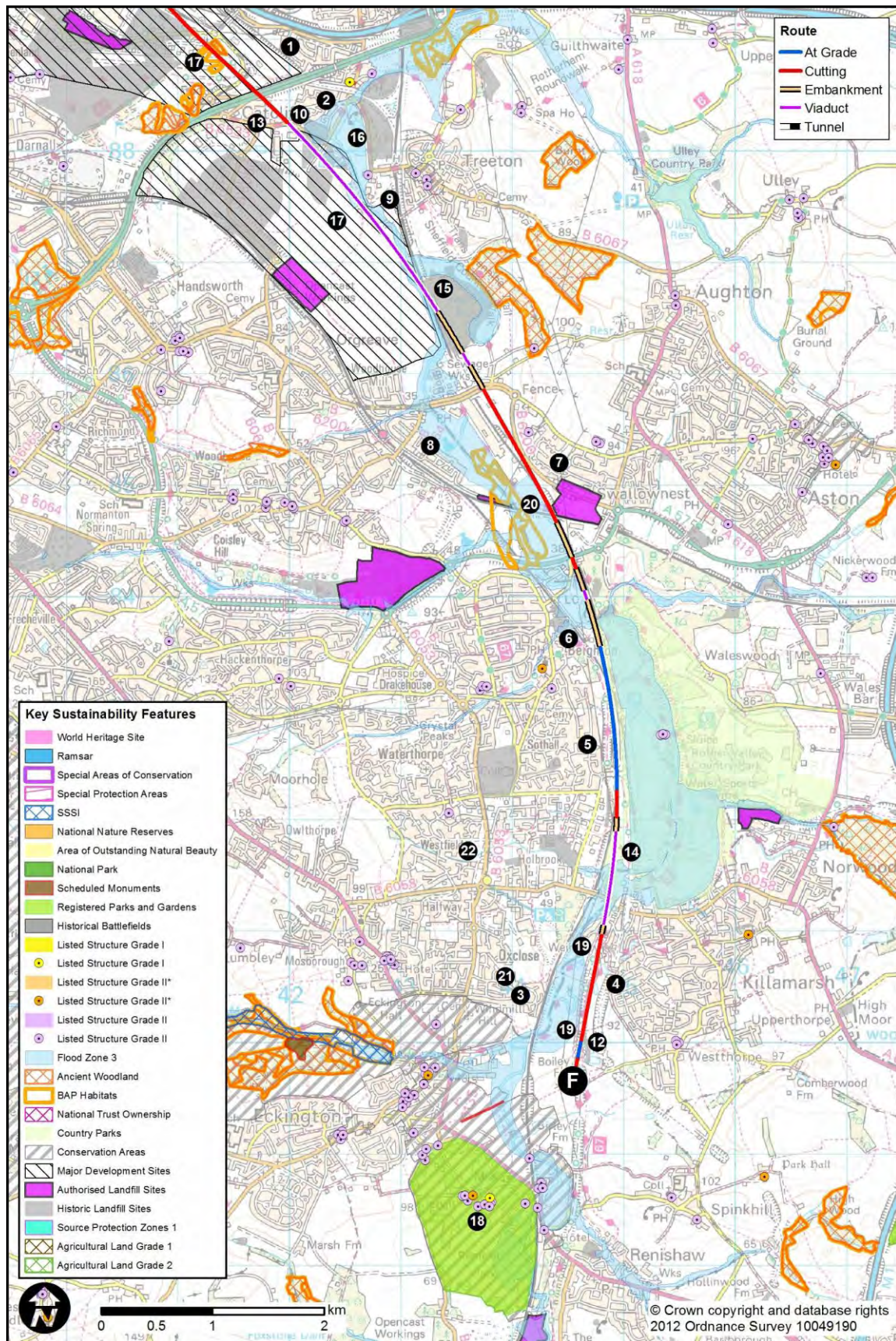
8.14.14. Waste and
material use

It is estimated that the route section would result in a surplus of 1,103,996m³ of excavated material.

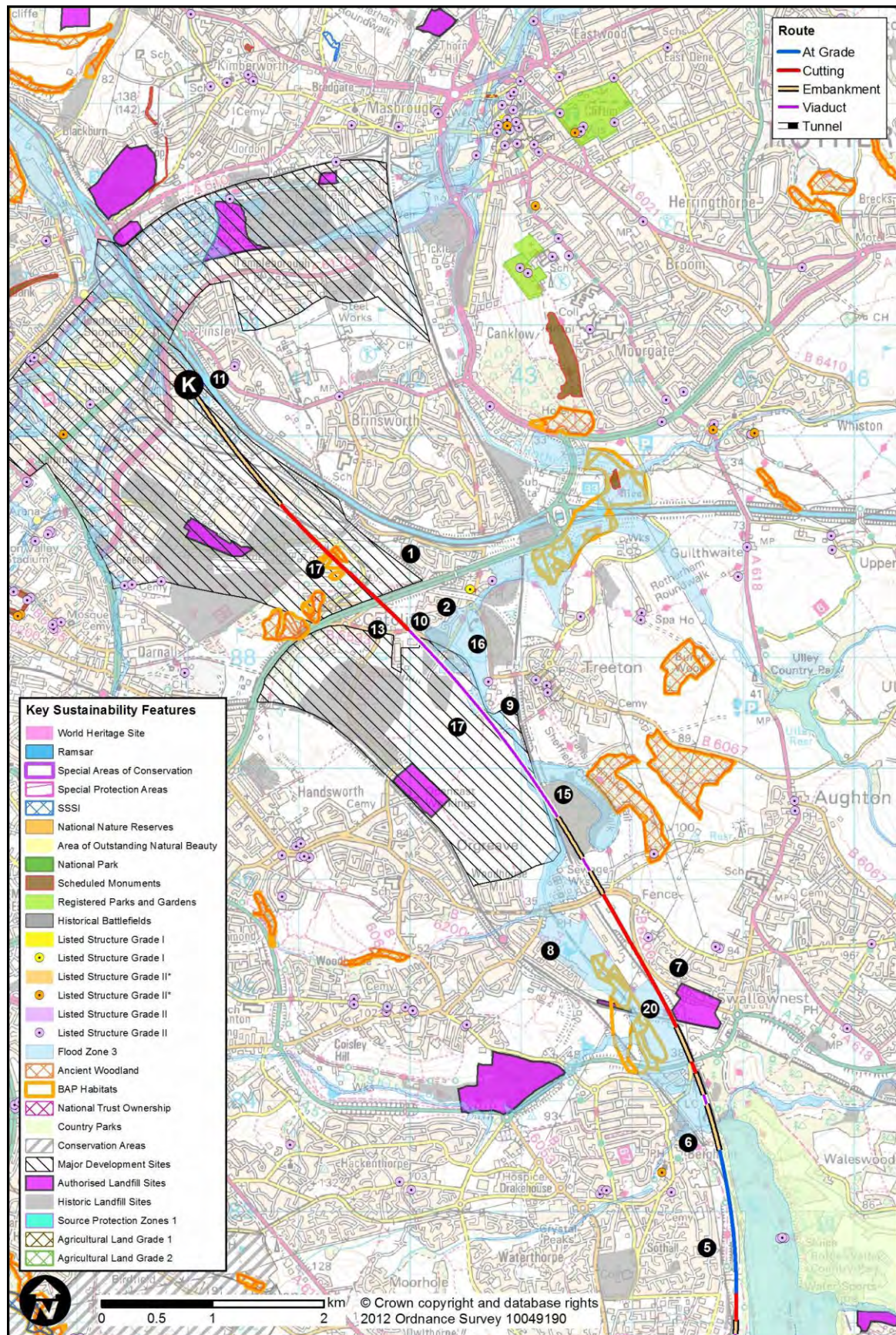
As a result of the route section impacting on the landfill sites, some of the waste material arising in the route section would be hazardous.

Estimated quantities of bulk building materials for this section comprise 4,000 tonnes of steel and 12,300 tonnes of concrete.

HSL14 - Figure 1 of 2

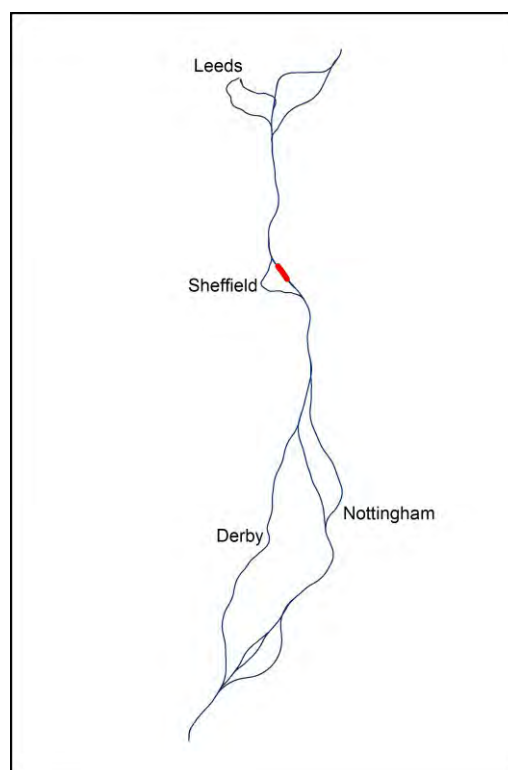


HSL14 - Figure 2 of 2



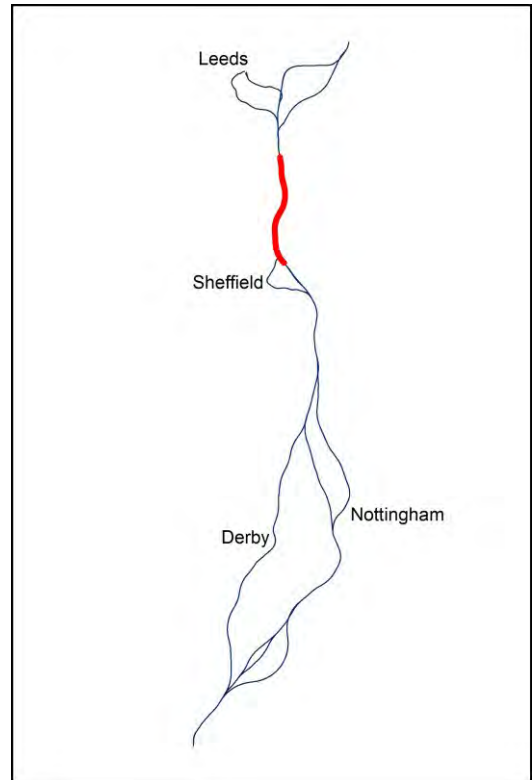
8.15. HSL15: Tinsley (K) to Blackburn (L)

- 8.15.1. HSL15 is a route section between Tinsley and Blackburn. The route section that includes the Meadowhall interchange station option is route section HSL28. This is described in Section 11.1.



8.16. HSL16: Blackburn (L) to Cold Hiendley (M)

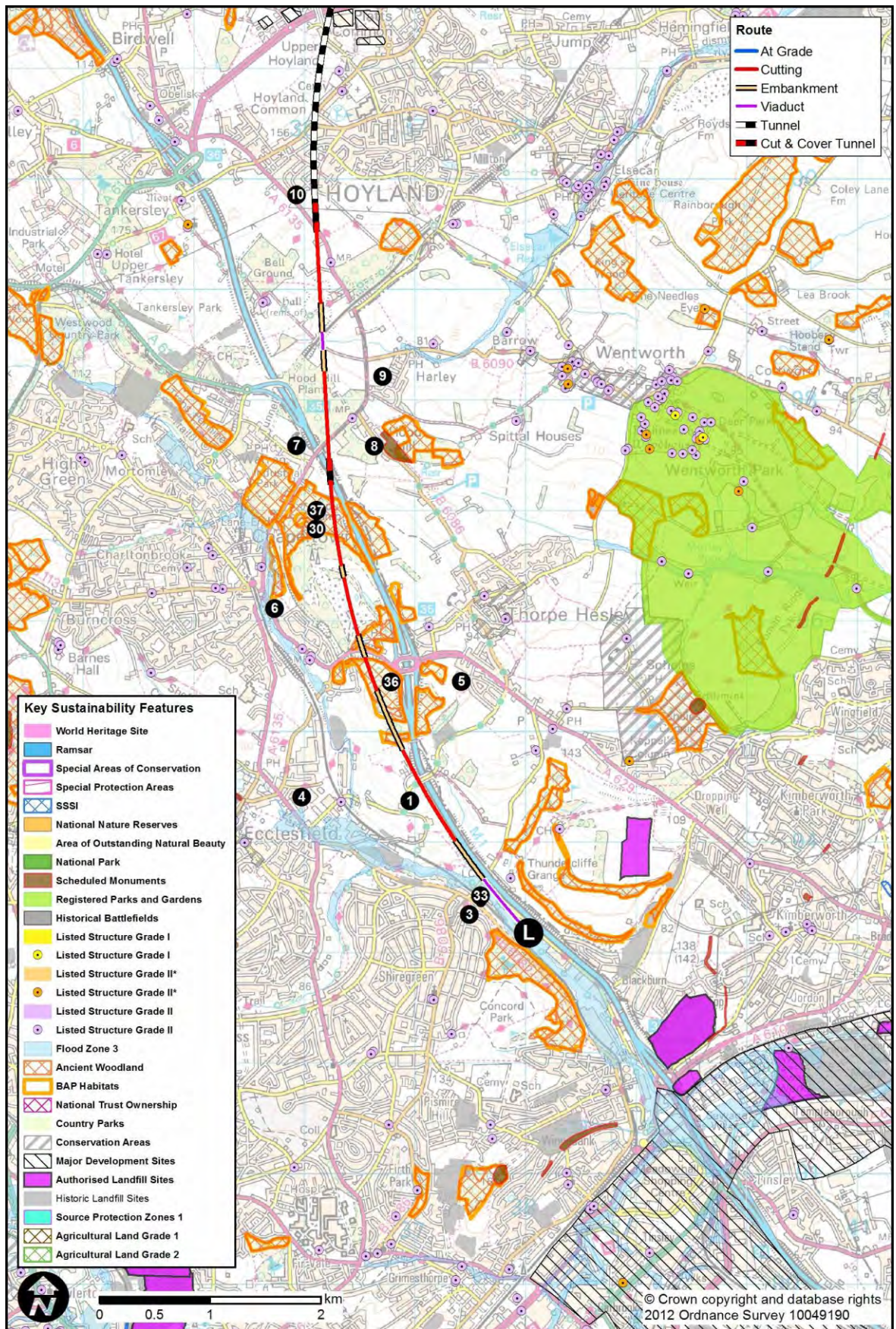
- 8.16.1. The route section between Blackburn and Cold Hiendley would be 23.1km (14.4 miles) long. It would connect to the south with HSL15 or HSL28 from Tinsley. To the north, it would connect to the ECML via either HSL17 or HSL18 and it would connect into Leeds city centre with either HSL19 or HSL21.
- 8.16.2. The route section would initially follow the M1 corridor, before crossing beneath the motorway at Chapeltown and entering tunnel under Hoyland. The route section would emerge from tunnel just north of the A6195 and continue towards Barnsley. It would cross over several minor roads and the Sheffield to Barnsley railway, passing under Ardsley in tunnel. The route section would then cross a number of minor roads up to the west of Winterset Reservoir.
- 8.16.3. HSL16 Figures 1 to 3 illustrate the route alignment and the principal sustainability features in the area.
- 8.16.4. Specific mitigation included within the route section comprises a number of localised realignments that have sought to reduce the residential demolitions at Warren Lane, north of Chapeltown and Swaithe, to reduce impacts to Wombwell Wood Scheduled Monument and to move the scheme further from Winterset Reservoir to ensure dam wall structural integrity.
- 8.16.5. **Population and settlements** The route section would result in the demolition of an estimated seven dwellings. In addition, an estimated eight commercial properties would also be demolished.
- There is the potential for isolation of dwellings at two locations, affecting an estimated 13 north-east of ❶ Ecclesfield (in addition to one community property, a nursing home) and one south-east of ❷ Royston.
- 8.16.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 1,308 people (equivalent to the occupants of some 555 dwellings). This would represent about 68 people per km of route. With ambient road noise, also taken into account noise impacts from HS2 would be expected to be less than this.
- The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ❸ Shiregreen, ❹ Ecclesfield, ❺ Thorpe Hesley, ❻ Chapeltown, ❼ Warren, ❽ Hood Hill, ❾ Harley, ❿ Hoyland, ⓫ Blacker Hill, ⓬ Swaithe, ⓭ Worsborough, ⓮ Lundwood, ⓯ West Green, ⓰ Cudworth, ⓱ Shafton Two Gates, ⓲ Carlton, ⓳ Royston, ⓴ Ellis Laithe, ⓵ Cold Hiendley and ⓶ Ryhill.
- In terms of noise insulation, approximately 129 dwellings would be expected to qualify, particularly at ❸ Shiregreen, ⓫ Blacker Hill, ⓬



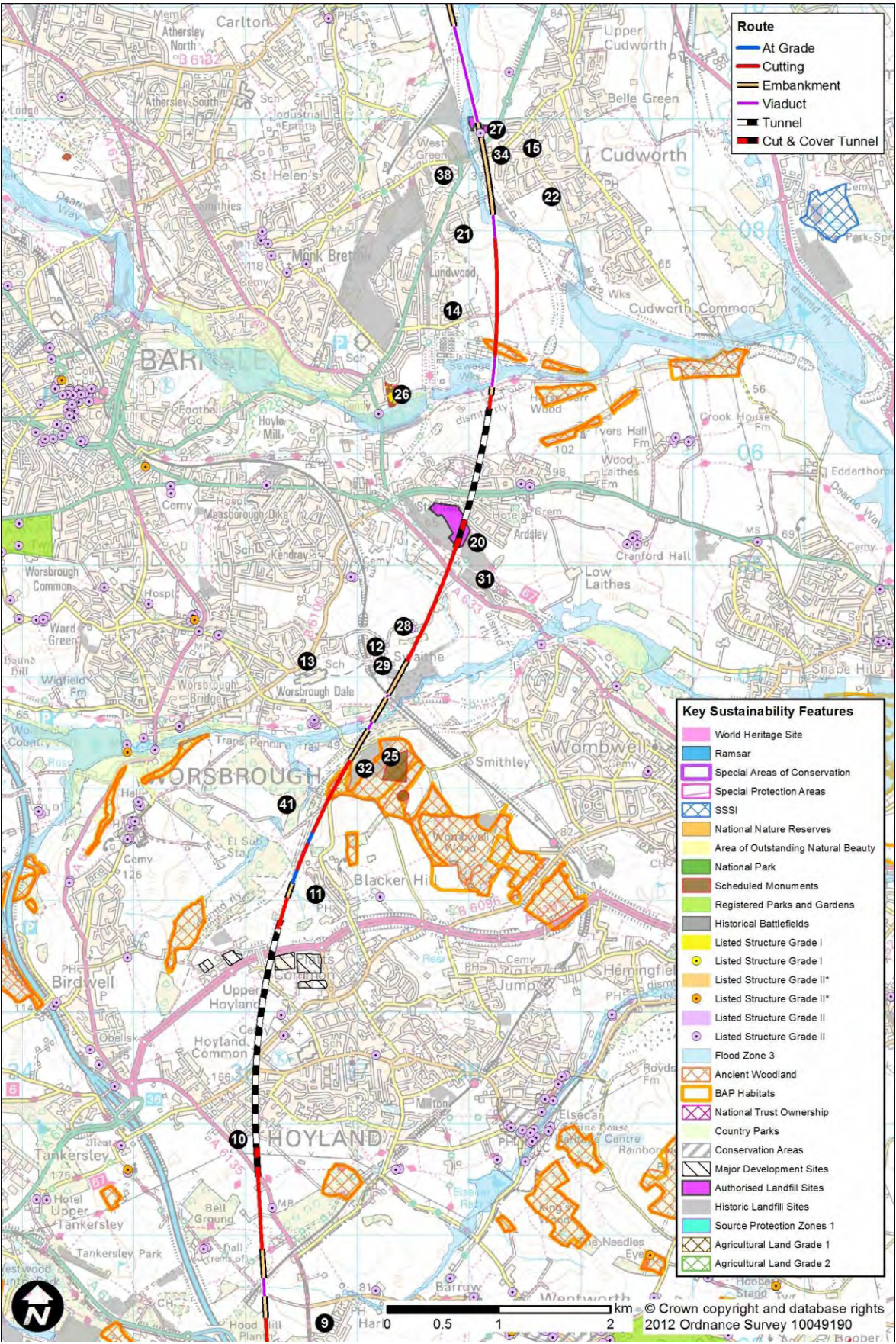
		<p>Swaithe, 38 West Green, 15 Cudworth, 16 Shafton Two Gates and 18 Cold Hiendley. This is equivalent to approximately seven dwellings per km of route section.</p>
8.16.7.	Health and well-being	<p>Approximately 80 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.</p>
8.16.8.	Access issues	<p>The 20 Trans Pennine Trail promoted recreational route would be crossed by the route section. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.</p>
8.16.9.	Landscape, townscape and cultural heritage	<p>The route section would follow the M1 corridor north-east of Sheffield, before diverging from it in cutting. North of Ecclesfield the route would be in cutting and there would cause substantial loss of woodland, (see <i>biodiversity and wildlife</i>), in the 30 Chapeltown area with both landscape and visual impacts.</p> <p>Emerging from tunnel north of Hoyland, the route section would cut through an area of hilly landform near 41 Worsbrough, causing local visual intrusion and extensive direct impacts on several woodlands. East of Barnsley, the route would mainly be in cutting or tunnel, although viaducts and embankments in the vicinity of the River Dearne and another minor stream would cause localised visual impact on residents of 21 Lundwood and 22 Cudworth. At its northern end the route section would cross 23 Cold Hiendley Reservoir on viaduct, which is used for recreation in association with 24 Winterset Country Park, causing visual impacts on recreational users.</p> <p>The Scheduled Monument of 25 Wombwell Wood Romano-British settlement would be near the route. Any impacts on its setting would be minimised by the location of the monument in woodland and are unlikely to be significant. The scheduled monument of 26 Monk Bretton Priory has a Grade I listed building in the complex near Barnsley and is situated further from the route. The proposed viaduct across the River Dearne is likely to have some impact on this setting, although this may not be significant.</p> <p>The Grade II listed 27 chimney at Bleachcroft Farm, near Cudworth would be directly impacted but the setting of the chimney is already degraded and the impact would be minor.</p> <p>The route section would have a moderate impact on the settings of an isolated farm complex of three Grade II listed buildings at 28 Swaithe Hall Farm. Impacts on the setting of the Grade II* listed 29 Swaithe House and three other Grade II structures near the route section would be negligible.</p>
8.16.10.	Biodiversity and wildlife	<p>The route section would pass within 10km of one Natura 2000 wildlife site. However, an HRA screening confirms that there would be no likely significant effects on this site.</p> <p>The Peak District EU Diploma Site is nowhere closer than about 7.5km from the route section and would not be adversely affected by it.</p> <p>The 31 Stairfoot Brickworks SSSI would be some 250m away at its closest point, but this is a geological SSSI and would be unaffected by the route section.</p>

- Seven areas of ancient woodland would be directly impacted including 36 Smithy Wood and 37 Hesley Wood near Chapeltown, 32 Wombwell Wood and 30 Sunnybank. These are either wet woodland or lowland mixed deciduous woodland BAP habitats.
- 8.16.11. Water resources and flood risk Three diversions of minor rivers may be required, 33 Blackburn Brook, 34 Cudworth Dyke tributary and 35 Cudworth Dyke. The route section would cross some 1.1km of Flood Zone 3.
- 8.16.12. Land use resources The route section would cross about 17.4km of green belt. Eleven landfill sites, situated between Swaithe, east of Worsborough and Royston would be directly affected. Detailed design would seek to minimise risks to people and the environment from this impact.
- 8.16.13. Waste and material use It is estimated that the route section would result in a surplus of 2,890,841m³ of excavated material. This includes 679,300m³ of tunnel excavated material.
- As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.
- Estimated quantities of bulk building materials for this section comprise 7,400 tonnes of steel and 22,900 tonnes of concrete.

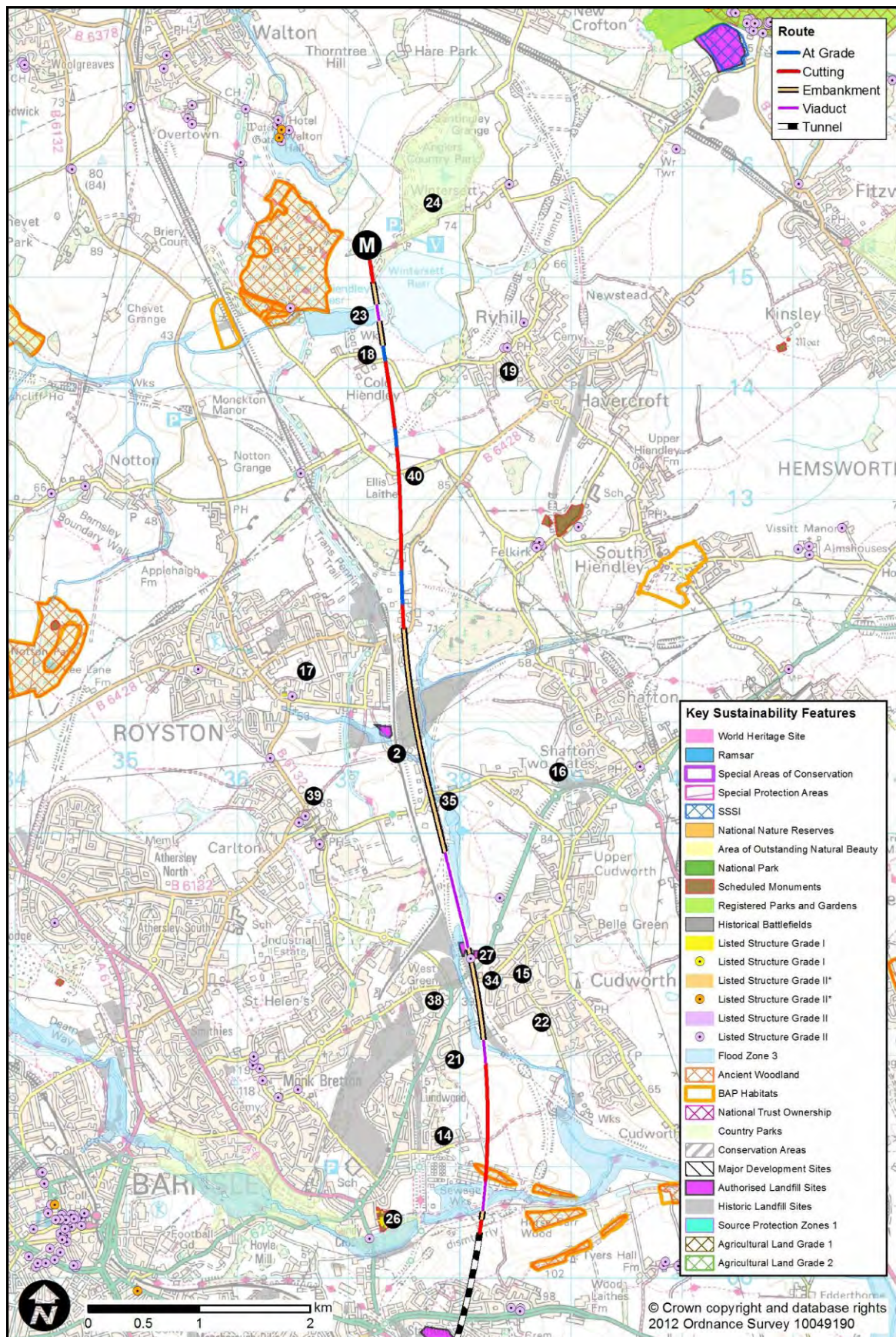
HSL16 - Figure 1 of 3



HSL16 - Figure 2 of 3

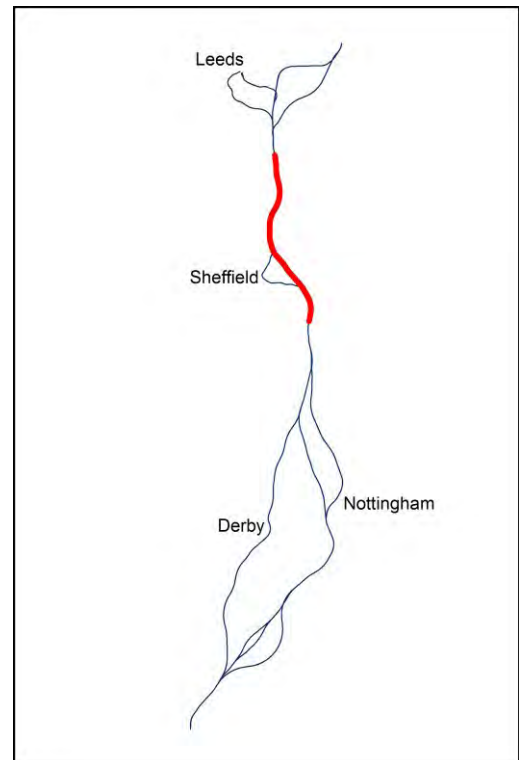


HSL16 - Figure 3 of 3



8.17. HSL24: Killamarsh (F) to Cold Hiendley (M)

- 8.17.1. This route section between Killamarsh and Cold Hiendley would be 38.8km (24.1 miles) long. It would connect with HSL05 from Tibshelf or HSL13 from Trowell. To the north it would connect with the ECML via HSL17 or HSL18, and with either of the spur options into Leeds city centre, HSL19 or HSL21. This route section would only be used in combination with the Victoria Loop, HSL29, which would include the Sheffield Victoria Station option.
- 8.17.2. The route section would follow existing transport corridors for much of its alignment. It would pass alongside the Chesterfield to Rotherham railway and the Rother Valley as far as Treeton, before diverging west and passing below the A630 and joining the M1 corridor near Brinsworth for several kilometres as far as Chapeltown before diverging east and entering tunnel under Hoyland. The route section would emerge from tunnel just north of the A6195 and continue towards Barnsley. It would cross over several minor roads and the Sheffield to Barnsley railway, passing under Ardsley in tunnel. The route section would then cross a number of minor roads up to the west of Winterset Reservoir.
- 8.17.3. HSL24 Figures 1 to 5 illustrate the route alignment and the principal sustainability features in the area.
- 8.17.4. Specific mitigation included within the route section comprises a number of localised realignments that have sought to reduce the residential demolitions around Station Road and Killamarsh, and to avoid crossings of the River Doe Lea and the River Rother. Other mitigation measures include reducing speed through the Rother Valley area in order to reduce noise impacts. Additional mitigation included a number of localised realignments that have sought to reduce the residential demolitions at Warren Lane, north of Chapeltown and Swaithe. Realignment also sought to reduce impacts to Wombwell Wood Scheduled Monument and to move the scheme further from Winterset Reservoir to ensure dam wall structural integrity.
- 8.17.5. **Population and settlements** This route section would result in the demolition of an estimated 36 dwellings. Of the total, 9 demolitions would be in areas of relatively high deprivation. In addition, an estimated 18 commercial properties and two community properties (both nursing homes) would also be demolished. Potential isolation would occur at five locations, affecting an estimated 359 dwellings at ① Brinsworth, 546 dwellings at ② Catcliffe (in addition to three community properties; a hall, a primary school and a community centre), 13 dwellings ③ west of Blackburn, 10 dwellings east of ④ Ecclesfield and one dwelling east of ⑤ Royston.



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| 8.17.6. | Noise | <p>Noise from HS2 trains would result in annoyance for an estimated 2,536 people (equivalent to the occupants of some 1,075 dwellings). This would represent about 66 people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be substantially less than this.</p> <p>The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ⑥ Oxclose, ⑦ Killamarsh, ⑧ Halfway, ⑨ Westfield, ⑩ Sothall, ⑪ Beighton, ⑫ Swallownest, ⑬ Woodhouse Mill, ⑭ Treeton, ② Catcliffe, ① Brinsworth, ⑮ Tinsley, ⑯ Meadowhall, ⑰ Wincobank, ⑱ Blackburn, ⑲ Shiregreen, ⑳ Warren, ㉓ Hood Hill, ㉑ Harley, ㉒ Hoyland, ㉔ Blacker Hill, ㉕ Worsbrough, ㉖ Swaithe, ㉗ Lundwood, ㉘ West Green, ㉙ Cudworth, ㉚ Shafton Two Gates, ㉛ Carlton, ⑤ Royston, ㉜ Ellis Laithe, ㉝ Ryhill, ㉞ Cold Hiendley and other scattered dwellings.</p> <p>In terms of noise insulation, approximately 456 dwellings would be expected to qualify, particularly at ⑥ Oxclose, ⑦ Killamarsh, ⑩ Sothall, ⑪ Beighton, ⑫ Swallownest, ⑭ Treeton, ② Catcliffe, ⑮ Tinsley, ⑰ Wincobank, ⑱ Blackburn, ⑲ Shiregreen, ㉒ Hoyland, ㉔ Blacker Hill, ㉖ Swaithe, ㉘ West Green, ㉙ Cudworth, ㉚ Shafton Two Gates and ㉞ Cold Hiendley. This is equivalent to approximately 12 dwellings per km of route section.</p> |
| 8.17.7. | Health and well-being | <p>An estimated 350 dwellings would be located within 100m of this route section. These would be at relatively greater risk of disturbance from construction activity.</p> |
| 8.17.8. | Access issues | <p>Four promoted recreational routes would be crossed by the route section, namely the Trans Pennine Trail crossed over ten times between ㉞ Boiley Farm and ㉞ Ardsley, ㉟ Sheffield Country Walk crossed three times, ㊱ Barnsley Boundary Walk crossed twice and one crossing of the ㊲ Dearne Way. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.</p> |
| 8.17.9. | Planning and development | <p>The route section would pass through a number of planned growth sites at ㊳ Orgreave, east of Sheffield. The site forms part of the Sheffield Enterprise Zone and has planning permission for the development of Waverley New Community. Waverley New Community includes 3,890 residential units, commercial development, finance and professional services, leisure and community uses. The scheme was granted outline permission March 2011, with a 30 year time limit on the consent. The masterplan for the site also includes the Waverley Advanced Manufacturing site.</p> |
| 8.17.10. | Landscape, townscape and cultural heritage | <p>At its southern end, the route would be in cutting along the line of a disused railway, with few impacts. Approaching ㊴ Rother Valley Country Park, it would rise onto a high viaduct and cross the River Rother, with some limited visual impact on users of part of the country park to the east and a small direct impact on the park area itself. Further north another high viaduct across the river and railway near ㊵ Treeton Dyke, would have visual impacts on recreational users (including users of the Trans Pennine Trail) and some direct impact on informal open space. Where it crosses Orgreave former opencast workings on high viaduct it would potentially cause visual impact on recreational users of nearby ㊶ Catcliffe Flash and residents at ②</p> |

Catcliffe.

There would be limited impacts where the route runs mainly on high viaduct through 44 Meadowhall. However, there might be direct impacts on the parallel 44 Trans Pennine Trail and on adjoining woodland. North of Ecclesfield the route would be in deep cutting and would cause substantial loss of woodland, including ancient woodland, in the 45 Chapeltown area with both landscape and visual impacts (see also *biodiversity and wildlife*). The route section overall would directly impact eight woodlands over a total distance of almost 3.5km.

The high viaduct crossings of the River Dearne and another minor stream at Barnsley would cause localised visual impact on residents of 27 Lundwood and 29 Cudworth, both near the route. At its northern end it would cross 46 Cold Hiendley Reservoir (which is used for recreation in association with Winterset Country Park) on high viaduct with visual impacts on recreational users.

The Grade II listed chimney at 48 Bleach Croft Farm, near Cudworth would be directly impacted but the setting of the chimney is already highly degraded and the impact would be minor.

The route section would have a moderate impact on the settings of an isolated farm complex of three Grade II listed buildings at 47 Swaithe Hall Farm. Impacts on the setting of the Grade II* listed 56 Swaithe House would be negligible.

The Scheduled Monument of 49 Wombwell Wood Romano-British settlement is near the route. Any impacts on its setting would be minimised by the location of the monument in woodland and are unlikely to be significant. The scheduled monument of 50 Monk Bretton Priory has a Grade I listed building in the complex near Barnsley and is situated further from the route. The proposed viaduct across the River Dearne is likely to have some impact on this setting, although this may not be significant.

The Grade II* Registered Parks and Gardens of 51 Renishaw Hall would lie within 1km of this route section, but given the distance and topography, the impact would be negligible.

8.17.11. Biodiversity and wildlife

The route would pass within 10km of one Natura 2000 wildlife site. However, the HRA screening confirms that there would be no likely significant effects on this site.

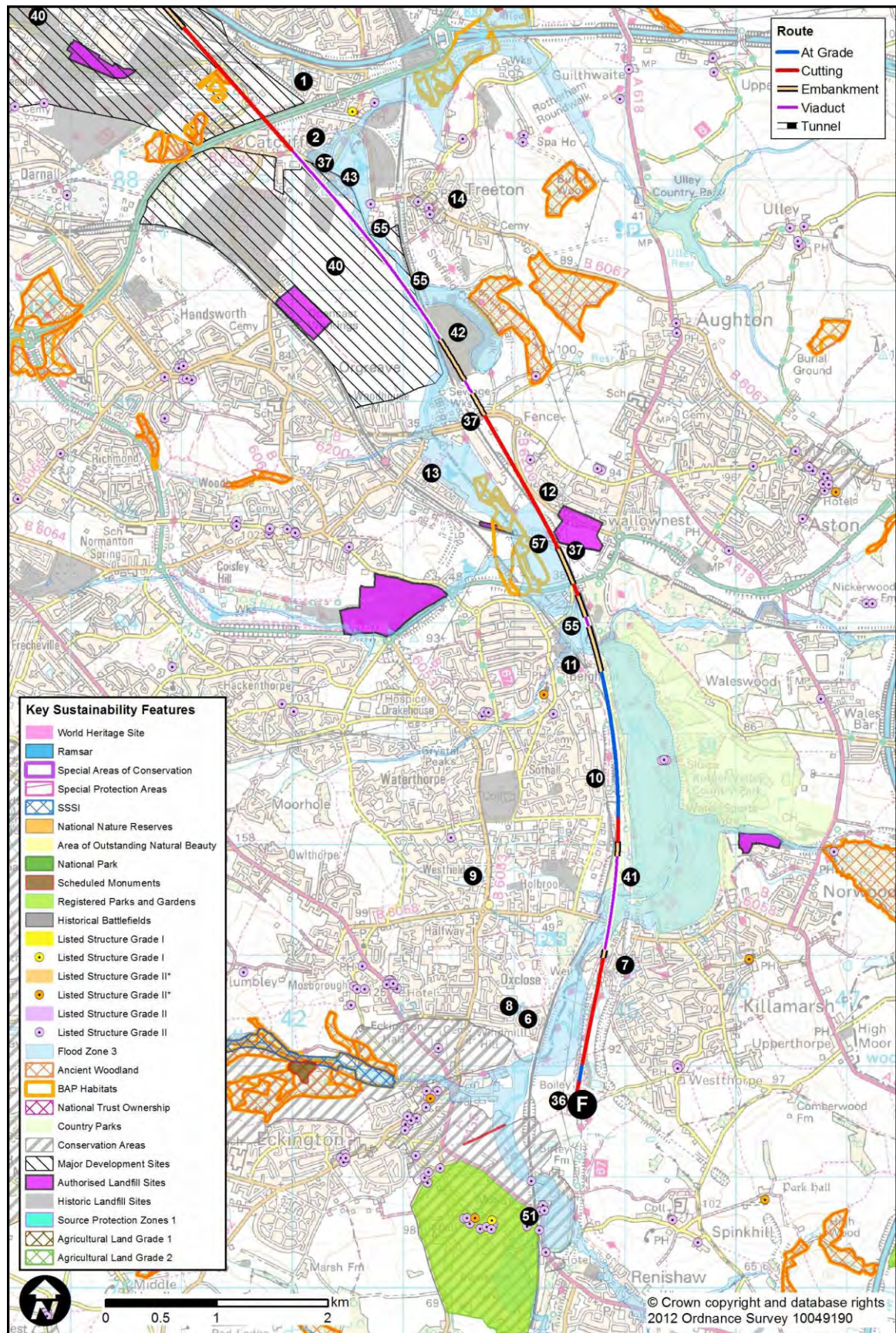
The Peak District is designated an EU Diploma Site, but is nowhere closer than about 7.5km from this route section and would not be adversely affected by it.

There would be two SSSIs within 2km of the route section, but impacts on these are considered unlikely.

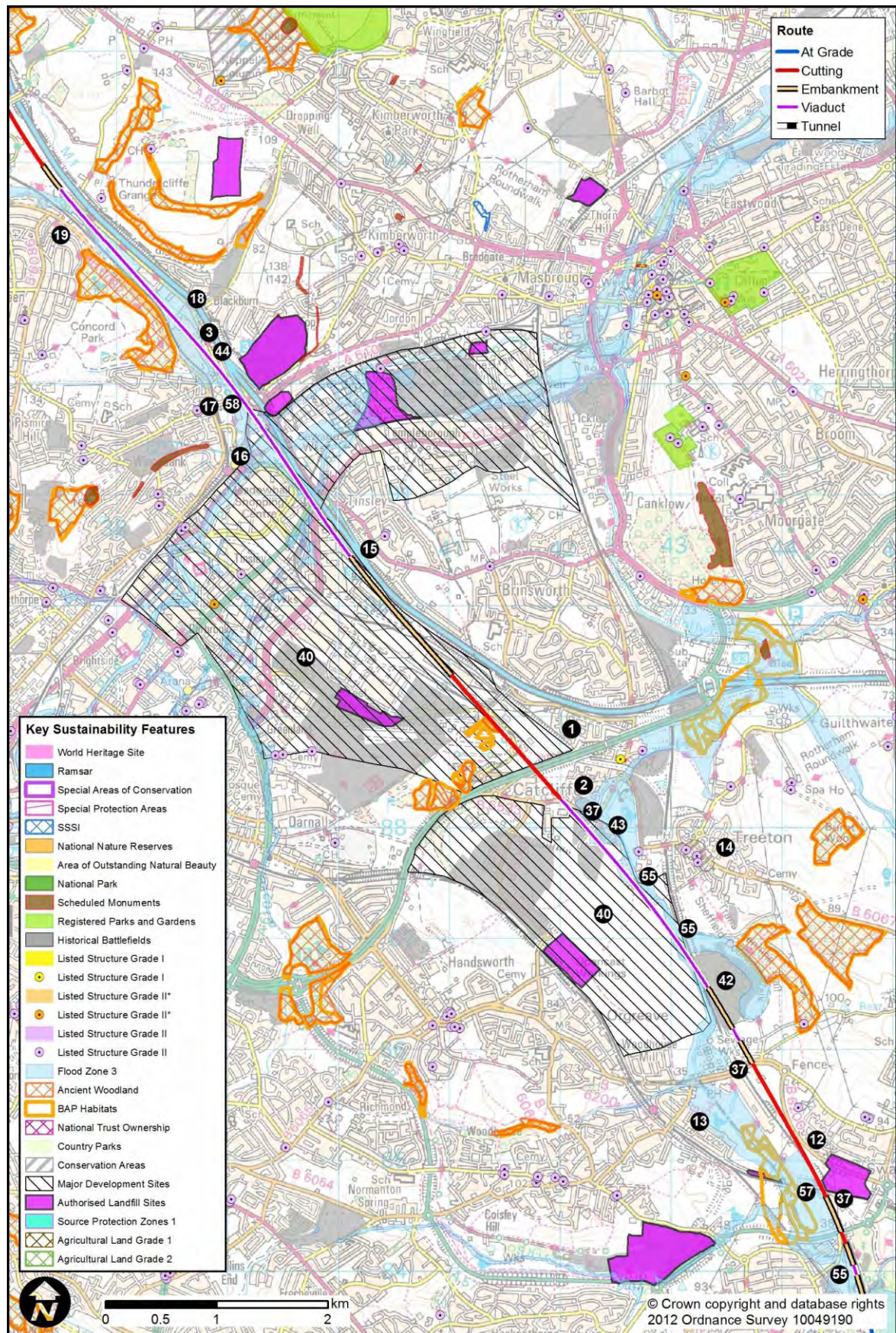
Eight ancient woodlands would be directly impacted, namely 53 Smithy Wood and 45 Hesley Wood near Chapeltown, 49 Wombwell Wood, 54 Sunnybank and four unnamed ancient woodlands. These are either wet woodland or lowland mixed deciduous woodland BAP habitats.

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| 8.17.12. Water resources and flood risk | <p>Three diversions of the 55 River Rother, a major river, may be required. Four diversions of minor rivers may be required, namely 57 Beighton Mill Tail Goit, 58 Blackburn Brook, the 52 Cudworth Dyke and a Cudworth Dyke tributary. Continuing scheme design would seek to avoid or minimise these impacts.</p> <p>The route section would cross some 5.3km of Flood Zone 3.</p> |
| 8.17.13. Land use resources | <p>The route section would cross about 24.8km of green belt.</p> <p>Seventeen landfill sites, nine between Killamarsh and Catcliffe and eight between Worsbrough and Royston, would be directly affected. Detailed design would seek to minimise risks to people and the environment from these impacts.</p> |
| 8.17.14. Waste and material use | <p>It is estimated that the route section would result in a surplus of 7,698,109m³ of excavated material. This includes 662,900m³ of tunnel excavated material.</p> <p>As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.</p> <p>Estimated quantities of bulk building materials for this section comprise 12,500 tonnes of steel and 38,600 tonnes of concrete.</p> |

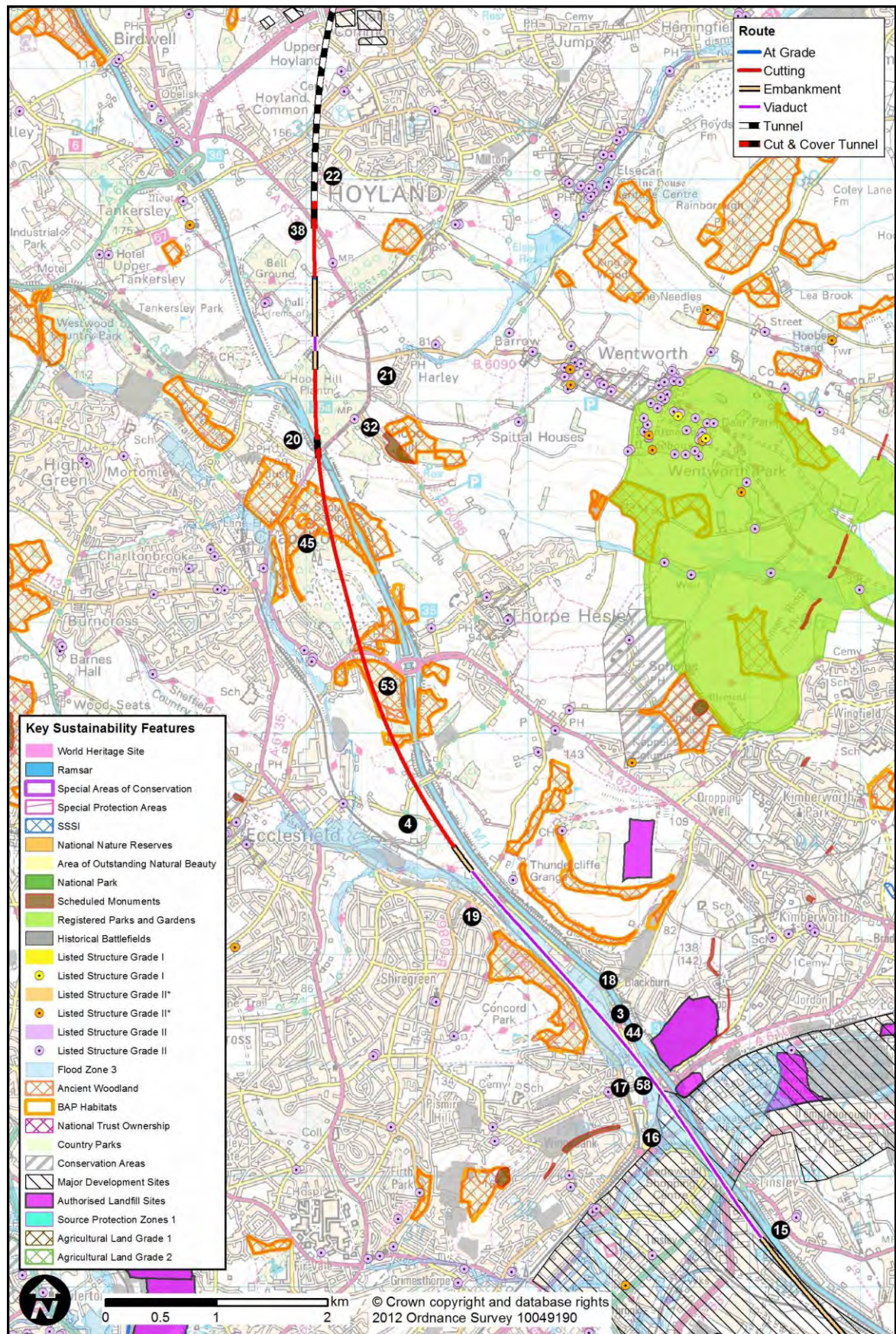
HSL24 - Figure 1 of 5



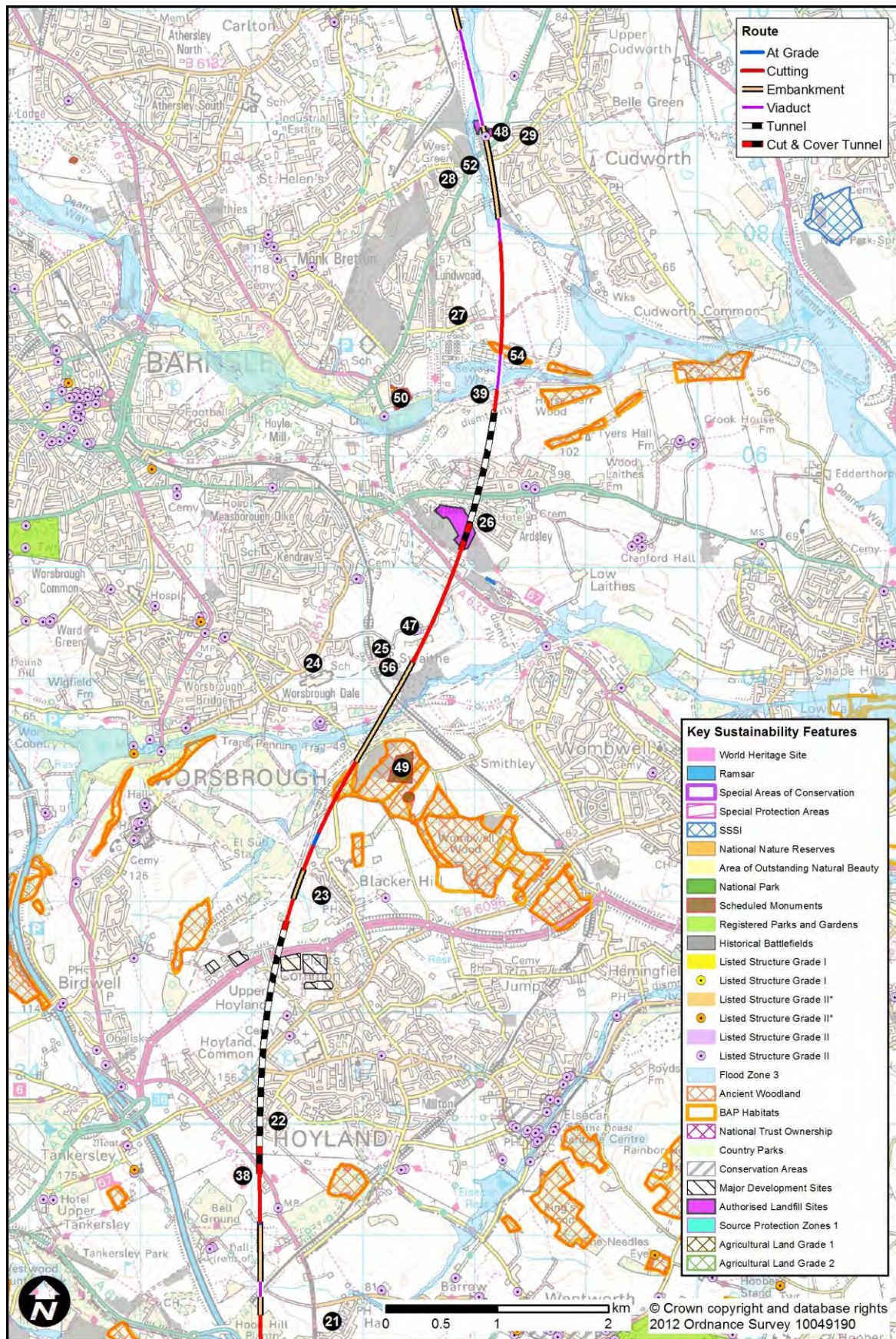
HSL24 - Figure 2 of 5



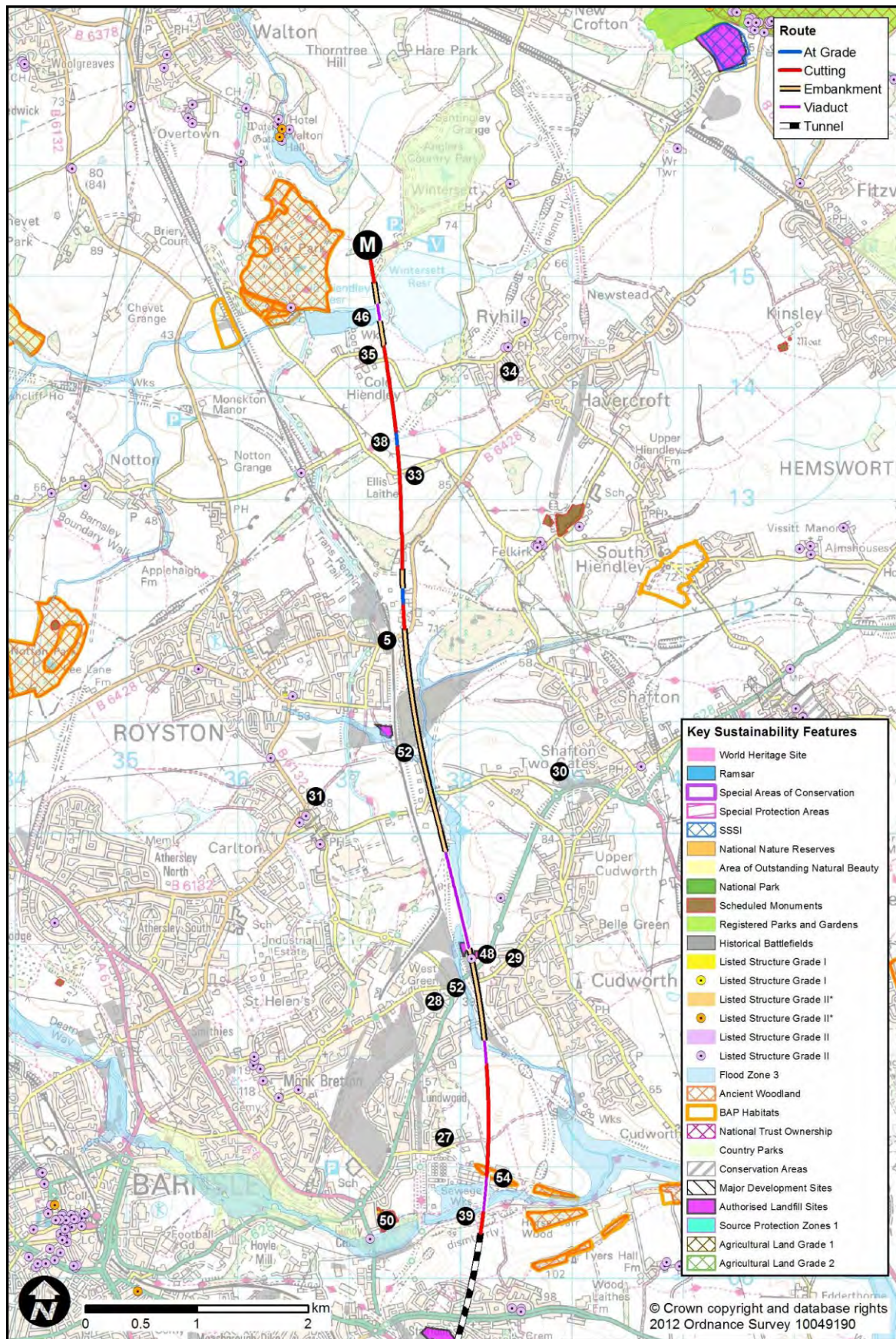
HSL24 - Figure 3 of 5



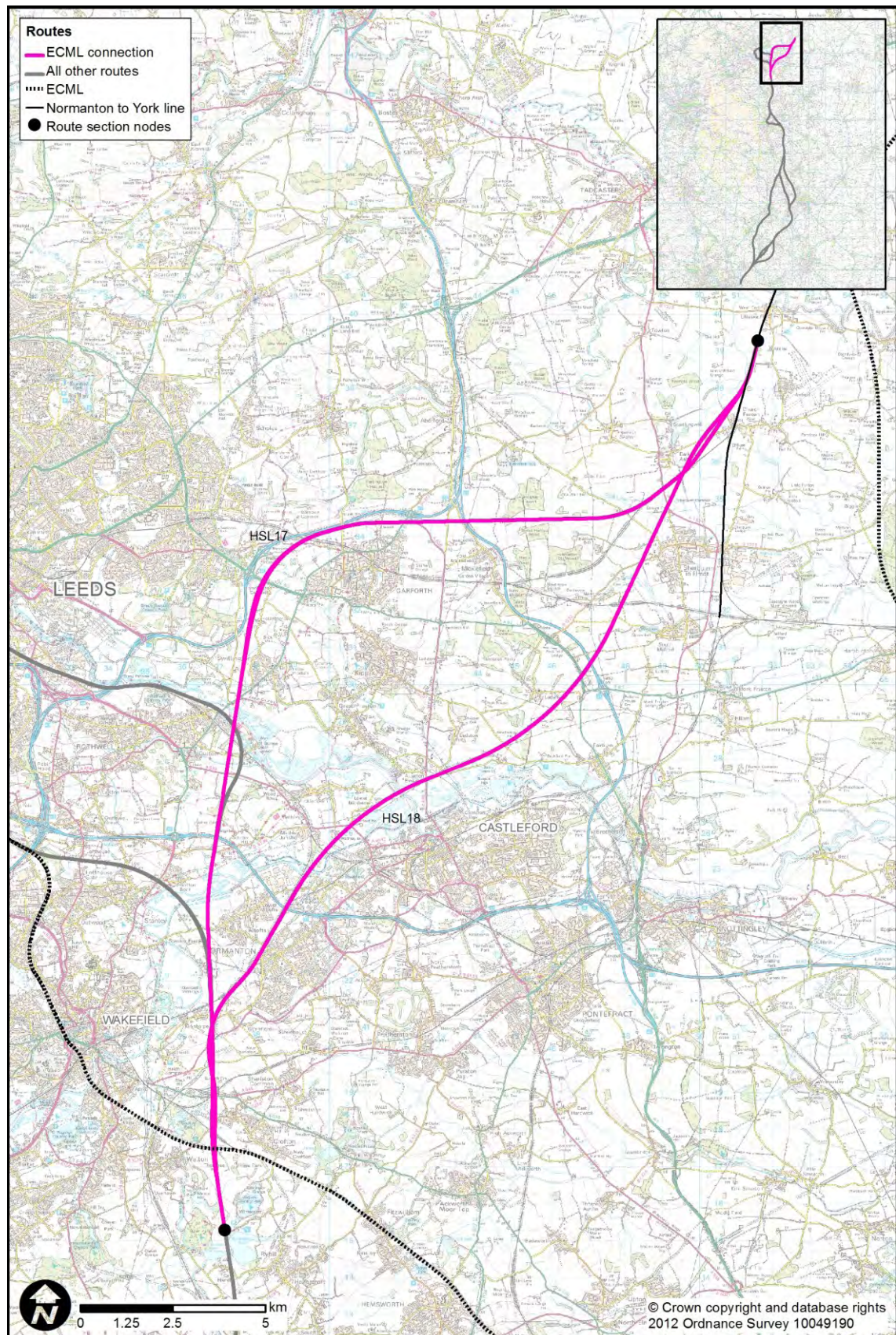
HSL24 - Figure 4 of 5



HSL24 - Figure 5 of 5



9. Leeds route: East Coast Main Line connection



9.1. HSL17: Cold Hiendley (M) to Church Fenton (V)

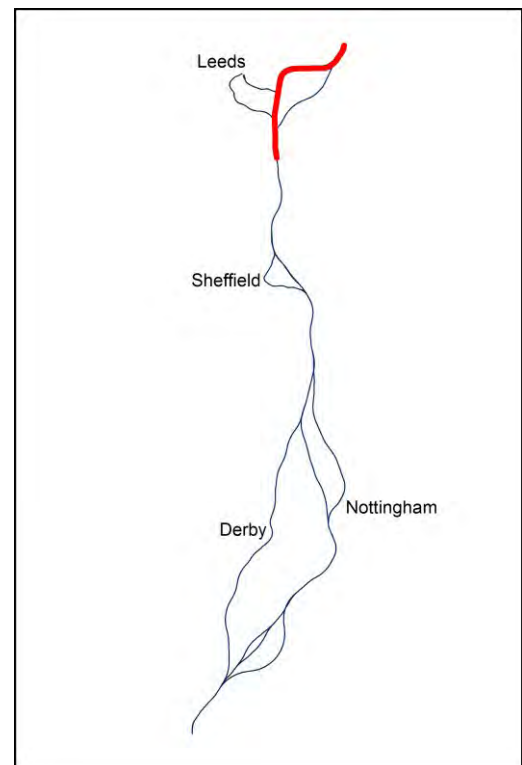
9.1.1. The route section between Cold Hiendley and Church Fenton would be 34.1km (21.2 miles) long. It would connect to the south HSL16 from Blackburn. It would provide one of two spur options to connect into the section of existing railway between Church Fenton and Ulleskelf, and would provide the connection to the ECML.

9.1.2. The route section would follow the undulating landscape on the eastern side of the Calder Valley. The area is crossed by numerous roads and railways, necessitating the use of embankments and bridges by the route section over several kilometres. As it approaches the Fitzwilliam to Wakefield railway, the route section would enter and remain largely in cutting past Normanton and Altofts before rising on to several more kilometres of generally elevated alignment. Viaducts would carry the route section across the M62 and then twice over the River Calder and the Aire and Calder Navigation as they meander across the broad river valley to the south-east of Leeds. The route section would enter cutting as it passes Swillington and joins the corridor of the M1. It would pass beneath the A63 and Leeds to York railway and bear eastwards alongside the motorway. It would pass beneath the A1(M) just north of Micklefield and enter undulating wooded and open countryside near Sherburn in Elmet which would require a mix of cutting and embankment up to the route section's alignment alongside the Normanton to York railway. At this point it would rise onto embankment across the flat broad valley of the River Wharfe, before passing onto a long viaduct and a junction with the Normanton to York railway (and from there, the ECML) south of Ulleskelf.

9.1.3. HSL17 Figures 1 to 5 illustrate the route alignment and the principal sustainability features in the area.

9.1.4. Specific mitigation included redesigning the route at a slower speed and as a spur from a route for passive provision for expansion of high speed rail. This afforded significant horizontal realignment to reduce impacts on scheduled monuments, Towton Battlefield, BAP habitat and ancient woodland.

9.1.5. **Population and settlements** The route section would result in the demolition of an estimated 11 dwellings. There is the potential for isolation of dwellings at two locations, affecting an estimated one at ❶ Swillington Bridge and two at ❷ Hook Moor.



9.1.6. Noise

Noise impacts for the route section would depend on the Leeds Station approach used, as this would affect the number of trains operating on the line. The estimated noise impacts arising from each of the possible scenarios are given below.

Terminus option	Number of people annoyed by noise	Equivalent to:	Qualifying for noise insulation
Woodlesford LA4 Spur (via HSL21)	685	291 dwellings or 21 people per km	118 dwellings
Transpennine LR5B Spur (via HSL19)	589	250 dwellings or 18 people per km	73 dwellings

With ambient road noise also taken into account, noise impacts from HS2 would be expected to be substantially less than this.

The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ③ Winterset, ④ Walton, ⑤ Crofton, ⑥ Oakenshaw Grange, ③⑥ Brand Hill, ⑦ Warmfield, ⑧ Kirkthorpe, ⑨ Goosehill, ⑩ Altofts, ⑪ Bottom Boat, ⑫ Hungate, ⑬ Oulton, ⑭ Woodlesford, ⑮ Swillington, ⑯ Swillington Common, ⑰ Garforth, ⑱ Barkston Ash, ⑲ Church Fenton and other scattered dwellings.

Dwellings qualifying for noise insulation would be located in ⑥ Oakenshaw Grange, ③⑥ Brand Hill, ⑦ Kirkthorpe, ⑫ Hungate, ⑮ Swillington, ⑯ Swillington Common and ⑲ Church Fenton.

9.1.7. Health and well-being

Approximately 173 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.

9.1.8. Access issues

Two promoted recreational routes would be crossed by the route section, namely ⑳ the Trans Pennine Trail (crossed three times) and ㉑ the Leeds Country Way (crossed four times). HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.

9.1.9. Planning and development

The ㉒ Welbeck landfill west of Normanton, potentially affected by the route section (see *land use resources*) has land allocated within the Waste development plan document (DPD) for landfill and the development of new commercial and industrial waste recovery facilities and modernisation of existing household waste recycling facility. This would be directly affected by the route section and is currently the largest landfill facility within the Wakefield District area, with consent to operate as a landfill site until 2018.

9.1.10. Landscape, townscape and cultural heritage

The route section north of Winterset Reservoir would mostly be on embankment to cross existing roads and railways through an area of former mineral working. Impact on landscape character would be fairly limited given the existing landscape context, although views of the embankment from two country parks and the western edge of ⑤ Crofton would result in some visual intrusion. The mixture of cutting with some embankment west of Normanton would cause visual impact at ⑦ Kirkthorpe, and would affect landscape character, especially as it passes

the 23 River Calder near the Newland Preceptory Scheduled Monument. The setting of this feature, which is understood to have no above ground remains, would not be affected. Two Grade II listed buildings on the site in the form of farm buildings and old stables at the 23 site of the former Newland Hall, would be expected to have a moderate impacts on their settings.

Immediately north of Newland, this route section could have a direct impact on the scheduled 24 henge on Birkwood Common, although it is possible that this impact could be avoided through further scheme refinement. The setting of the low earthworks, bank and ditch remains could be affected, although within a much degraded landscape the impact is unlikely to be a significant one.

The river crossing would affect the character of a relatively undeveloped section of the valley and cause visual intrusion for recreational users and residents at 11 Bottom Boat and 25 Normanton. Continuing towards Oulton, further embankment, as well as cutting would affect the landscape character, particularly through impacts on woodland. The route section would cross the 26 River Aire and the Aire and Calder Navigation between Woodlesford and Swillington resulting in major landscape character impacts on the valley as well as major visual impacts on recreational users of the navigation and 27 Trans Pennine Trail, and residents of part of 14 Woodlesford. Further north there would be visual impacts on residents of 15 Swillington. There would be direct impacts on several areas of woodland and parkland within the river corridor.

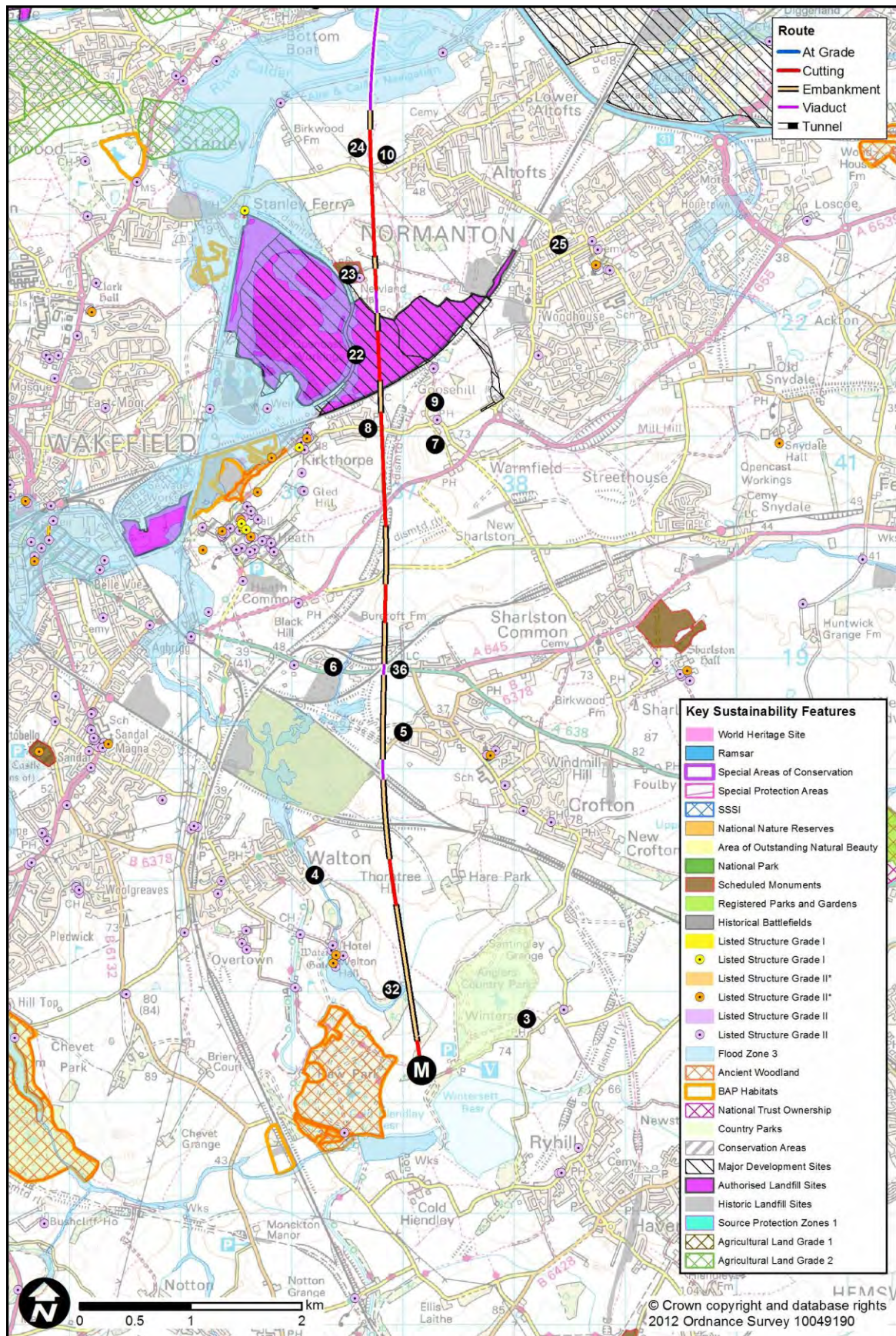
From west of Swillington to north of Garforth the route section would broadly follow the M1 in cutting along most of its length, with fairly limited landscape or visual impacts except in the area west of 17 Garforth where there would be some short viaduct and embanked sections that might cause localised visual intrusion and affect landscape character. There would also be some localised woodland loss. Running due east from near Garforth, the route section would continue north-east to near Ulleskelf. Initially parallel with the M1 there would be little landscape or visual impact. East of the A1(M) it would run close to grade across farmland and partly along the line of an existing railway to near 18 Barkston Ash, again with limited impacts. The route section would then rise onto embankment and viaduct to cross the Normanton to York railway, resulting in impacts on landscape character and visual impacts south of 18 Barkston Ash and west of 19 Church Fenton.

Three scheduled sections of 28 Grim's Ditch, collectively forming part of the West Yorkshire Grim's Ditch would be near the route section and could have their settings affected, although due to the close proximity of the M1 and the relatively poor preservation of the two southern sections, these impacts are not expected to be significant.

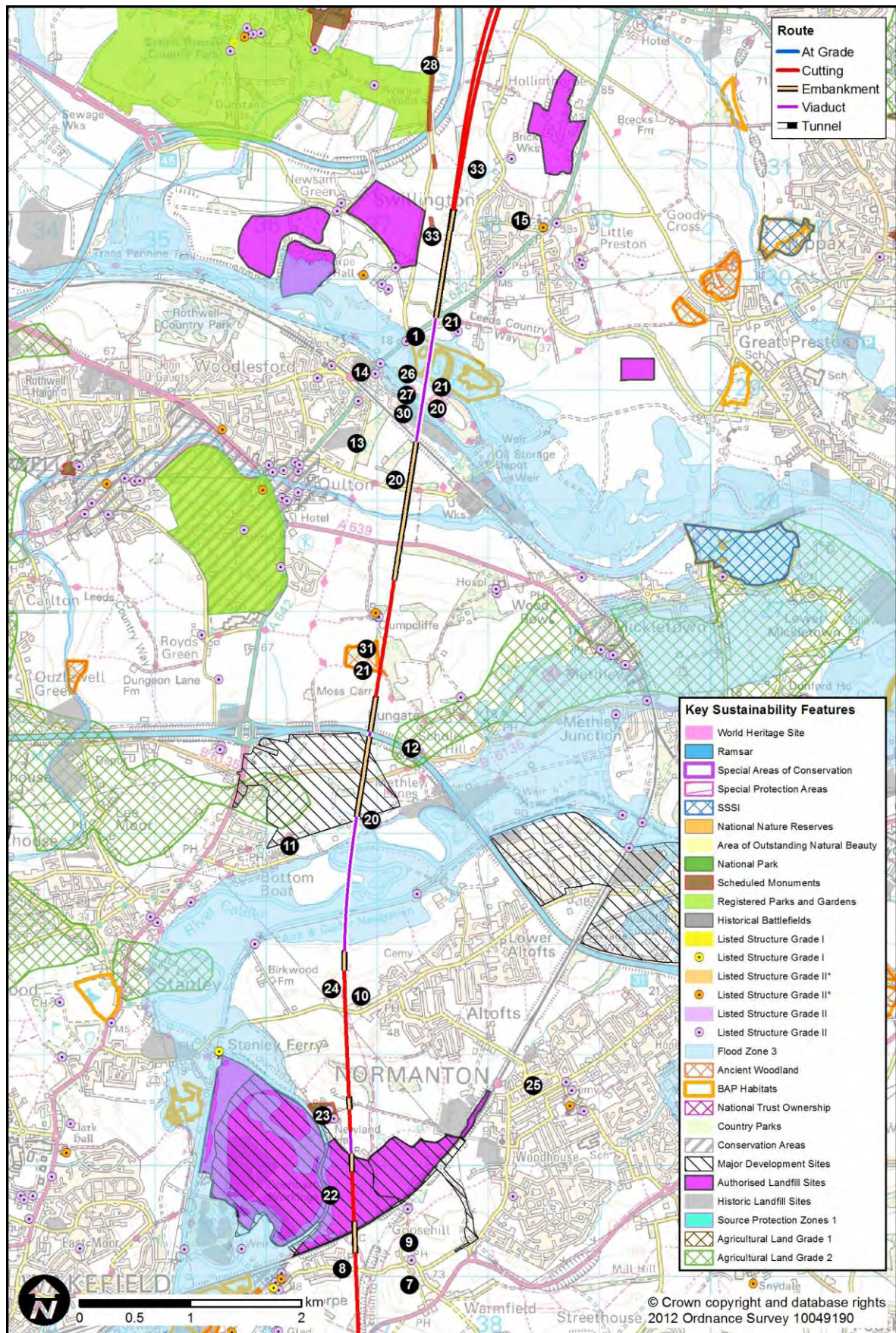
Apart from the two Grade II listed buildings at the 23 former Newland Hall (see above) all other listed structures near the route section would have either minor or negligible impacts on their settings.

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| 9.1.11. | Biodiversity and wildlife | <p>The route section would pass within 10km of one Natura 2000 wildlife site. However, HRA screening confirms that there would be no likely significant effects on this site.</p> <p>There would be four SSSIs within 2km of the route section, although the risk of impact to all of them is considered to be low.</p> <p>The route section would directly affect four BAP habitats including two areas of coastal and floodplain grazing marsh south of 29 Ulleskelf, an area of undetermined grassland and a lowland mixed deciduous woodland, which is also an ancient woodland called 31 Moss Carr Wood. It is possible that the latter could be avoided through further scheme refinement.</p> |
| 9.1.12. | Water resources and flood risk | <p>Five diversions of minor rivers may be required, namely at 32 Drain Beck, 32 Drain Beck tributary at Wintersett Reservoir, 33 River Aire tributary at two places and the 35 Cock Beck tributary. Continuing scheme design would seek to avoid or minimise this impact.</p> <p>The route section would cross some 3.5km of Flood Zone 3.</p> |
| 9.1.13. | Land use resources | <p>The route would cross about 13.2km of Grade 2 agricultural land. It would cross about 36.5km of green belt.</p> <p>Three landfill sites, 22 west of Normanton, 34 north of Sherburn in Elmet and 30 east of Oulton, would be directly affected and the design would require further work to minimise risks to people and the environment.</p> |
| 9.1.14. | Waste and material use | <p>It is estimated that the route section would result in a surplus of 1,823,267m³ of excavated material.</p> <p>As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.</p> <p>Estimated quantities of bulk building materials for this section comprise 12,500 tonnes of steel and 38,300 tonnes of concrete.</p> |

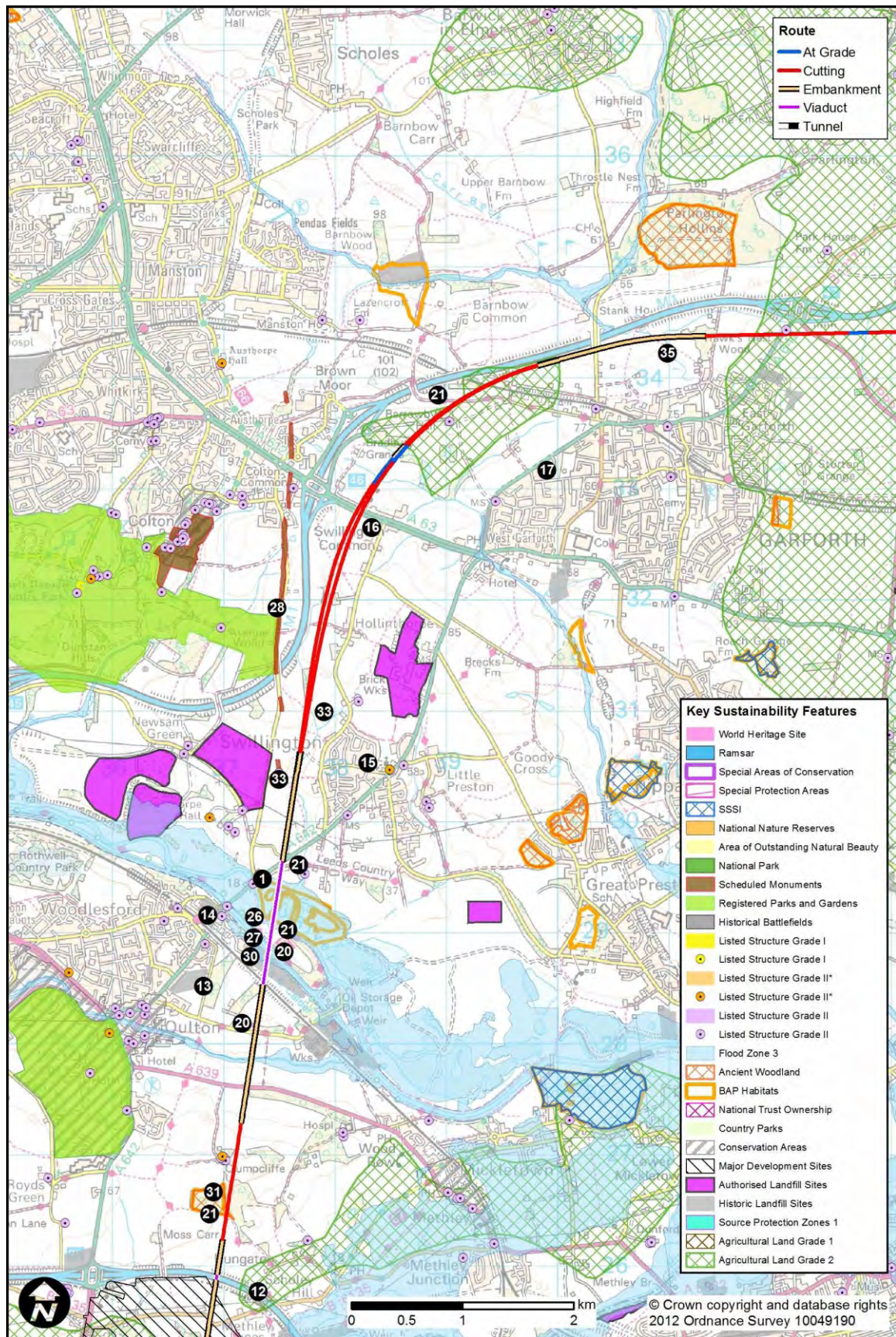
HSL17 - Figure 1 of 5



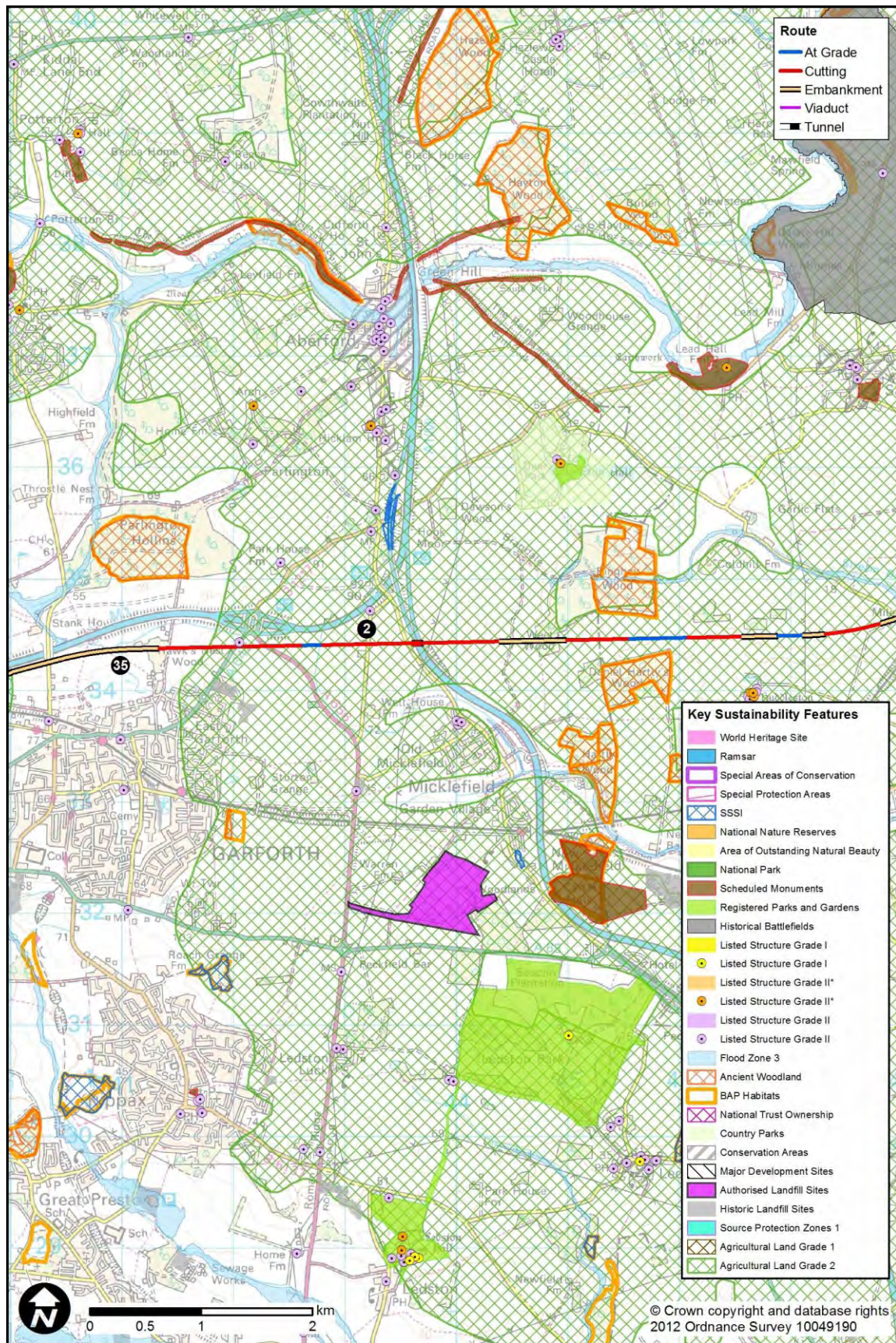
HSL17 - Figure 2 of 5



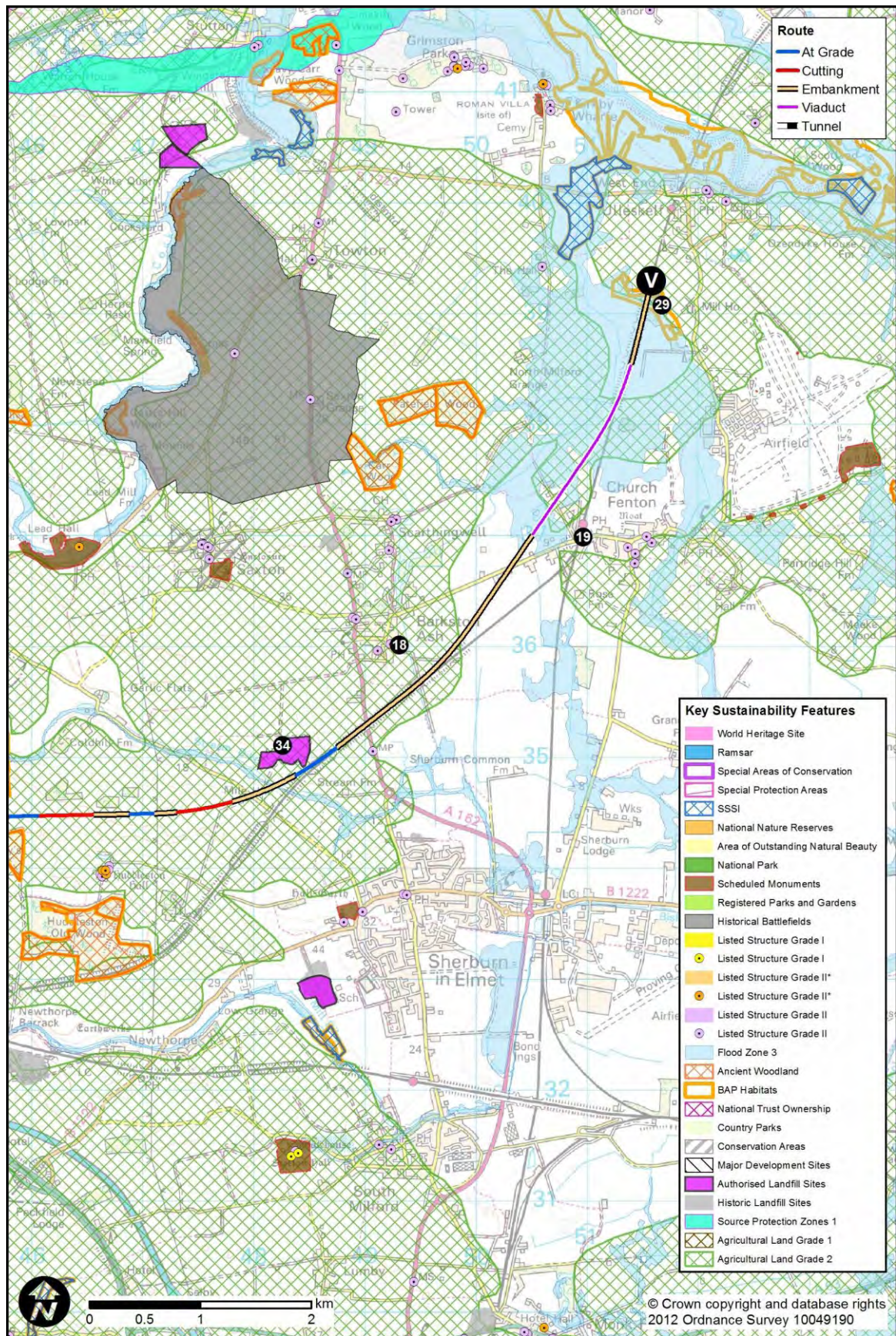
HSL17 - Figure 3 of 5



HSL17 - Figure 4 of 5

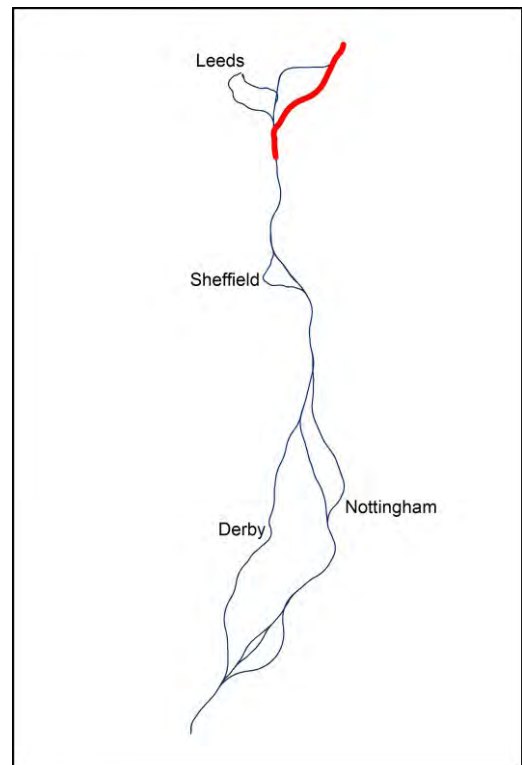


HSL17 - Figure 5 of 5



9.2. HSL18: Cold Hiendley (M) to Church Fenton (V)

- 9.2.1. The route section between Cold Hiendley and Church Fenton would be 30km (18.6 miles) long. It would connect to the south HSL16 from Blackburn. At the northern end, it would provide one of two spur options to connect into the section of existing railway between Church Fenton and Ulleskelf, and would provide the connection to the ECML.
- 9.2.2. The route section would pass from Winterset Reservoir to Walton in cutting, embankment and at grade before crossing a number of rail corridors and roads at Sharlston Common. At Normanton it would join the rail corridor and cross the M62 near junction 31. The route would cross the River Calder on a long section of viaduct and pass by Newton Ings and Fairburn Ings before passing under the A1(M) in cutting. The route would go by Sherburn in Elmet and Church Fenton and would require a mix of cutting and embankment up to the route section's alignment alongside the Normanton to York railway. At this point it would rise onto embankment across the flat broad valley of the River Wharfe, before passing onto a long viaduct and a junction with the Normanton to York railway (and from there, the ECML) south of Ulleskelf.
- 9.2.3. HSL18 Figures 1 to 4 illustrate the route alignment and the principal sustainability features in the area.
- 9.2.4. Specific mitigation included within the route section comprises a number of localised realignments that have sought to reduce impacts on the River Calder to a more simplified crossing by more closely aligning the route with the areas of higher ground in this area. Additionally moving the scheme from Mickletown Ings SSSI and Fairburn and Newton Ings SSSI provided further mitigation.
- 9.2.5. **Population and settlements** The route section would result in the demolition of an estimated 23 dwellings. These include a cluster at ❶ Normanton. In addition, an estimated 10 commercial properties would also be demolished. There is the potential for isolation of dwellings at one location, affecting an estimated one at ❷ Methley Junction.
- 9.2.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 571 people (equivalent to the occupants of some 242 dwellings). This would represent about 18 people per km of route. With ambient road noise, also taken into account noise impacts from HS2 would be expected to be substantially less than this.
- The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ❸ Walton, ❹ Crofton, ❺ Oakenshaw Grange, ❻ Brand Hill, ❼ Normanton, ❼ Altofts, ❽ Methley Junction, ❾ Low Common, ❿ Whitwood Mere, ⓫



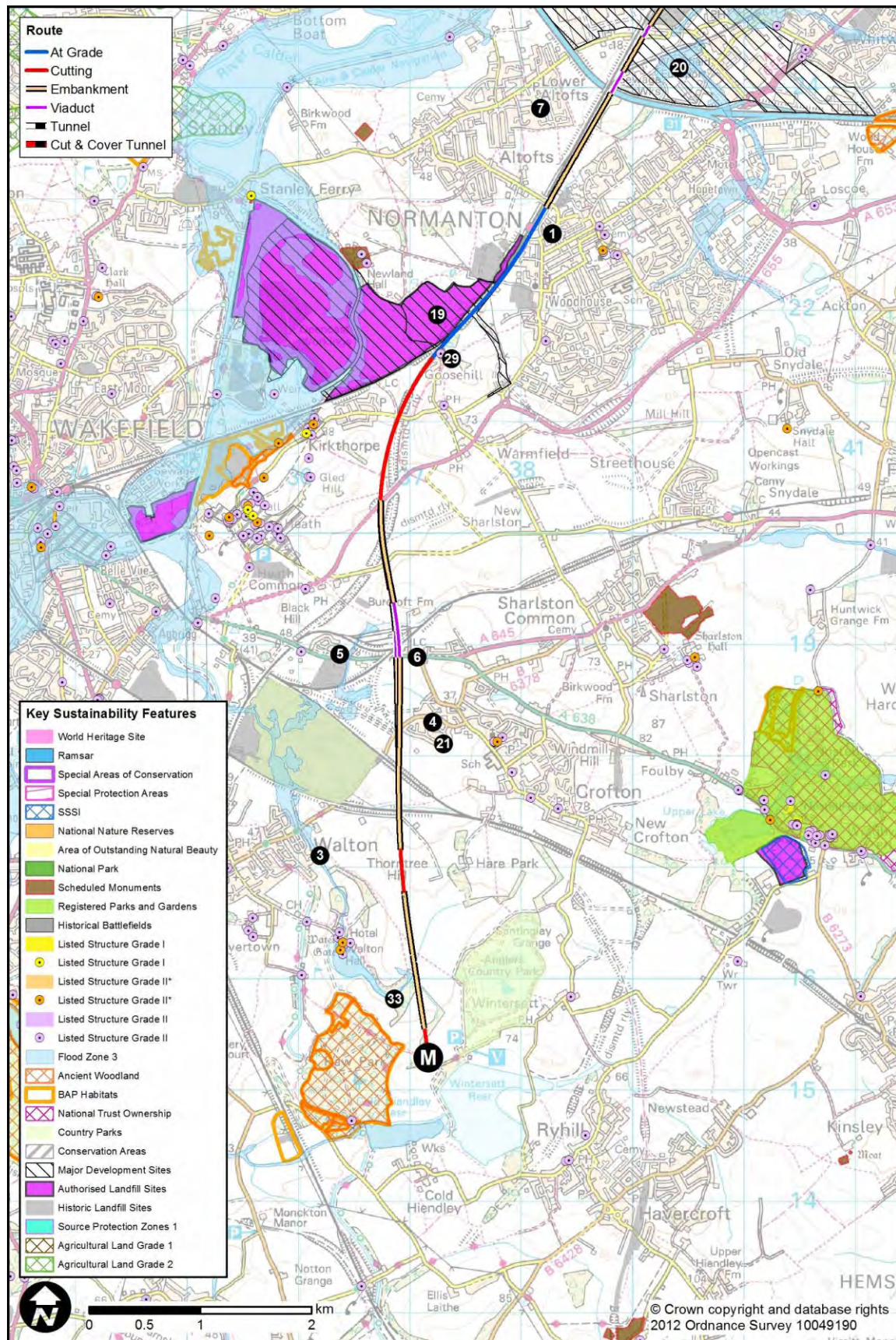
Mickletown, 12 Allerton Bywater, 13 Ledston, 14 Ledsham, 15 Newthorpe, 16 Sherburn in Elmet, 17 Barkston Ash, 18 Church Fenton and other scattered dwellings.

In terms of noise insulation, approximately 76 dwellings would be expected to qualify, particularly at 6 Normanton, 9 Low Common and 12 Allerton Bywater. This is equivalent to approximately three dwellings per km of route section.

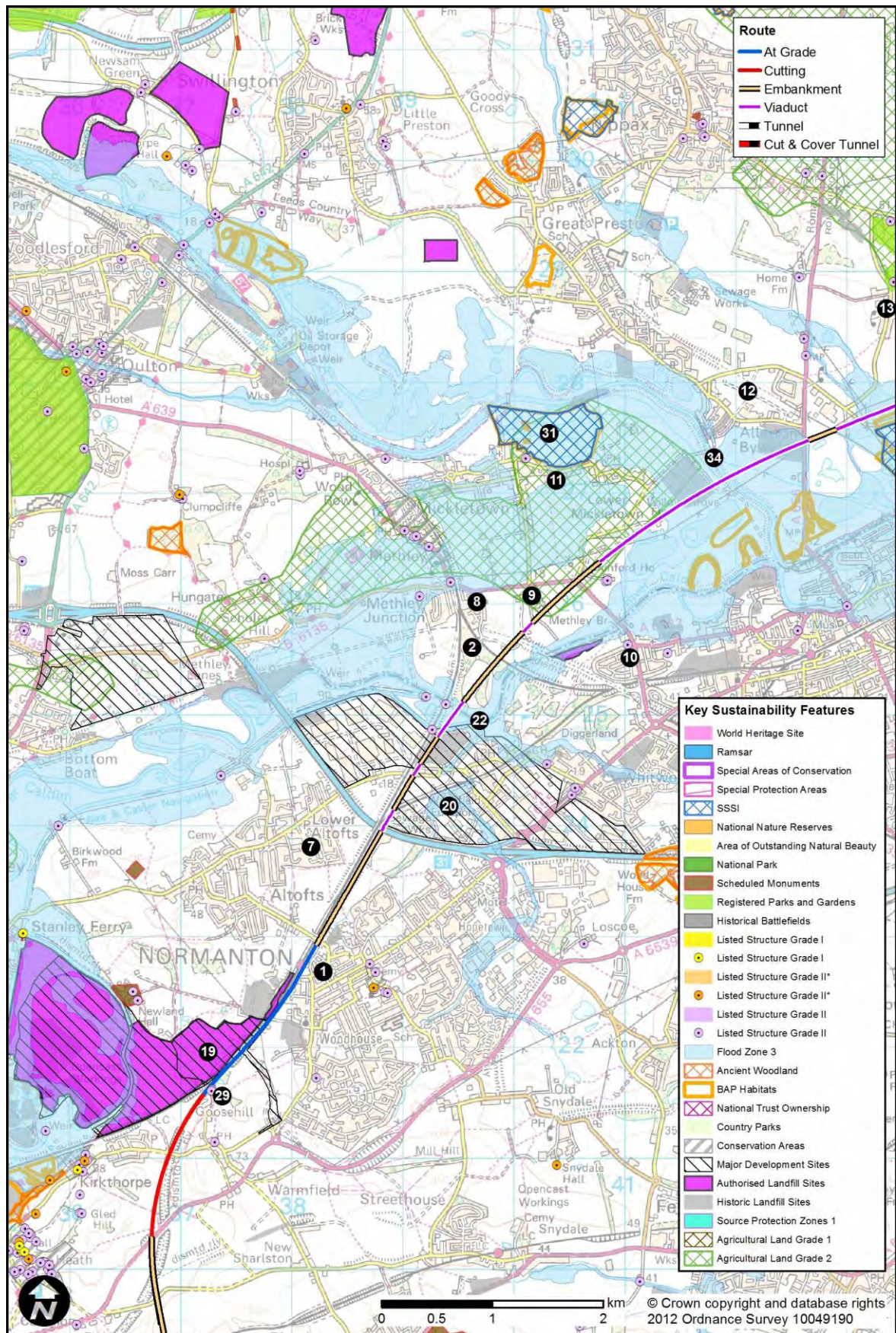
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| 9.2.7. | Health and well-being | Approximately 264 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity. |
| 9.2.8. | Access issues | No promoted recreational routes would be crossed by the route section. |
| 9.2.9. | Planning and development | <p>The landfill site at 19 Welbeck potentially affected by the route section (see <i>land use resources</i>) has land allocated within the Waste development plan document (DPD) for landfill and the development of new commercial and industrial waste recovery facilities and modernisation of existing household waste recycling facility. It is currently the largest landfill facility within the Wakefield District area, with consent to operate as a landfill site until 2018.</p> <p>The route section would also pass through 20 Wakefield (Whitwood) Europort Distribution Centre. The site is identified within the Wakefield Metropolitan Borough Council Sites Allocation DPD for employment.</p> |
| 9.2.10. | Landscape, townscape and cultural heritage | <p>At its southern end the route section would pass on embankment within 300m of two country parks, potentially giving rise to some localised visual intrusion. The route section may also give rise to visual impacts from new housing at Allerton Bywater.</p> <p>The route section then enters a short section of four-track route east of Wakefield, which could give rise to visual impact on residents at the western edge of the village of 21 Crofton with views of embankment. The section past the 22 River Calder and the viaduct over the 34 Aire and Calder would affect views of users of the navigation, although this would be seen within an existing industrial landscape.</p> <p>The route section would pass in cutting through attractive farmland and estate parkland, skirting 750m east of 23 Ledston Hall and Park (Grade II* Registered Park and Garden) with a moderate impact on its setting. It would then continue north-east towards York through an open, mainly arable landscape, rising onto viaduct and embankment north-west of 24 Sherburn-in-Elmet where it would give rise to moderate or even major visual intrusion affecting residents of the village and views from the Grade I listed 25 Church of All Saints, the setting of which would be affected. The scheduled site of 26 King Athelstan's Palace is immediately north of the church, it is preserved as a series of low earthworks at the edge of the village. The route section would be visible from the monument and would generate an impact on its setting.</p> <p>North of Sherburn in Elmet the route section would be on embankment and viaduct before joining the ECML near Ulleskelf. There would be limited impact on the character of the landscape, which is flat, open and mainly arable. However, there would be moderate visual intrusion affecting the villages of 27 Barkston Ash and 28 Church Fenton.</p> |

		<p>Eight areas of woodland would be affected by the route section.</p> <p>The route section would have a direct impact on the Grade II listed 29 Newhall Lodge (Goosehill), as well as its separately listed gate piers and flanking wall. Of the eight Grade II listed structures near the route, all would be subject to only negligible impacts.</p>
9.2.11.	Biodiversity and wildlife	<p>The route section would pass within 10km of one Natura 2000 wildlife site. However, an HRA screening confirms that there would be no likely significant effects on this site.</p> <p>There would be six SSSIs within 2km of the route section. Impacts on three of these are unlikely. However, there is a moderate to high risk of impact to 30 Fairburn & Newton Ings (which would be about 90m away at its closest point) and 31 Mickletown Ings (which would be about 750m from the route section away at its closest point) due to disturbance of birds and fragmentation and loss of supporting habitat. There is also a moderate risk of hydrological impact to 32 Madbanks and Ledsham Banks SSSI, which would be within 90m of the route section at its nearest point.</p> <p>There would be a direct impact on four areas of BAP habitat, including purple moor grass and rush pasture (although it could potentially be avoided through route refinement), lowland calcareous grassland two areas of coastal and floodplain grazing marsh.</p>
9.2.12.	Water resources and flood risk	<p>Three minor rivers may require diversion, 33 Drain Beck, 33 Drain Beck tributary at Winterset Reservoir and 35 Stream Dike tributary at Huddleston Hall. Continuing scheme design would seek to avoid or minimise this impact.</p> <p>The route would cross some 5.3km of Flood Zone 3.</p>
9.2.13.	Land use resources	<p>The route would cross about 10.9km of Grade 2 agricultural land. It would cross about 27.9km of green belt.</p> <p>Seven landfill sites, six between Normanton and Allerton Bywater and one at 36 Sherburn in Elmet, would be directly affected and the design would require further work to minimise risks to people and the environment.</p>
9.2.14.	Waste and material use	<p>It is estimated that the route section would result in a deficit of - 2,226,445m³ of excavated material.</p> <p>As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.</p> <p>Estimated quantities of bulk building materials for this section comprise 10,200 tonnes of steel and 32,000 tonnes of concrete.</p>

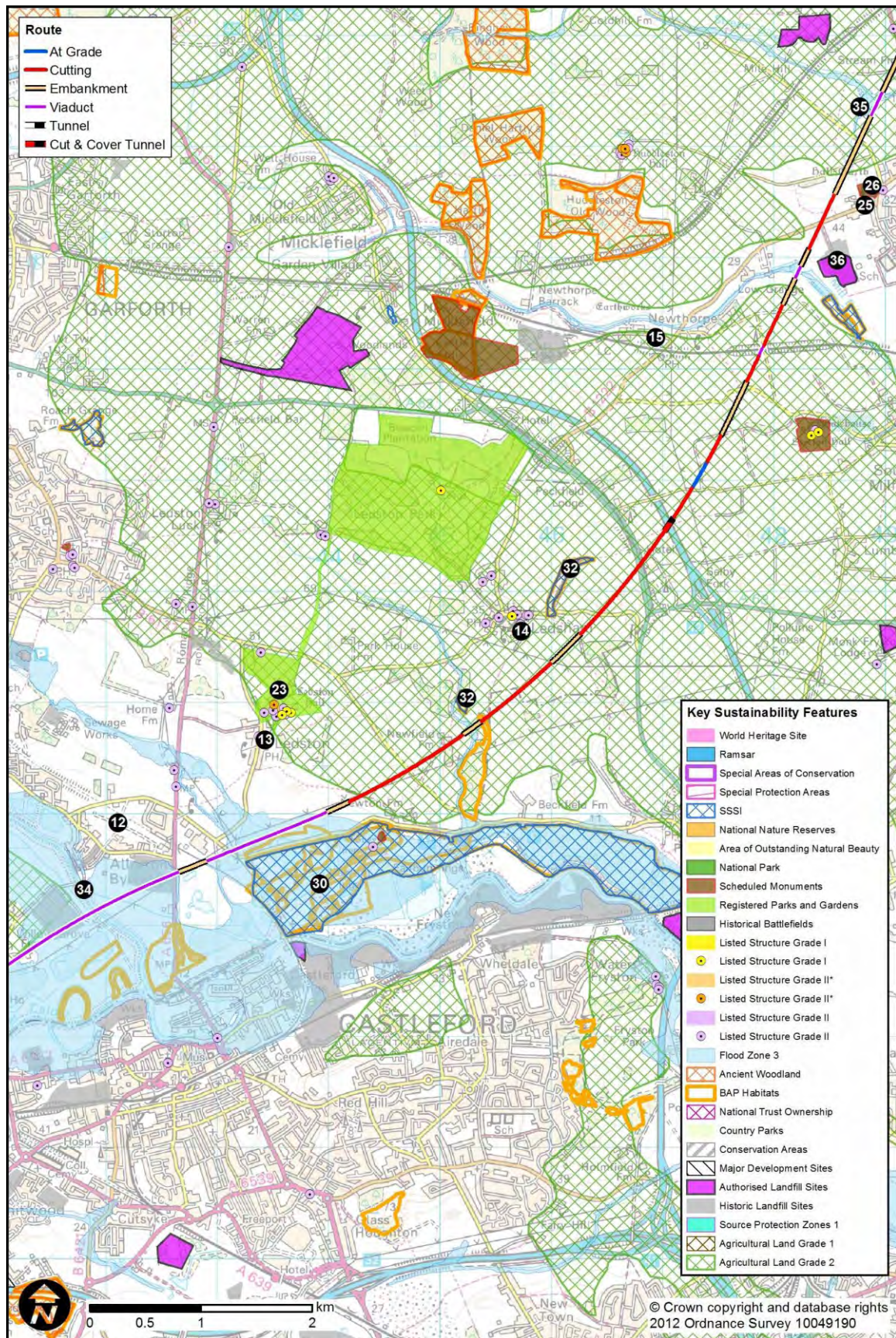
HSL18 - Figure 1 of 4



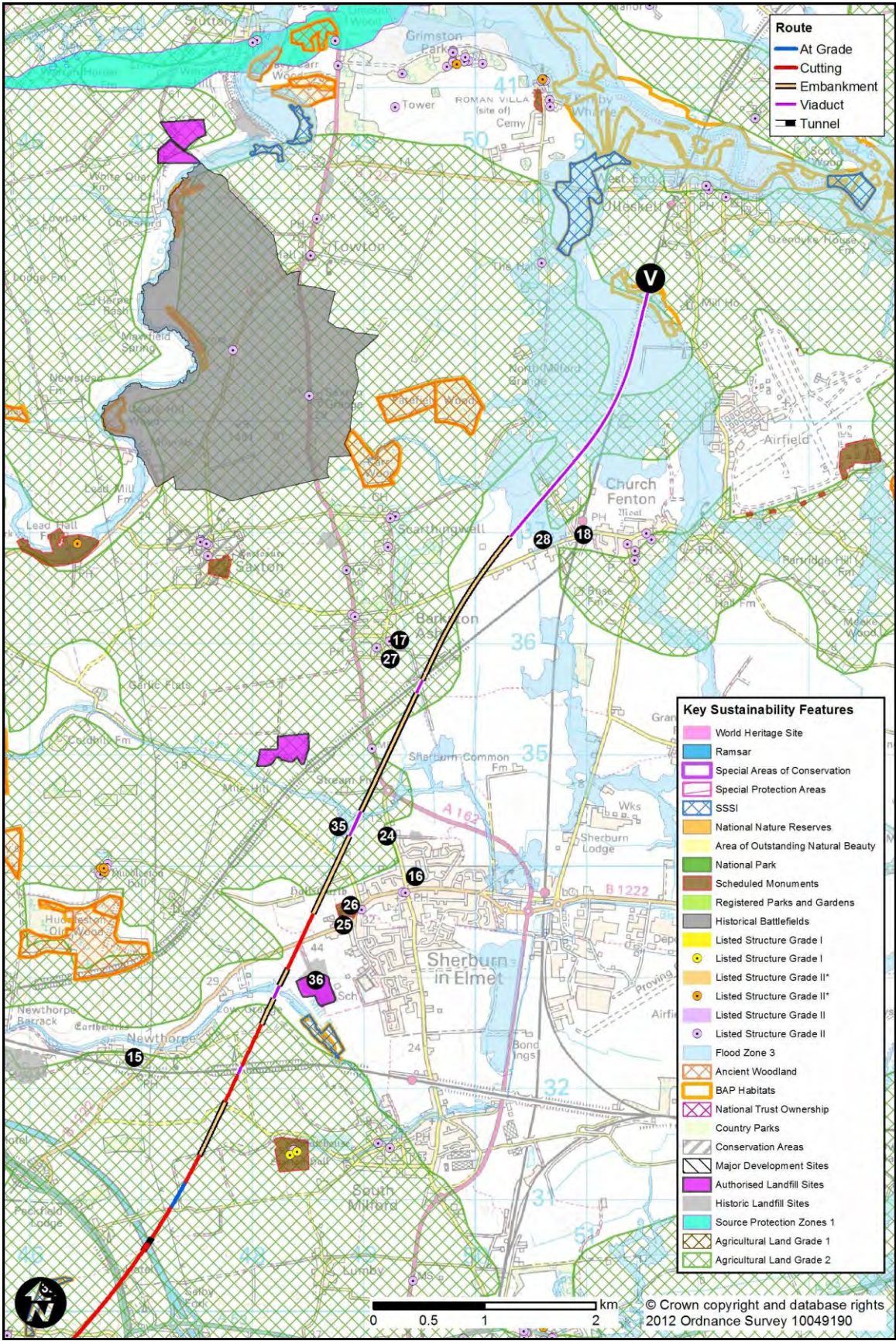
HSL18 - Figure 2 of 4



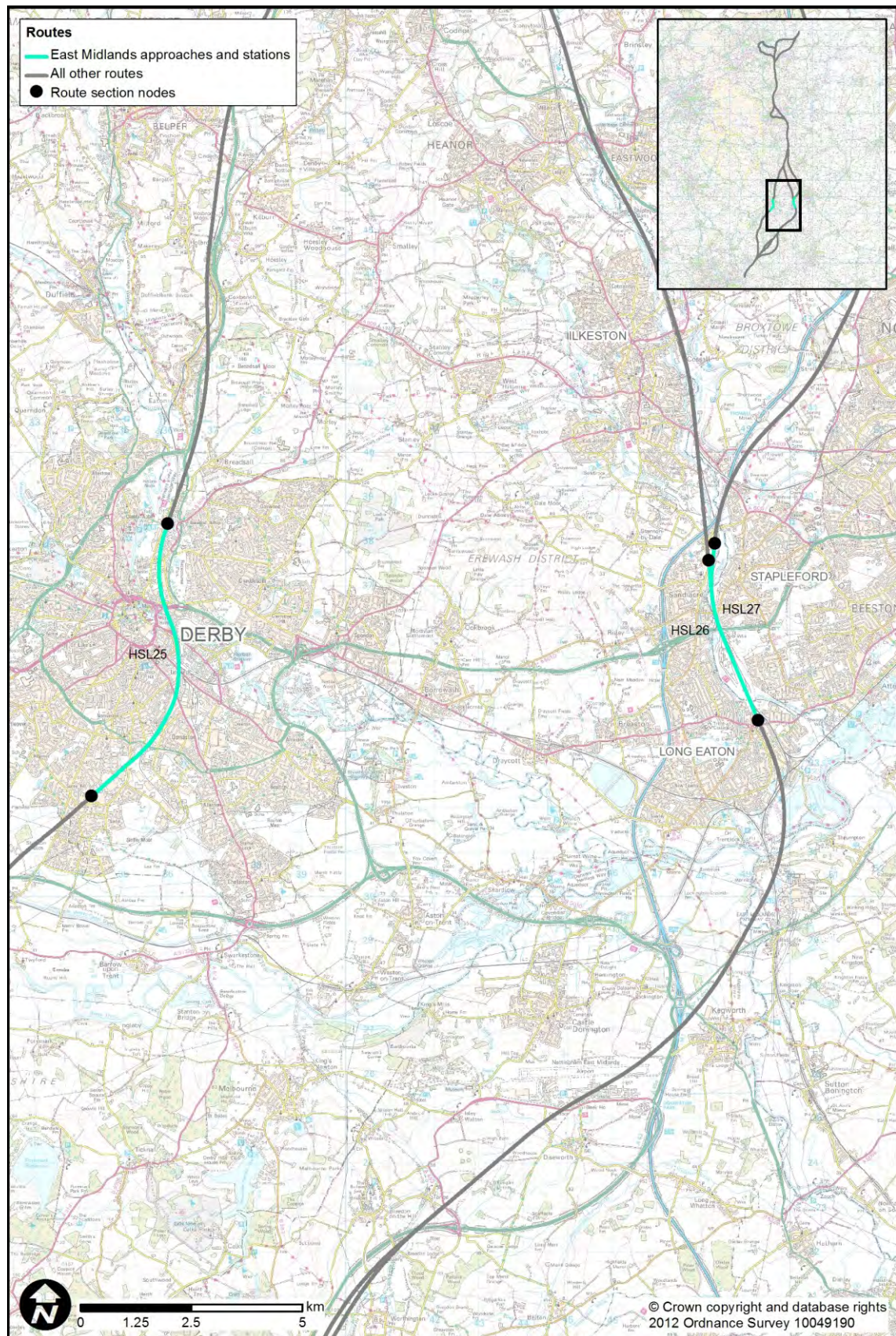
HSL18 - Figure 3 of 4



HSL18 - Figure 4 of 4



10. Leeds route: East Midlands approaches and stations



10.1. HSL25: Sunny Hill (C) to Breadsall (D), including Derby Station

10.1.1. The route section between Sunny Hill and Breadsall would be 7km (4.3 miles) long. It would connect to the south with HSL02 from Birchmoor. North of Breadsall, the route section would continue north along HSL04 to Tibshelf. This section includes the proposed Derby Station.

10.1.2. The route section would follow the existing Birmingham to Derby railway from Sunny Hill through central Derby. It would follow the existing rail alignment into Derby, with the HS2 station at ground level on the site of the existing Derby Midland Station. The alignment north of the station would take the route section over the River Derwent.

10.1.3. HSL 25 Figures 1 to 2 illustrate the route alignment and the principal sustainability features in the area.

10.1.4. Specific mitigation included within the route section comprises a number of localised realignments that have sought to reduce residential demolitions at Little Chester.

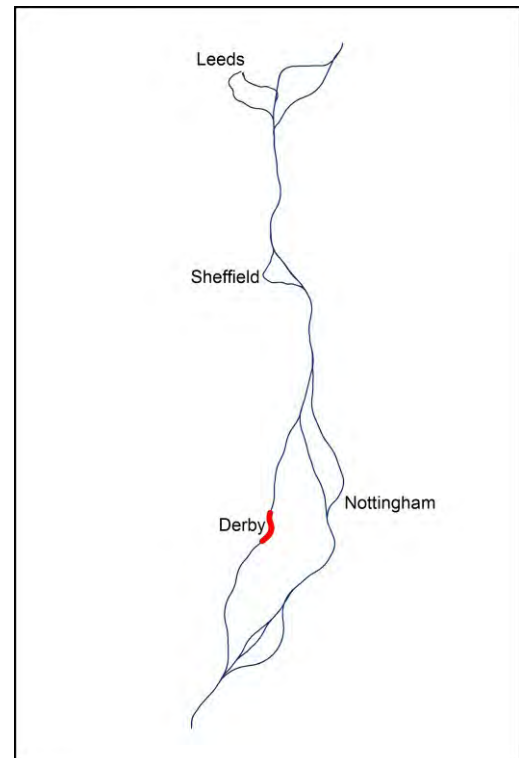
10.1.5. **Population and settlements** The route section would result in the demolition of an estimated 39 dwellings (11 of which are associated with the station). These include a cluster at ❶ Sunny Hill, Derby. Of the total, 19 demolitions would be in areas of relatively high deprivation. In addition, an estimated 81 commercial properties (20 of which are associated with the station) and two community properties ❶ Derby Station and ❷ Derby College) would also be demolished.

10.1.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 196 people (equivalent to the occupants of some 84 dwellings). This would represent about 28 people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.

The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ❷ Sunny Hill, ❸ Pear Tree, ❹ Breadsall Hilltop, ❺ The Holmes, ❻ Little Chester and other scattered dwellings.

In terms of noise insulation, approximately 211 dwellings would be expected to qualify, particularly at Normanton (❷ Sunny Hill and ❸ Pear Tree) and Derby (❺ The Holmes and ❻ Little Chester). This is equivalent to approximately 31 dwellings per km of route section.

Modelling of noise impacts from the operational station will be undertaken as designs are progressed. They would be influenced by plant and PA systems, generated road traffic, and frequency and speed of trains.



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| 10.1.7. | Health and well-being | Approximately 550 dwellings would be located within 100m of the route section. A further 340 dwellings would be located within 100m of the station. These could all be at greater risk of disturbance from construction activity. |
| 10.1.8. | Access issues | The new station would offer transport interchange opportunities with national rail services. |
| 10.1.9. | Jobs and Houses | <p>The station would potentially displace businesses providing an estimated 1,500 jobs. However, an estimated 3,600 jobs would be supported through development around the station generated as a result of HS2. Of these between about 2,376 and 2,880 would be in areas of relatively high deprivation.</p> <p>There would be an estimated 500 housing units supported. Of these, between about 330 and 400 would be in areas of relatively high deprivation.</p> |
| 10.1.10. | Planning and development | <p>The station would support the Derby Sub-Region Strategic Housing Market Assessment (2008) which allocates Derby and the wider city region for 44,760 homes up to 2026.</p> <p>The Derby Emerging Core Strategy has allocated two potential options for growth: one concentrating on the urban area and one focusing on greenfield development. The station would support both strategies.</p> |
| 10.1.11. | Landscape, townscape and cultural heritage – line of route | <p>To the south and north of Derby any visual impact would be very limited given its existing industrial setting. Adjacent to Breadsall Hilltop the route section would follow viaduct over the existing railway line. To the north, it would intersect the designated buffer of the ⑦ Derwent Valley Mills World Heritage Site for just over 1 km. However, this part of the World Heritage Site is largely industrial, and landscape and visual impacts would be minor or moderate at worst, especially given the screening provided by existing buildings and trees.</p> <p>The ⑧ Derby Racecourse Roman Vicus and Cemetery Scheduled Monument would be close to the route section, but with no known above ground remains, there would be no impact on its setting. The industrial setting would further reduce the potential for such impacts.</p> <p>The registered parks and gardens of the ⑨ Derby Arboretum (Grade II*) and ⑩ Nottingham Road Cemetery (Grade II) would lie near the route section, but with tree cover and dense urban density, impacts on their settings would be negligible.</p> <p>The route section would cross a small section of the ⑤ Little Chester Conservation Area along an existing railway line with some minor visual and noise impacts. Five Grade II listed structures would be near the route section, but impacts on their settings would be negligible.</p> |
| 10.1.12. | Landscape, townscape and cultural heritage - station. | <p>A new multi-storey car park would be built on the site of an existing surface car park to the south-west of the station. The station roof line would be about 10m above existing ground level. To the north, a number of buildings would need to be demolished on the east side of ⑫ Railway Terrace. The existing Derby Station would also be demolished. In addition, part of ⑬ Derby College is also likely to require demolition. The loss of these buildings would affect the townscape character. However, the principal impact derives from the scale of the new station building and high level concourse, amidst the considerably smaller existing structures</p> |

in the surrounding area. This would affect the setting of the conservation area to the west and the listed 17 roundhouse buildings to the east.

A new bridge carrying the HS2 and classic rail lines at grade across the River Derwent would likely cause visual intrusion and result in loss of riverside and other tree cover on both banks. The impact overall would be moderate.

The station would intersect the 14 City of Derby Conservation Area moderately affecting views and connectivity with the listed former station features on the opposite side of the station. There would also be a minor impact on distant views for the 9 Arboretum, 15 Hartington and 16 Nottingham Road Conservation Areas.

There would be a moderate impact on the setting of the Grade II* listed 13 former engine shed, 13 carriage shop and 19 former railway workshop.

10.1.13. Biodiversity and wildlife

No key ecological designations would be affected by the route section.

10.1.14. Water resources and flood risk

Diversion of the minor river, 20 Cuttle Brook, would be required. Continuing scheme design would seek to avoid or minimise these impacts.

It would impact about some 596m² of SPZ1 and potentially affect groundwater flows to Brunswick abstraction point, which is licensed to abstract less than 1000m³/day.

The route section would cross some 1km of Flood Zone 3, largely in cutting and therefore at risk of flooding. The station footprint would occupy about 14,300m² of Flood Zone 3.

10.1.15. Land use resources

Three landfill sites, two in the 17 Sunny Hill and one in the 18 Breadsall Hilltop suburbs of Derby, would be directly affected and the design would require further work to minimise risks to people and the environment.

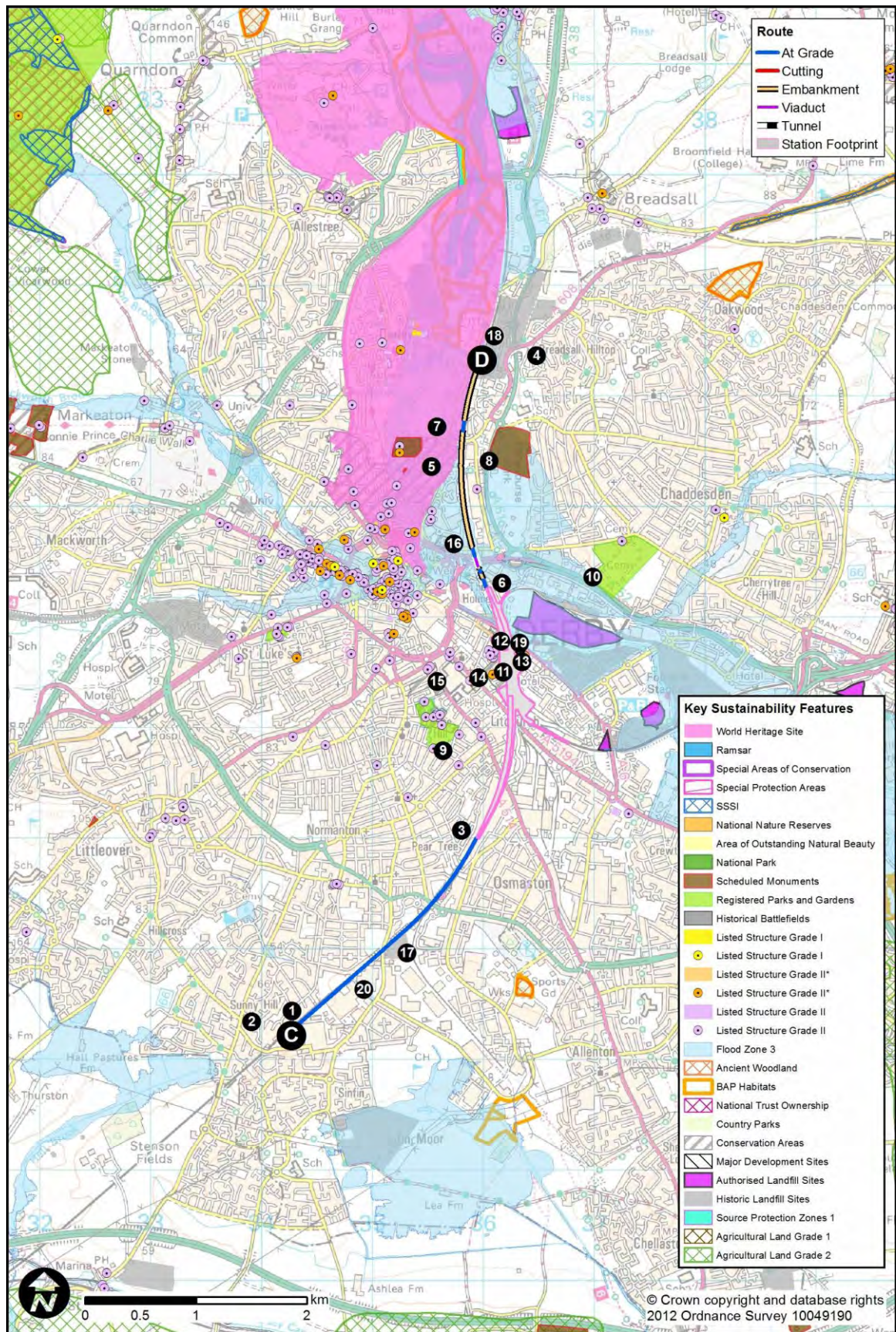
10.1.16. Waste and material use

It is estimated that the route section would result in a surplus of 37,813m³ of excavated material. Derby Station would be an elevated structure and would therefore not generate significant quantities of excavated material.

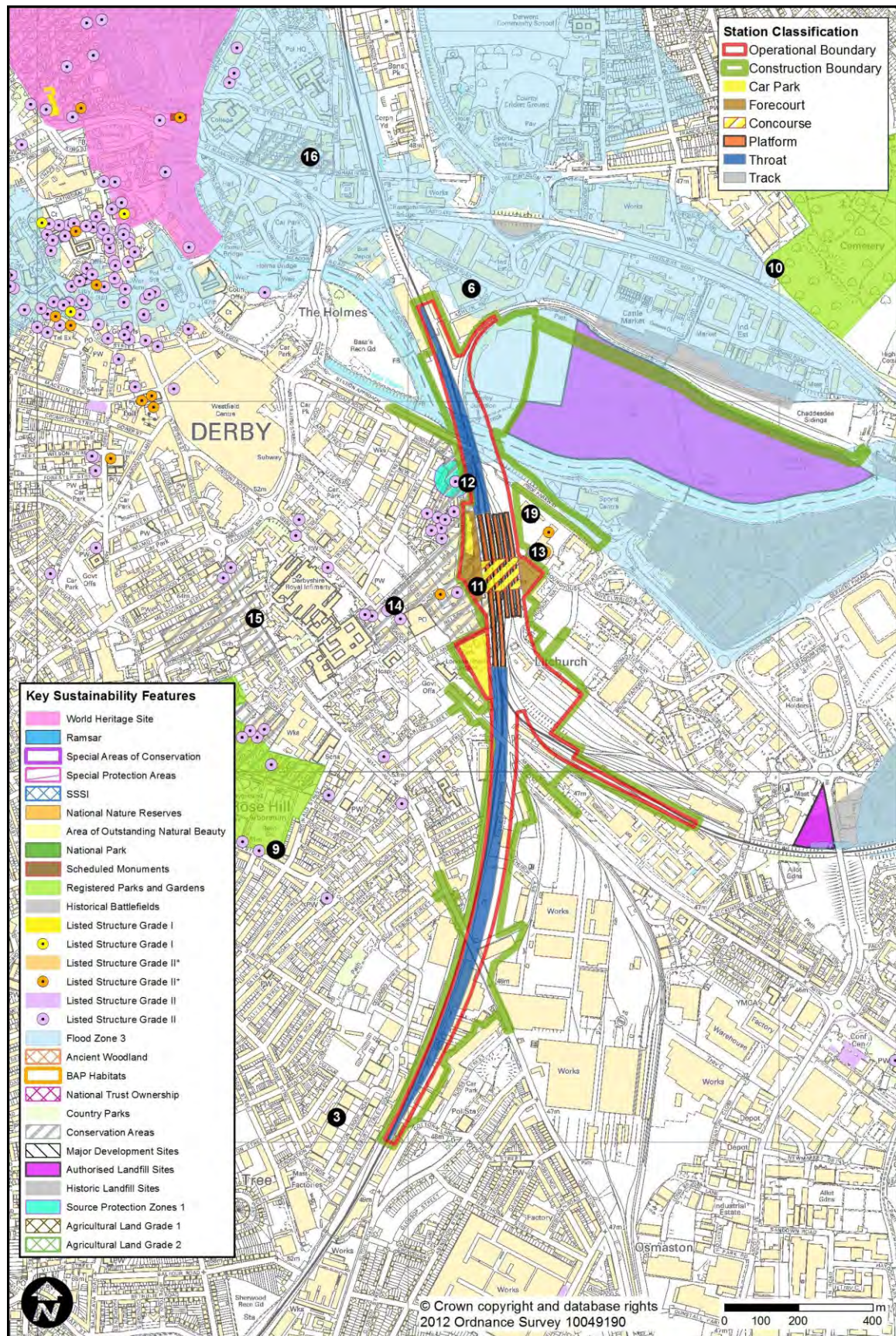
As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.

Estimated quantities of bulk building materials for this section comprise 2,100 tonnes of steel and 6,500 tonnes of concrete. The station would require an additional 414,800 tonnes of concrete; estimated quantities of steel are not provided at this stage.

HSL25 - Figure 1 of 2

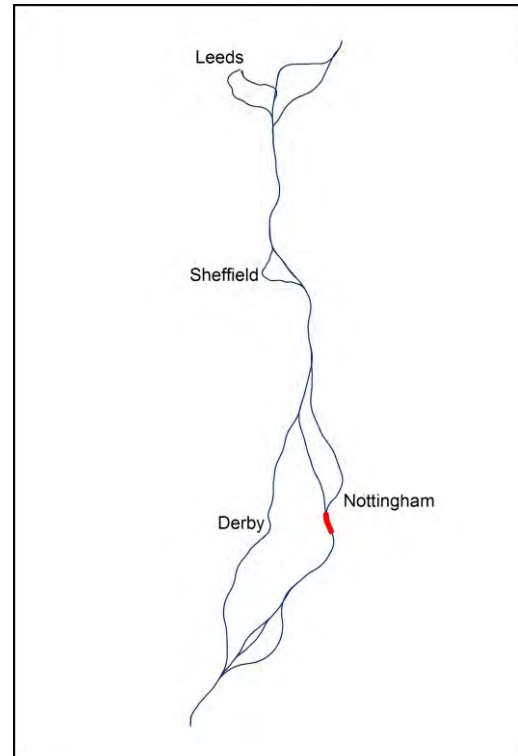


HSL25 - Figure 2 of 2



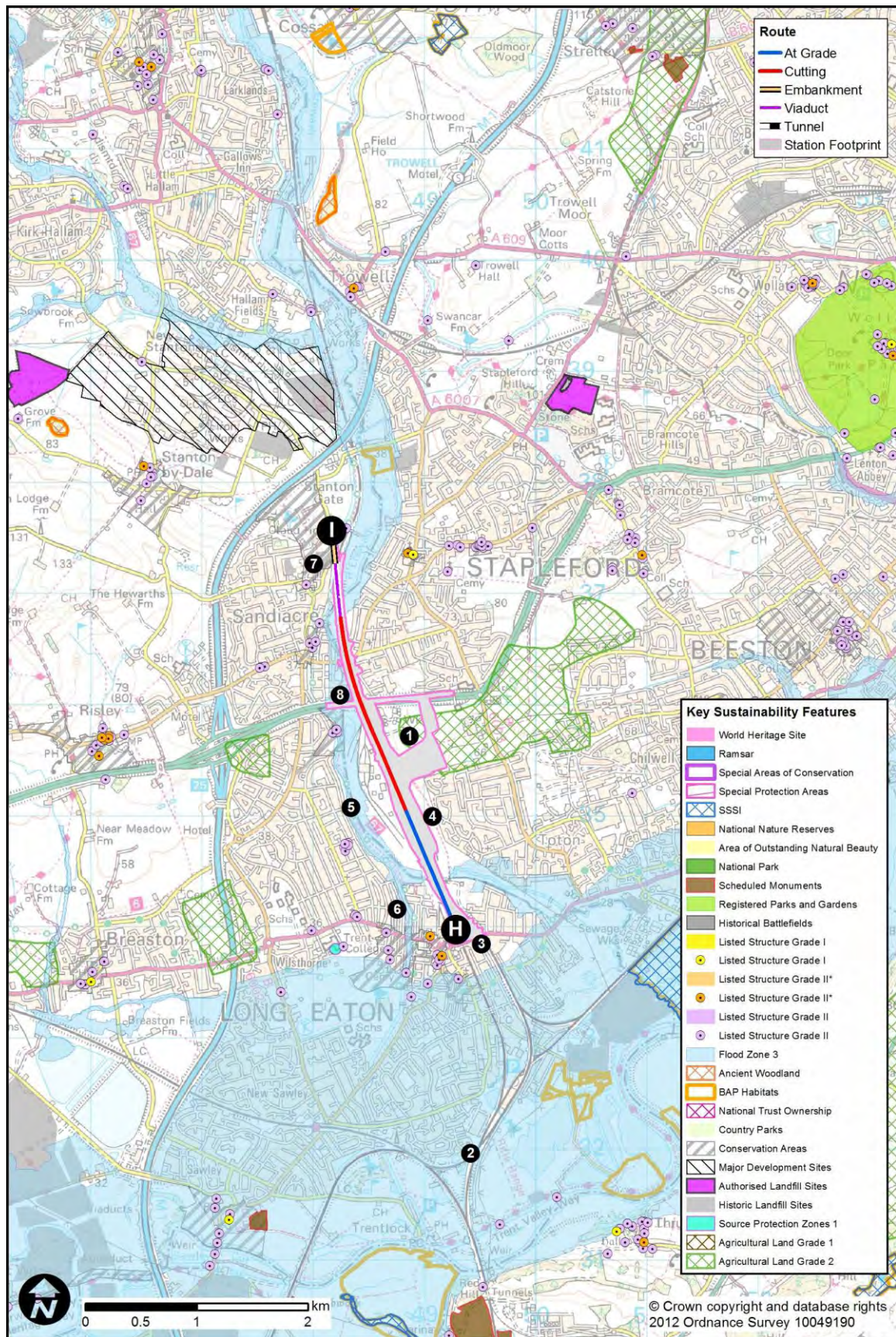
10.2. HSL26: Long Eaton (H) to Sandiacre (I), including Toton Station

- 10.2.1. The route section between Long Eaton and Sandiacre would be 3.8km (2.4 miles) long. To the south it would connect with HSL09 from Tonge. At Sandiacre, the route would continue north along HSL11 to Tibshelf. The route section includes the proposed Toton Station.
- 10.2.2. There is an opportunity for classic compatible trains from Nottingham to serve Toton Station. An appraisal of the infrastructure needed to support classic compatible services to Nottingham, as well as Sheffield, is provided in Chapter 16.
- 10.2.3. The new HS2 station would be located between the Nottingham suburbs of Toton and Stapleford in the Erewash Valley. It would be situated on the eastern part of the existing Toton railway sidings which form part of Toton Yard.
- 10.2.4. Provision for conventional rail services between Toton and the East Midlands region would be achieved by providing additional platforms for conventional trains adjacent to HS2 platforms at the new Toton Station. Infrastructure works to existing tracks south of the new station would be required to provide adequate capacity to serve these platforms and accommodate HS2 trains. These works were subject to a high level appraisal of direct effects on property and key environmental features. Although the works would take place south of the station (alongside the HSL09 route section) they are described here since they will accommodate existing rail traffic (relocated from the tracks to be used by HS2), maintain connections to Toton Yard; and serve the new conventional rail platforms at Toton Station. They would require some property demolitions (as discussed below), but they would not directly affect any key environmental features.
- 10.2.5. HSL26 Figures 1 to 2 illustrates the route alignment and the principal sustainability features in the area.
- 10.2.6. The potential for mitigation was limited at this early stage of station design. However, care was taken to minimise demolitions and to integrate the design within the landscape.
- 10.2.7. **Population and settlements** The station would result in the demolition of 23 dwellings and 22 commercial properties. Potential isolation would affect one dwelling, at ① Bessell Lane Farm. Works to the tracks south of the station (as outlined above) would require the demolition of 13 dwellings at ② Ludford Close and ③ Conway Road.
- 10.2.8. **Noise** Modelling of noise impacts from the operational station will be undertaken as designs are progressed. They would be influenced by plant and PA systems, generated road traffic, and frequency and speed of trains.
- 10.2.9. **Health and well-being** Approximately 613 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.

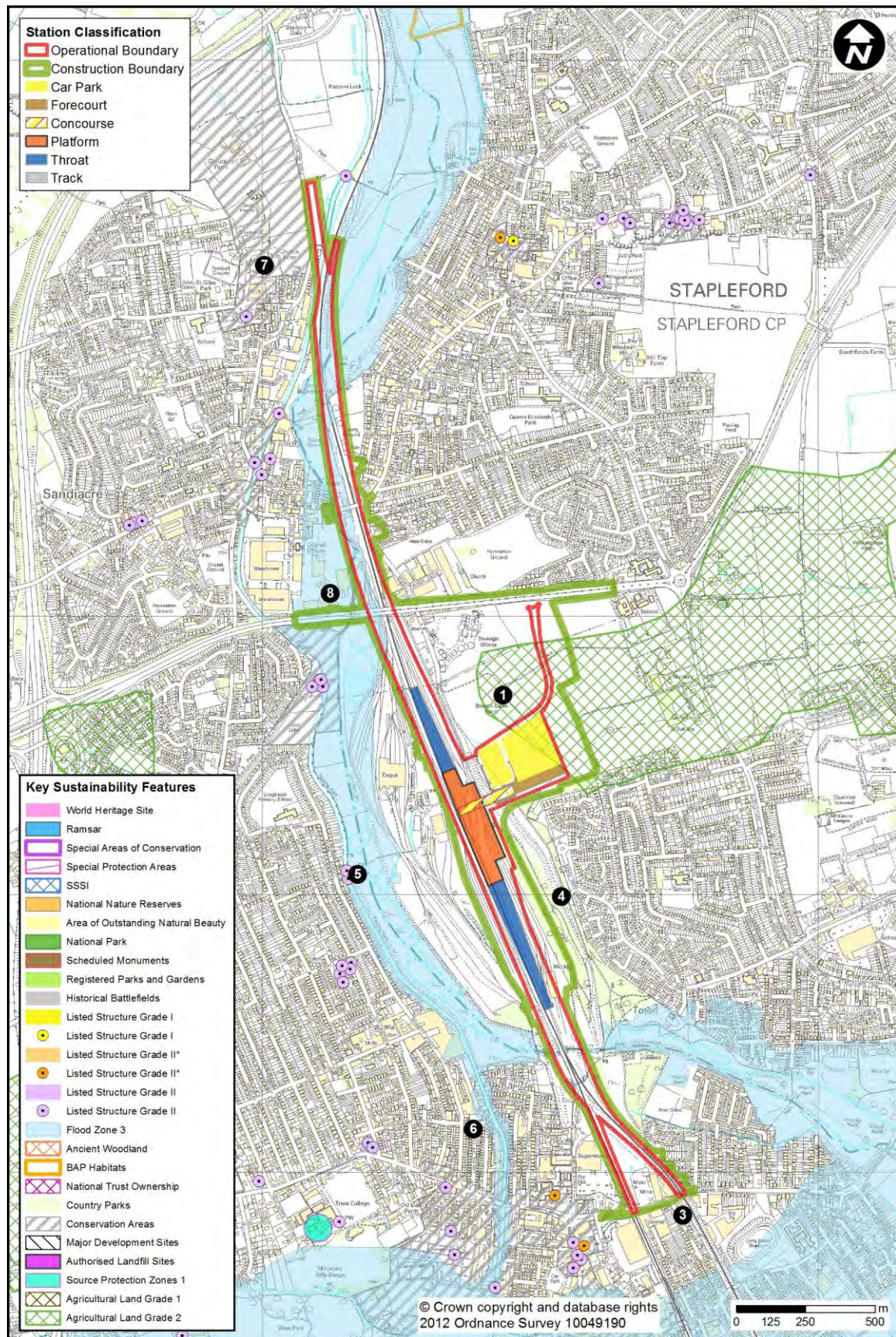


10.2.10.	Access issues	The station would provide an opportunity for interchange with conventional rail services into Nottingham and Derby, which would be developed as part of the HS2 proposals.
10.2.11.	Jobs and houses	The works would potentially displace businesses providing an estimated 600 jobs. However, an estimated 1,500 jobs and 150 houses would be supported through development around the station generated as a result of HS2.
10.2.12.	Planning and development	The station would lie within the Borough of Broxtowe, with part of the construction boundary in the Borough of Erewash. It is currently designated as green belt. Councils in Nottingham have been working together to prepare an aligned core strategy, a draft of which will be published in spring 2012. In line with the collaborative approach to the designation of future growth areas, the July 2011 Broxtowe Council cabinet report <i>Strategic Site Allocations Required in the Core Strategy</i> identified a potential sustainable urban extension site on land between Toton and Stapleford to include Toton sidings. Planning officers at Broxtowe Council have stated that an HS2 station at this location would be supported with the potential release of adjoining green belt land for appropriate development.
10.2.13.	Landscape, townscape and cultural heritage	<p>The station would involve the development of significant greenfield land to provide a new access road to the A52 across open agricultural land. The new station would be sited on the east side of Toton Yard and would extend up the hillside from the valley floor. There would be relatively few views of this station due to the lie of the land and the location on a valley floor. However, there would be some views of the new station concourse and car park from housing on the edge of ④ Toton with potential views from the ⑤ Erewash Canal, the residential areas of ⑥ Long Eaton and from the A52 eastbound. The townscape impact is expected to be minor.</p> <p>The Grade I listed ⑦ Church of St Giles would lie 175m from the tracks approaching the station, but would be screened by intervening vegetation.</p>
10.2.14.	Biodiversity and wildlife	One SSSI would be located within 2km of the station, but the risk of impact to this is low.
10.2.15.	Water resources and flood risk	<p>The station spans the entire floodplain (Flood Zone 3) of the ⑧ River Erewash. Significant in-channel works or possible diversion would be required to convey flows past the station.</p> <p>The station footprint would occupy an estimated 5.7ha of Flood Zone 3.</p>
10.2.16.	Land use resources	The station would impact about 206ha of Grade 2 agricultural land. It would affect about 33ha of green belt.
10.2.17.	Waste and material use	<p>It is estimated that the route section would result in a deficit of - 33,700m³ of excavated material. Toton Station would be an elevated structure and would therefore not generate significant quantities of excavated material.</p> <p>Estimated quantities of bulk building materials for this section comprise 1,300 tonnes of steel and 3,900 tonnes of concrete. The station would require an additional 412,500 tonnes of concrete; estimated quantities of steel are not provided at this stage.</p>

HSL26 - Figure 1 of 2

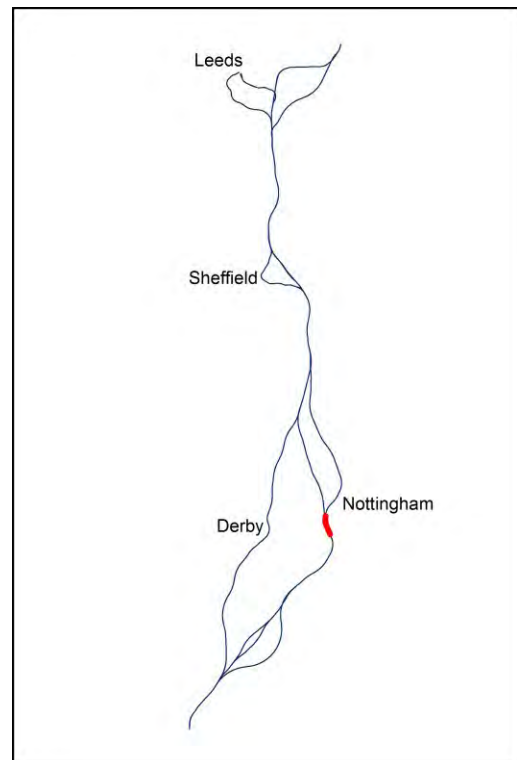


HSL26 - Figure 2 of 2



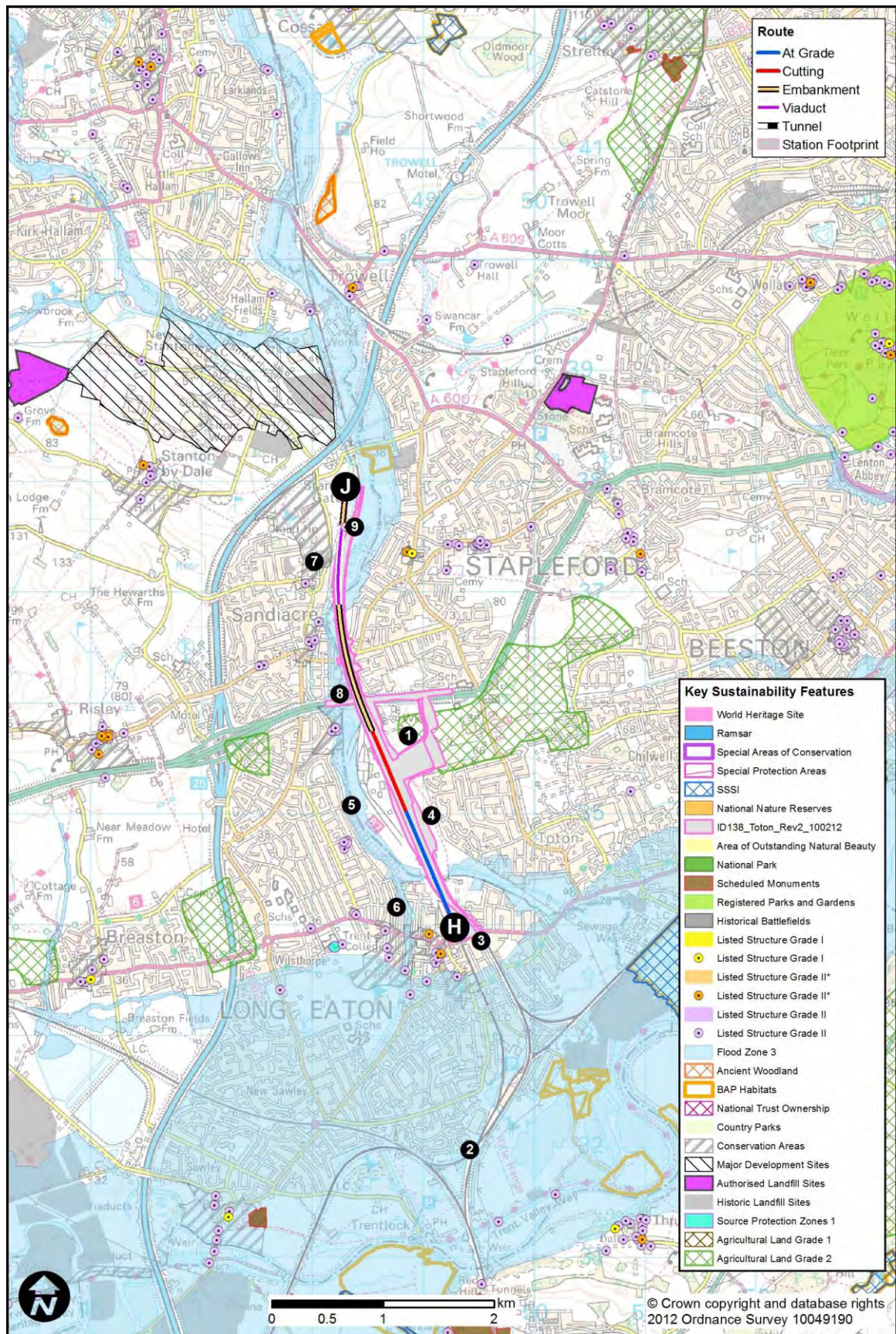
10.3. HSL27: Long Eaton (H) to Trowell (J), including Toton Station

- 10.3.1. The route section between Long Eaton and Trowell would be 4.1km (2.5 miles) long. To the south it would connect with HSL09 from Tonge. At Sandiacre, the route would continue north along HSL13 to Killamarsh. The route section includes the proposed Toton Station.
- 10.3.2. There is an opportunity for classic compatible trains from Nottingham to serve Toton Station. An appraisal of the infrastructure needed to support classic compatible services to Nottingham, as well as Sheffield, is provided in Chapter 16.
- 10.3.3. The new four platform station would be located between the Nottingham suburbs of Toton and Stapleford in the Erewash Valley. It would be situated on the eastern part of the existing Toton railway sidings which form part of Toton Yard.
- 10.3.4. Provision for conventional rail services between Toton and the East Midlands Region would be achieved by providing four platforms for conventional trains adjacent to HS2 platforms at the new Toton Station. Infrastructure works to existing tracks south of the new station would be required to provide adequate capacity to serve these platforms and accommodate HS2 trains. These works were subject to a high level appraisal of direct effects on property and key environmental features. Although the works would take place south of the station (alongside the HSL09 route section) they are described here since they affect the provision for conventional rail services at Toton Station. They would require some property demolitions (as discussed below), but they would not directly affect any key environmental features.
- 10.3.5. HSL27 Figures 1 to 2 illustrate the route alignment and the principal sustainability features in the area.
- 10.3.6. The potential for mitigation was limited at this early stage of station design, although care was taken to minimise demolitions and to integrate the design within the landscape.
- 10.3.7. **Population and settlements** The station would result in the demolition of 23 dwellings and 18 commercial properties.
Potential isolation would affect one dwelling, at ① Bessell Lane Farm. The track works south of the station associated with provision of conventional services would require the demolition of 13 dwellings at ② Ludford Close and ③ Conway Road.
- 10.3.8. **Noise** Modelling of noise impacts from the operational station will be undertaken as designs are progressed. They would be influenced by plant and PA systems, generated road traffic, and frequency and speed of trains.
- 10.3.9. **Health and well-being** Approximately 613 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.

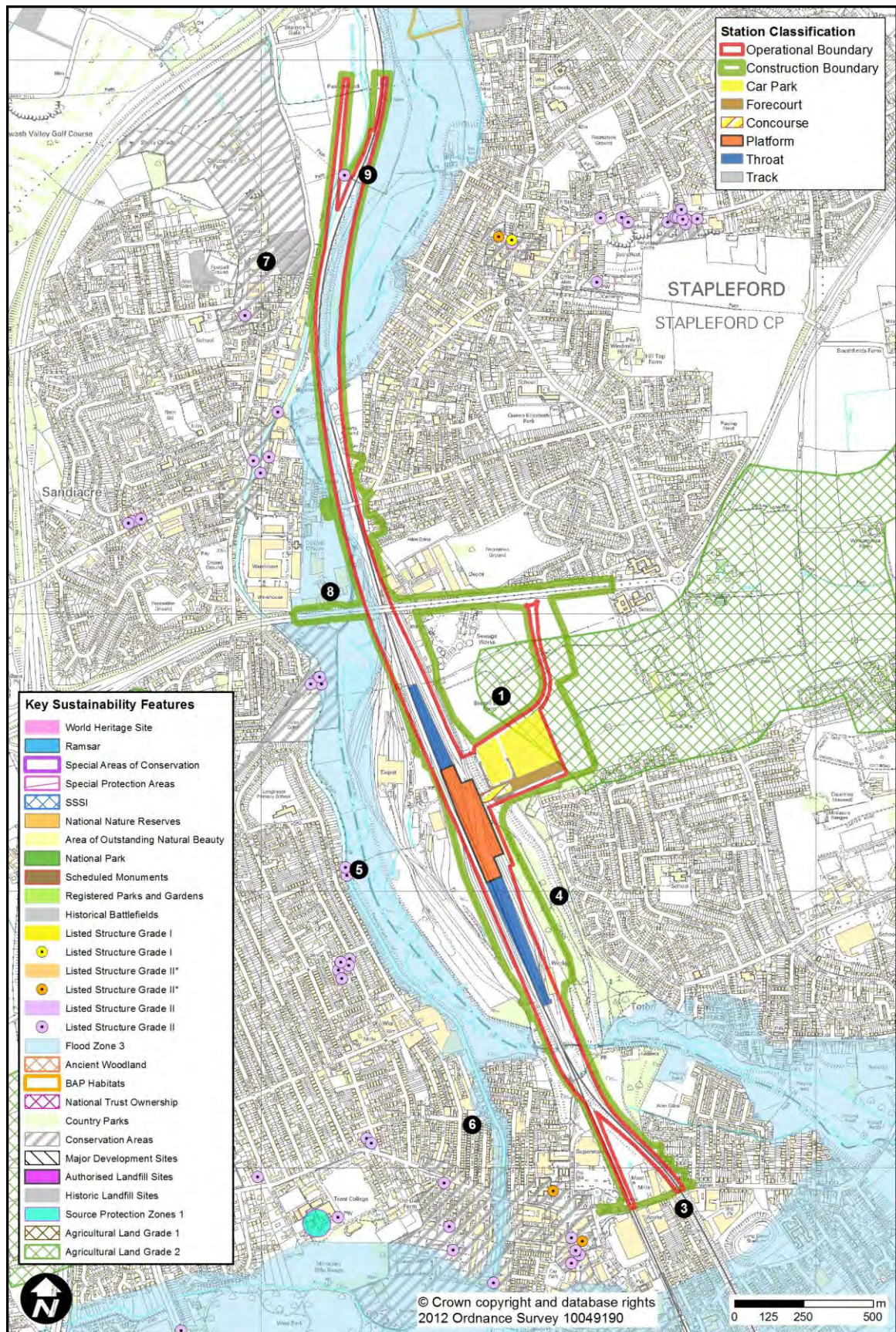


10.3.10.	Access issues	The station would provide an opportunity for interchange with conventional rail services into Nottingham and Derby, which would be developed as part of the HS2 proposals.
10.3.11.	Jobs and houses	The works would potentially displace businesses providing an estimated 600 jobs. However, an estimated 1,500 jobs and 150 houses would be supported through development around the station generated as a result of HS2. Of these, none would be in areas of relatively high deprivation.
10.3.12.	Planning and development	The station would lie within the Borough of Broxtowe, with part of the construction boundary in Borough of Erewash. It is currently designated as green belt. Councils in Nottingham have been working together to prepare an aligned core strategy, a draft of which will be published in spring 2012. In line with the collaborative approach to designation of future growth areas, the July 2011 Broxtowe Council cabinet report <i>Strategic Site Allocations Required in the Core Strategy</i> identified a potential sustainable urban extension site on land between Toton and Stapleford to include Toton sidings. Planning officers at Broxtowe Council have stated that an HS2 station at this location would be supported with the potential release of adjoining green belt land for appropriate development.
10.3.13.	Landscape, townscape and cultural heritage	<p>The station would involve the development of significant greenfield land to provide a new access road to the A52 across open agricultural land. The new station would be sited on the east side of Toton Yard and would extend up the hillside from the valley floor. There would be relatively few views of this station due to the lie of the land and the location on a valley floor. However, there would be some views of the new station concourse and car park from housing on the edge of ④ Toton with potential views from the ⑤ Erewash Canal, the residential areas of ⑥ Long Eaton and from the A52 eastbound. The townscape impact is expected to be relatively minor.</p> <p>The route section would require the demolition of one Grade II listed building, ⑨ Canal Bridge on Erewash Canal. The Grade I listed ⑦ Church of St Giles would lie 175m from the station, but would be screened by intervening vegetation.</p>
10.3.14.	Biodiversity and wildlife	One SSSI would be located within 2km of the station, but the risk of impact to this is low.
10.3.15.	Water resources and flood risk	<p>The station spans the entire floodplain (Flood Zone 3) of the ⑧ River Erewash. Significant in-channel works or possible diversion would be required to convey flows past the station.</p> <p>The station footprint would occupy an estimated 5.7ha of Flood Zone 3.</p>
10.3.16.	Land use resources	The station would impact about 206ha of Grade 2 agricultural land. It would affect about 33ha of green belt.
10.3.17.	Waste and material use	<p>It is estimated that the route section would result in a deficit of - 37,813m³ of excavated material. Toton Station would be an elevated structure and would therefore not generate significant quantities of excavated material.</p> <p>Estimated quantities of bulk building materials for this section comprise 1,300 tonnes of steel and 4,100 tonnes of concrete. The station would require an additional 412,500 tonnes of concrete; estimated quantities of steel are not provided at this stage.</p>

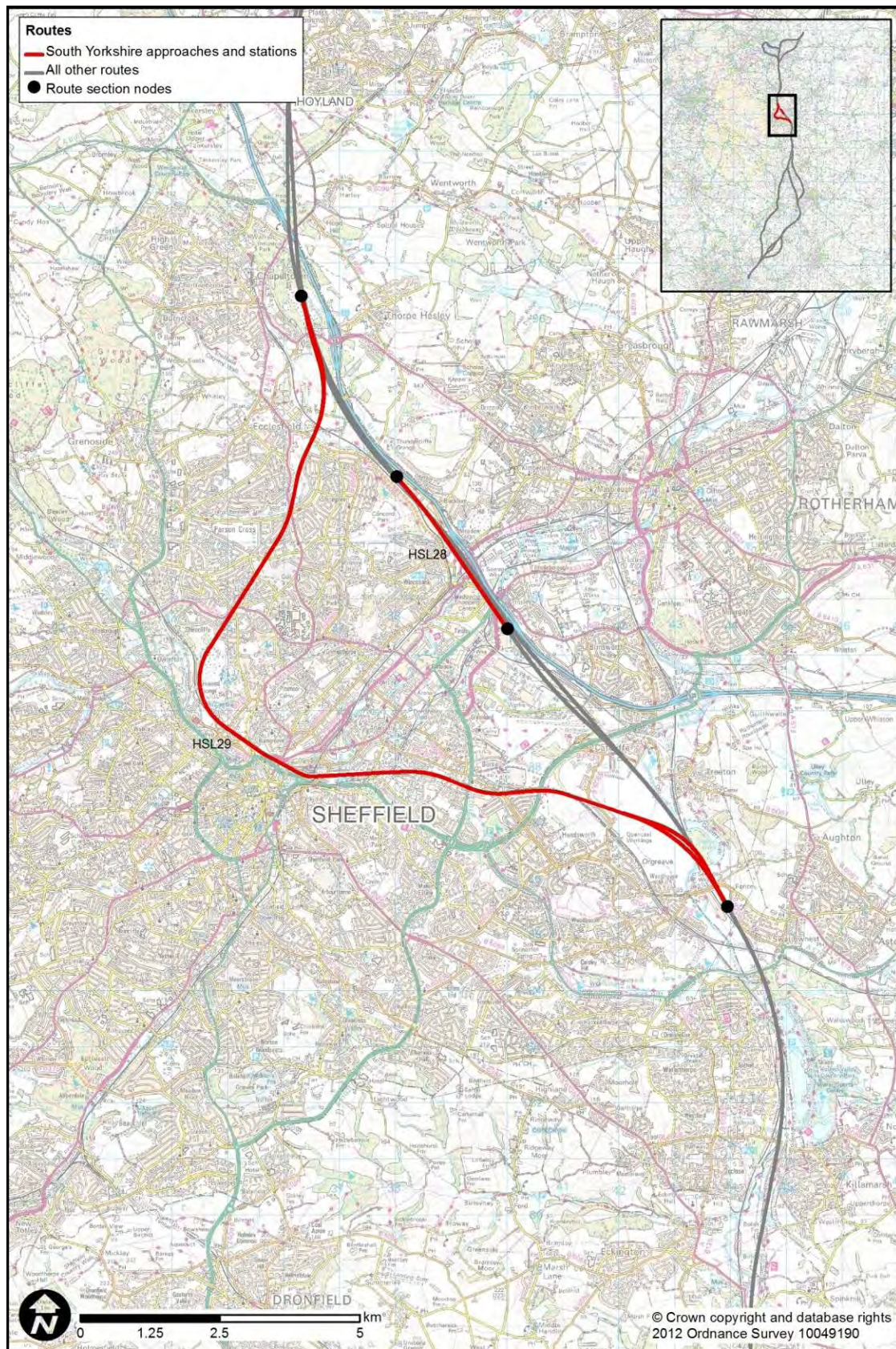
HSL27 - Figure 1 of 2



HSL27 - Figure 2 of 2

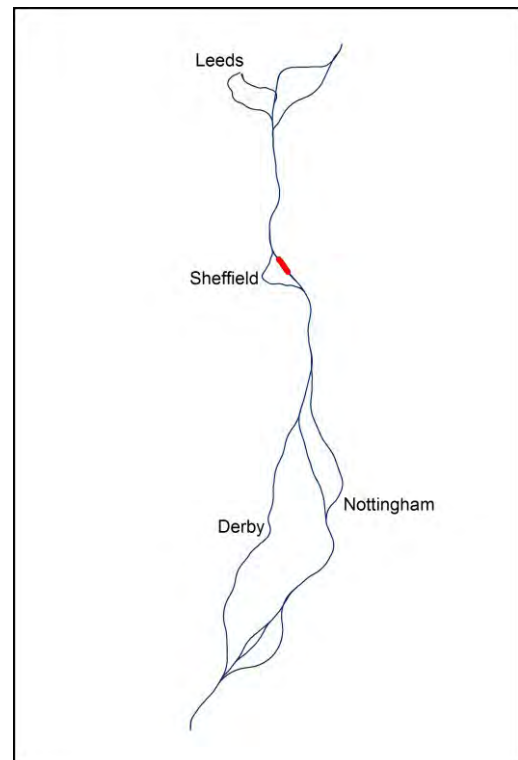


11. Leeds route: South Yorkshire approaches and stations



11.1. HSL28: Tinsley (K) to Blackburn (L), including Sheffield Meadowhall Station

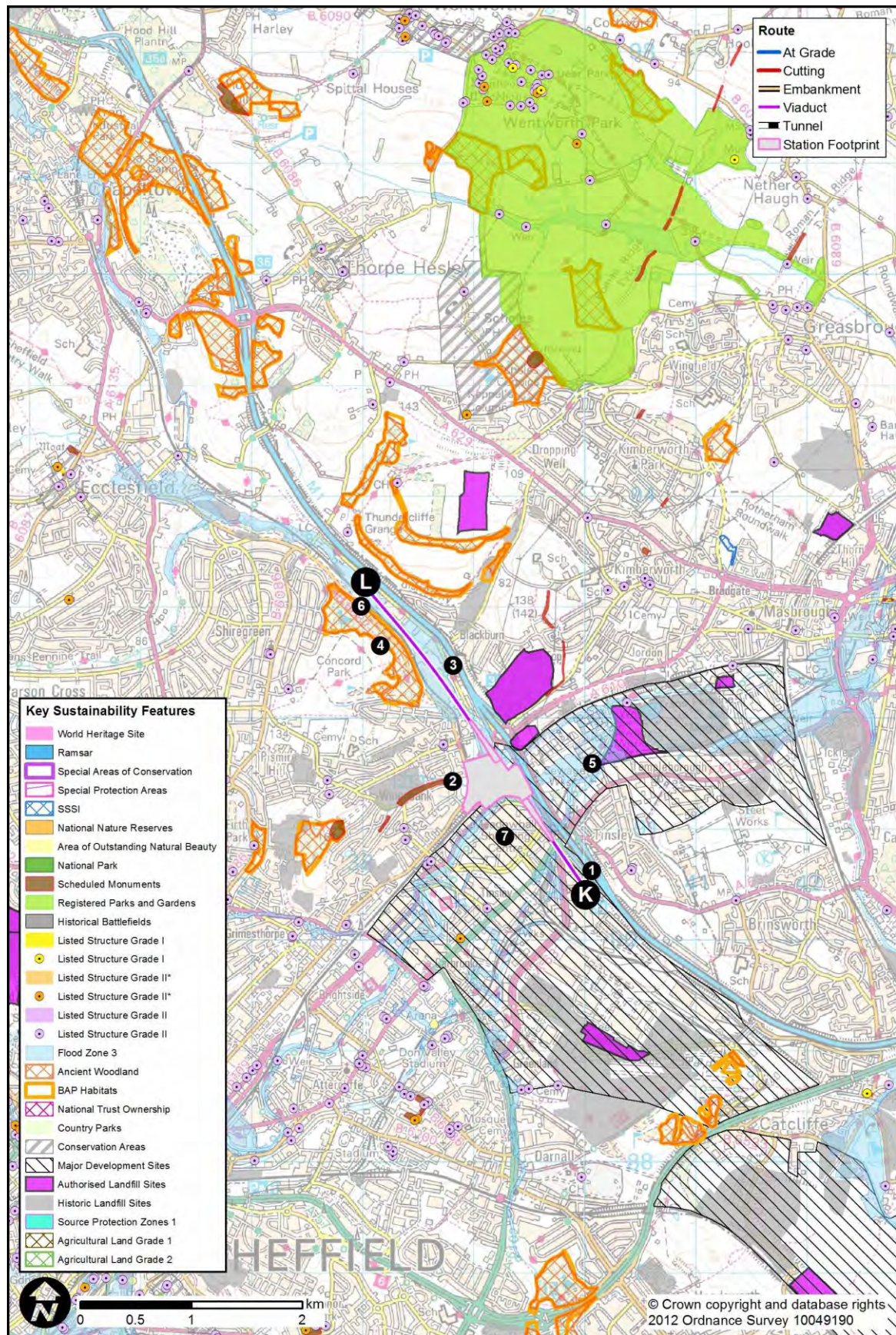
- 11.1.1. The route section between Tinsley and Blackburn would be 3.4km (2.1 miles) long. The section of route connecting to Tinsley from the south would be HSL14 from Killamarsh. At Blackburn, the route would continue north along HSL16 to Cold Hiendley.
- 11.1.2. The route section would pass through the industrial and commercial area at Meadowhall; running parallel to the M1 corridor. The station would be located next to the elevated M1 Motorway, to the east of the Meadowhall Shopping Centre, with four-track sections to the north and south.
- 11.1.3. HSL28 Figures 1 to 2 illustrate the route alignment and the principal sustainability features in the area.
- 11.1.4. The station and associated infrastructure design sought to provide an effective interchange with the existing railway station and local road network.



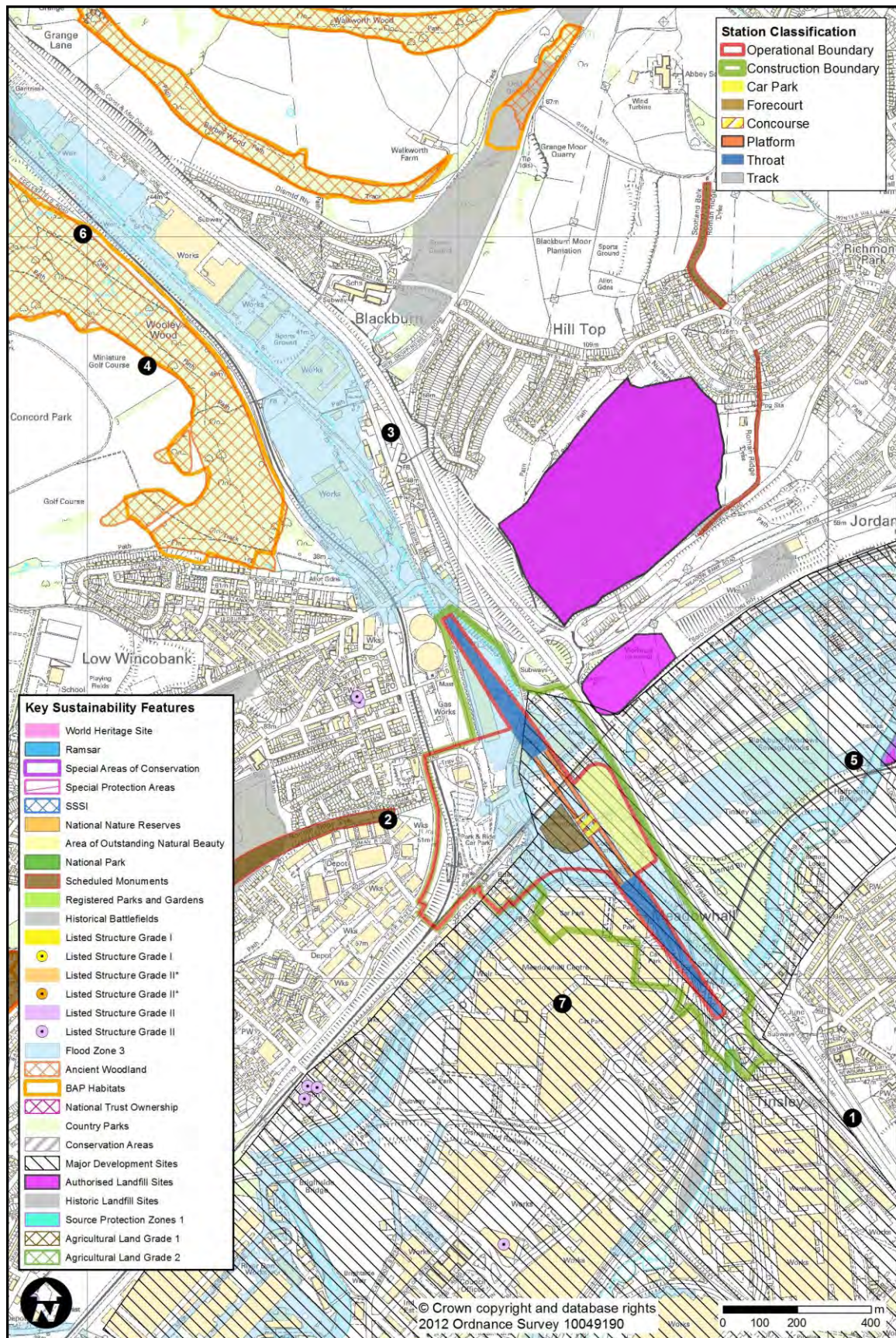
- 11.1.5. **Population and settlements** The station and four-track sections would result in the demolition of an estimated 52 dwellings. These include a cluster at ① Greasbro Road. Of the total, one demolition would be in an area of relatively high deprivation. The works would also require the demolition of 17 commercial properties.
Potential isolation would affect 18 dwellings ③ north west of Meadowhall.
- 11.1.6. **Noise** Modelling of noise impacts from the operational station will be undertaken as designs are progressed. They would be influenced by plant and PA systems, generated road traffic, and frequency and speed of trains.
- 11.1.7. **Health and well-being** Approximately 85 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
- 11.1.8. **Access issues** This station would offer interchange opportunities with network rail services and the Sheffield Supertram.
④ The Sheffield Country Walk and the ⑤ Trans Pennine Trail promoted recreational routes would each be crossed by the route and station respectively. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.
- 11.1.9. **Jobs and houses** The works would potentially displace businesses providing an estimated 1,300 jobs. However, an estimated 5,000 jobs would be supported through development around the station generated as a result of HS2. Of these between 2,500 and 3,750 would be in areas of relatively higher deprivation.
There would be an estimated 400 housing units supported, of which between 200 and 300 would be in areas of relatively higher deprivation.

11.1.10. Planning and development	The station would support the designation of the new Enterprise Zone at ⑦ Meadowhall. The station would also support the development of the Meadowhall area as a location for offices, with the potential to meet some longer term housing needs (Sheffield City Council Core Strategy 2009), the regeneration of the Lower Don Valley and growth of the wider city region.
11.1.11. Landscape, townscape and cultural heritage	<p>The elevated station and new station roof would form a new skyline. Given its considerable length and height it is likely to bring additional visual intrusion with a dominant effect on the townscape character. Views from the M1 towards the Meadowhall Centre and Sheffield may also be obstructed and there would be some direct impacts on the river and canal side tree cover and users of the ⑤ Trans Pennine Trail due to the station throat. There would also be a moderate impact caused by the southern four-track section which requires the demolition of all residential properties in ① Greasbro Road.</p> <p>The scheduled ② Roman Ridge: Section Between Jenkin Road and Tylers Street would be located near the station but in this industrial townscape, impacts on its setting would be negligible.</p>
11.1.12. Biodiversity and wildlife	The Peak District is designated an EU Diploma Site but would not be adversely affected by the route section. No other key ecological designations would potentially be affected either directly or indirectly by the route section.
11.1.13. Water resources and flood risk	<p>⑥ The Blackburn Brook, a minor river, may require diversion.</p> <p>The route would cross some 2.5km of Flood Zone 3. The station footprint would span the entire floodplain (Flood Zone 3) of the River Don, and the entire floodplain of the Blackburn Brook at its confluence with the River Don. Significant in-channel works or possible diversions would be required to convey flows past the station.</p>
11.1.14. Land use resources	The route would have no impacts on key land use resources.
11.1.15. Waste and material use	<p>Sheffield Meadowhall Station would be an elevated structure and would therefore not generate significant quantities of excavated material.</p> <p>Estimated quantities of bulk building materials for the station and four-track section comprise 900 tonnes of steel and 2,900 tonnes of concrete. The station would require an additional 396,100 tonnes of concrete; estimated quantities of steel are not provided at this stage.</p>

HSL28 - Figure 1 of 2



HSL28 - Figure 2 of 2



11.2. HSL29: Victoria Loop, including Sheffield Victoria Station

11.2.1. The route section provides the option for a connection to a station in central Sheffield. The route section would be 18.5km (11.5 miles) long, forming a loop allowing access to the proposed Sheffield Victoria Station. It would connect into HSL14, in the south and HSL14 in the north forming the main through-route. The alternative option would have a station at Meadowhall (HSL28).

11.2.2. The route would diverge from HSL24 at Swallownest. Having crossed over the River Rother on a long viaduct north of Orgreave, it would align with the corridor of the existing Sheffield to Worksop railway and follow it at ground level as far as Sheffield Victoria Station. It would then leave the city centre and turn northwards entering tunnel for about 4km before emerging in cutting near Shiregreen. It would rise onto embankment and viaduct over the Hartley Brook Dyke, before dropping into cutting beneath the A629 near Chapeltown. The HS2 station would be located at the site of a former railway station, on a viaduct, in the Victoria Quays area to the north of the city centre.

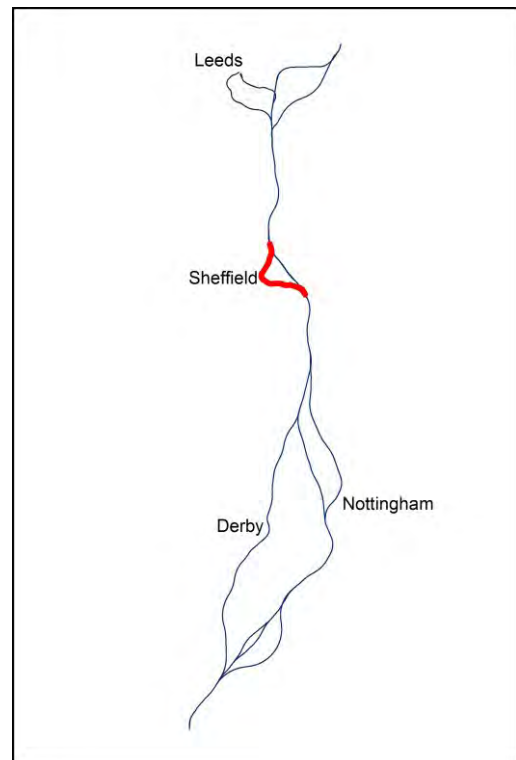
11.2.3. HSL29 Figures 1 to 4 illustrate the route alignment and the principal sustainability features in the area.

11.2.4. Specific mitigation included within the route section comprises localised realignments that have sought to follow the edge of proposed buildings within the Orgreave Development Site to minimise impact on the master plan, avoid Neepsend SSSI and change in the position of the tunnel portal exit near Shiregreen to reduce demolitions. Mitigation also sought to minimise the impact on the Grade II* listed viaduct at the station.

11.2.5. **Population and settlements** The route section would result in the demolition of an estimated 41 dwellings. These include a cluster at ① Handsworth, Sheffield. Of the total, 32 demolitions would be in areas of relatively high deprivation. In addition, an estimated 63 commercial properties would also be demolished (51 of which would be at the station) and one community property, a nursery (which would be at the station). Potential isolation would occur at one location, affecting an estimated 11 dwellings east of ② Ecclesfield.

11.2.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 157 people (equivalent to the occupants of some 67 dwellings). This would represent about seven people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be substantially less than this.

The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential



		<p>noise impacts. These settlements are located at or near to 20 Woodhouse Mill, 3 Orgreave, 4 Treeton, 5 Darnall, 6 Ecclesfield and other scattered dwellings.</p> <p>In terms of noise insulation, approximately 135 dwellings would be expected to qualify, particularly at 5 Darnall and 6 Ecclesfield. This is equivalent to approximately six dwellings per km of route section.</p> <p>Modelling of noise impacts from the operational station will be undertaken as designs are progressed. They would be influenced by plant and PA systems, generated road traffic, and frequency and speed of trains.</p>
11.2.7.	Health and well-being	<p>Approximately 970 dwellings would be located within 100m of the route section. A further 100 dwellings would be located within 100m of the station. These could be at greater risk of disturbance from construction activity.</p>
11.2.8.	Access issues	<p>The 7 Trans Pennine Trail would be crossed by the route section in three locations. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.</p>
11.2.9.	Jobs and houses	<p>The station would potentially displace businesses providing an estimated 1,300 jobs. However, an estimated 9,000 jobs would be supported through development around the station generated as a result of HS2. Of these, between 4,500 and 6,750 would be in areas of relatively high deprivation.</p> <p>There would be an estimated 900 housing units supported, of which between 450 and 675 would be in areas of relatively high deprivation.</p>
11.2.10.	Planning and development	<p>The route section would pass through a number of planned growth sites at 8 Orgreave, east of Sheffield. The site forms part of the Sheffield Enterprise Zone and has planning permission for the development of Waverley New Community, which includes 3,890 residential units, commercial development, finance and professional services, leisure and community uses. The scheme was granted outline permission March 2011, with a 30 year time limit on the consent. The masterplan for the site also includes the Waverley Advanced Manufacturing site.</p> <p>The Sheffield City Council Core Strategy 2009 acknowledges that the city centre will be the driver of the city and the region's economy, providing sustainable employment opportunities, which will be supported by sustainable transport and a high quality environment.</p> <p>The station would conflict with three proposed site allocations (for retail, business and industrial uses), although provided the detailed design is taken forward as part of a masterplan led approach the station would support the key objectives set out in the core strategy.</p>
11.2.11.	Landscape, townscape and cultural heritage – line of route	<p>This twin-track route section would rise on high viaducts across the reclaimed Orgreave opencast works. There would be a small direct impact on informal open space at 9 Treeton Dyke, as well as visual impact on recreational receptors on the 7 Trans Pennine Trail which runs along the river and residents at 10 Woodhouse, who would have views of the viaducts over the railway. Given the presence of existing railways and industrial areas close by, the visual impact of the twin viaducts is assessed as moderate only.</p> <p>Between Orgreave and Sheffield Victoria the route section would follow</p>

- an existing railway across former opencast workings and landscape and visual impacts would be minor.
- The route section would emerge from tunnel in deep cutting with some short viaducts along a wooded valley at Ecclesfield. The valley has an attractive landscape, overlooked by residential areas, and includes a number of recreational walking routes, including the Trans Pennine Trail. The valley's character would be adversely affected.
- The route section would run north in deep cutting east of ⑪ Chapeltown, involving the loss of woodland, much of it ancient, resulting in possibly major visual and landscape impacts.
- 11.2.12. Landscape, townscape and cultural heritage - station. The station would have a potentially major impact on the townscape due to the demolition of the Grade II listed ⑫ Royal Victoria Hotel, which forms a key component of the historic station complex. There would be a loss of attractive unlisted buildings that frame the Grade II* listed ⑬ Wicker Arch and associated viaduct on its south site, although there may be a potential to integrate these structures into the new station. There would be further implications on the setting of the Grade II listed ⑭ National Westminster Bank and ⑮ 85-93 Wicker Street, and the unlisted buildings associated with the ⑯ Crucible Steel Works and ⑰ Attercliffe Sipelia Works. In addition, the townscape character would be adversely affected by the widened track bed and the introduction of sizable structures which would enforce the visual separation between areas north and south of the viaduct. This may affect views from the ⑱ Park Hill Estate and the wider area.
- The Grade II listed ⑫ Royal Victoria Hotel would be demolished, this would be a major impact. There would be a major impact on the setting of the Grade II* listed ⑬ Wicker Arch and adjoining viaduct, a moderate impact on the setting of the Grade II listed ⑭ National Westminster Bank; and a minor impact on the setting of the Grade II listed ⑮ 85-93 Wicker Street, ⑰ Attercliffe Sipelia Works and the ⑯ Crucible Steel Works.
- 11.2.13. Biodiversity and wildlife The route would directly affect one ancient woodland, which is also a wet woodland BAP habitat.
- 11.2.14. Water resources and flood risk The route section would cross some 640m of Flood Zone 3. The station footprint would span the entire floodplain (Flood Zone 3) of the River Don. Significant in-channel works or possible diversion would be required to convey flows past the station.
- 11.2.15. Land use resources The route section would cross about 9km of green belt. Seven landfill sites would be directly affected. There would be four between Orgreave and Sheffield city centre, one in the ⑳ Parkwood Springs area of Sheffield and two at ㉑ Ecclesfield, would be directly affected. The design would require further work to minimise risks to people and the environment.

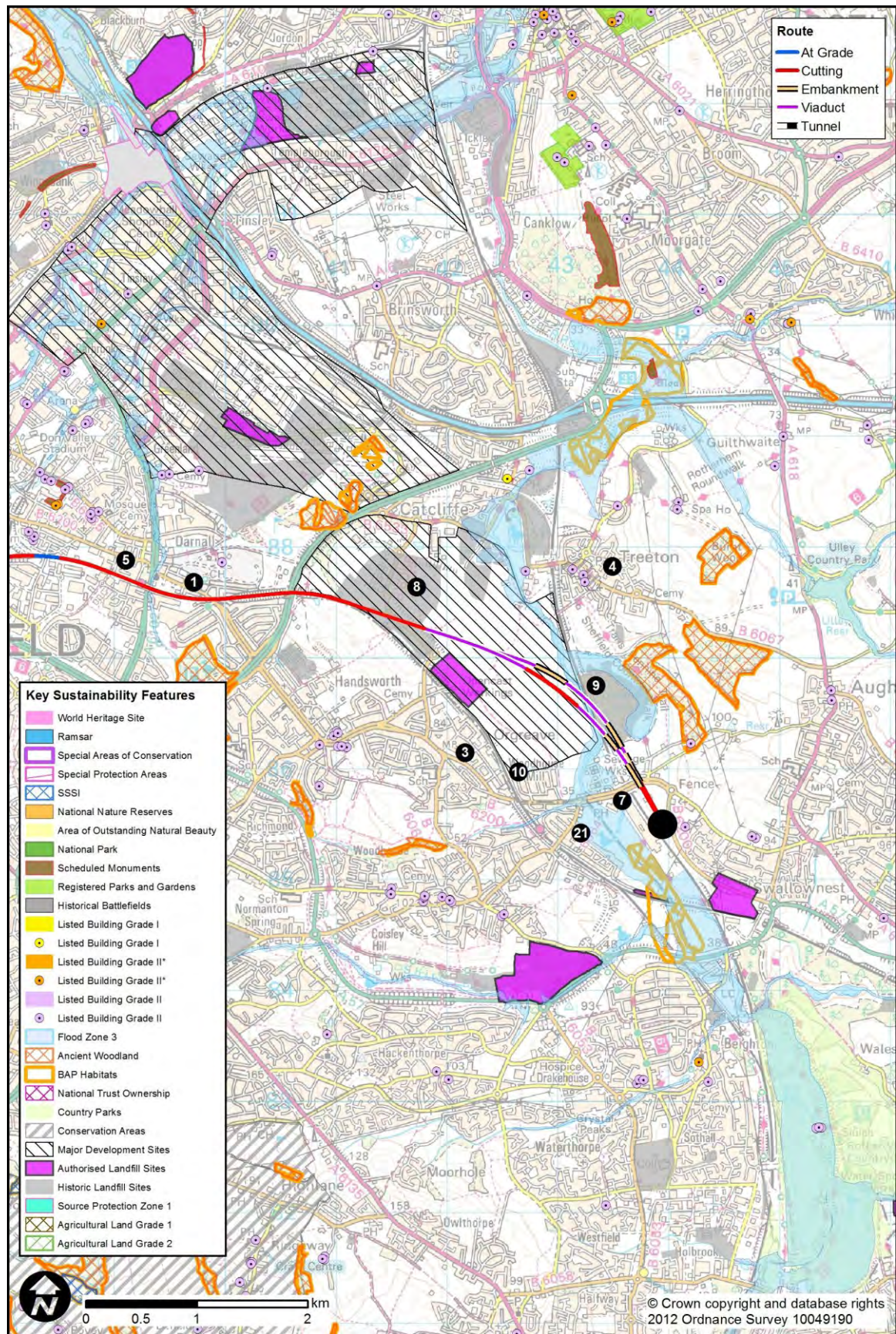
11.2.16. Waste and material use

It is estimated that the route section would result in a surplus of 3,078,715m³ of excavated material. This includes 477,500m³ of tunnel excavated material. Sheffield Victoria Station would be an elevated structure and would therefore not generate significant quantities of excavated material.

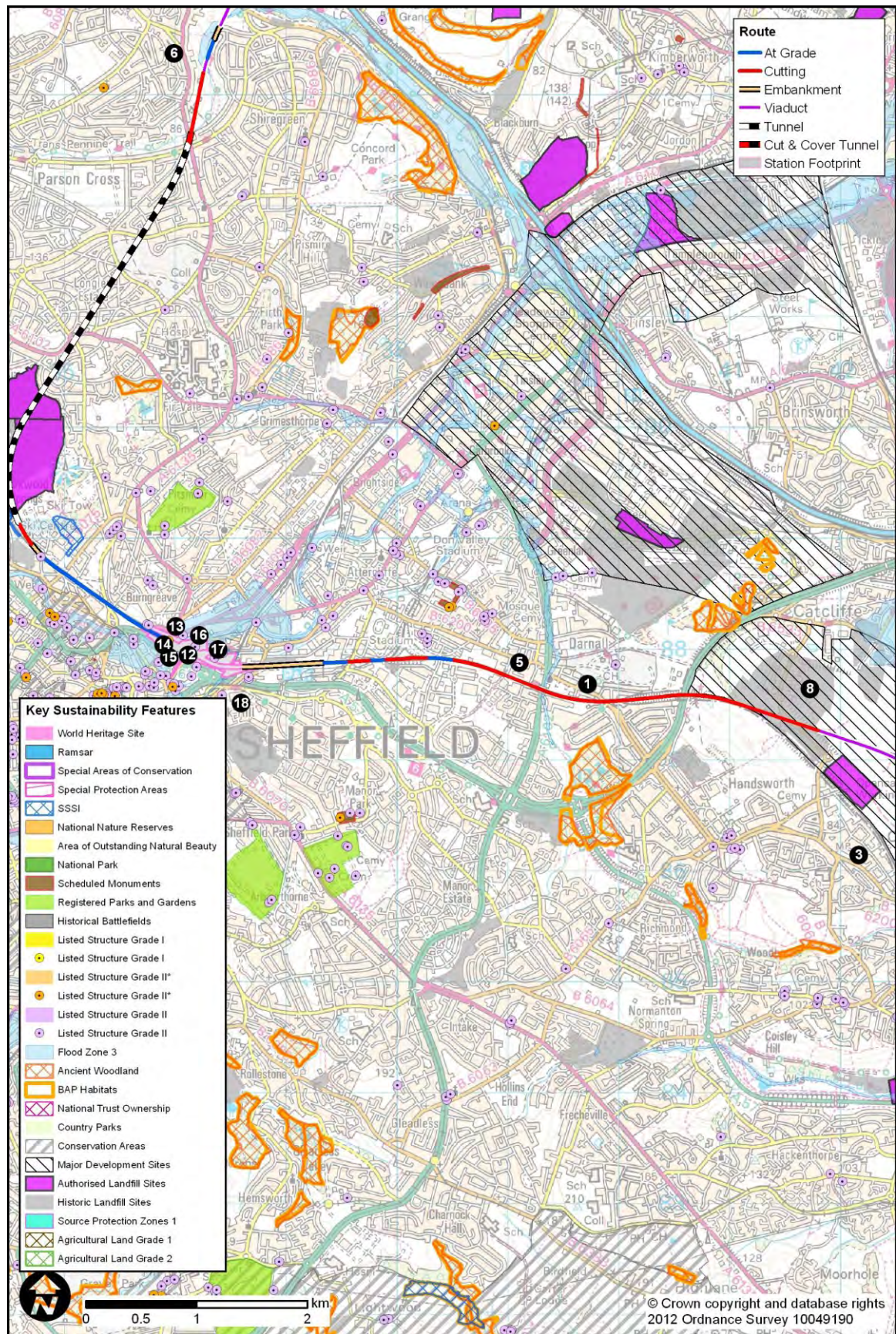
As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.

Estimated quantities of bulk building materials for this section comprise 7,700 tonnes of steel and 23,600 tonnes of concrete. The station would require an additional 398,100 tonnes of concrete; estimated quantities of steel are not provided at this stage.

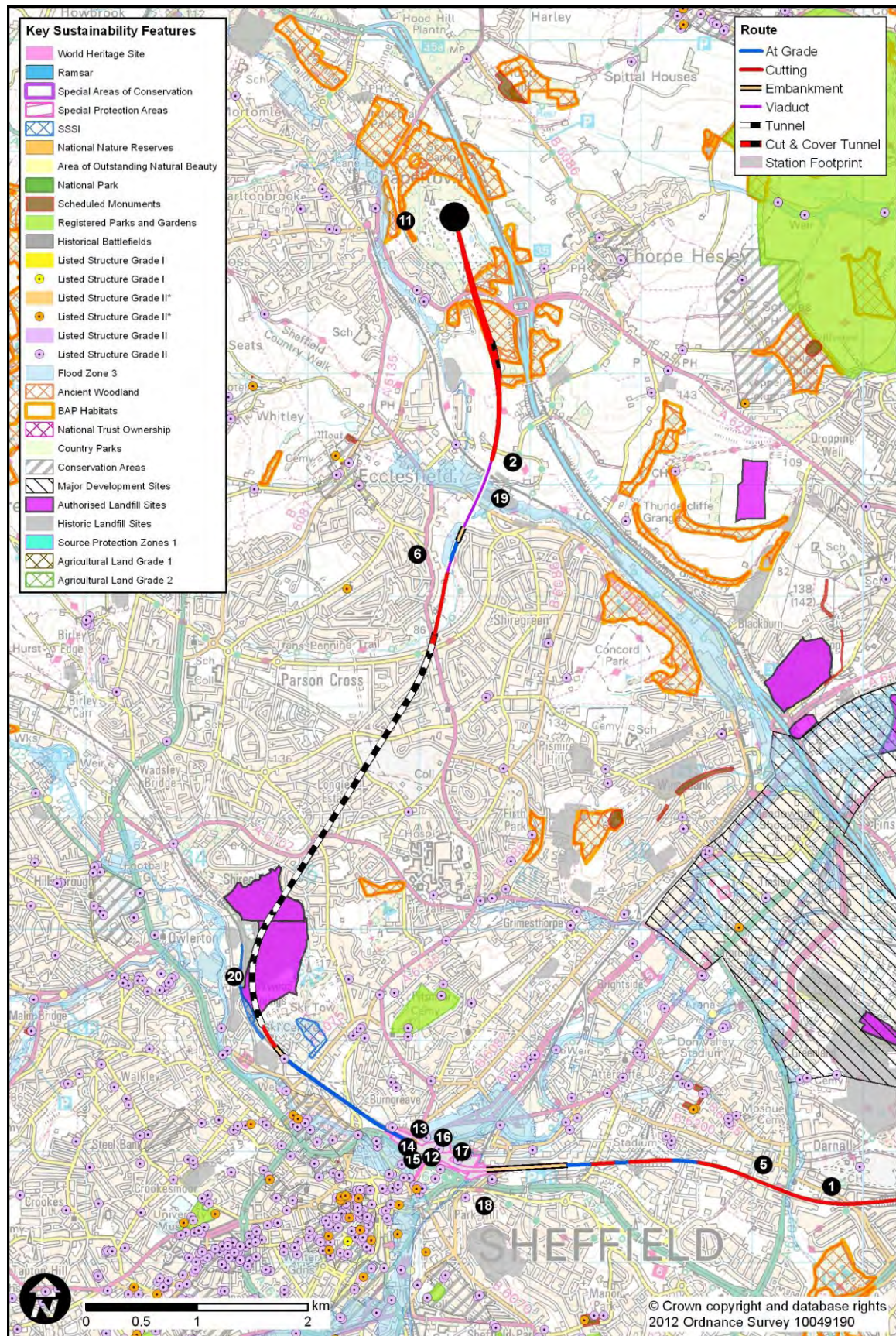
HSL29 - Figure 1 of 4



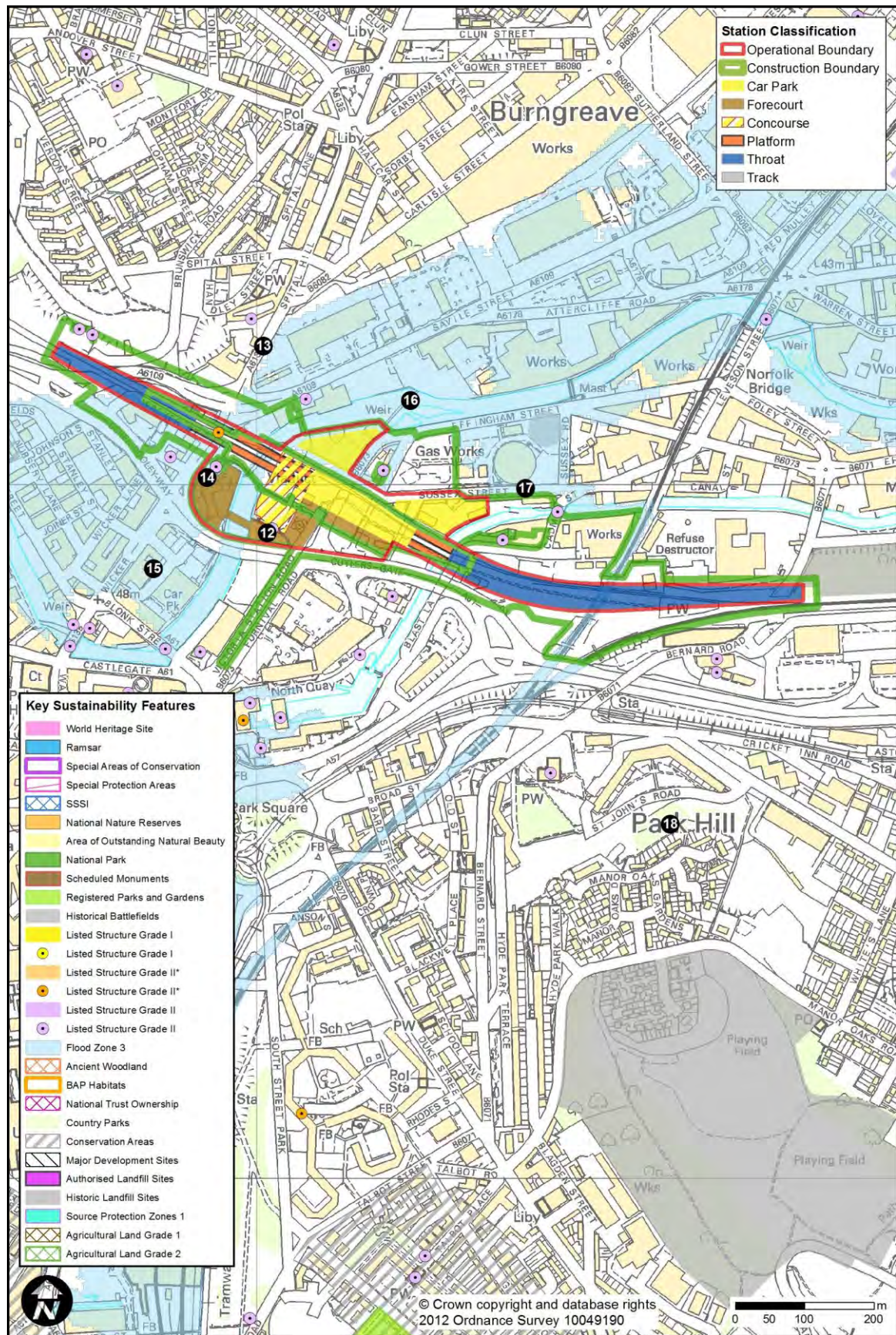
HSL29 - Figure 2 of 4



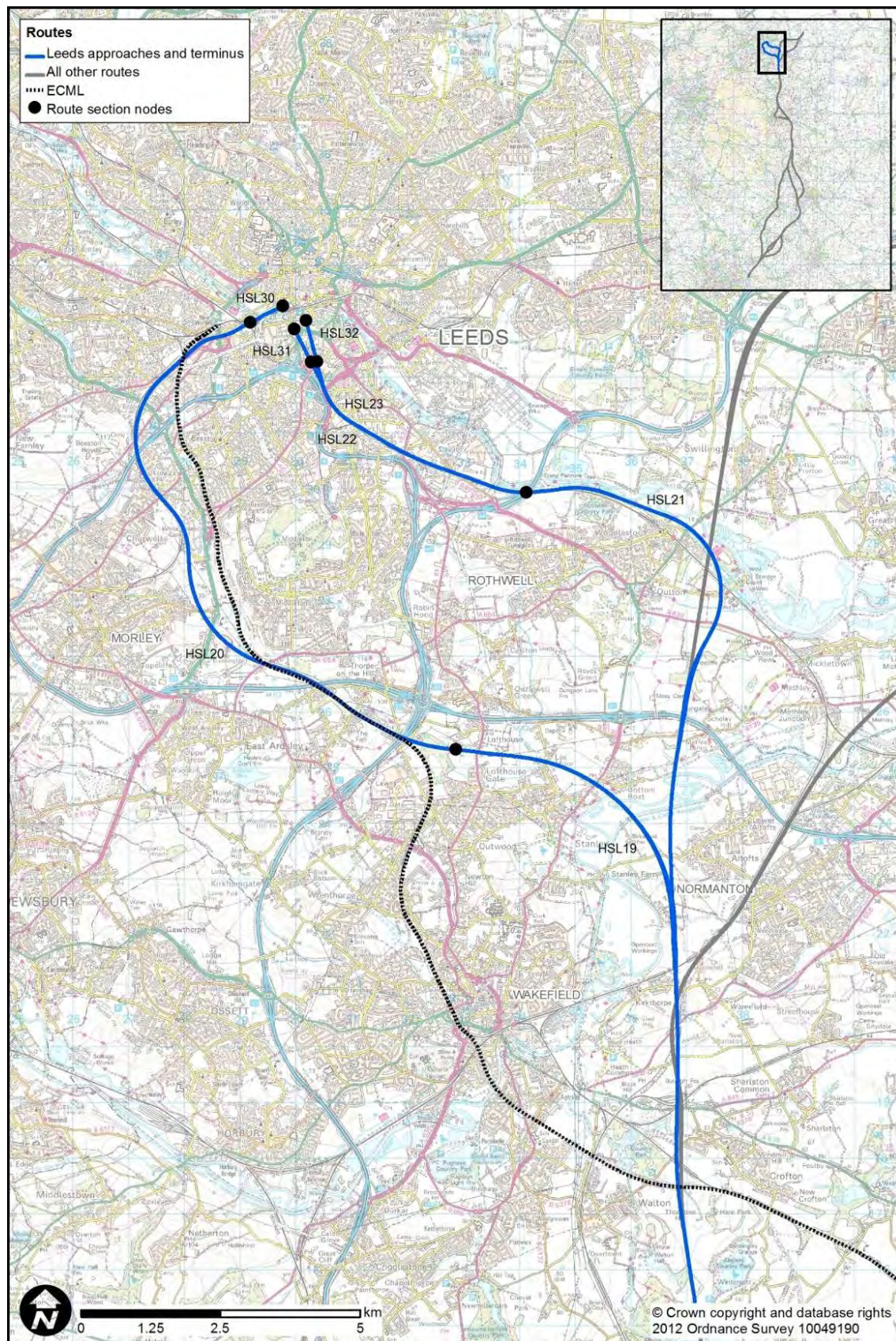
HSL29 - Figure 3 of 4



HSL29 - Figure 4 of 4



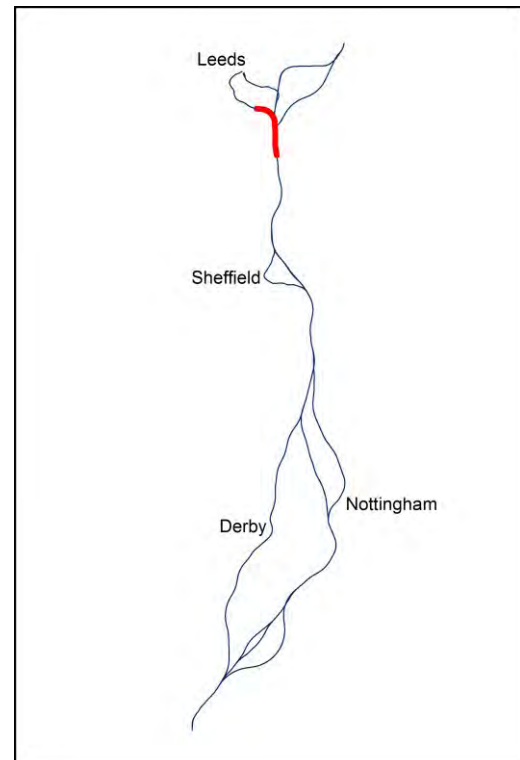
12. Leeds route: Leeds approaches and terminus



12.1. HSL19: Cold Hiendley (M) to Lofthouse (N)

12.1.1. The route section between Cold Hiendley and Lofthouse would be 12.6km (7.8 miles) long. It would connect to the south with HSL16 from Blackburn. At Lofthouse, the route would continue north along HSL20 to Holbeck and then to a Leeds Station option.

12.1.2. Having crossed over the Wakefield to Normanton railway, the route section would continue along cuttings and embankment on the eastern side of the flat Calder Valley, past reclaimed mine workings and through wooded farmland. West of Altofts it would bear west and rise onto embankment and then a long viaduct over the River Calder and the Aire and Calder Navigation. It would then descend into cutting beneath the A642 before rising on embankment and short viaduct over Lee Moor Beck. It would go to cutting again beneath the A61 just south of Lofthouse.



12.1.3. HSL19 Figures 1 to 2 illustrate the route alignment and the principal sustainability features in the area.

12.1.4. No additional mitigation has been incorporated into the route section at this stage.

12.1.5. **Population and settlements** The route section would result in the demolition of an estimated two dwellings. In addition, an estimated one commercial property would be demolished.

12.1.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 307 people (equivalent to the occupants of some 131 dwellings). This would represent about 20 people per km of route. With ambient road noise, also taken into account noise impacts from HS2 would be expected to be less than this.

The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ① Wintersett, ② Walton, ③ Crofton, ④ Oakenshaw Grange, ⑤ Brand Hill, ⑥ Kirkthorpe, ⑦ Goosehill, ⑧ Bottom Boat, ⑨ Stanley, ⑩ Lofthouse Gate, ⑪ Lee Moor and other scattered dwellings.

In terms of noise insulation, approximately 34 dwellings would be expected to qualify, particularly at ⑤ Brand Hill. This is equivalent to approximately three dwellings per km of route section.

12.1.7. **Health and well-being** Approximately 99 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.

12.1.8. **Access issues** The ⑫ Leeds Country Way and the ⑬ Trans Pennine Trail promoted recreational routes would be crossed by the route section. HS2 Ltd

- would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.
- 12.1.9. Planning and development The landfill site at 13 Welbeck potentially affected by the route section (see *land use resources*) has land allocated within the waste development plan document (DPD) for the development of new commercial and industrial waste recovery facilities and modernisation of existing household waste recycling facility. This would be directly affected by the route section. It is currently the largest landfill facility within Wakefield District area, with consent to operate as a landfill site until 2018.
- 12.1.10. Landscape, townscape and cultural heritage North of Winterset Reservoir the impact on landscape character would be fairly limited given the existing context of mineral workings, although views of the embankment from two country parks and the western edge of 3 Crofton would result in some visual intrusion. Embankment and cutting west of Normanton would cause visual impact at 6 Kirkthorpe, and would affect landscape character, especially as it passes the 18 River Calder near the 18 Newland Preceptory Scheduled Monument. The setting of this feature, which is understood to have no above ground remains, would not be affected. Two Grade II listed buildings on the site in the form of farm buildings and old stables at the site of the 18 former Newland Hall, would be expected to have at moderate impacts on their settings.
- A four-track section between Kirkthorpe and the Aire and Calder Navigation west of Normanton would result in some landscape impact, notably from the viaduct and high embankments close to the River Calder.
- A viaduct would carry the route section over the Aire and Calder Navigation and River Calder, with moderate impact on the setting of the Grade II listed 14 Birkwood Lock. Deep cutting and embankment would affect landscape character and cause visual impacts, especially on users of the navigation and residents of 8 Bottom Boat and 11 Lee Moor.
- In addition to the Newland Preceptory, a second scheduled monument in the form of a 20 henge on Birkwood Common would be some 200m from the route section. This is believed to survive as a low earthwork, but within a setting of modern development, including an adjacent electricity pylon, the impact on the setting of the monument would not be significant.
- 12.1.11. Biodiversity and wildlife The route section would pass within 10km of one Natura 2000 wildlife site. However, an HRA screening confirms that there would be no likely significant effects on this site.
- 12.1.12. Water resources and flood risk The 19 River Calder, a major river, may require diversion. Three minor rivers would also require diversion, namely 16 Drain Beck, 16 Drain Beck tributary at Winterset reservoir and 17 Oulton Beck tributary at Lee Moor. Continuing scheme design would seek to avoid or minimise this impact.
- The route section would cross some 800m of Flood Zone 3.
- 12.1.13. Land use resources The route would cross about 1.4km of Grade 2 agricultural land. It would cross about 15.8km of green belt.
- Two landfill sites, at 15 Welbeck and 13 Lofthouse, would be directly affected, and the design would require further work to minimise risks to

people and the environment from these impacts.

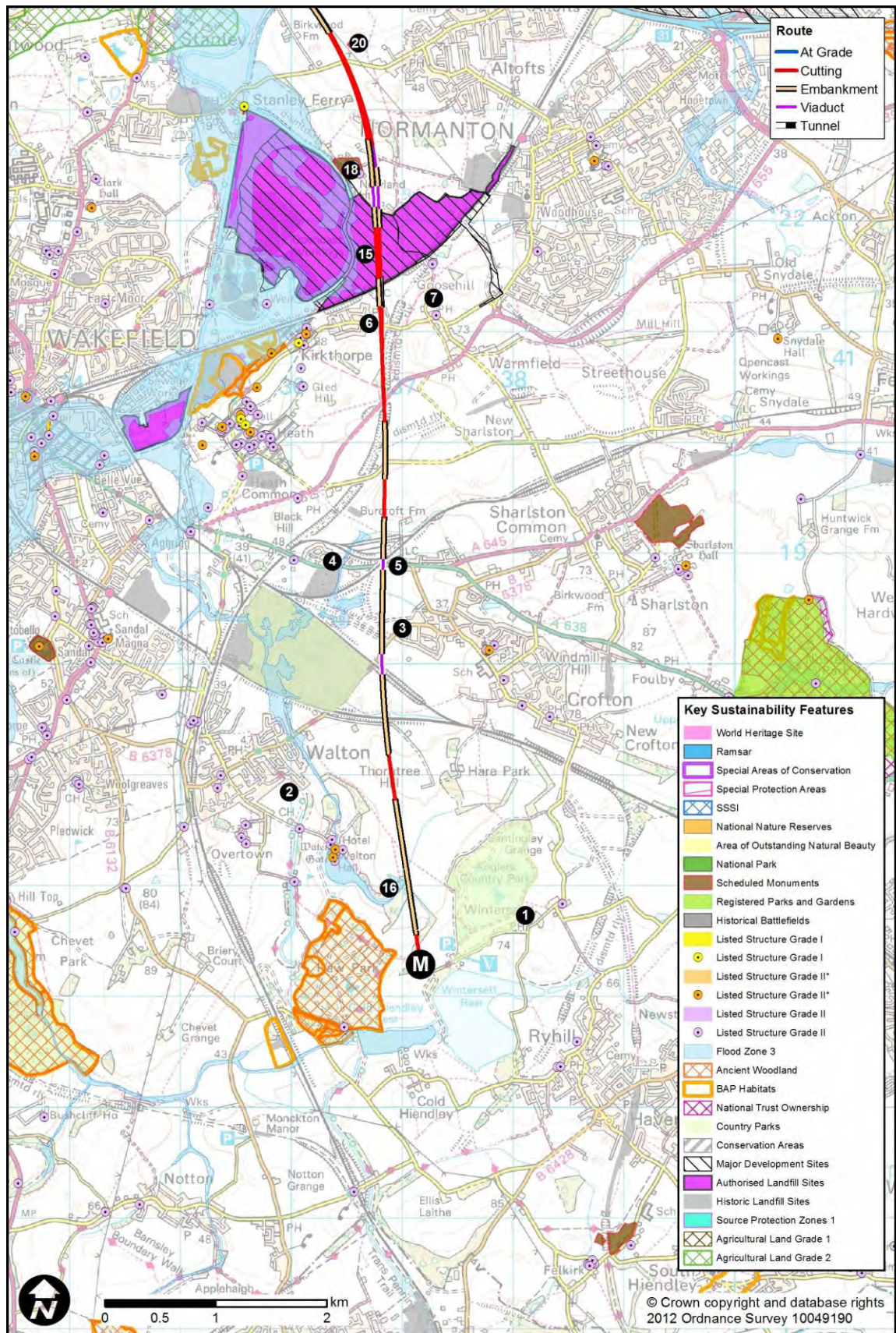
12.1.14. Waste and
material use

It is estimated that the route section would result in a surplus of 748,638m³ of excavated material.

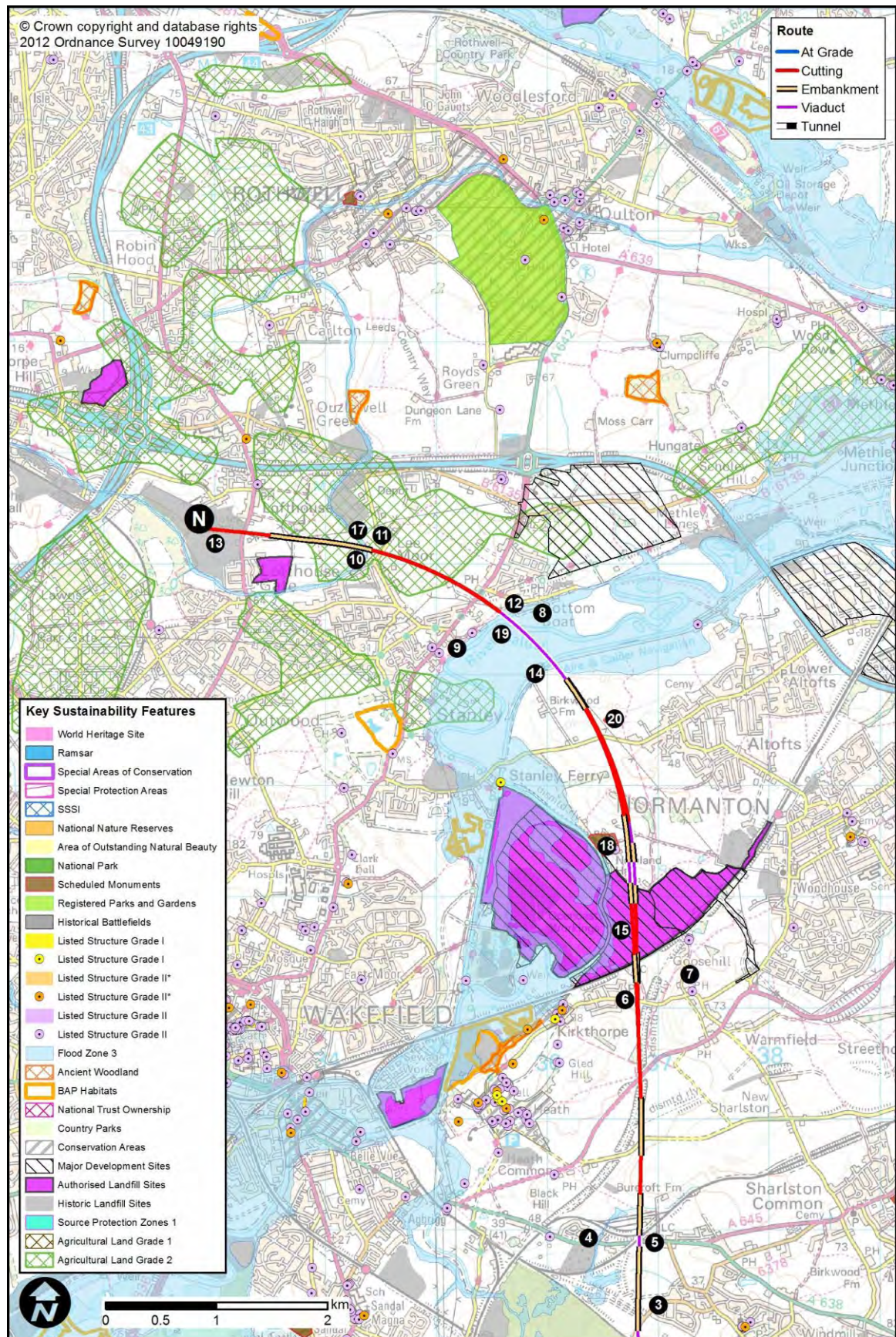
As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.

Estimated quantities of bulk building materials for this section comprise 5,100 tonnes of steel and 15,600 tonnes of concrete.

HSL19 - Figure 1 of 2

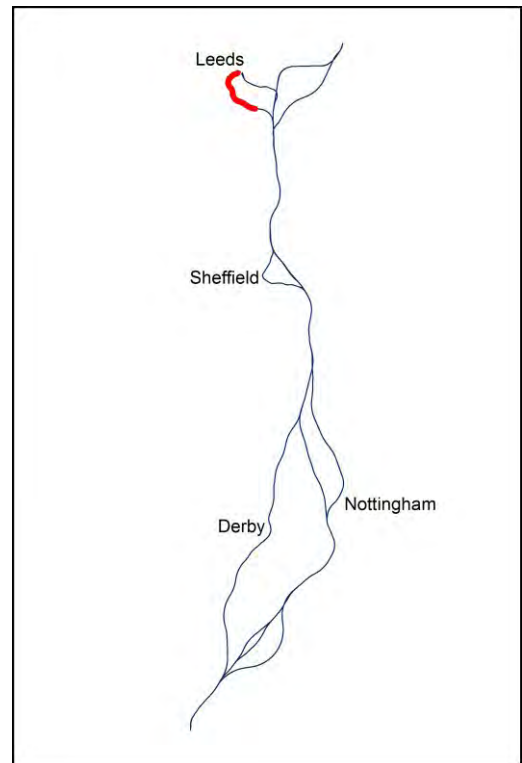


HSL19 - Figure 2 of 2



12.2. HSL20: Lofthouse (N) to Holbeck (O)

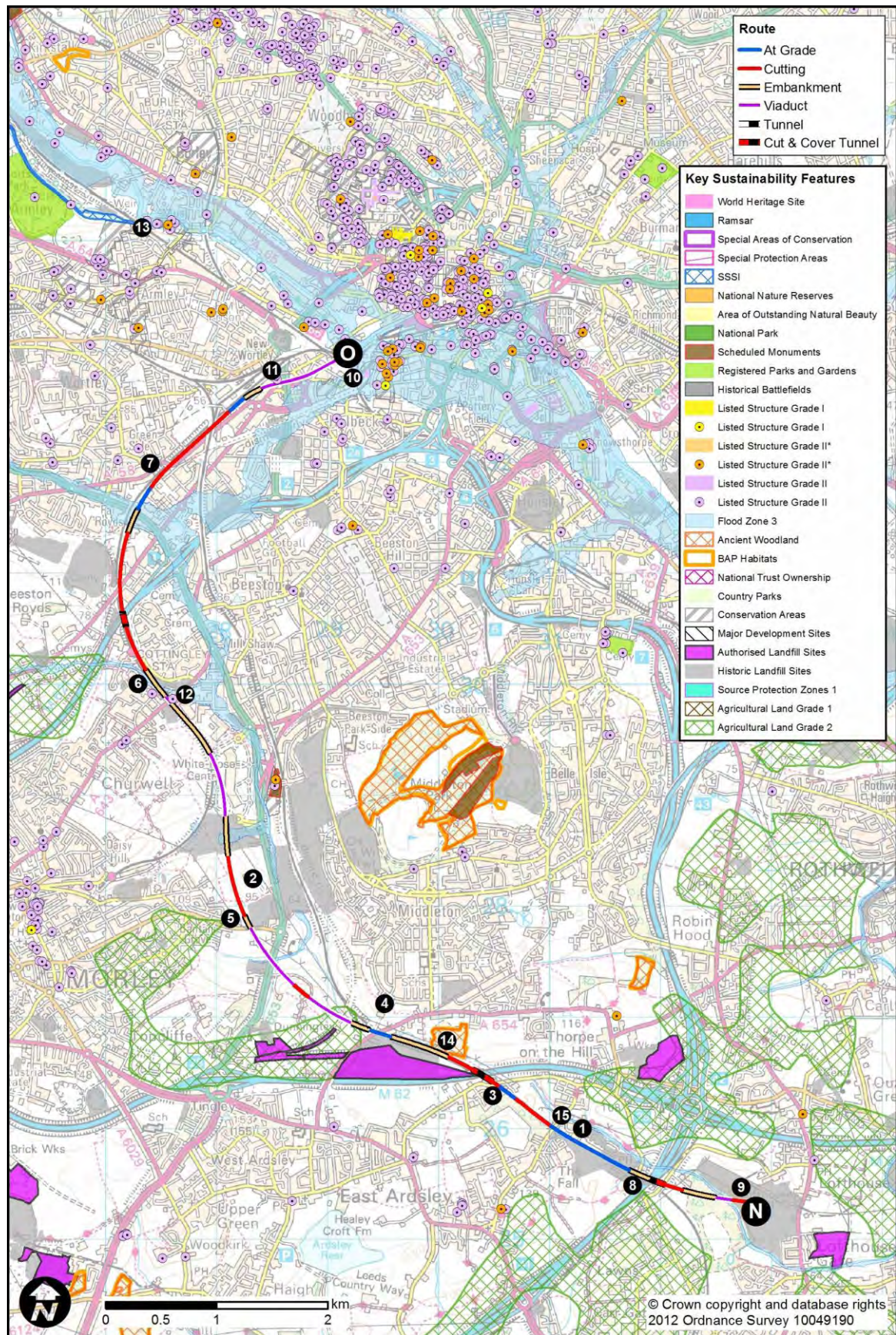
- 12.2.1. The route section between Lofthouse and Holbeck would be 11.8km (7.3 miles) long. It would connect to the south with HSL19 from Cold Hiendley. At Holbeck, the route would continue north along HSL30 to Leeds Station option 1A.
- 12.2.2. The route section would begin at Lofthouse where it would follow the alignment of the Doncaster to Leeds railway before passing under the M1, M62 and the A654. It would diverge from the railway and pass over the A653 on viaduct, turning northwards on embankment and viaduct before passing beneath the M621, the A62, A653 and the Dewsbury to Leeds railway, and then rising onto viaduct at Holbeck.
- 12.2.3. HSL20 Figure 1 illustrates the route alignment and the principal sustainability features in the area.
- 12.2.4. Specific mitigation included within the route section comprised localised realignments that have sought to reduce residential demolitions at The Fall.
- 12.2.5. **Population and settlements** The route section would result in the demolition of an estimated 41 dwellings. These include a cluster at ❶ The Fall. Of the total, one demolition would be in an area of relatively high deprivation. In addition, an estimated 39 commercial properties would also be demolished. There is the potential for isolation of an estimated two dwellings south of ❷ the White Rose Centre (Leeds).
- 12.2.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 139 people (equivalent to the occupants of some 59 dwellings). This would represent about 12 people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.
- The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ❶ The Fall, ❸ Ardsley Common, ❹ Middleton, ❺ Morley, ❻ Churwell, ❼ Wortley and other scattered dwellings.
- In terms of noise insulation, approximately 206 dwellings would be expected to qualify, particularly at ❶ The Fall, ❸ Ardsley Common, ❹ Middleton, ❻ Churwell and ❼ Wortley. This is equivalent to approximately 18 dwellings per km of route section.
- 12.2.7. **Health and well-being** Approximately 900 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.



- | | | |
|----------|--|---|
| 12.2.8. | Access issues | <p>⑧ Leeds Country Way promoted recreational route would be crossed by the route section. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.</p> |
| 12.2.9. | Landscape, townscape and cultural heritage | <p>Much of the route would be in cutting and would partly follow transport corridors. Therefore, its landscape and visual impacts would be limited. However, near ⑨ Lofthouse there would be direct impacts on an area of woodland and informal open space. The embankments and high viaduct required to cross the A653 would cause at least moderate visual intrusion affecting views of the relatively undeveloped valley landscape east of ② Morley. Further north the route would turn north-east in cutting to approach Leeds city centre, rising onto viaduct, through an area of light industry, warehousing and retail and giving rise to some visual intrusion. This is not expected to be significant, given the existing setting. However, there could be some impacts on the ⑩ Holbeck Conservation Area.</p> <p>Six woodlands would be affected in total by the route section, including one ancient woodland (see <i>biodiversity and wildlife</i>).</p> <p>A direct impact on the Grade II Listed milestone immediately north-east of ⑪ Six Arches Viaduct would be a minor impact, as it can be moved. The route section would have a direct impact on the Grade II Listed walls, gates and gate piers at ⑫ Jacob Kramer College wall, the loss of which would be a moderate impact. Impacts on the setting of the Grade II listed ⑫ Jacob Kramer College and the College Caretaker's House at ② Kildare Terrace would also be moderate, especially when considered cumulatively with the direct impacts.</p> |
| 12.2.10. | Biodiversity and wildlife | <p>The route section would pass within 2km of the ⑬ Leeds-Liverpool Canal SSSI, but within 30m of an undesignated part of the canal. Assuming best practice techniques are used during construction, adverse effects may be avoided.</p> <p>⑭ Thorpe Wood would be directly affected by the route section. This is both ancient woodland and a wet woodland BAP habitat.</p> |
| 12.2.11. | Water resources and flood risk | <p>Two diversions of minor rivers may be required, namely the ⑮ Gate Beck tributary at East Ardsley and ⑭ Gate Beck. Continuing scheme design would seek to avoid or minimise these impacts.</p> <p>The route section would cross some 450m of Flood Zone 3.</p> |
| 12.2.12. | Land use resources | <p>The route would cross about 300m of Grade 2 agricultural land. It would cross about 6.5km of green belt.</p> <p>Eleven landfill sites between Lofthouse and the Far Royds suburb of Leeds would be directly affected, and the design would require further work to minimise risks to people and the environment from these impacts.</p> |

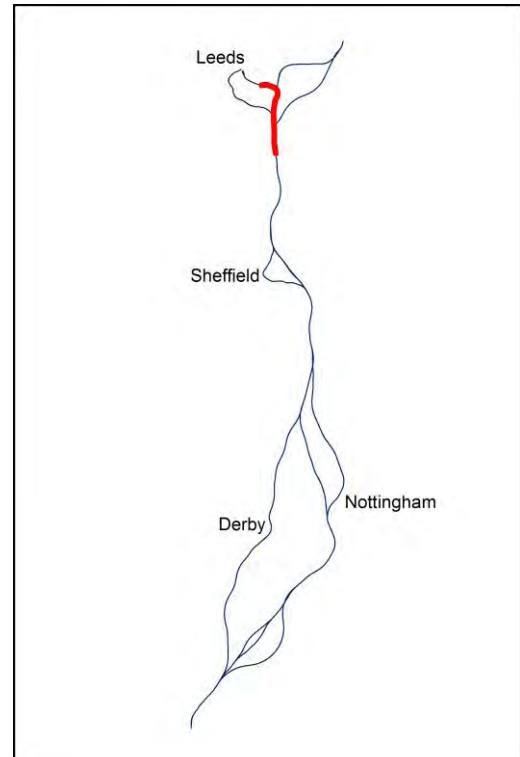
- 12.2.13. Waste and material use
- It is estimated that the route section would result in a surplus of 10,607m³ of excavated material.
- As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.
- Estimated quantities of bulk building materials for this section comprise 3,800 tonnes of steel and 11,700 tonnes of concrete.

HSL20 - Figure 1



12.3. HSL21: Cold Hiendley (M) to Woodlesford (Q)

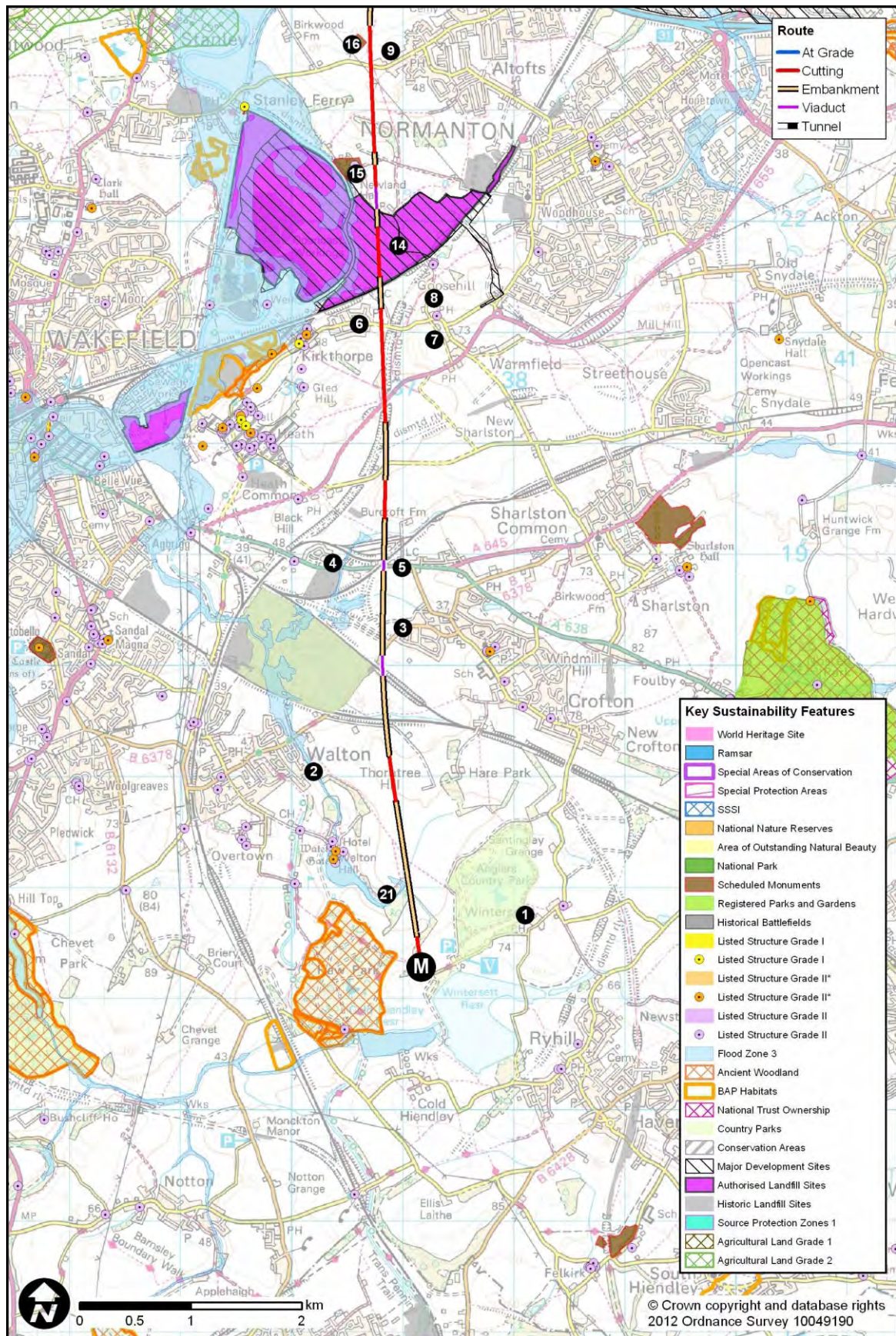
- 12.3.1. The route section between Cold Hiendley and Woodlesford would be 17.4km (10.8 miles) long. It would connect to the south with HSL16 from Blackburn. At Woodlesford, the route section would continue west along HSL22 or HSL23 into a Leeds Station option.
- 12.3.2. The route section would follow the undulating landscape on the eastern side of the Calder Valley. The valley is crossed by numerous roads and railways, requiring the route to use embankments and bridges over several kilometres. As it approaches the Wakefield to Normanton railway, it would use cutting past Normanton and Altofts, before crossing the River Calder on viaduct. North of the River Calder it would run largely on embankment to Oulton, with viaducts/bridges over the M62 and the A639. The route section would then curve west to follow the Aire Valley, using a viaduct to carry it above the flood plain and across the Aire and Calder Navigation, before entering into cutting beneath the M1.
- 12.3.3. HS21 Figures 1to 2 illustrate the route alignment and the principal sustainability features in the area.
- 12.3.4. Specific mitigation included within the route section comprises a number of localised realignments that have sought to avoid crossing of the River Aire, and moving the scheme away from the Rothwell Country Park. Vertical realignment through the Aire Valley has sought to avoid the rivers and realignment near Woodlesford sought to reduce impacts to local residents.
- 12.3.5. **Population and settlements** The route section would not result in the demolition of any dwellings. However, an estimated one commercial property would be demolished.
- 12.3.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated 492 people (equivalent to the occupants of some 209 dwellings). This would represent about 54 people per km of route. With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.
- The results of the strategic noise appraisal have highlighted a number of settlements in close proximity to the route that would require careful consideration during project development to protect them from potential noise impacts. These settlements are located at or near to ① Winterset, ② Walton, ③ Crofton, ④ Oakenshaw Grange, ⑤ Brand Hill, ⑥ Kirkthorpe, ⑦ Warmfield, ⑧ Goosehill, ⑨ Altofts, ⑩ Bottom Boat, ⑪ Woodlesford and other scattered dwellings.
- In terms of noise insulation, approximately 98 dwellings would be expected to qualify, particularly at ⑤ Brand Hill and ⑥ Kirkthorpe. This is equivalent to approximately 11 dwellings per km of route section.



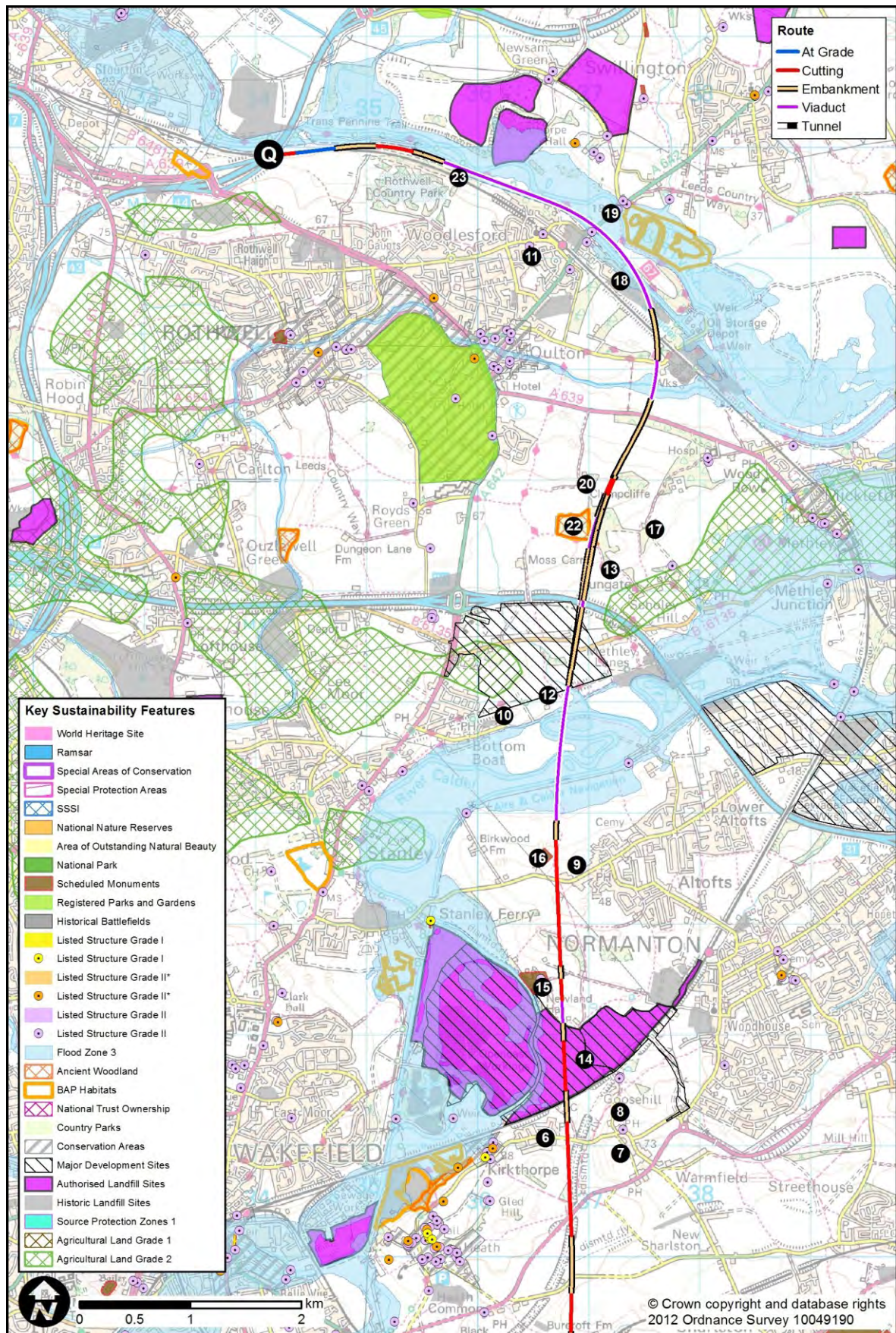
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| 12.3.7. | Health and well-being | Approximately 89 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity. |
| 12.3.8. | Access issues | Two promoted recreational routes would be crossed by the route section, namely the 12 Trans Pennine Trail and the 13 Leeds Country Way (in two locations). HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme. |
| 12.3.9. | Planning and development | The landfill site at 14 Welbeck potentially affected by the route section (see <i>land use resources</i>) has land allocated within the Waste development plan document (DPD) for landfill and the development of new commercial and industrial waste recovery facilities and modernisation of existing household waste recycling facility. It is currently the largest landfill facility within the Wakefield District area, with consent to operate as a landfill site until 2018. |
| 12.3.10. | Landscape, townscape and cultural heritage | <p>North of Winterset Reservoir impact on landscape character would be fairly limited given the existing context of mineral workings, although views of the embankment from two country parks and the western edge of Crofton would result in some visual intrusion. Embankment and cutting west of Normanton would cause visual impact at 6 Kirkthorpe, and would affect landscape character, especially as it passes the River Calder near the 15 Newland Preceptory Scheduled Monument. The setting of this feature, which is understood to have no above ground remains, would not be affected. 15 Two Grade II listed buildings in the form of farm buildings and old stables at the site of the former Newland Hall, would be expected to have at moderate impacts on their settings. Immediately north of Newland, this route section could have a direct impact on the 16 Scheduled Henge on Birkwood Common. However, it is possible that this impact could be avoided through further scheme refinement. The setting of the low earthworks, bank and ditch remains would be affected, although within a much degraded landscape the impact is unlikely to be a significant one.</p> <p>The route section would continue on embankment or viaduct over most of the rest of its length. This would adversely affect landscape character due to its impact on woodlands, several of which would be directly affected west of 17 Methley. Its crossing of the Aire Valley would have a fairly limited impact on the landscape character and on visual receptors as the context of the area includes former mineral working. However, the high viaduct on the northern edge of Woodlesford would be intrusive and would result in visual impacts on both users of the 18 Aire and Calder Navigation, the 13 Trans Pennine Trail and on residents. It would run into cutting north of Rothwell Country Park and join the route of the Normanton to Leeds railway.</p> <p>The Grade II listed 19 Swillington Bridge over the Aire and Calder Navigation would be directly affected. The settings of the Grade II* listed gazebo near 20 Clumpcliffe Farm would be subject to minor impacts.</p> |

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| 12.3.11. Biodiversity and wildlife | <p>The route section would pass within 10km of one Natura 2000 wildlife site. However, an HRA screening confirms that there would be no likely significant effects on this site.</p> <p>②② Moss Carr Wood ancient woodland and lowland mixed deciduous woodland BAP habitat would be peripherally affected by the route section.</p> |
| 12.3.12. Water resources and flood risk | <p>Two minor rivers, namely ②① Drain Beck and ②① Drain Beck tributary at Winterset reservoir, may require diversion. The ②③ Aire and Calder navigation may need to be diverted. Continuing scheme design would seek to avoid or minimise these impacts.</p> <p>The route section would cross some 3km Flood Zone 3.</p> |
| 12.3.13. Land use resources | <p>The route would cross an estimated 19.2km of green belt.</p> <p>Two landfill sites, east of ①⑧ Welbeck and at ①④ Woodlesford, would be directly affected and the design would require further work to minimise risks to people and the environment.</p> |
| 12.3.14. Waste and material use | <p>It is estimated that the route section would result in a deficit of - 643,706m³ of excavated material.</p> <p>As a result of the route section impacting on the landfill site, it is possible that some of the waste material arising in the route section would be hazardous.</p> <p>Estimated quantities of bulk building materials for this section comprise 6,200 tonnes of steel and 19,000 tonnes of concrete.</p> |

HSL21- Figure 1 of 2

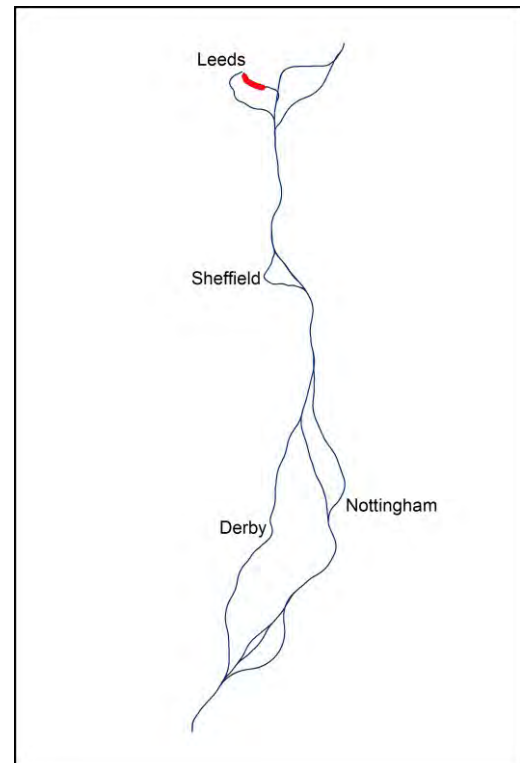


HSL 21- Figure 2 of 2



12.4. HSL22: Woodlesford (Q) to Hunslet (R)

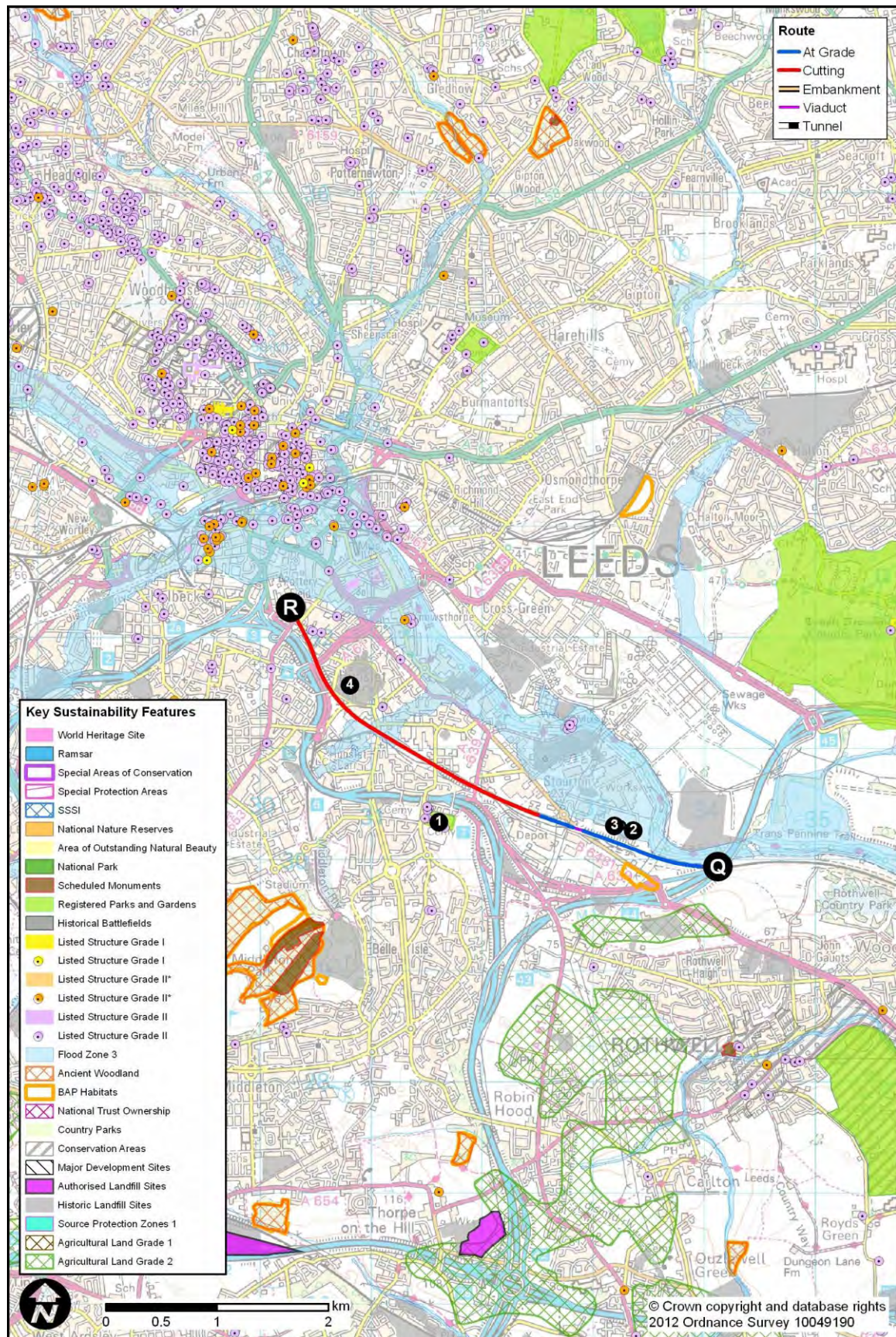
- 12.4.1. The route section between Woodlesford and Hunslet would be 14.7km (9.1 miles) long. It would connect to the south with HSL21 from Cold Hiendley. At Hunslet, the route section would continue north along HSL31 into Leeds city centre, Neville Street Station (option 13F).
- 12.4.2. The route section would be almost entirely in cutting, running alongside the Normanton to Leeds railway. It would pass initially under the M1 and would continue through the industrial areas of Stourton and Hunslet, just north of the M621. It would continue in cutting beneath Leatherly Road into Pottery Field.
- 12.4.3. HSL22 Figure 1 illustrates the route alignment and the principal sustainability features in the area.
- 12.4.4. No additional mitigation has been incorporated into the route section at this stage.



- 12.4.5. **Population and settlements** The route section would result in the demolition of an estimated four dwellings, all of which would be in areas of relatively high deprivation. In addition, an estimated 23 commercial properties and one community property (leisure centre) would also be demolished.
- 12.4.6. **Noise** Noise from HS2 trains would result in annoyance for an estimated two people (equivalent to the occupants of one dwelling). With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.
Approximately three dwellings would potentially qualify for noise insulation along the route section. This is equivalent to one property potentially qualifying for noise insulation per km of route section.
- 12.4.7. **Health and well-being** Approximately 100 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
- 12.4.8. **Access issues** No promoted recreational routes would be crossed by the route section.
- 12.4.9. **Landscape, townscape and cultural heritage** The route section would run almost entirely in cutting parallel to an existing railway and through industrial areas. Its landscape and visual impacts would generally be very limited apart from the section closest to the city centre, where the route would depart from the existing railway and rise onto embankment. This would potentially result in localised visual intrusion and a minor direct impact on an area of informal public open space.
Impacts on the settings of five nearby Grade II listed structures and the Grade II registered parks and gardens of ① Hunslet Cemetery would be negligible.

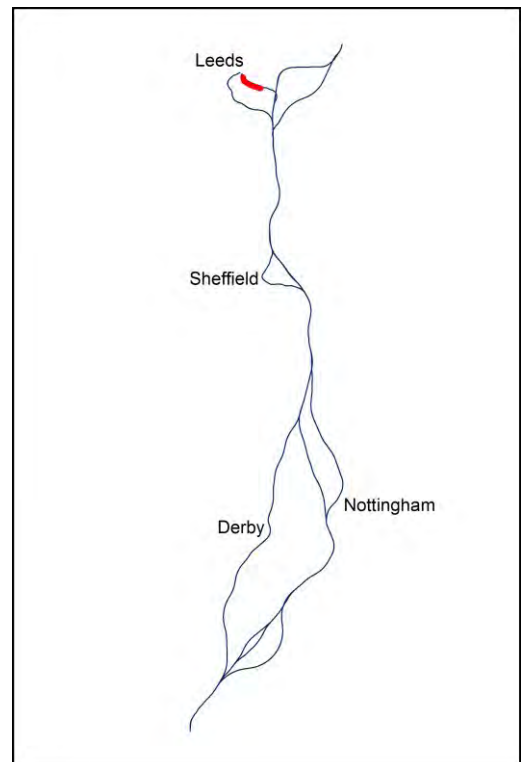
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| 12.4.10. | Biodiversity and wildlife | No key ecological designations would be affected by the route section. |
| 12.4.11. | Water resources and flood risk | <p>The ② Farnley Beck major river may require diversion. Continuing scheme design would seek to avoid or minimise this impact.</p> <p>The route section would cross some 420m of Flood Zone 3, the majority of which would be cutting and therefore at risk of flooding.</p> |
| 12.4.12. | Land use resources | Two landfill sites, in the ③ Stourton and ④ Hunslet areas of Leeds, would be directly affected by the route and the design would require further work to minimise risks to people and the environment from these impacts. |
| 12.4.13. | Waste and material use | <p>It is estimated that the route section would result in a surplus of 167,852m³ of excavated material.</p> <p>As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.</p> <p>Estimated quantities of bulk building materials for this section comprise 1,500 tonnes of steel and 4,700 tonnes of concrete.</p> |

HSL22 - Figure 1



12.5. HSL23: Woodlesford (Q) to Hunslet (S)

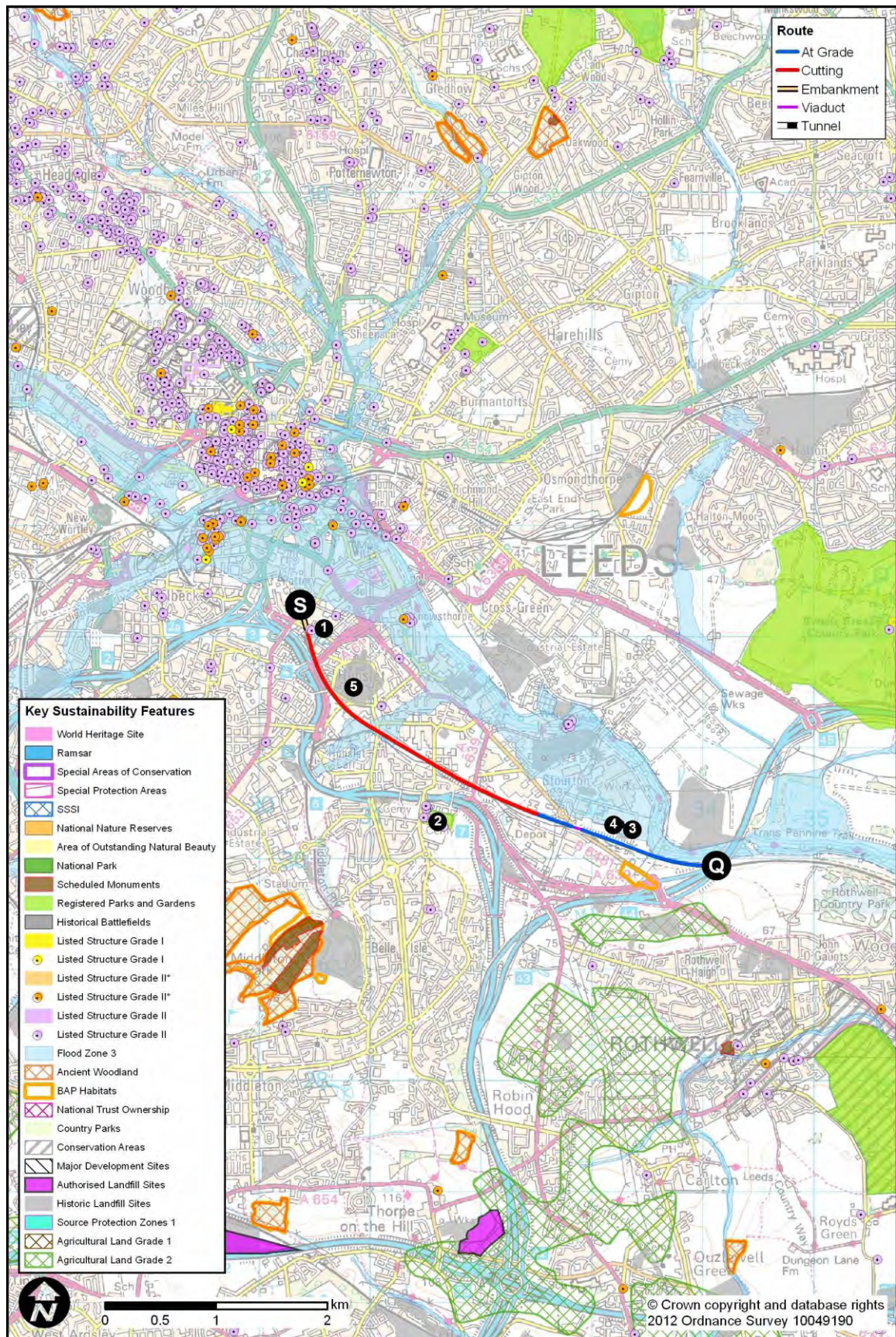
- 12.5.1. The route section between Woodlesford and Hunslet would be 14.7km (9.1 miles) long. It would connect to the south with HSL21 from Cold Hiendley. North of Hunslet, the route would continue along HSL32 into Leeds City Centre, Wilson Street Station (option 13E).
- 12.5.2. The route section would be almost entirely in cutting, running alongside the Normanton to Leeds railway. It would pass initially under the M1 and would continue through the industrial areas of Stourton and Hunslet, just north of the M621. It would rise onto embankment before crossing over Leatherly Road into Pottery Field onto embankment.
- 12.5.3. HSL23 Figure 1 illustrates the route alignment and the principal sustainability features in the area.
- 12.5.4. No additional mitigation has been incorporated into the route section at this stage.



- 12.5.5. Population and settlements
The route section would result in the demolition of an estimated four dwellings, all of which would be in areas of relatively high deprivation. In addition, an estimated 23 commercial properties and one community property (leisure centre) would also be demolished.
- 12.5.6. Noise
Noise from HS2 trains would result in annoyance for an estimated two people (equivalent to the occupants of one dwelling). With ambient road noise also taken into account noise impacts from HS2 would be expected to be less than this.
In terms of noise insulation, approximately three dwellings would be expected to qualify. This is equivalent to one dwelling per km of route section.
- 12.5.7. Health and well-being
Approximately 100 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
- 12.5.8. Access issues
No promoted recreational routes would be crossed by the route section.
- 12.5.9. Landscape, townscape and cultural heritage
The route section would run mainly at grade or in cutting, parallel to an existing railway and through industrial areas. Its landscape and visual impacts would generally be very limited apart from the section closest to the city centre, where the route would depart from the existing railway and rise onto embankment. This would potentially give rise to localised visual intrusion and a minor direct impact on an area of informal public open space.
There would be direct impacts on the Victorian ① Boyne Engineering Works office, as well as on ① gate piers for the works, both of which are Grade II listed. Impacts on the settings of three nearby Grade II listed structures and the Grade II registered parks and gardens of ② Hunslet

		Cemetery would be negligible.
12.5.10.	Biodiversity and wildlife	No key ecological designations would be affected by the route section.
12.5.11.	Water resources and flood risk	<p>③ The Farnley Beck major river may require diversion. Continuing scheme design would seek to avoid or minimise this impact.</p> <p>The route section would cross some 420m of Flood Zone 3, the majority of which would be cutting and therefore at risk of flooding</p>
12.5.12.	Land use resources	<p>Two landfill sites, in the ④ Stourton and ⑤ Hunslet areas of Leeds, would be directly affected by the route and the design would require further work to minimise risks to people and the environment from these impacts.</p>
12.5.13.	Waste and material use	<p>It is estimated that the route section would result in a surplus of 175,424m³ of excavated material.</p> <p>As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.</p> <p>Estimated quantities of bulk building materials for this section comprise 1,500 tonnes of steel and 4,700 tonnes of concrete.</p>

HSL23 - Figure 1



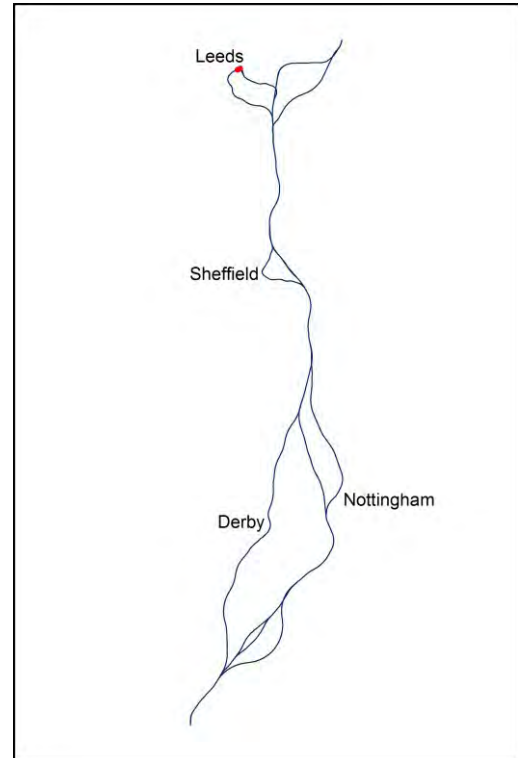
12.6. HSL30: Holbeck (O) to Leeds Station LST1A (P)

12.6.1. The section of route between Holbeck and Leeds Station LST1A would be about 1km long. Linking with HSL20, it would include Leeds Station option LST1A.

12.6.2. The route would approach the station on viaduct, passing over the Leeds and Liverpool Canal and River Aire. The station would be located on land currently occupied by multi-storey and surface car parking and public open space. It would lie between the existing Leeds City Station platforms to the south and the River Aire to the north.

12.6.3. HSL30 Figure 1 illustrates the route alignment and the principal sustainability features in the area.

12.6.4. Specific mitigation included within the route section comprises work to avoid the impact on the River Aire and to minimise visual intrusion, plus reducing impacts on the listed station and Queen's Hotel.

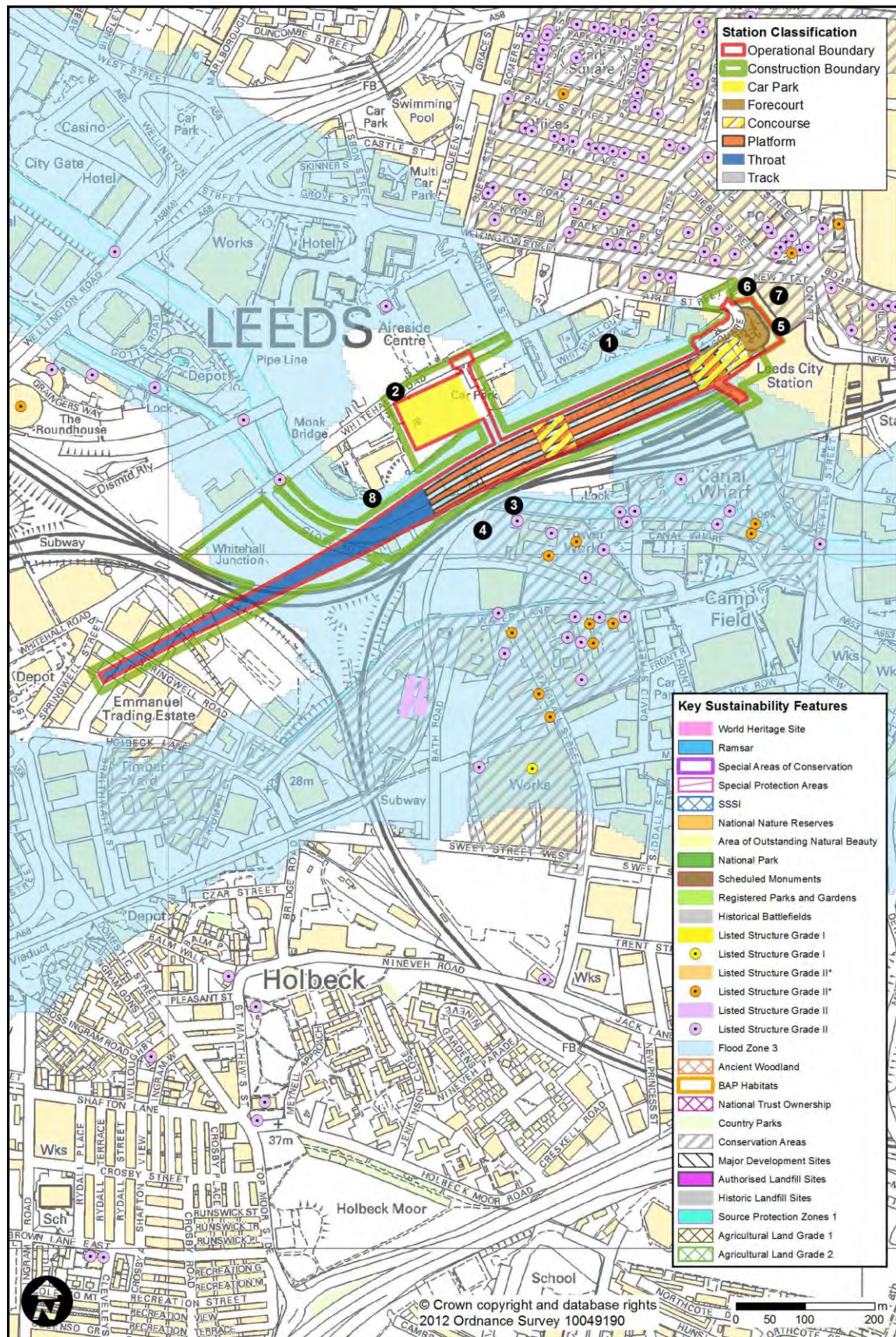


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| 12.6.5. | Population and settlements | The route section would result no residential and 10 commercial demolitions. There would be no isolation or severance of dwellings. |
| 12.6.6. | Noise | Modelling of noise impacts from the operational station will be undertaken as designs are progressed. They would be influenced by plant and PA systems, generated road traffic, and frequency and speed of trains. |
| 12.6.7. | Health and well-being | Approximately 968 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity. |
| 12.6.8. | Access issues | There would be a potential for interchange with national rail services at the new station. |
| 12.6.9. | Jobs and houses | The works would potentially displace businesses providing an estimated 500 jobs. However, an estimated 14,500 jobs would be supported through development around the station generated as a result of HS2, of which about 2,175-3,625 would be in areas of relatively high deprivation. There would be an estimated 1,900 housing units supported, of which 285-475 would be in areas of relatively high deprivation. |
| 12.6.10. | Planning and development | This station would support the Enterprise Zone designated in the Aire Valley.

Leeds City Council have progressed their core strategy to the preferred approach stage. The city centre is promoted as a primary focus for shopping, economic development and urban renewal. The station option would support these policies. |

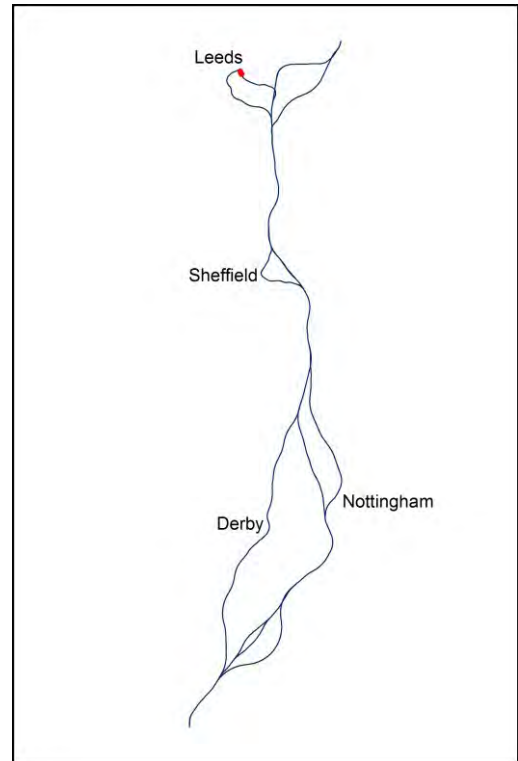
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| 12.6.11. Landscape, townscape and cultural heritage | <p>The station would have some limited impacts on the existing townscape fabric with slight impacts on the waterfront areas and views. In particular, the southerly aspect of the buildings on the north side of the ❶ River Aire would be adversely affected by the new station structure and proposed elevated road bridge and throat to the west. This would reinforce the existing visual severance. Views to the river from ❷ Whitehall Road would be blocked by the new car park. Use and enjoyment of the river and canal-side areas would also be adversely affected. Overall the station would result in minor adverse landscape and visual impacts.</p> <p>There would be a moderate impact on ❸ Canal Wharf Conservation Area with the new station highly visible from the boundary. There would be a minor impact on ❹ Holbeck Conservation Area, with views confined to the west end of the platform area and the new tracks.</p> <p>There would be minor alterations to the Grade II listed ❺ concourse of the former London Midland and Scottish Railway and to the rear addition of the ❻ former Railway Company Offices. There would also be a minor impact on the setting of the Grade II listed ❼ Queens Hotel.</p> |
| 12.6.12. Biodiversity and wildlife | No key ecological designations would be affected by the route section. |
| 12.6.13. Water resources and flood risk | <p>The station may require the diversion of the ❽ River Aire, a major river. Continuing scheme design would seek to avoid or minimise this impact.</p> <p>The station spans the entire floodplain (Flood Zone 3) of the River Aire. Significant in-channel works or possible diversion would be required to convey flows past the station.</p> |
| 12.6.14. Land use resources | There would be no impact on key land use resources. |
| 12.6.15. Waste and material use | <p>Leeds LST1A Station would be an elevated structure and would therefore not generate significant quantities of excavated material.</p> <p>Estimated quantities of bulk building materials for this section comprise 200 tonnes of steel and 500 tonnes of concrete. The station would require an additional 402,700 tonnes of concrete; estimated quantities of steel are not provided at this stage.</p> |

HSL30 - Figure 1



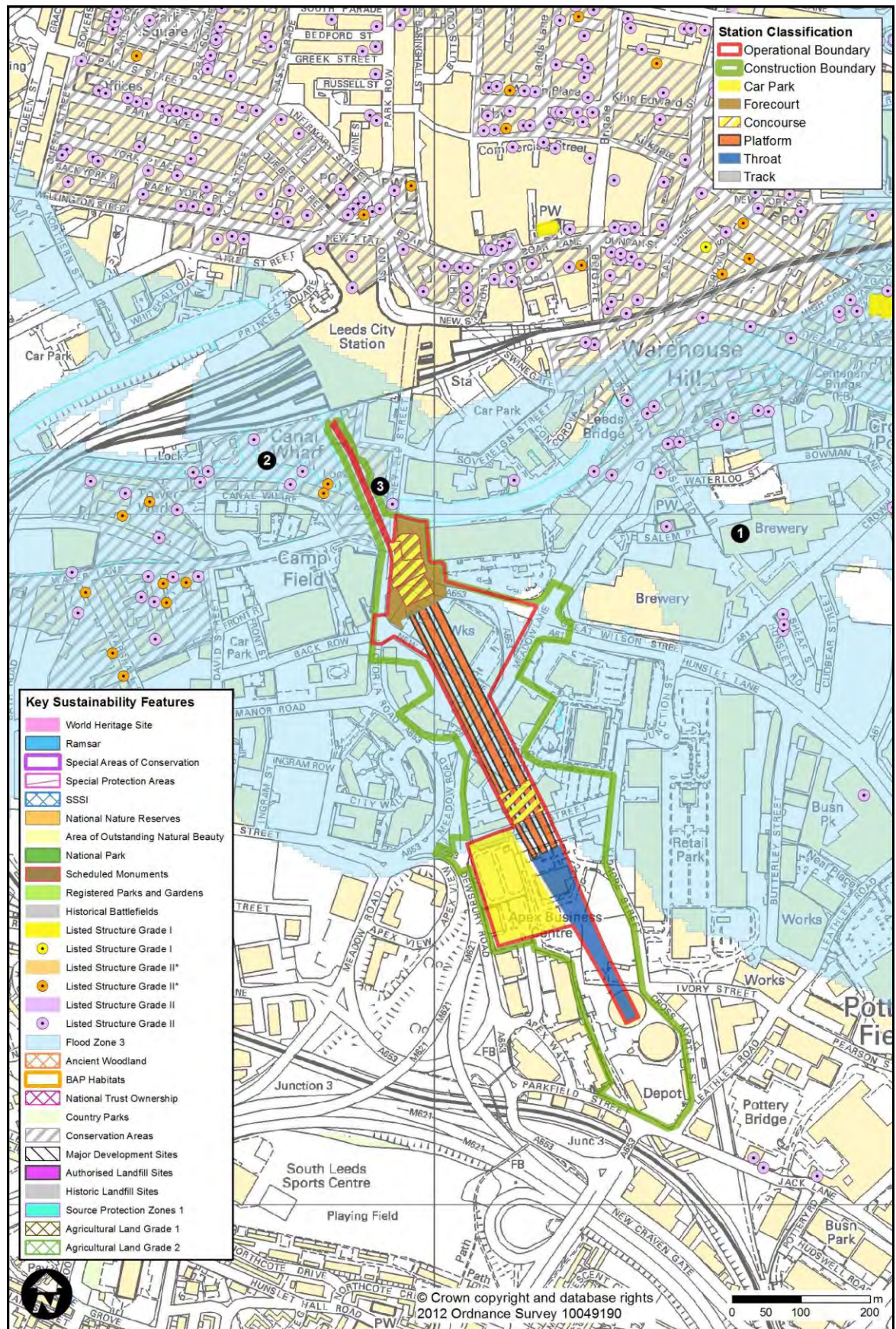
12.7. HSL31: Hunslet (R) to Neville Street (T), including Leeds Station LST13F

- 12.7.1. The section of route between Hunslet and Neville Street would be about 0.7km long. It would include the Leeds terminus station, option LST13F which extends from HSL22.
- 12.7.2. The route section would approach the station on viaduct to the east of the M621. The elevated station would be located on the southern bank of the River Aire to the west of the Asda building and Crown Point Retail Park. A high level passenger link is proposed over the river to link the station with Leeds city centre and train station.
- 12.7.3. HSL31 Figure 1 illustrates the route alignment and the principal sustainability features in the area.
- 12.7.4. Specific mitigation included within the route section comprises work to avoid impacts on the River Aire and minimise visual intrusion to the east and west along the river corridor. It also aims to integrate the scheme with the design layout proposed by the South Bank Planning Statement (see *planning and development* below).
- 12.7.5. Population and settlements The route section would result in 14 commercial demolitions.
- 12.7.6. Noise Modelling of noise impacts from the operational station will be undertaken as designs are progressed. They would be influenced by plant and PA systems, generated road traffic, and frequency and speed of trains.
- 12.7.7. Health and well-being Approximately 519 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
- 12.7.8. Access issues There would be potential for interchange with existing national rail services at the new station.
- 12.7.9. Jobs and houses The works would potentially displace businesses providing an estimated 1,500 jobs. However, an estimated 13,200 jobs would be supported through development around the station generated as a result of HS2, of which about 1,980-3,330 would be in areas of relatively higher deprivation.
- There would be an estimated 1,700 housing units supported, of which 255-425 would be in areas of relatively higher deprivation.
- 12.7.10. Planning and development The station option would support the Enterprise Zone designated in the Aire Valley. The station would conflict with the ① South Bank Planning Statement. However, there is potential for the station to be integrated into this master plan led approach for the area south of the River Aire. The station would support the growth of the southern side of the city and the wider city region, as identified in the draft core strategy.



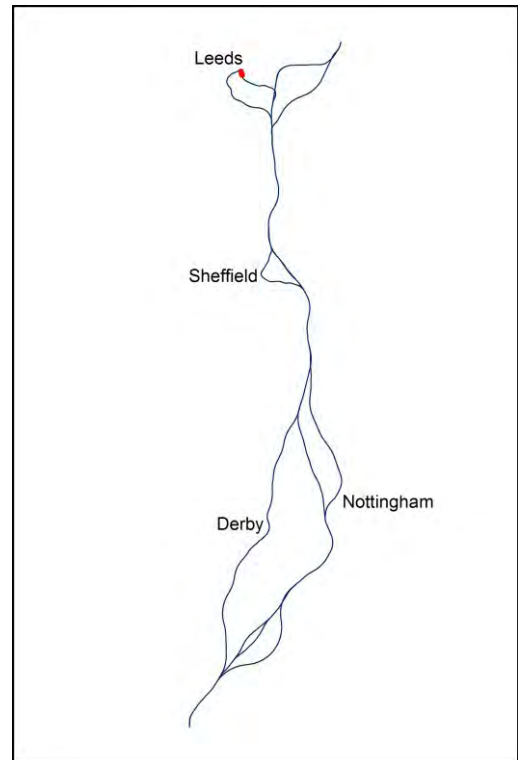
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| 12.7.11. Landscape, townscape and cultural heritage | <p>The station roof would be approximately 20m above ground level, broadly in keeping with the taller existing buildings in the area. However, the station and high level passenger link would be likely to cause an adverse impact on the local townscape. The diagonal route of the high level link would be visually discordant within the surrounding context. It would also give rise to visual intrusion and would impact townscape character. Further south, the elevated platforms and tracks would cause visual intrusion and bring disruption to existing street patterns and movement. The overall townscape impact would be major adverse, although there could be some opportunities for townscape enhancement as part of future redevelopment in the longer term.</p> <p>The station footprint would occupy 830m² of the ② Canal Wharf Conservation Area, resulting in impacts on its character. The high level passenger link would restrict views from across the river, as well as for river users.</p> <p>There would also be a moderate impact on the setting of the ③ Grade II listed Victoria Bridge.</p> |
| 12.7.12. Biodiversity and wildlife | No key ecological designations would be affected by the route section. |
| 12.7.13. Water resources and flood risk | The high level link would cross the River Aire, a major river. The station footprint would occupy about 44,000m ² of Flood Zone 3. Significant floodplain works or possible secondary channel construction may be required to convey flood flows past the station. |
| 12.7.14. Land use resources | There would be no impact on key land use resources. |
| 12.7.15. Waste and material use | <p>Leeds 13F Station would be an elevated structure and would therefore not generate significant quantities of excavated material.</p> <p>Estimated quantities of bulk building materials for this section comprise 100 tonnes of steel and 300 tonnes of concrete. The station would require an additional 406,900 tonnes of concrete; estimated quantities of steel are not provided at this stage.</p> |

HSL31 - Figure 1



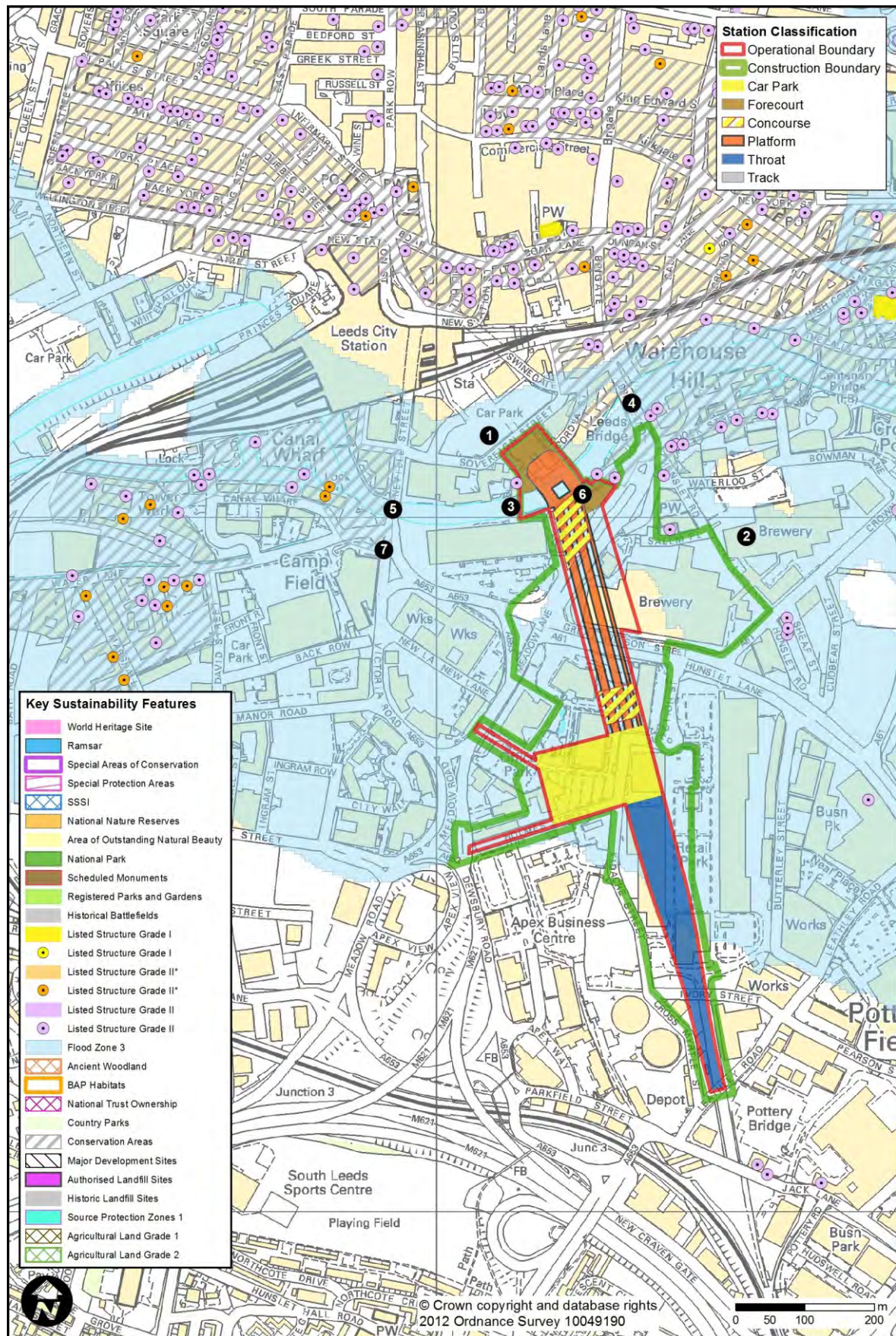
12.8. HSL32: Hunslet (R) to Neville Street (T), including Leeds Station LST13E

- 12.8.1. The section of route between Hunslet and Great Wilson Street would be about 0.9km (1 mile) long. It would include the Leeds terminus station, option LST13E, which would link with HSL23.
- 12.8.2. The route section would enter the station on viaduct. The station would be located on part of the Crown Point Retail Park and the Leeds Brewery site. It would be an elevated station; the concourse would span the River Aire terminating at Sovereign Street, to the immediate south of Leeds Station.
- 12.8.3. HSL32 Figure 1 illustrates the route alignment and the principal sustainability features in the area.
- 12.8.4. Specific mitigation included within the route section comprises work to avoid impacts on the River Aire and minimise visual intrusion to the east and west along the river corridor. It also aims to integrate the scheme with the design layout proposed by the Sovereign Street and South Bank Planning Statements (see *planning and development* below).
- 12.8.5. **Population and settlements** The route section would result in no residential demolitions and 24 commercial demolitions. There would be no isolation or severance of dwellings.
- 12.8.6. **Noise** Modelling of noise impacts from the operational station will be undertaken as designs are progressed. They would be influenced by plant and PA systems, generated road traffic, and frequency and speed of trains.
- 12.8.7. **Health and well-being** Approximately 472 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
- 12.8.8. **Access issues** There would be a potential for interchange with existing national rail services.
- 12.8.9. **Jobs and houses** The works would potentially displace businesses providing an estimated 5,500 jobs. However, an estimated 12,100 jobs would be supported through development around the station generated as a result of HS2, of which about 1,815-3,025 would be in areas of relatively high deprivation. There would be an estimated 1,100 housing units supported, of which 165-275 would be in areas of relatively high deprivation.
- 12.8.10. **Planning and development** This station would support the Enterprise Zone designated in the Aire Valley. The station would conflict with the ① Sovereign Street and ② South Bank Planning Statements. However, there is potential for the station to be integrated into this masterplan led approach for the areas both north and south of the River Aire. The station would also support the growth of the southern side of the city and the wider city region, as identified in the emerging core strategy.

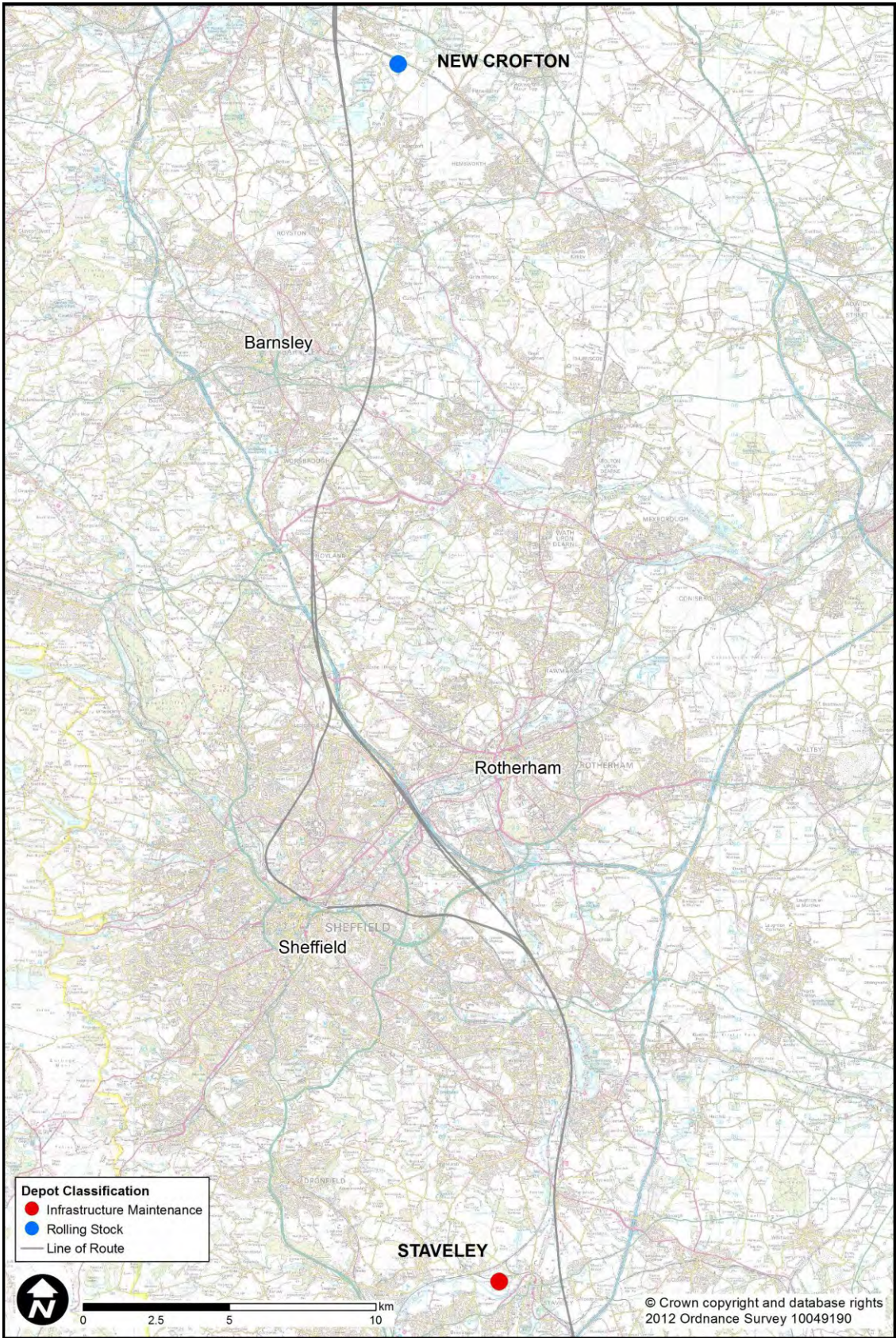


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| 12.8.11. Landscape, townscape and cultural heritage | <p>The station would be elevated and span the width of the River Aire. The roof line would be approximately 20m above the ③ River Aire and would cause significant visual intrusion. It would obstruct key views along the river from green space and adjoining bridges, and would affect the distinctive historic riverside setting.</p> <p>The principal visual impacts would be on views from ④ Leeds Bridge and ⑤ Victoria Bridge. In addition, there would be visual impacts caused by the elevated platforms and tracks, and disruption to existing street patterns and movement along these. Overall, the townscape impact is expected to be major adverse, although there may be some opportunities for townscape enhancement as part of the future redevelopment south of the river in the longer term.</p> <p>The station would intersect the ⑥ Leeds City Centre Conservation Area, although the impact would be minor. The station would only cross about 50m of the conservation area in a location already affected by a major road junction. The station would also have a minor impact on the setting on the ⑦ Canal Wharf Conservation Area.</p> |
| 12.8.12. Biodiversity and wildlife | No key ecological designations would be affected by the route section. |
| 12.8.13. Water resources and flood risk | <p>The station would span the entire width of the River Aire, a major river. The station footprint would occupy about 58,000m² of Flood Zone 3. Significant in-channel works or possible diversion would be required to convey flows past the station.</p> |
| 12.8.14. Land use resources | There would be no impact on key land use resources. |
| 12.8.15. Waste and material use | <p>Leeds 13E Station would be an elevated structure and would therefore not generate significant quantities of excavated material.</p> <p>Estimated quantities of bulk building materials for the section comprise 100 tonnes of steel and 400 tonnes of concrete. The station would require an additional 403,100 tonnes of concrete; estimated quantities of steel are not provided at this stage.</p> |

HSL32 - Figure 1



13. Leeds route: depots

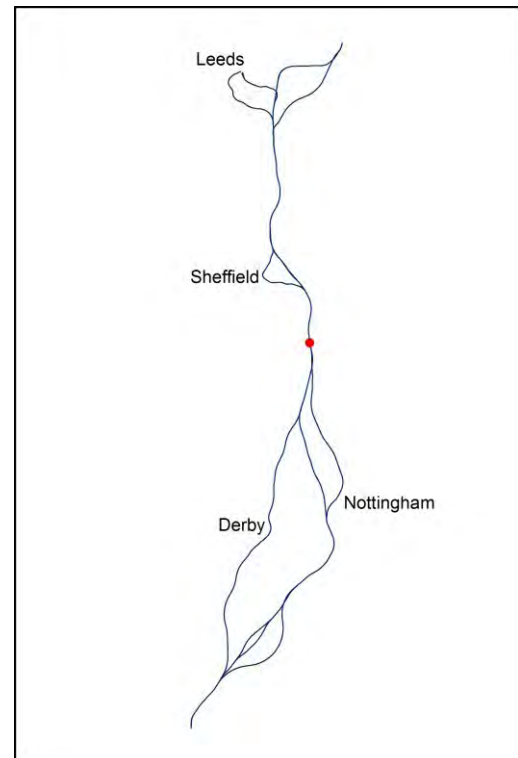


13.1. Staveley Infrastructure Maintenance Depot

13.1.1. The Staveley 2 IMD option would occupy former industrial land north of Staveley and the River Rother. The depot would be single ended and connect with route sections HSL05 and would make use of the disused Bolsover railway to connect with the existing Chesterfield to Rotherham railway.

13.1.2. Staveley 2 IMD Figure 1 illustrates the depot site and the depot approach alignment and the principal sustainability features in the area.

13.1.3. The potential for mitigation was limited at this early stage of depot design. However care was taken to minimise impact on the surrounding landscape, property and water resources.

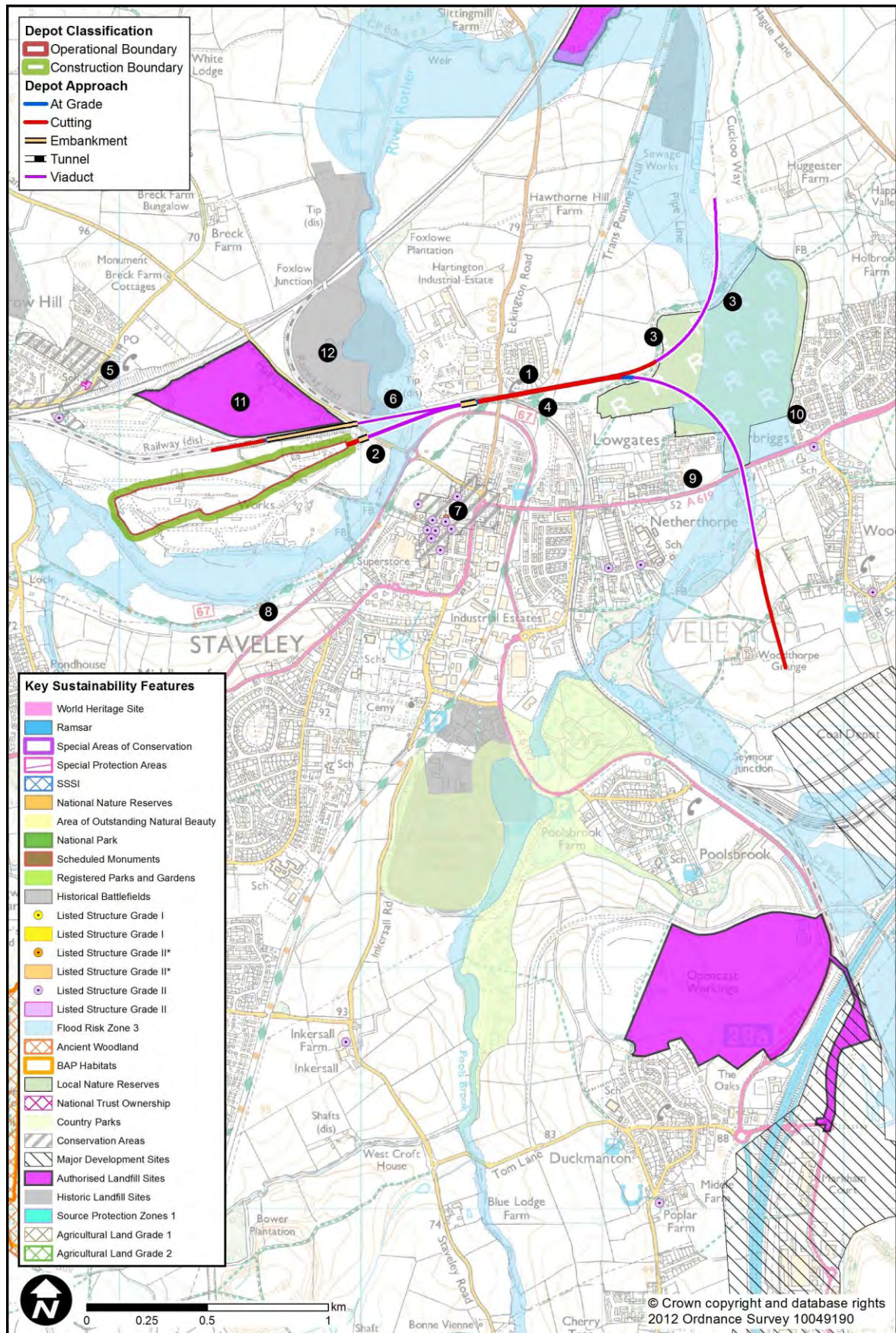


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| 13.1.4. | Population and settlements | The option would result in the demolition of an estimated 16 dwellings at ❶ Hartington. 15 of these dwellings are located in an area of relatively high deprivation. However, it is likely that further scheme refinement could minimise these demolitions. The depot option would also result in the demolition of one industrial property at ❷ Hall Lane Junction. |
| 13.1.5. | Noise | Modelling of noise impacts from the operational depot has not been undertaken. Noise impacts would be influenced by plant, generated road traffic, and the frequency and speed of trains travelling into the depot. |
| 13.1.6. | Health and well-being | Approximately 93 dwellings would be located within 100m of the depot option that could be at greater risk of disturbance from construction activity. |
| 13.1.7. | Access issues | Two promoted recreational routes would be potentially severed by the depot option, namely the ❸ Cuckoo Way (crossed twice) and the ❹ Trans Pennine Trail. HS2 Ltd would seek to maintain all existing right of ways (including promoted recreational routes) through the ongoing design of the scheme. |
| 13.1.8. | Jobs | Works for the depot option are predicted to result in the displacement of approximately 50 jobs. However, it is estimated that approximately 100 jobs would be created by the depot. |
| 13.1.9. | Planning and development | The site is designated for industrial and business use and Chesterfield Borough Council is currently preparing the Staveley Works Area Action Plan. The approach to the depot would cross green belt, the depot itself lies within the Area Action Plan. |

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| 13.1.10. Landscape, townscape and cultural heritage | Given the former industrial context, the impact on landscape character is expected to be minor. Visual impacts could affect parts of ⑤ Barrow Hill (which is also a conservation area), but any impacts are unlikely to be major. The depot approach would pass within 100m of ① Hartington and, although in cutting, would cause at least moderate visual impacts for some residents. The approach viaducts over the ⑥ River Rother are likely to have a moderate visual impact on the character of the valley and on ⑦ Staveley Conservation Area. It would also affect the visual amenity of recreational users of the ⑧ Canal Marina and the river valley. The new viaducts to the east would cause at least moderate visual impacts for residents at ⑨ Netherthorpe and ⑩ Mastin Moor. |
| 13.1.11. Biodiversity and wildlife | No key ecological designations would be affected by the depot option. |
| 13.1.12. Water resources and flood risk | The ⑥ River Rother, a major river, would require diversion. The depot option would occupy about 8ha of Flood Zone 3. |
| 13.1.13. Land use resources | The depot approach would occupy approximately 10ha of green belt. An ⑪ active and a ⑫ historic landfill site north-west of Staveley would be within 50m of the depot approach but not intersected by it. |
| 13.1.14. Waste and material use | It is estimated that the route section would result in a surplus of 281,411m ³ of excavated material.

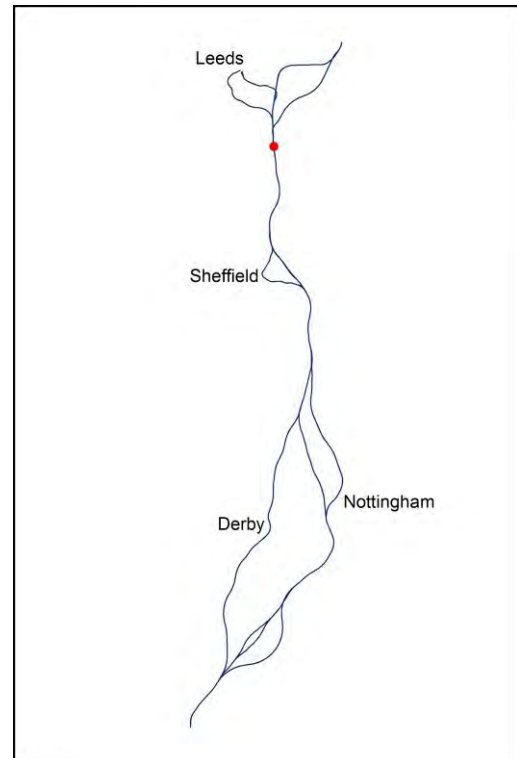
As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising would be hazardous. Estimated quantities of bulk building materials for this section comprise 1,000 tonnes of steel and 3,200 tonnes of concrete. |

Staveley 2 IMD Figure 1



13.2. New Crofton Rolling Stock Depot

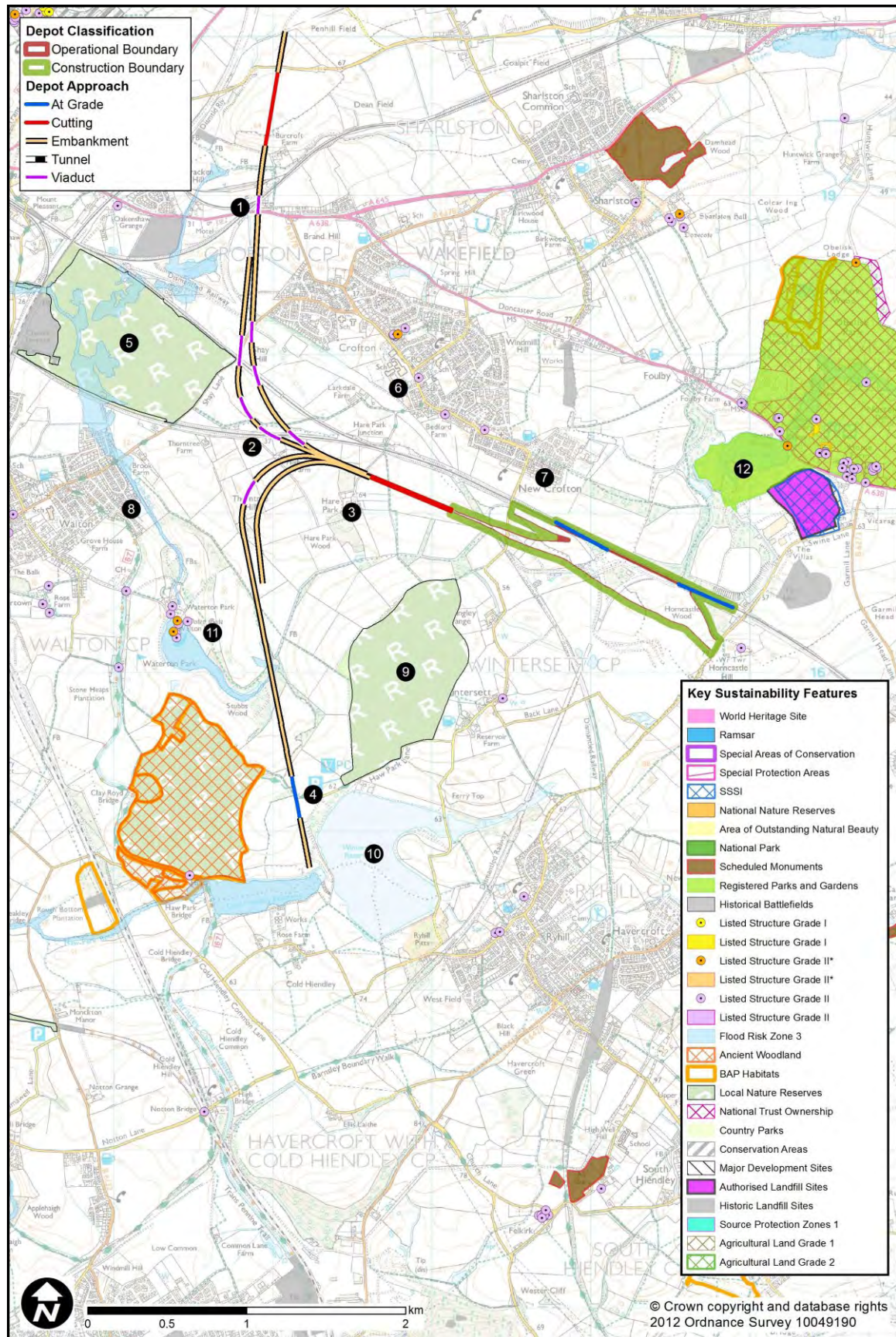
- 13.2.1. The depot would be located on land comprising agricultural land, a disused railway and a former coal disposal plant. It would be south of New Crofton and north of Anglers Country Park, to the east of Wakefield. This site would be single ended and connect with route sections HSL16 and its southern end and HSL17, HSL18, HSL19, or HSL21 at its northern end, with spur connections into the west side of the depot.
- 13.2.2. New Crofton RSD Figure 1 illustrates the depot location and the principal sustainability features in the area.
- 13.2.3. The potential for mitigation was limited at this early stage of depot design. However, care was taken to minimise impact on the surrounding landscape, settlements and ecological sites.



- 13.2.4. Population and settlements For the approach the depot would result in the demolition of an estimated four dwellings near ❶ Crofton East Junction, as well as ❷ Highfield Farm. Potential isolation is expected to affect two dwellings at ❸ Hare Park.
- 13.2.5. Noise Modelling of noise impacts from the operational depot has not been undertaken. Noise impacts would be influenced by plant, generated road traffic, and the frequency and speed of trains travelling into the depot.
- 13.2.6. Health and well-being Approximately 29 dwellings would be located within 100m of the depot that could be at greater risk of disturbance from construction activity.
- 13.2.7. Access issues The ❹ Trans Pennine Trail promoted recreational route would be severed by the depot option. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.
- 13.2.8. Jobs It is estimated that approximately 100 jobs would be created by the depot.
- 13.2.9. Planning and development The depot would support existing regional policy (the Yorkshire and Humber RSS to 2026) due to its location within a Regeneration Priority Area. However, existing regional strategies are to be revoked so this policy support will not apply in the future. The depot would conflict with local development policy (Wakefield Core Strategy) as it lies within green belt.
- 13.2.10. Landscape, townscape and cultural heritage Given the open character of the depot site and notwithstanding existing rail infrastructure, the depot option is likely to be visible over a fairly wide area and have moderate impacts on landscape character. The depot and, in particular, the complex junction arrangements with the high speed line, including embankment and viaduct over an existing railway, would have moderate to major impacts on landscape character,

- including the setting of ⑤ Walton Country Park, immediately to the west, and the visual amenity of residents at ⑥ Crofton, ⑦ New Crofton and ⑧ Walton, and recreational users of ⑨ Anglers Country Park and ⑩ Winterset Reservoir. There would be a direct impact on woodland on the eastern edge of ⑪ Walton Hall (hotel and golf course).
- ⑫ Nostell Priory Grade II* Registered Park and Garden would be within 500m although situated beyond the existing railway and behind a wooded slope. Impacts on its setting would be negligible.
- Potential impacts on the setting of one Grade II listed structure near the depot approach would be negligible.
- 13.2.11. Biodiversity and wildlife The route section would pass within 10km of one Natura 2000 wildlife site. However HRA screening confirms that there would be no likely significant effects on this site.
Nostell Brickyard Quarry SSSI would be within 2km, but would be unaffected.
- 13.2.12. Water resources and flood risk The depot approach would occupy about 1ha Flood Zone 3.
- 13.2.13. Land use resources The depot option would occupy about 36ha of green belt.
- 13.2.14. Waste and material use It is estimated that the route section would result in a deficit of - 2,337,765m³ of excavated material.
Estimated quantities of bulk building materials for this section comprise 2,100 tonnes of steel and 6,500 tonnes of concrete.

New Crofton RSD Figure 1



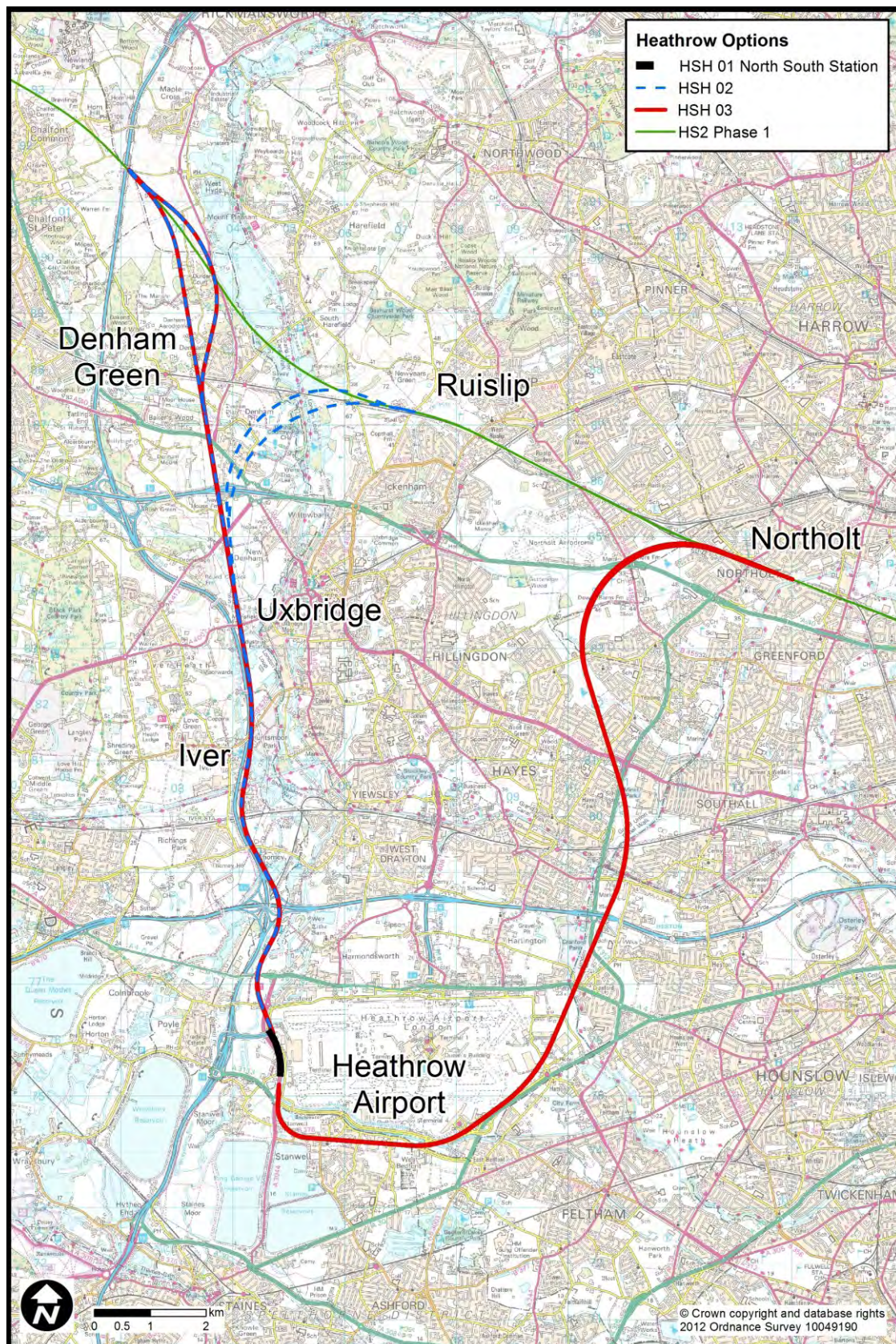
14. Classic compatible services

- 14.1.1. This chapter describes the infrastructure needed to enable high speed classic compatible high speed trains on the high speed network to access existing rail infrastructure and so serve Nottingham Station and Sheffield Midland Station. There are other locations on both the Leeds and Manchester routes, where classic compatible trains would leave the high speed network and join the existing network. These include connections to the ECML near Ulleskelf and connections with the WCML at Crewe, Golborne and Preston. Infrastructure associated with these connections is not considered here.
- 14.1.2. Works to Attenborough Junction would be required to allow classic compatible trains to serve Nottingham. To allow classic compatible trains to serve Sheffield, works are required in Darnall and to Network Rail lines.
- 14.1.3. Population and settlements Classic compatible infrastructure would result in the demolition of an estimated four dwellings.
- 14.1.4. Noise It is assumed that one HS2 train per hour would run to each of Sheffield and Nottingham. Due to the low frequency of these trains approaching into Sheffield and Nottingham city centres compared to classic train services, it is likely there would be a negligible change in population potentially annoyed by operational noise.
- 14.1.5. Access issues The Trans Pennine Trail and Sheffield Country Way promoted recreational routes would each be crossed by classic compatible infrastructure. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.
- 14.1.6. Landscape, townscape and cultural heritage The classic compatible Attenborough Flyover would pass south-west along the edge of Attenborough Gravel Pits, a popular visitor location. The flyover would be overlooked at close range from parts of Long Eaton, Attenborough village (a conservation area), the visitor centre, Trent Meadows picnic site, the River Trent corridor and the Trent Valley Way. Both landscape character and visual impacts are expected to be high as there are no existing elevated structures in this sensitive, open and relatively undeveloped section of the river corridor. The classic compatible Darnall lines would involve a twin-track route section which would run from north-west of Swallownest to north of Handsworth, east of Sheffield. Initially in cutting, it would rise onto parallel viaducts, veering north-west and over an existing railway line and the HS2 mainline. There would be a small direct impact on informal open space at Treeton Dyke as well as visual impact on recreational receptors and residents at Woodhouse, who would have views of the viaducts over the railway. Other potential recreational receptors would include walkers on the Trans Pennine Trail, which the HS2 route would cross on embankment then follow on embankment or viaduct at a distance of 300-400m for around 1km in the area east of Treeton Dyke. Given the presence of existing railways and industrial areas close by, the visual impact of the twin viaducts is assessed as moderate only, but it might nonetheless be significant. The classic compatible Darnall Network Rail lines would follow an existing rail line at grade, approaching Sheffield Midland Station from

the east through the suburbs of Darnall and Park Hill. There is likely to be some localised direct impact on landscape character depending on the extent of any demolitions and loss of lineside vegetation. There may also be some additional visual impact, potentially affecting lineside properties and the settings of the Park Hill Estate Grade II* Listed Structure and part of Sheaf Valley Park, which would overlook the line at its western end. Overall impacts are expected to be relatively minor.

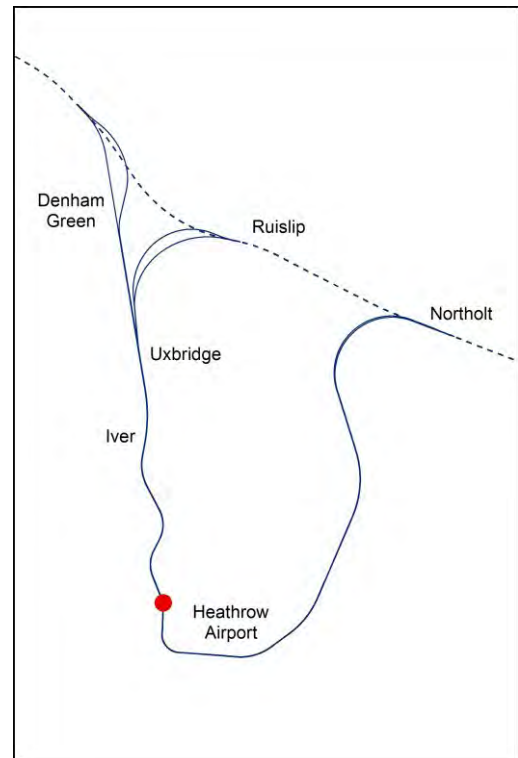
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| 14.1.7. | Biodiversity and wildlife | <p>Classic compatible infrastructure would pass within 10km of two Natura 2000 wildlife site. However, the HRA screening confirms that there would be no likely significant effects on these sites.</p> <p>Classic compatible infrastructure would intersect Attenborough Gravel Pit SSSI. Although the route would be primarily on viaduct there is potential to affect birds and plants forming special interest features of the site.</p> <p>In addition, an area of reedbeds BAP habitat would be directly affected by the Attenborough flyover.</p> |
| 14.1.8. | Water resources and flood risk | <p>The classic compatible infrastructure works at Darnall may require diversion to the River Sheaf, a major watercourse.</p> <p>In total, classic compatible infrastructure would cross about 2.2km of Flood Zone 3.</p> |
| 14.1.9. | Land use resources | <p>Classic compatible infrastructure would cross about 5.3km of green belt.</p> <p>Five landfill sites would be directly affected by the classic compatible infrastructure, and the design would require further work to minimise risks to people and the environment from these impacts.</p> |
| 14.1.10. | Waste and material use | <p>Estimated quantities of excavated material have not been determined at this stage for the classic compatible works.</p> <p>As a result of the route section impacting on the landfill sites, it is possible that some hazardous waste may be produced.</p> <p>Estimated quantities of bulk building materials for classic compatible infrastructure comprise 4,800 tonnes of steel and 15,100 tonnes of concrete.</p> |

15. Heathrow route: line of route and stations



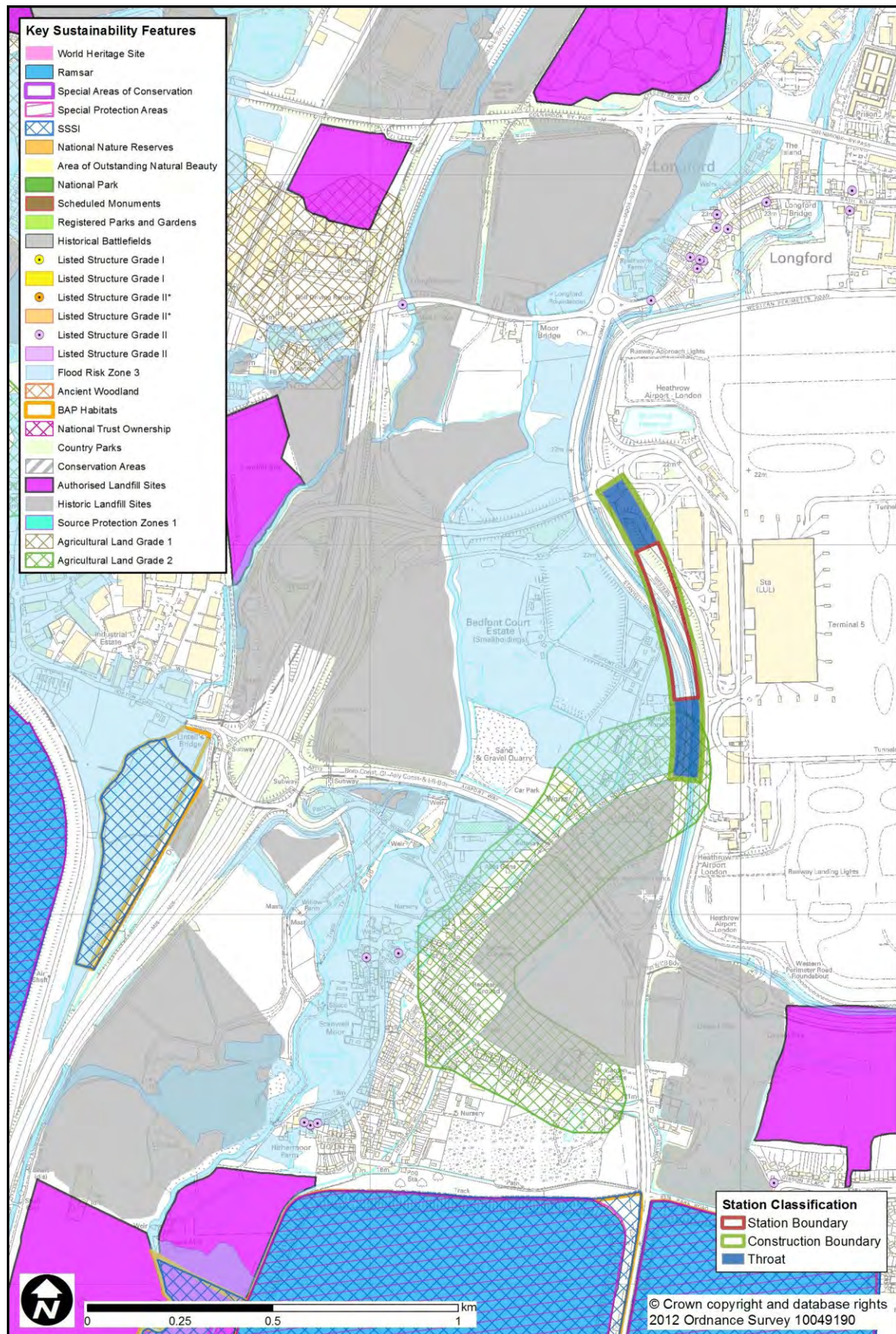
15.1. HSH01 Heathrow Terminal 5 HS2 Station

- 15.1.1. The new Heathrow HS2 Station is the only station option under consideration at this stage, and would serve any of the connections off Phase 1. It would be located to the west of Heathrow Terminal 5 (T5) and would be aligned in a north-south direction. It would be situated broadly alongside the A3044 Stanwell Moor Road and the Duke of Northumberland's River and Longford River ("the twin channelled rivers"). The station would be constructed below the ground and above the existing Piccadilly and Heathrow Express lines, but below the level of the adjacent T5 building and multi storey car parks. It would link to T5 with a 100m long travelator.
- 15.1.2. HSH01 Heathrow Terminal 5 HS2 Station Figure 1 illustrates the station location and the principal sustainability features in the area.
- 15.1.3. The potential for mitigation was limited at this early stage of station design. However, care was taken to minimise impact on flooding and water resources, surrounding landscape and ecological sites.
- 15.1.4. Population and settlements No dwellings would be demolished. However, the station would result in the demolition of a water treatment facility located along the ① Western Perimeter Road.
- There would be no potential isolation or severance of residential dwellings.
- 15.1.5. Noise Modelling of noise impacts from the operational station will be undertaken as designs are progressed. However, it is likely that noise impacts would be limited by the location of the station, which would be below the ground, with the station approach in cutting. The likelihood of increase in noise from secondary effects such as traffic intensification would be low as it is an existing busy international transport hub. The potential significance of any noise increase is likely to be low as there are few dwellings in the vicinity and they are currently exposed to existing motorway and aircraft noise.
- 15.1.6. Health and well-being No dwellings would be located within 100m of the station.
- 15.1.7. Access issues The station would offer some public transport interchange opportunities as it connects directly with the Piccadilly Underground Line and Heathrow Express Line. It would also offer direct access to Heathrow Terminal 5 for international connectivity.
- The station option would not directly affect any promoted recreational routes.



15.1.8.	Planning and development	The station would lie partly within land identified in the Heathrow Airport Interim Masterplan (2005) for ancillary use. These types of areas have to be located on existing airport land which results in limited options for alternatives. The London Plan (2008) supports improvements of routes to Heathrow Airport. There would be limited direct impact on landscape resources, other than some tree and vegetation loss. There would be only a slight impact on landscape character, as the new station would relate closely to existing buildings and infrastructure.
15.1.9.	Landscape, townscape and cultural heritage	There would be some localised visual impacts on ② Bedfont Court smallholdings to the west. It is possible that there would also be some localised visual impact on residents to the outskirts of ③ Longford Conservation Area to the north and ④ Stanwell Moor to the south-west. However, given the distance and the existing landscape context this is not expected to be significant.
15.1.10.	Biodiversity and wildlife	<p>The station would be located within 10km of three Natura 2000 sites. The potential for significant effects at one of these, ⑤ South West London Water Bodies SPA and Ramsar site, cannot be discounted at this stage. Further details are described in an HRA screening report, which acknowledges the need for more detailed analysis. Any potential in-combination effects of Phase 1 and the proposed Heathrow link option would form a necessary part of ongoing HRA screening requirements to determine the likelihood of a significant effect on the South West London Water Bodies SPA and Ramsar site, and would need to be considered in order to inform the decision on the choice of link to serve Heathrow.</p> <p>One SSSI would be located within 2km, but any adverse effects are considered unlikely.</p>
15.1.11.	Water resources and flood risk	<p>Two minor rivers, the ⑥ Duke of Northumberland's River and ⑥ Longford River (the twin channelled rivers) are likely to need diverting, with wider implications for the River Colne system to which they are linked.</p> <p>The station lies partly in the floodplain (Flood Zone 3) of the ⑦ River Colne system and would, without mitigation, potentially be at risk of flooding. Continuing scheme design would seek to avoid or minimise these impacts.</p> <p>Taking account of both the permanent station footprint and the provisional construction footprint, about 1.8ha of Flood Zone 3 would be affected.</p>
15.1.12.	Land use resources	The station would occupy some 5ha of green belt.
15.1.13.	Waste and material use	<p>The sub-surface station option would generate excavated material, although estimated quantities have not been calculated at this stage.</p> <p>The station would require an estimated 381,100 tonnes of concrete; estimated quantities of steel are not provided at this stage.</p>

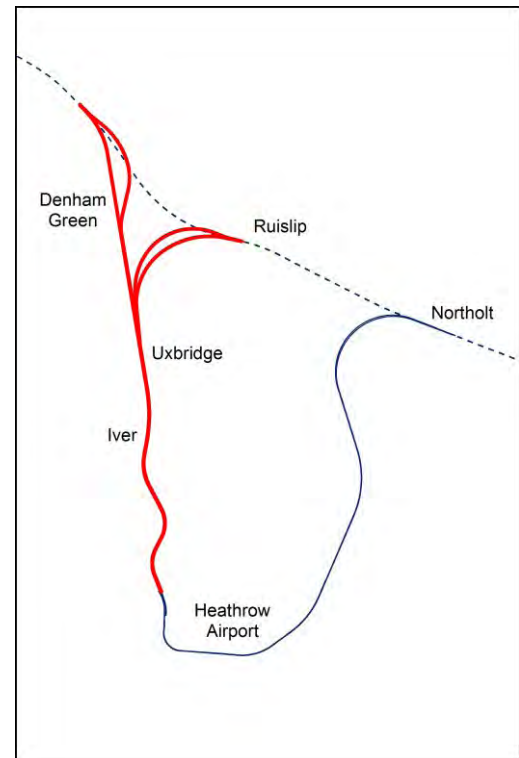
HSH01: Heathrow Terminal 5 HS2 Station - Figure 1



15.2. HSH02: M25 East East NS Station Spur

15.2.1. The route section would be approximately 30km (19 miles) long and would comprise two spurs off Phase 1 that connect with a new station at Heathrow Terminal 5.

15.2.2. The route section would diverge from the main HS2 line at Chalfont Common. The two lines would use a mix of embankment, cutting and viaduct across open countryside through the Colne Valley, before entering separate tunnel portals that would pass under the A412, Durdent Court, Denham Aerodrome and Denham Green. They would converge beneath the Chilterns Railway and the M40. The route section would emerge from tunnel just south of the M40 and remain largely at grade as it passes alongside the eastern edge of the M25. It would then rise onto viaduct at Huntsmoor Park to carry it over the Grand Union Canal, the Great Western Line, the M25 and M4 junction and then across Harmondsworth Park to the A4. At the A4 it would pass into cut and cover and enter the new T5 station. The eastern arm of the spur from the Phase 1 line would run for a short distance along the surface to the north of Ickenham before entering tunnel beneath the existing Chiltern Line and emerging to the south of the M4 on surface and embankment before tying into the western arm of the spur near New Denham.



15.2.3. HSH02 Figure 1 illustrates the route alignment and the principal sustainability features in the area.

15.2.4. The potential for mitigation is limited at this early of design. However, care was taken to minimise impact on the surrounding landscape, settlements, ecological sites and water resources.

15.2.5. Population and settlements The route section would result in the demolition of an estimated eight dwellings and one community building, ① Iver Nature Study Centre south of New Denham. In addition, an estimated ten commercial properties would also be demolished with a total of seven at ② Court Lane Depot Site, Iver.

Potential isolation would affect three areas comprising two dwellings at ③ Longfordmoor, five dwellings at ④ M40 junction 1 and one dwelling at ⑤ Mansfield Farm.

15.2.6. Noise Noise from HS2 trains would result in annoyance for approximately 11 people (equivalent to the occupants of five dwellings). With ambient road noise from nearby motorways also taken into account, noise impacts from HS2 would be expected to be less than this.

In terms of noise insulation, approximately three dwellings would potentially qualify.

15.2.7. Health and well-being Approximately ten dwellings would be located within 100m of the route that could be at greater risk of disturbance from construction activity.

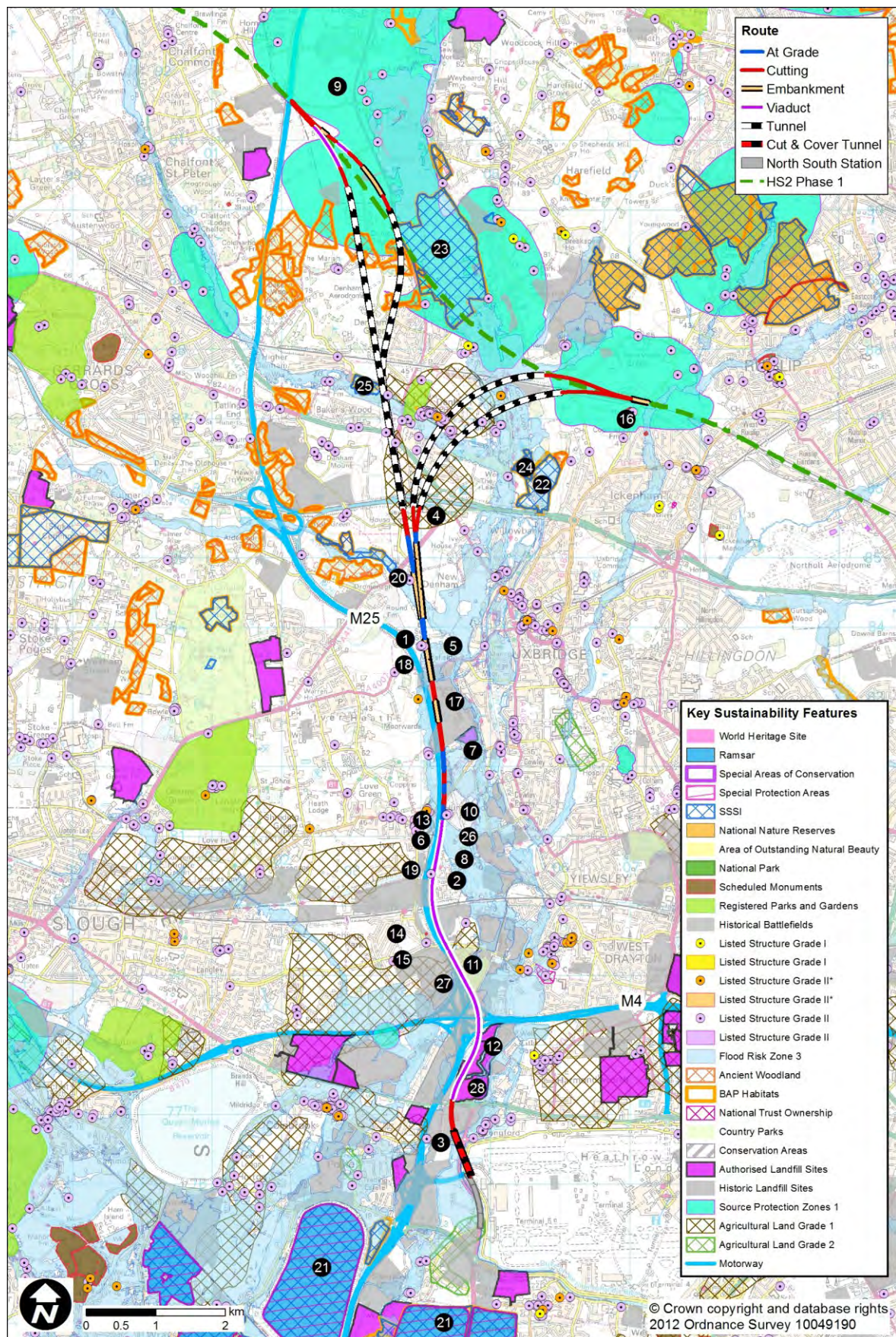
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| 15.2.8. | Access issues | <p>⑥ Shakespeare's Way and the ⑧ Grand Union Canal Walk promoted recreational routes would potentially be severed by the route section. HS2 Ltd would seek to maintain all existing rights of way (including promoted recreational routes) through the on-going design of the scheme.</p> |
| 15.2.9. | Planning and development | <p>The station would lie partly within land identified in the Heathrow Airport Interim Masterplan (2005) for ancillary use. These types of areas have to be located on existing airport land which results in limited options for alternatives. The London Plan (2008) supports improvements of routes to Heathrow Airport.</p> |
| 15.2.10. | Landscape, townscape and cultural heritage | <p>The route would adversely affect the landscape character of the ⑨ Colne Valley south of Maple Cross, as well as between Uxbridge and Heathrow. It would give rise to direct impacts on unregistered parkland at ⑩ Huntsmoor Park, ⑪ Thorney Country Park and golf course and ⑫ Harmondsworth Park. The viaduct crossings of the M4 and Great Western Line railway would have visual impacts on recreational users of these areas, including views from walking routes within the Colne Valley to the east (⑦ London Loop, ⑧ Grand Union Canal Walk and ⑥ Shakespeare's Way) and users of the ⑧ Grand Union Canal. Residential areas at ⑬ Iver (a conservation area), which directly adjoin the western edge of the motorway, ⑭ Richings Park (south of Iver Station) and at ⑮ Thorney (north of the M4 and M25 junction), might also have some views of the viaduct rising above the motorway.</p> <p>Any impact on the Chilterns AONB should be negligible as the route section would be in cutting and separated from the AONB by the M25. Three woodlands would be directly impacted by the route section.</p> <p>Indirect impacts may affect the setting of nearby ⑯ Brackenbury Farm moated site Scheduled Monument north of Ickenham. The proposed route would pass the designated site on embankment to the north of the existing railway, although some screening is provided by mature trees and adjacent farm buildings. Scheduled crop marks would lie near the route, at Thorney north of the M4. However, it is unlikely that any above ground remains are present, so their setting would not be affected.</p> <p>Three Grade II listed structures would be directly affected by the route with moderate impacts, namely ⑩ a barn to the south of Huntsmoor Park Farmhouse, ⑰ a dovecote east of Mansfield Farm and ⑱ Iver Court Farmhouse.</p> <p>The route could indirectly affect the setting of 15 Grade II listed structures. At least minor impacts would affect five listed structures, namely ⑩ Huntsmoor Park Farmhouse, ⑤ Mansfield Farmhouse, ⑤ Barn to the north east of Mansfield Farm, ⑳ Southlands Manor, and ㉑ Barn to the north east of Southlands Manor. All other impacts would be negligible.</p> |
| 15.2.11. | Biodiversity and wildlife | <p>The route would be located within 10km of four Natura 2000 sites. The potential for significant effects at one of these sites, ㉒ South West London Water Bodies SPA and Ramsar site, cannot be discounted at this stage. Further details are described in an HRA screening report, which acknowledges the need for more detailed analysis. Any potential in-combination effects of Phase 1 and the proposed Heathrow link option would form a necessary part of ongoing HRA screening requirements to</p> |

determine the likelihood of a significant effect on the South West London Water Bodies SPA and Ramsar site, and would need to be considered in order to inform the decision on the choice of link to serve Heathrow.

Ten SSSIs would be located within 2km of the route section. There is a moderate risk of impact to 22 Frays Farm Meadows SSSI, 23 Mid Colne Valley SSSI, 24 Denham Lock Wood SSSI and 25 Old Rectory Meadows SSSI through air pollution and water pollution or other hydrological changes. Hydrological impacts (see *water resources and flood risk*) through construction works in the lakes could have indirect impacts on the Colne Valley SSSI, which is likely to be linked hydrologically with them.

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| 15.2.12. Water resources and flood risk | <p>The 26 Colne Brook, a major river, would need to be diverted. Continuing scheme design would seek to avoid or minimise this impact.</p> <p>The line would be in cutting through the channel of the River Colne, the twin channelled rivers and two minor tributaries. Approximately 200m of line would be in cutting in Flood Zone 3, bisecting the entire floodplain, and therefore at risk of flooding.</p> <p>Approximately 5km of the route section would be in cutting or tunnel through Grade 1 Source Protection Zones and a further 1.5km through Grade 2 Source Protection Zones, with potentially major impacts on water abstractions in Ickenham, Blackford, Northmoor and West Hyde. The route section would cross about 8.2km of Flood Zone 3. There is also potential for impacts on surface water quality on the system of lakes in the Colne Valley, as well as groundwater impacts.</p> |
| 15.2.13. Land use resources | <p>The route section would intersect about 1.5km of Grade 1 agricultural land. Taking account of the separation of lines tying in with Phase 1, about 14km of the route section would be through green belt.</p> <p>The route section would directly affect 17 landfills. A cluster of seven historic landfills 17 south of Uxbridge Moor; a cluster of six historic landfills at 27 Thorney; and a cluster of three active landfills at 28 Longford.</p> |
| 15.2.14. Waste and material use | <p>It is estimated that the route section would result in a surplus of 3,043,700m³ of excavated material.</p> <p>As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.</p> <p>Estimated quantities of bulk building materials for this section comprise 9,800 tonnes of steel and 30,100 tonnes of concrete.</p> |

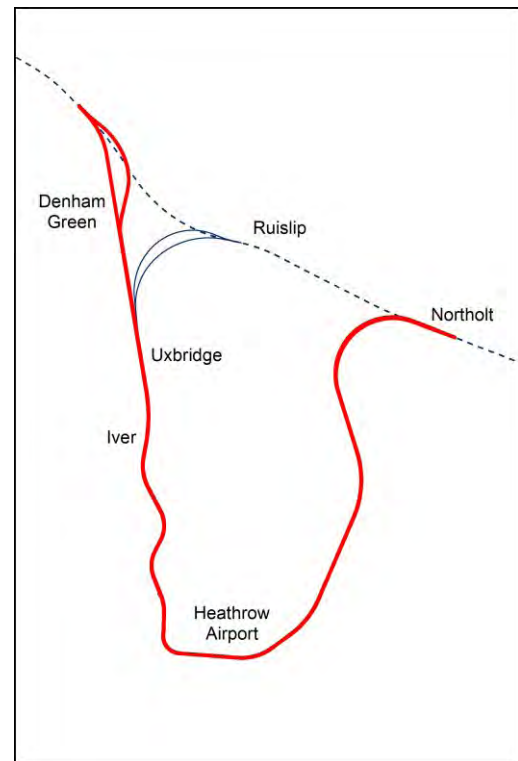
HS202: M25 East East North South Station Spur - Figure 1



15.3. HSH03: M25 East East NS Station Loop

15.3.1. The route section would be approximately 39km (24 miles) long and would comprise a loop that diverges from Phase 1, passes through a new station at Heathrow Terminal 5 (T5) and then continues to re-join Phase 1 at Northolt.

15.3.2. The route section would diverge from Phase 1 at Chalfont Common. The two lines would use a mix of embankment and cutting through the Colne Valley, before entering separate tunnel portals that would pass under the A412, Durdent Court, Denham Aerodrome and Denham Green. They would converge beneath the existing Chilterns Railway and the M40. The route section would emerge from tunnel just south of the M40 and remain largely at ground level as it passes alongside the eastern edge of the M25. It would then rise onto viaduct at Huntsmoor Park to carry it over the Grand Union Canal, the existing Great Western Line, the M25 and M4 junction and then across Harmondsworth Park to the A4. At the A4 it would pass into cutting and enter the new T5 Station. Continuing south of the new station, the route section would enter a tunnel and run to the south of the airport underneath the twin channelled rivers and the A3113, close to Staines Reservoir and then east towards Terminal 4. It would then continue north in tunnel underneath the M4, through Hayes and Southall and loop east as it crossed the A40 in cutting and viaduct to Northolt where it would join the main HS2 line.



15.3.3. HSH03 Figure 1 illustrates the route alignment and the principal sustainability features in the area.

15.3.4. The potential for mitigation is limited at this early stage of design. However, care was taken to minimise impact on the surrounding landscape, settlements, ecological sites and water resources.

15.3.5. Population and settlements The route section would result in the demolition of an estimated 30 dwellings. These include clusters ❶ at Mandeville Road Northolt (12 dwellings) and ❷ Carr Road Northolt (six dwellings) and two community buildings (❸ Iver Nature Study Centre south of New Denham and the ❹ London Ladies Football Club, South Ruislip). No residential demolitions would be required in areas of relatively high deprivation. In addition, an estimated ten commercial properties would also be demolished with seven of these located at ❺ Court Lane Depot site.

Three areas would be isolated affecting five dwellings at ❻ M40 junction 1, two dwellings at ❼ Longfordmoor and one dwelling at ❽ Mansfield Farm.

15.3.6. Noise Noise from HS2 trains would result in annoyance for approximately 27 people (equivalent to the occupants of 12 dwellings). With ambient road noise from nearby motorways also taken into account, noise impacts from HS2 would be expected to be less than this.

In terms of noise insulation, approximately 45 dwellings would potentially

		qualify.
15.3.7.	Health and well-being	Approximately 950 dwellings would be located within 100m of the route section that could be at greater risk of disturbance from construction activity.
15.3.8.	Access issues	⑨ Shakespeare's Way and the ⑪ Grand Union Canal Walk promoted recreational routes would potentially be severed by the route section. HS2 Ltd would seek to maintain all existing right of ways (including promoted recreational routes) through the ongoing design of the scheme.
15.3.9.	Planning and development	The route would lie partly within land identified in the Heathrow Airport Interim Masterplan (2005) for ancillary use. These types of areas have to be located on existing airport land which results in limited options for alternatives. The London Plan (2008) supports improvements of routes to Heathrow Airport.
15.3.10.	Landscape, townscape and cultural heritage	<p>The route would adversely affect the landscape character of the 12 Colne Valley south of Maple Cross as well as between Uxbridge and Heathrow. It would give rise to direct impacts on unregistered parkland at ⑬ Huntsmoor Park, ⑭ Thorney Country Park and golf course and ⑮ Harmondsworth Park. The viaduct crossings of the M4 and Great Western Line railway would have visual impacts on recreational users of these areas, including views from walking routes within the Colne Valley to the east (⑩ London Loop, ⑪ Grand Union Canal Walk and ⑨ Shakespeare's Way) and users of the ⑪ Grand Union Canal.</p> <p>Residential areas at ⑯ Iver (a conservation area), which adjoin the western edge of the motorway at ⑰ Richings Park (south of Iver Station), and ⑱ Thorney (north of the M4 and M25 junction), could also have views of the viaduct rising above the motorway.</p> <p>At ⑲ Northolt, the route section's alignment on viaduct and embankment over an existing railway, would give rise to severe visual impacts to adjacent residential areas and a school.</p> <p>Any impact on the Chilterns AONB would be negligible, as the route section would be in cutting and separated from the AONB by the M25. One woodland would be directly impacted by the route section.</p> <p>Four Grade II Listed Structures (⑬ Barn to the south of Huntsmoor Park Farmhouse, ⑳ Dovecote east of Mansfield Farm, ㉑ Iver Court Farmhouse and a ㉒ Polish War Memorial) would be directly affected by the route. The ㉒ Polish War Memorial is an iconic structure with major historic significance. The route section would be cutting in this location and therefore the impact would be major. However, the structure could be re-located. Loss of the other structures would be minor impacts.</p> <p>The route could affect the setting of 15 Grade II listed structures. At the very least, minor impacts would affect five listed structures, namely ⑬ Huntsmoor Park Farmhouse, ⑧ Mansfield Farmhouse, ⑧ Barn to the north east of Mansfield Farm, ㉓ Southlands Manor, and ㉔ Barn to the north east of Southlands Manor.</p>
15.3.11.	Biodiversity and wildlife	The route would be located within 10km of four Natura 2000 sites. The potential for significant effects at one of these sites, ㉔ South West London Water Bodies SPA and Ramsar site, cannot be discounted at this stage. Further details are described in an HRA screening report, which acknowledges the need for more detailed analysis. Any potential in-

combination effects of Phase 1 and the proposed Heathrow link option would form a necessary part of ongoing HRA screening requirements to determine the likelihood of a significant effect on the South West London Water Bodies SPA and Ramsar site, and would need to be considered in order to inform the decision on the choice of link to serve Heathrow.

Ten SSSIs would be located within 2km of the route section. Several of these are at risk of adverse effects from pollution or changes in hydrology, namely: 25 Mid Colne Valley SSSI; 26 Old Rectory Meadows SSSI; and 27 Staines Moor SSSI.

15.3.12. Water resources and flood risk

The route would cross about 3 km of Flood Zone 3.

The 28 Colne Brook a major river would need to be diverted. Continuing scheme design would seek to avoid or minimise these impacts. There would be deep cutting through the River Colne and the Yeading Brook, both of which would require the use of aqueducts to convey the river over the route, with a substantial flood defence in order to prevent the line from flooding, and significant amounts of floodplain compensation obtained from areas which are presently outside of the floodplain.

There would also be long sections of embankment within Flood Zone 3, which would require floodplain compensation. Low crossings over the Alder Bourne, the Colne brook and the Wraysbury River could also result in increased flood levels which would need to be mitigated by design and compensation.

Approximately 2.6km of the route section would be in cut or tunnel through SPZ1, with a further 1.2km through SPZ2 with potentially major impacts on water abstractions in Blackford, Northmoor and West Hyde.

15.3.13. Land use resources

The route would intersect about 500m of Grade 1 agricultural land. It would affect about 14km of green belt.

The route section would directly affect 20 landfills. A cluster of seven historic landfills 32 south of Uxbridge Moor; a cluster of six historic landfills at 33 Thorney; and a cluster of three active landfills at 34 Longford. The remaining four landfills are scattered along the route.

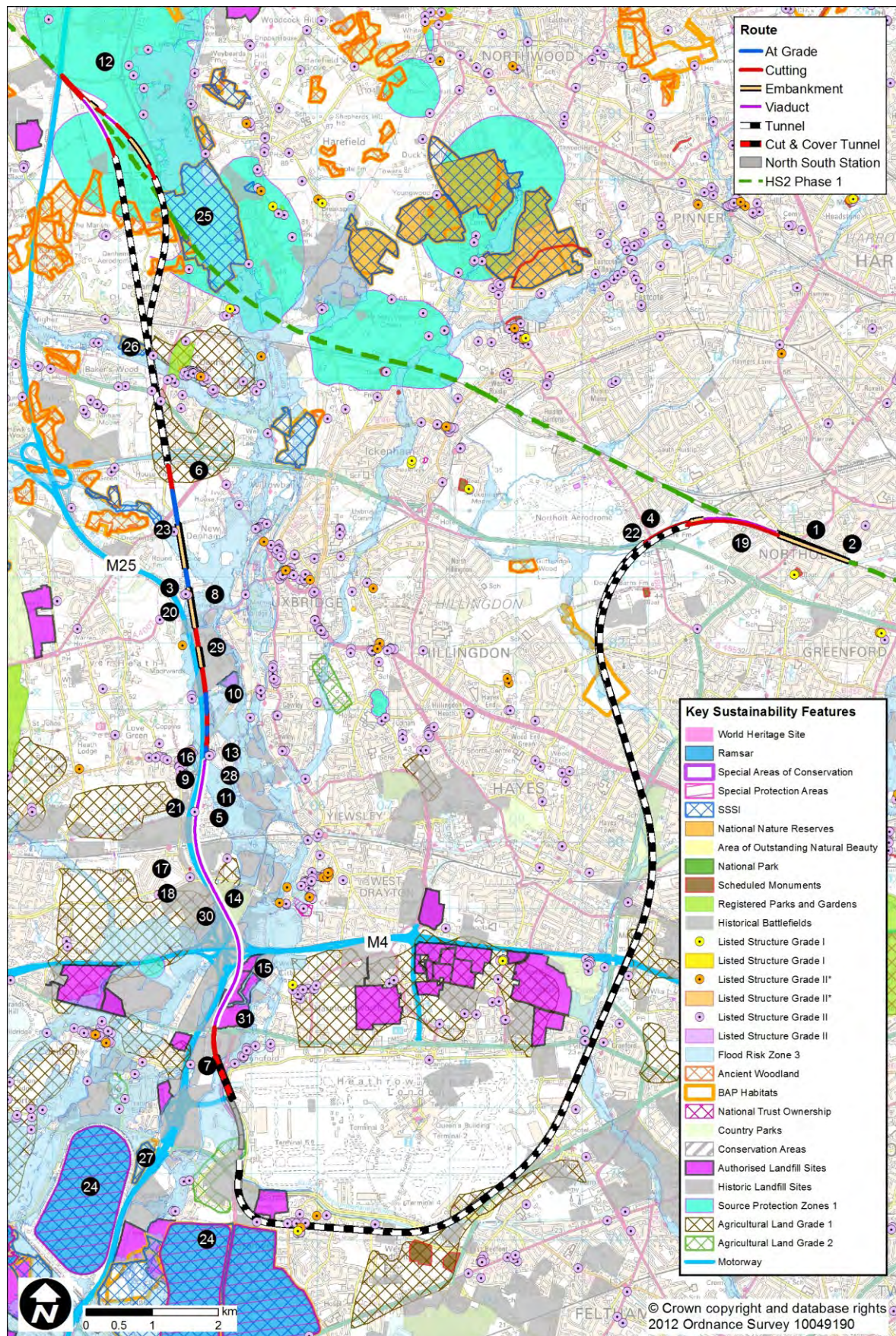
15.3.14. Waste and material use

It is estimated that the route section would result in a surplus of 5,346,200m³ of excavated material.

As a result of the route section impacting on the landfill sites, it is possible that some of the waste material arising in the route section would be hazardous.

Estimated quantities of bulk building materials for this section comprise 12,400 tonnes of steel and 38,300 tonnes of concrete.

HS2 Phase 1: M25 East East NS Station Loop – Figure 1



16. The base proposition

16.1. Overview

- 16.1.1. This section summarises the sustainability performance of the base proposition, as referenced in the *Options for phase two of the high speed network* report. The base proposition represents a high speed rail network that meets the HS2 Ltd remit set by Government. It is used by HS2 Ltd as the basis for analysis of the business case. It has no particular status over any other possible whole route scenario.
- 16.1.2. The base proposition comprises a single route to Leeds and a single route to Manchester, including interchange stations, depots and connections with the existing rail network off each arm. The specific elements (or route sections) of the base proposition are listed below. More detailed descriptions of these route sections are provided in their appropriate chapters.

Manchester

- HSM03 Streethay to Swynnerton;
- HSM06 Swynnerton to Madeley;
- HSM08 Madeley to Hough;
- HSM10 Hough to Winterbottom;
- HSM12 Winterbottom to Warburton;
- HSM33 Little Bollington to Carrington;
- HSM31B Carrington to Ardwick;
- HSM26 Ardwick to Manchester Piccadilly Station;
- HSM21 Warburton to Lowton;
- HSM22 Lowton to Bamfurlong (connection to the WCML); and
- Depots at Crewe and Golborne.

Leeds

- HSL01 Water Orton to Birchmoor;
- HSL06 Birchmoor to Tonge;
- HSL09 Tonge to Long Eaton;
- HSL26 Long Eaton to Sandiacre (Toton Station);
- HSL11 Sandiacre to Tibshelf;
- HSL05 Tibshelf to Killamarsh;
- HSL14 Killamarsh to Tinsley;
- HSL28 Tinsley to Blackburn (Meadowhall Station);
- HSL16 Blackburn to Cold Hiendley;
- HSL21 Cold Hiendley to Woodlesford;
- HSL22 Woodlesford to Hunslet;
- HSL31 Hunslet to Neville Street (Leeds Station LST13F);

- HSL17 Cold Hiendley to Church Fenton; and
- Depots at Staveley and New Crofton.

16.1.3. The sustainability performance of the base proposition is described respectively for the Manchester and Leeds routes. Having first summarised the characteristics of the route, its sustainability performance is reported in terms of the principal individual impacts of the routes, stations and depots, as well as the combined impacts that represent a summation of the individual impacts.

16.2. Manchester base proposition characteristics

16.2.1. The base proposition to Manchester would comprise about 140km (88 miles) of new railway, including the main route up to the outskirts of Manchester, the approach into the station and the connection with the WCML. This comprises the following mix of alignments.

Alignment	Length (km)
At Grade	19.5
Cutting	38.6
Embankment	49.5
Tunnel	14.8
Viaduct	18.5
Grand Total	140.9

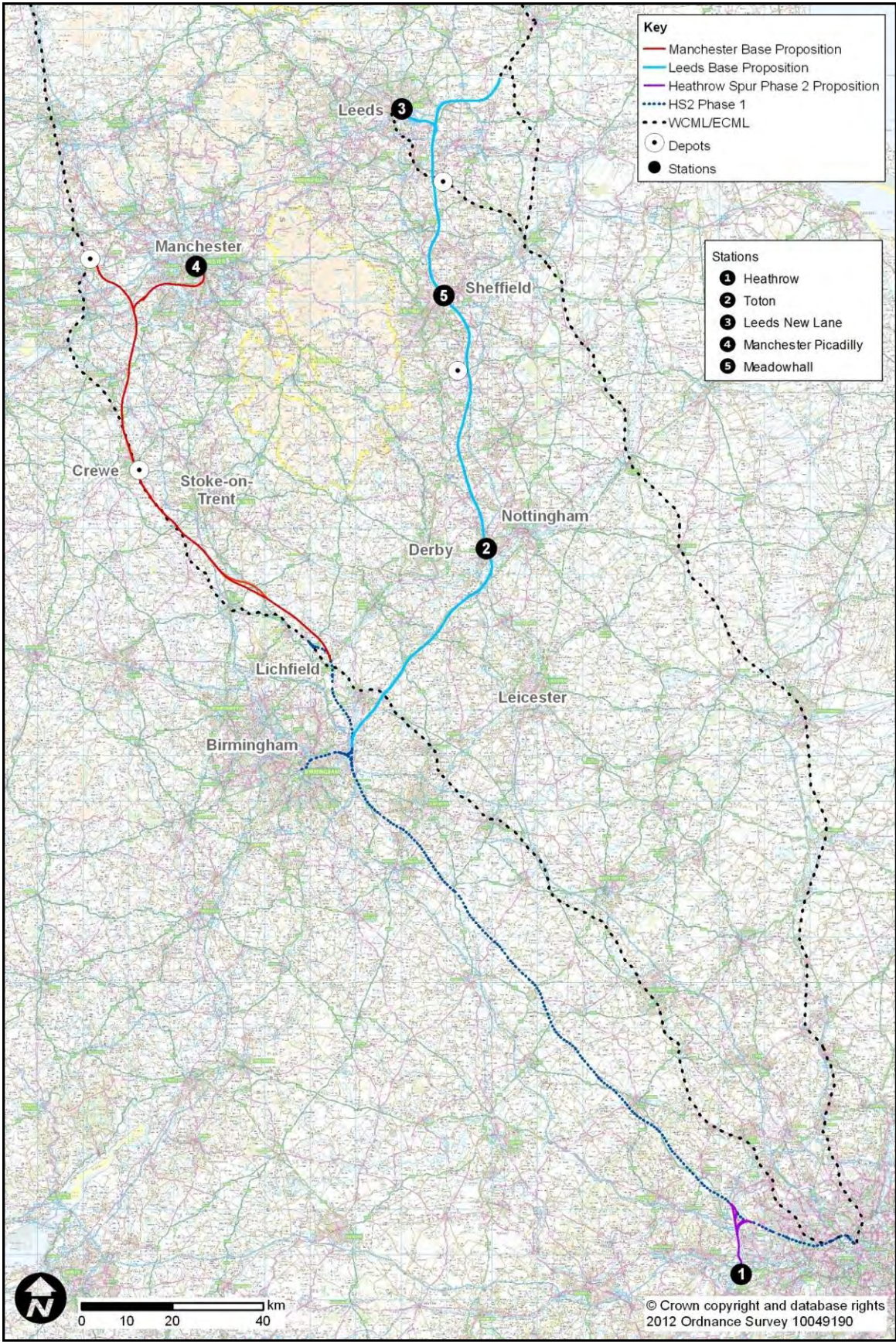
16.2.2. Of this, an estimated 28.7km (about 22% of the surface route) would be within (i.e. within 150m of) an existing transport corridor (A-road, motorway or railway).

16.3. Manchester base proposition key impacts

16.3.1. Describing first the terminus station, the base proposition to Manchester would terminate at Manchester Piccadilly. The station would provide for excellent interchange with existing public transport, and improved pedestrian access in the area. It would offer substantial potential for supporting local economic activity, and through this, for some 29,700 jobs and 3,100 houses. The industrial and commercial character of the proposed station site would be well suited for development, and townscape impacts would be low, although the listed train shed would be affected.

16.3.2. Describing the route from south to north, it has been kept away from Cannock Chase AONB, while other refinements have been introduced to reduce impacts on settlements such as Hixon and Salt, and Sandon registered park, although this has introduced possibly greater risks to the European designated Pasturefields Salt Marsh SAC, as well as other landscape impacts, particularly from the long viaduct across the Trent Valley. Its route through open countryside south of Newcastle under Lyme would result in landscape impacts, but continuing north it would join the corridor of the WCML near Madeley. It would remain alongside this existing railway (apart from where it passes in tunnel beneath Crewe) for some 15km until diverging from it just south of Middlewich. The route would bring landscape and visual impacts where it crosses open countryside, and diversion of the River Dane may be required.

Base proposition - Figure 1



- 16.3.3. Passing to the north of the M6 the route would align with overhead power lines over several kilometres, but would pass to the west of the Mere and Rostherne Mere, which are two European designated habitats. Ongoing work continues to assess and minimise risk of impact on these sites. The route would pass some 2km west of Dunham Massey Park, although it would cross a small area of National Trust owned farmland at the edge of the estate. The approach into Manchester would cross the Mersey Valley on viaduct resulting in landscape, visual and ecological impacts. Some 10km of tunnel would then take the route to Ardwick where it would then follow existing railway into the new station.
- 16.3.4. The connection with the WCML would require a high viaduct to carry it over the Manchester Ship Canal, resulting in landscape and visual impacts. However, the route would pass the edge of Culcheth in cutting to help reduce impacts here. The route would pass close by parts of the Manchester Mosses SAC. Appraisal so far suggests that impacts would be avoided on this site, but work will continue to better assess and mitigate this risk. The route would join the WCML north of Golborne at Bamfurlong. A proposed depot here would result in landscape, heritage and ecological impacts, although further refinement would be able to reduce these.

16.4. Manchester base proposition combined impacts

- | | | |
|---------|--|--|
| 16.4.1. | Population and settlements | <p>The base proposition would result in the demolition of an estimated 120 dwellings, 60 commercial properties and two community facilities.</p> <p>Potential isolation would occur at 10 locations, affecting an estimated 53 dwellings.</p> |
| 16.4.2. | Noise | <p>Noise from HS2 trains would result in annoyance for an estimated 1,800 people (equivalent to the occupants of some 760 dwellings).</p> <p>Approximately 670 dwellings would be expected to qualify for noise insulation.</p> |
| 16.4.3. | Landscape, townscape and cultural heritage | <p>No national parks or areas of outstanding natural beauty would be directly affected.</p> <p>The base proposition would have direct impacts on six grade II listed structures.</p> <p>There would be impacts on the settings of one scheduled monument, one historic battlefield and one Grade I listed structure. Four conservation areas would be directly affected.</p> |
| 16.4.4. | Biodiversity and wildlife | <p>No Natura 2000 sites would be directly affected, although there is a potential for indirect effects to two SACs. Further details are described in HRA screening reports, which acknowledge the need for more detailed analysis.</p> <p>One SSSI would be directly affected, although it is possible that this impact could be avoided through further scheme refinement.</p> <p>Twenty-nine areas of BAP habitat would be directly affected by the base proposition, including seven ancient woodlands.</p> |
| 16.4.5. | Water resources and flood risk | <p>The base proposition may require the diversion of 18 minor rivers (including five at the depots), five of which result from the two depots. Continuing scheme design would seek to avoid or minimise these impacts.</p> <p>About 9km of Flood Zone 3 would be directly affected. Station and depot footprints would require an additional 5ha of landtake from Flood Zone 3.</p> |

- 16.4.6. Jobs and houses The station at Manchester Piccadilly would offer potential for supporting local economic activity, and through this, for some 29,700 jobs and 3,100 houses. Of these, some 2,970 jobs and 310 houses would be in areas of relatively high deprivation. Commercial demolitions would result in the displacement of an estimated 1,920 jobs.
- 16.4.7. Planning and development The base proposition would directly affect three major development sites.
- 16.4.8. Land use resources The base proposition would cross about 1km of Grade 1 agricultural land and about 27km of Grade 2 land. Station and depot footprints would require an additional 8ha of landtake from Grade 2 agricultural land. Two active landfill sites would be directly affected. The design would require further work to minimise risks to people and the environment from these impacts.
- 16.4.9. Waste and material use It is estimated that the route section would result in a surplus of about 0.25 million cubic metres of excavated material.
- Estimated quantities of bulk building materials for this section comprise 49,400 tonnes of steel and 473,500 tonnes of concrete.

16.5. Leeds base proposition characteristics

- 16.5.1. The base proposition to Leeds would comprise about 196km (122 miles) of new railway, including the main route up to the outskirts of Leeds, the approach into Leeds Station and the connection with the ECML. This comprises the following mix of alignments.

Alignment	Length (km)
At Grade	12.2
Cutting	76.3
Embankment	64.2
Bored Tunnel	5.5
Cut and Cover Tunnel	3.1
Viaduct	34.9
Grand Total	196.2

- 16.5.2. Of this, an estimated 61.1km (about 32% of the surface route) would be within (i.e. within 150m of) an existing transport corridor (A-road, motorway or railway).

16.6. Leeds base proposition key impacts

- 16.6.1. Describing first the terminus and interchange stations, the base proposition to Leeds would terminate at a station at Neville Street. The station would provide for interchange with existing public transport, and would offer potential for supporting local economic activity, and through this, for some 13,200 jobs. It would support the Aire Valley Enterprise Zone and would have the potential to be integrated into the South Bank masterplan. However, the new station would result in impacts on local townscape and heritage and would require further work to investigate ways of minimising these impacts.
- 16.6.2. Interchange stations are proposed at Toton west of Nottingham, and at Meadowhall in Sheffield. The Toton Station is on greenfield land but its environmental impacts would be limited. The local authority would seek to adopt policies that were supportive for wider development in the area. Meadowhall Station would be in a dense urban

environment and demolitions would displace some 1,300 jobs. However, the station would offer potential for supporting local economic activity, and through this, for some 5,000 jobs. The elevated viaduct would result in visual impacts. The station would occupy some 14 hectares of Flood Zone 3, although much of it would be elevated above it.

- 16.6.3. Describing the route from south to north, it would follow closely the route of the M42 and A42 for some 40km. This would greatly help to limit its impacts, although there would be noise and visual impacts at villages close to the route, and the character of the undulating landscape around Ashby de la Zouch would be affected. The route would cross the River Mease SAC. Appraisal so far suggests that impacts on this feature could be largely avoided, but further analysis will be required to better assess and mitigate this risk. The route would pass in cutting to the south of Toton Station, so helping to reduce impacts, although noise impacts would be likely.
- 16.6.4. North of Toton the route would be elevated along the Erewash Valley resulting in landscape, townscape and visual impacts and noise impacts within this densely settled area up to Alferton. A number of former landfill sites would also be crossed. The route would form a new transport corridor west of Hardwick Hall and its registered park, although it would be some 2km away.
- 16.6.5. The route would approach the densely settled outskirts of Sheffield along the Rother Valley possibly requiring works to the River Rother, and giving rise to noise impacts. It would cross a number of former landfill sites, and would directly affect planned growth in the area of Orgreave. It would follow the M1 through Meadowhall but would directly affect a number of ancient woodlands as it passes east of Chapeltown. Otherwise the route would use cutting and tunnel to reduce impacts as it continues north.
- 16.6.6. The route would pass through the large and significant landfill site west of Normanton. The Leeds approach and ECML connection would diverge near Woodlesford, the former using viaduct over some distance, resulting in major landscape and visual impacts. The route to the ECML would follow the M1 corridor past Garforth, and would then cross open countryside, although in cutting, its impacts would be limited. The design has been amended to take it some way from the nationally important site of Towton battlefield.

16.7. Leeds base proposition combined impacts

- 16.7.1. **Population and settlements** The base proposition would result in the demolition of an estimated 180 dwellings, 176 commercial properties and two community facilities. Potential isolation would occur at 23 locations, affecting an estimated 1,000 dwellings. Two areas of potential severance would affect 19 dwellings.
- 16.7.2. **Noise** Noise from HS2 trains would result in annoyance for an estimated 8,850 people (equivalent to the occupants of some 3,750 dwellings). Approximately 2,000 dwellings would be expected to qualify for noise insulation.
- 16.7.3. **Landscape, townscape and cultural heritage** No national parks or areas of outstanding natural beauty would be directly affected. The base proposition would have direct impacts on two scheduled monuments. The base proposition would have direct impacts on six grade II listed structures. There would be impacts on the settings of nine scheduled monuments, three Grade I listed structures and one Grade I registered park and garden. Nine conservation areas would be directly affected.

- 16.7.4. Biodiversity and wildlife One Natura 2000 site would potentially be directly affected. Further details are described in an HRA screening report, which acknowledges the need for more detailed analysis.
Twenty-seven areas of BAP habitat would be directly affected by the base proposition, including 14 ancient woodlands.
- 16.7.5. Water resources and flood risk The base proposition may require the diversion of nine major rivers, five of which result from stations or depots, and 20 minor rivers. Two canal diversions may be required. Continuing scheme design would seek to avoid or minimise these impacts.
About 30km of Flood Zone 3 would be directly affected. Station and depot footprints would require an additional 33ha of landtake from Flood Zone 3.
- 16.7.6. Jobs and houses The stations at Leeds, Meadowhall and Toton would offer potential for supporting local economic activity, and through this, for some 19,700 jobs and 2,250 houses. Of these, some 5,730 jobs and 550 houses would be in areas of relatively high deprivation. Commercial demolitions would result in the displacement of an estimated 3,450 jobs.
- 16.7.7. Planning and development The base proposition would directly affect three major development sites and conflict with two extant planning permissions.
- 16.7.8. Land use resources The base proposition would cross about 28km of Grade 2 agricultural land. Station and depot footprints would require an additional 206ha of landtake from Grade 2 agricultural land.
Nine active landfill sites would be directly affected. The design would require further work to minimise risks to people and the environment from these impacts.
- 16.7.9. Waste and material use It is estimated that the route section would result in a surplus of 18.5 million cubic metres of excavated material.
Estimated quantities of bulk building materials for this section comprise 69,000 tonnes of steel and 1,428,500 tonnes of concrete.

16.8. Heathrow base proposition characteristics

- 16.8.1. The base proposition to Heathrow would comprise about 29km (18 miles) of new railway that provides a spur from the Phase 1 line to a new station at Heathrow Terminal 5. It would include two connections with the Phase 1 line. In total, the railway would compriseThis comprises the following mix of alignments.

Alignment	Length (km)
At Grade	2.0
Cutting	6.24
Embankment	2.8
Tunnel	13.6
Viaduct	4.4
Grand Total	29.0

- 16.8.2. Of this, an estimated 8.8km (about 60% of the surface route) would be within (i.e. within

150m of) an existing transport corridor (A-road, motorway or railway).

16.9. Heathrow base proposition key impacts

- 16.9.1. The base proposition to Heathrow would terminate west of Heathrow Terminal 5, constructed below ground but over the existing Piccadilly and Heathrow Express lines. It would provide interchange both with the airport and with existing national rail (including Crossrail) and London Underground services.
- 16.9.2. The spur would result in the demolition of an estimated eight dwellings, as well as the Iver Nature Study Centre. Noise from HS2 trains would result in annoyance for approximately 11 people. Three dwellings would potentially qualify for noise insulation.
- 16.9.3. The station would lie partly within the floodplain of the River Colne. In addition, the spur would be in cutting through the channel of the Colne and the flood plain of the Colne Valley. Without mitigation, it would be at risk of flooding. Continuing scheme design would seek to avoid or minimise these impacts.
- 16.9.4. The spur and station could indirectly affect the South West London Water Bodies SPA and Ramsar site. Ongoing work will seek to better understand these risks and to set out, where appropriate, any necessary mitigation. In particular, the potential for in-combination effects of these works and the earlier Phase 1 HS2 works would form a necessary part of HRA screening and assessment to inform the decision on the choice of link to serve Heathrow. The spur would also present some risk of impact to four SSSIs through potential air pollution and water pollution or other hydrological changes.
- 16.9.5. The spur would require viaduct crossings over the M4 and Great Western Line railway, which would have visual impacts for, amongst others, recreational users within the Colne Valley, as well as some residents in Iver, Richings Park and Thorney. It would directly affect Huntsmoor Park, Thorney Country Park and golf course and Harmondsworth Park. The spur would have direct impacts on three Grade II listed structures and would affect the setting of the Scheduled Monument at Brackenbury Farm moated site.

APPENDIX 1

AoS framework

APPENDIX 2

Explanation of terms

APPENDIX 3

Sifting history

APPENDIX 4

Noise appraisal method

APPENDIX 5

Scoping of social and distributional impacts

