

High Speed Rail (West Midlands - Crewe)

Supplementary Environmental Statement 2 and
Additional Provision 2 Environmental Statement

Volume 2: Community Area report

CA1: Fradley to Colton

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Department for Transport

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

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Structure of the HS2 Supplementary Environmental Statement 2 and Additional Provision 2 Environmental Statement

This report is part of the suite of documents that make up the Supplementary Environmental Statement 2 (SES2) and Additional Provision 2 Environmental Statement (AP2 ES) for Phase 2a of the High Speed Two (HS2) rail network between the West Midlands and Crewe. The SES2 and the AP2 ES are separate documents, however, they are bound together and presented in a number of volumes as described below and shown in Figure 1.

- Non-technical summary (NTS). This provides a summary in non-technical language of the SES2 (Part 1) and the AP2 ES (Part 2). It presents a summary of any likely residual significant environmental effects (i.e. effects which are likely to remain after mitigation measures are put in place), both beneficial and adverse, which are new or different to those reported in the Environmental Statement (ES) submitted to Parliament in July 2017 in support of the hybrid Bill for Phase 2a of HS2 ('the main ES'), as amended by the Supplementary Environmental Statement 1 (SES1) submitted in March 2018 (and by SES2 for the AP2 amendments). The AP1 amendments described in the AP1 ES submitted in March 2018 are also taken into account where relevant;
- Glossary of terms and list of abbreviations. This contains any new or different terms and abbreviations used throughout the SES2 and the AP2 ES which are not already explained in the main ES or SES1 and AP1 ES;
- Volume 1: Introduction to the SES2 and the AP2 ES. This introduces the supplementary environmental information and changes to the design and construction assumptions included within the SES2 and amendments within the AP2 ES. The report explains the environmental impact assessment (EIA) process that has been applied;
- Volume 2: Community area reports and map books. These report the supplementary environmental information and changes to the design and construction assumptions included within the SES2 (Part 1), amendments within the AP2 ES (Part 2) and any new or different likely significant environmental effects arising from these changes or assumptions and amendments in each community area. These effects are compared to those reported in the main ES, as amended by SES1 (and by SES2 for the AP2 amendments). The AP1 amendments are also taken into account where relevant. The maps relevant to each community area are provided in separate Volume 2 map books and should be read in conjunction with the relevant community area report;
- Volume 3: Route-wide effects. This describes any new or different likely significant environmental effects arising at a route-wide level from the supplementary environmental information and changes to the design and construction assumptions included within the SES2 (Part 1) and the amendments within the AP2 ES (Part 2) compared to those reported in the

SES2 and AP2 ES Volume 2 – Community area 1, Fradley to Colton

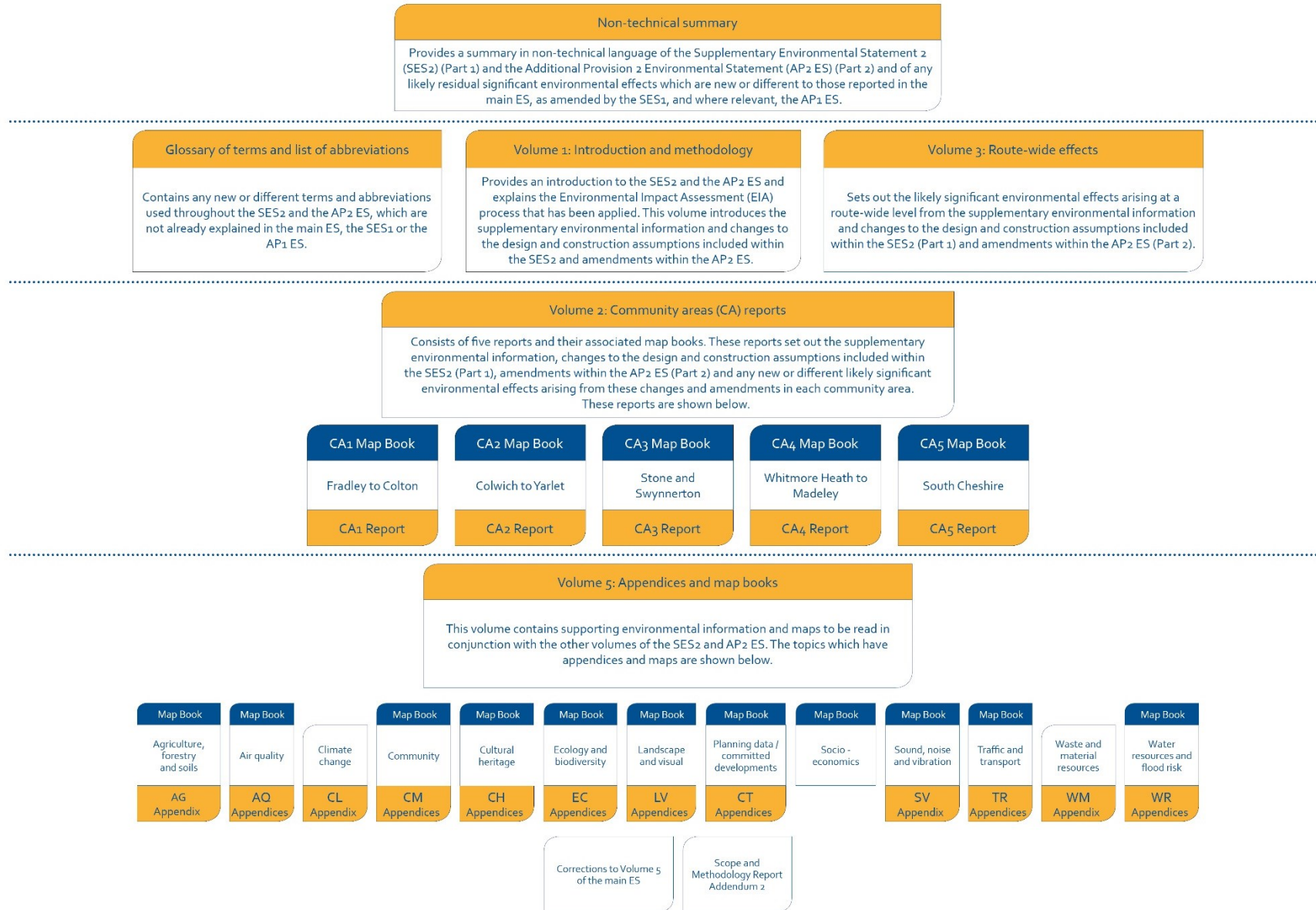
main ES, as amended by SES1 (and by SES2 for AP2). The AP1 amendments are also taken into account where relevant; and

- Volume 5: Appendices and map book. These contain supporting environmental information and associated maps.

A Volume 4: Off-route effects report was produced as part of the main ES. This assessed the likely significant effects of the scheme at locations beyond the Phase 2a route corridor and its immediate environment. A separate Volume 4 has not been produced as part of the SES2 and AP2 ES. Any new or different significant off-route effects arising from the AP2 amendments are reported in the most relevant Volume 2 Community area report.

Certain reports and maps containing background information and data (BID) have been produced, which do not form part of the SES2 and AP2 ES. These documents are available online at www.gov.uk/hs2. The BID documents and maps present background survey information and other relevant background material.

Figure 1: Structure of the SES2 and AP2 ES



Structure of this report

This volume of the SES2 and AP2 ES is divided into five community area (CA) reports, which are in turn divided into two parts.

Part 1 provides supplementary environmental information, where relevant, relating to:

- new baseline information with respect to environmental surveys completed and additional information received since the production of the SES1 and AP1 ES;
- changes to the design and construction assumptions that do not require changes to the Bill; and
- corrections to the main ES and the SES1 and AP1 ES.

Part 2 provides environmental assessment information relating to proposed amendments to the design, which have resulted in the need to alter the powers conferred by the Bill.

Parts 1 and 2 include, where relevant:

- a description of the SES2 changes (Part 1) or the proposed AP2 amendments (Part 2) within the community area that have triggered the need for reassessment;
- an assessment of the environmental effects of the SES2 changes (Part 1) or the proposed AP2 amendments (Part 2) for relevant environmental topics considering the:
 - scope, assumptions and limitations of the assessment;
 - environmental baseline;
 - effects arising during construction;
 - effects arising from operation;
 - mitigation and residual effects; and
- a summary of any new or different likely residual significant effects as a result of the SES2 changes (Part 1) and the proposed AP2 amendments (Part 2).

1 Introduction

- 1.1.1 The High Speed Rail (West Midlands – Crewe) Bill was submitted to Parliament together with the main ES in July 2017. The SES1 and AP1 ES, which was submitted in March 2018, updated the main ES and contained a number of changes and amendments to the design of the original scheme (i.e. the scheme submitted in July 2017).
- 1.1.2 Since the submission of the main ES, SES1 and AP1 ES, updates to environmental baseline information and changes to the scheme design or assumptions have occurred, which may lead to new or different significant effects. These effects, depending on the type of change, are reported in the SES2 (Part 1) or AP2 ES (Part 2).
- 1.1.3 The Bill and associated Additional Provisions (APs) to the Bill described above, if enacted by Parliament, will provide the powers to construct, operate and maintain Phase 2a of HS2.
- 1.1.4 In order to differentiate between the original scheme and the subsequent changes, the terms set out in Table 1 are used.

Table 1: Scheme definitions

Scheme name	Definition	Relevant CAs
the original scheme	the Bill scheme submitted to Parliament in July 2017, which was assessed in the main ES	1 – 5
the SES1 scheme	the original scheme with the changes described in the SES1 submitted in March 2018	1 – 5
the AP1 revised scheme	the SES1 scheme as amended by the AP1 submitted in March 2018	1 – 3, 5
the SES2 scheme	the SES1 scheme with the changes described in the SES2	1 – 5
the AP2 revised scheme	the SES2 scheme as amended by the AP2	1 – 5

- 1.1.5 The following terms are used to differentiate between changes included in the SES2 and those included in the AP2 ES:
- ‘SES2 design changes’ – changes to the scheme design reported in the SES2 that do not require additional powers. In this report the term ‘design change’ is also used;
 - ‘SES2 changes’ – all changes reported in the SES2 that do not require additional powers. This may include new baseline information, changes to the design and construction assumptions, and corrections; and
 - ‘AP2 amendments’ – amendments to the scheme reported in the AP2 ES that include requirements for additional powers in the Bill. In this report the term ‘amendment’ is also used.
- 1.1.6 In addition, the following terms are also used in the SES2 and AP2 ES, where relevant:

- ‘SES1 design changes’ – changes to the scheme design reported in the SES1 that do not require additional powers;
- ‘SES1 changes’ – all changes reported in the SES1 that do not require additional powers. These may include new baseline information, changes to the design and construction assumptions, and corrections; and
- ‘AP1 amendments’ – amendments to the scheme reported in the AP1 ES that include requirements for additional powers in the Bill.

1.1.7 The SES2 (Part 1 of this report) contains updated environmental baseline information and scheme information relating to changes within the current limits and powers of the Bill, and therefore do not require an AP to the Bill. The SES2 changes within the Fradley to Colton area include:

- additional environmental baseline information for air quality, cultural heritage, ecology and biodiversity, and traffic and transport;
- changes to the design and construction assumptions that do not require changes to the Bill; and
- corrections to the main ES.

1.1.8 These changes are described in Part 1 and are assessed on a topic by topic basis where relevant using the same approach adopted in the main ES, SES1 and AP1 ES.

1.1.9 The purpose of SES2 is to provide an assessment of any new or different likely significant environmental effects arising from the changes described. As there were SES1 changes in the Fradley to Colton area, the environmental effects of the SES2 changes are compared to those reported in the main ES as amended by SES1, with the AP1 amendments taken into account as appropriate.

1.1.10 The AP2 ES (Part 2 of this report) describes the likely significant effects of amendments to the design of the scheme, which require the use of land outside the original limits of the Bill, additional access rights, and/or other extensions to the powers conferred by the Bill, making it necessary to submit an AP to the Bill.

1.1.11 The AP2 ES reports the assessment of each amendment separately for all relevant topics. The purpose of the AP2 ES is to provide an assessment of any new or different likely significant environmental effects arising from the amendments, compared to those reported in the main ES, as amended by SES1 and SES2, taking into account AP1 amendments where relevant.

1.1.12 A combined assessment of new or different significant construction traffic effects, as a result of changes in construction traffic flows, is reported in Section 7. This is because alterations in construction traffic flows cannot generally be directly attributed to particular SES2 changes or AP2 amendments. Traffic and transport effects are reported first, since the effects arise from changes in construction traffic flows, and then other topics which are affected by traffic and transport changes are reported as necessary.

SES2 and AP2 ES Volume 2 – Community area 1, Fradley to Colton

- 1.1.13 All other new or different significant traffic and transport effects are reported with the relevant SES2 change or AP2 amendment.
- 1.1.14 The standard measures that will be used to mitigate likely significant adverse environmental effects during construction and operation of the scheme are described in the main ES Volume 1, Section 9 and the draft Code of Construction Practice (CoCP)¹ submitted in support of the Bill. Implementation of these measures has been assumed in this SES2 and AP2 ES.

¹ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, draft Code of Construction Practice (CT-003-000). Available online at <https://www.gov.uk/government/publications/draft-code-of-construction-practice-for-hs2-phase-2a>

Part 1: Supplementary Environmental Statement 2

2 Summary of changes in the Fradley to Colton area

2.1 New environmental baseline information

2.1.1 Since the production of the main ES, SES1 and AP1 ES, updates to the environmental baseline information have occurred which may lead to new or different significant effects for the following environmental topics.

Air quality

2.1.2 Air quality measurements for the baseline year of 2016 have become available in the Fradley to Colton area. These 2016 air quality measurements have been used to verify the air quality models for the assessment of traffic emissions which is presented in Section 7. This is done by comparing predicted pollutant concentrations against air quality measurements. Details of the 2016 air quality measurements and monitoring sites that are relevant to the assessment are provided in the SES2 and AP2 ES Volume 5: Appendix AQ-001-001 and Map Series AQ-01.

2.1.3 Since the assessment of the original scheme, the Department for Environment, Food and Rural Affairs (Defra) has issued updated tools for undertaking air quality assessments, for example background pollutant concentrations and road vehicle emission factors. Further explanation is presented in Volume 1. The air quality assessment undertaken for the SES2 changes and AP2 amendments uses these updated tools and is reported in Section 7.

Cultural heritage

2.1.4 Additional geophysical and heritage walkover surveys have been undertaken in the Fradley to Colton area.

2.1.5 Details of surveys completed and the additional desk-based information obtained is provided in Background Information Data (BID) document BID-CH-004-000, which accompanies the SES2 and AP2 ES, and Map Series CH-01; CH-02 and CH-03 in the SES2 and AP2 ES Volume 5: Cultural heritage Map Book.

Ecology and biodiversity

2.1.6 Additional Phase 1 habitat surveys have been undertaken and new ecological baseline data relating to the designation of nature conservation sites have been published by Staffordshire Wildlife Trust for the Fradley to Colton area.

2.1.7 Details of the additional Phase 1 habitat surveys undertaken in the Fradley to Colton area are provided in background information and data (BID) document (BID EC-019-000), which accompanies the SES2 and AP2 ES. Details of the data

relating to the designation of nature conservation sites is provided in SES2 and AP2 ES Volume 5: Appendix EC-001-000.

- 2.1.8 SES2 and AP2 ES Volume 5: Appendix EC-018-000 provides a summary of additional ecological survey data, which has resulted in no change to the conclusions of the main ES. SES2 and AP2 ES Volume 5: Appendix EC-016-000 identifies additional local/parish level effects that are likely to occur as a consequence of SES2 changes and AP2 amendments, but which will not be significant.

Traffic and transport

- 2.1.9 Additional information on traffic flows on six roads and/or junctions in the Fradley to Colton area has been collected. This is set out in BID document BID-TR-001-000, which accompanies the SES2 and AP2 ES.
- 2.1.10 SES2 and AP2 ES Volume 5: Appendix TR-001-000 provides an assessment of the survey data, which has resulted in no change to the conclusions of the main ES.

2.2 Changes to the design or construction assumptions not requiring a change to the Bill

- 2.2.1 Since submission of the SES1 and AP1 ES, the need to make changes to the design and construction assumptions has been identified. The changes in the Fradley to Colton area are as follows and described in the following sections:

- construction programme;
- railway systems compounds;
- borrow pits; and
- SES2 engineering design changes.

- 2.2.2 These changes do not require a change to the Bill.

Changes to construction programme in the Fradley to Colton area

- 2.2.3 The main ES provided indicative details of the construction works to be managed from the construction compounds in the Fradley to Colton area, including duration of works, number of workers and a summary of the works to be undertaken.
- 2.2.4 In addition, a construction programme illustrating indicative periods for each of the core construction activities was also provided. See Volume 2, CA1, Section 2 of the main ES².
- 2.2.5 Since submission of the SES1 and AP1 ES, changes to the design and construction assumptions, including a route-wide review of the earthworks and movement of

² HS2 Ltd (2017). *High Speed Rail (West Midlands – Crewe), Environmental Statement, Volume 2, CA1, Figure 6 Indicative construction programme between 2020 and 2027*. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/627561/E13_Vol2_CA1_Fradley_to_Colton_WEB.pdf

materials, have resulted in the need to make alterations to the indicative construction programme, shown in Figure 2 and reported in Section 3 of the SES2 and Section 5 of the AP2 ES.

- 2.2.6 The main SES2 design changes and AP2 amendments which give rise to changes to the construction programme are listed below and identified in Figure 2, which provides a revised indicative construction programme³. A separate indicative construction programme is provided in Figure 6 for the amendment providing additional land and a change to Bill powers to make alterations to the Handsacre Junction connection into the West Coast Main Line (AP2-001-001). AP2 amendments which give rise to changes to the construction programme are included in this section for completeness, but the assessment of those amendments is reported in Section 5 of the AP2 ES.
- 2.2.7 The following SES2 design changes give rise to changes to the construction programme:
- New utility compound for the British Pipeline Agency (BPA) fuel pipeline diversion works, north of Pyford Brook (SES2-001-002); and
 - New utility compound for the Western Power Distribution power line diversion works, south-west of Jonghams Lane (SES2-001-009).
- 2.2.8 The SES2 design changes above are considered to require a reassessment of the likely significant environmental effects and any mitigation and these are reported in Section 7.
- 2.2.9 The following AP2 amendments give rise to changes to the construction programme:
- Additional land required for modifications to A515 Lichfield Road and Wood End Lane junction and widening of Wood End Lane (AP2-001-002);
 - Additional land required for the diversion of a Cadent gas pipeline and a new utility compound, north of Pyford Brook (AP2-001-005);
 - Additional land and a change to Bill powers required to divert Common Lane to the A515 Lichfield Road (AP2-001-006);
 - Additional land required for the amendment to a National Grid Electricity Transmission 400kV overhead power line and a utility compound, near Kings Bromley viaduct (AP2-001-007);
 - Additional land required for the diversion of a National Grid Gas Transmission gas pipeline and a utility compound, north of Pipe Ridware (AP2-001-010);
 - Additional land and a change to Bill powers required for a grid supply point connection to National Grid Parkgate substation (AP2-001-015); and

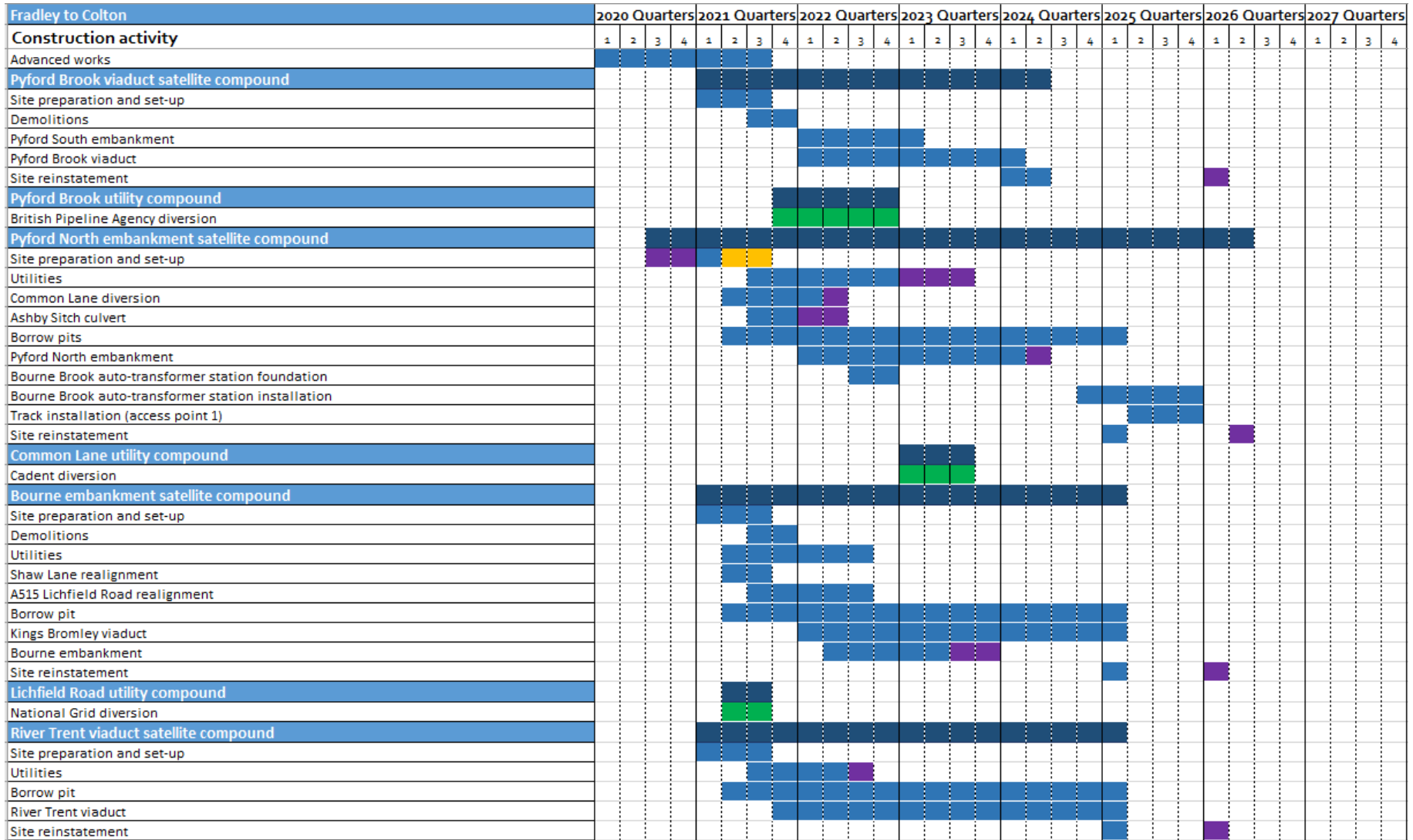
³ Site reinstatement shown in the construction programme is phased; phase one includes reinstatement of civils construction compounds following completion of civils construction activities. The second phase includes reinstatement of haul roads, which remain until completion of track installation construction activities.

- Additional land required for the provision of a replacement facility for Mayfield Children's Home (AP2-002-001).

2.2.10 The AP2 amendments above are considered to require a reassessment of the likely significant environmental effects and any mitigation and these are reported in Section 5 or Section 7, where relevant.

2.2.11 Other AP2 amendments give rise to changes to the construction programme but are not of a scale to be shown in Figure 2. These AP2 amendments are also reported in Section 5 and the construction programme is as described in the relevant scheme descriptions.

Figure 2: Indicative construction programme



Fradley to Colton	2020 Quarters				2021 Quarters				2022 Quarters				2023 Quarters				2024 Quarters				2025 Quarters				2026 Quarters				2027 Quarters											
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Construction activity																																								
Moor Lane diversion																																								
Newlands Lane overbridge																																								
Newlands Lane underbridge																																								
Moor Lane closure																																								
Stockwell Heath culvert																																								
Stockwell Heath embankment																																								
Newlands Lane auto-transformer feeder station foundation																																								
Newlands Lane National Grid 132kV substation																																								
Site reinstatement																																								
Parkgate GSP utility compound																																								
Parkgate substation																																								
Parkgate route																																								
Newlands Lane auto-transformer feeder station satellite compound																																								
Site preparation and set-up																																								
Newlands Lane auto-transformer feeder station installation																																								
Site reinstatement																																								
Stockwell Heath cutting satellite compound																																								
Site preparation and set-up																																								
Hamley (South) culvert																																								
Hamley (North) drop inlet culvert																																								
B5013 Uttoxeter Road underbridge and realignment																																								
Utilities																																								
Moreton South embankment																																								
Jonghams Lane widening																																								
Stockwell Heath cutting																																								
Track installation (access point 3)																																								
Site reinstatement																																								
Moreton Brook viaduct satellite compound																																								
Site preparation and set-up																																								
Utilities																																								
Moreton Brook viaduct																																								
Site reinstatement																																								
Jonghams Lane utility compound																																								
Western Power diversion																																								
Railway systems																																								
Overhead line electrification, communications and traction power																																								
Testing and commissioning																																								

Key	
	Compound duration showing start and end of mobilisation. Activities below will be managed from the above compound. Second phase site reinstatement can occur post the compound demobilisation.
	Activity duration (indicates where there is no change from the main ES taking into consideration SES1 changes and AP1 amendments).
	Increase in duration as a result of a SES2 change or AP2 amendment.
	Decrease in duration as a result of a SES2 change or AP2 amendment (A yellow box indicates that works are no longer taking place in the quarter indicated).
	New element of the programme (compound or associated works) as a result of a SES2 change or an AP2 amendment.

Railway systems compounds

- 2.2.12 The Bill provides for land to be acquired for a number of railway systems compounds from which railway installation works will be managed. These works include: installation of the hydraulically bound layer⁴ and pre-cast slab, rails (including crossovers) and overhead line equipment, installation of auto-transformer stations and changes to the existing rail network.
- 2.2.13 Since the submission of the SES₁ and AP₁ ES, refinement of the construction methodology and access requirements for the installation of slab track⁵ has led to changes in the operational characteristics of three railway systems compounds in the Fradley to Colton area. These include:
- change to the operational period (duration and start/end date);
 - change in the number of railway system workers (peak and/or average); and
 - change in railway systems construction traffic numbers (heavy goods vehicles (HGV) and cars/light goods vehicles (LGV)).
- 2.2.14 To further support this refinement in construction methodology, wherever practicable site haul routes have been retained on completion of the civil engineering phase to support the access to railway systems compounds for slab track installation from the main road network and to reduce the reliance on access from the local road network.
- 2.2.15 The change to the operational characteristics of the existing compounds in this area does not require a change to the Bill and is not considered in isolation to require a reassessment of the environmental effects or mitigation as set out in the main ES with respect to any environmental topics.
- 2.2.16 Whilst the changes to the construction methodology and access requirements for the installation of a slab track formation will increase the number of railway systems HGV movements, these will be later in the construction programme than civil engineering HGV movements and will, wherever practicable, utilise access via site haul routes from the main road network. In these locations, any increase in traffic on the road network associated with slab track installation will be relatively small. Therefore, there will be no new or different significant traffic effects as a result of these changes in isolation, compared to those reported in the main ES or SES₁. This change, in combination with other SES₂ changes and AP₂ amendments, is reported for traffic, and other topics which are affected by changes to traffic flows, in Section 7.
- 2.2.17 Table 2 provides details on the changes to the operational characteristics of the existing railway systems compounds in this area.

⁴ Aggregate mixture incorporating cement or lime based or other binders, which harden in-situ by a chemical/hydraulic reaction.

⁵ HS₂ Ltd (2018). *High Speed Rail (West Midlands-Crewe), Supplementary Environmental Statement and Additional Provision Environmental Statement*, Volume 1, Section 7. Available online at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/692614/G7_Volume_1_WEB.pdf

SES2 and AP2 ES Volume 2 – Community area 1, Fradley to Colton

Table 2: Summary of changes to the construction assumptions within the existing powers of the Bill in the Fradley to Colton area

Details of changes to construction assumptions	Description of the SES1 scheme	Description of the SES2 scheme	Change to significant effects
Change to the operational duration ⁶ for the Pyford North embankment satellite compound	<p>SES1 reported that this compound would be operational for a total of five years and three months, commencing during 2021. Civil engineering works would be managed from this compound for a period of three years and nine months commencing during 2021, followed by railway installation works for a period of one year and six months, commencing during 2024.</p> <p>Map CT-05-202, G6 in the main ES Volume 2: CA1 Map Book</p>	<p>There are no changes to the operational characteristics for this compound related to civil engineering works.</p> <p>The railway installation works will be undertaken for a period of one year and three months, commencing during 2024. The compound will be operational for a total of five years, a decrease in three months from that reported in SES1.</p>	<p>The decrease in duration of the compound to support the railway systems works is small in comparison to the overall duration of the compound (civil engineering and railway systems works). Therefore, the level of significance reported in the main ES will not change.</p>
Change to the railway systems worker numbers and railway systems HGV trips for the Pipe Ridware embankment satellite compound	<p>The main ES reported that the compound would support an average of 30 civil engineering workers per day (45 workers at peak times) and an average of 30 railway systems workers per day (45 workers at peak times).</p> <p>The main ES further reported that the compound would generate 96-122 civil engineering HGV trips per day and up to 10 railway systems HGV trips per day during busy periods⁷ and within the peak month of activity.</p> <p>Map CT-05-204, D4 to D5 in the main ES Volume 2: CA1 Map Book</p>	<p>There are no changes to the operational characteristics for this compound related to civil engineering works.</p> <p>There will be an increase in the number of railway systems workers supported by this compound with an average of 45 railway systems workers per day (70 workers at peak times).</p> <p>There will be an increase in the number of railway systems HGV trips generated by this compound with 159-162 trips per day during the busy periods and within the peak month of activity.</p>	<p>Although there will be an increase in peak HGV and worker trips to this compound as a result of the change, this will not lead to any new or different significant effects in isolation, as the change to overall traffic levels on the road network is relatively small.</p> <p>The assessment of the changes in railway systems HGV and worker trips is considered in combination with other SES2 changes and AP2 amendments and reported in Section 7.</p>
Change to the operational duration for the Stockwell Heath cutting satellite compound	<p>SES1 reported that this compound would be operational for a total of five years and six months, commencing during 2021. Civil engineering works would be managed from this compound for a period of four years and three months, followed by railway installation works for a period of one year and three months, commencing during 2025.</p> <p>Map CT-05-208, B4 to B5 in the main ES Volume 2: CA1 Map Book</p>	<p>There are no changes to the operational characteristics for this compound related to civil engineering works.</p> <p>The railway installation works will be undertaken for a period of one year, commencing during 2025. The compound will be operational for a total of five years and three months, a decrease in three months from that reported in SES1.</p>	<p>The decrease in duration of the compound to support railway systems works is small in comparison to the overall duration of the compound (civil engineering and railway systems works). Therefore, the level of significance reported in the main ES will not change.</p>

⁶ The Volume 2 scheme description of the construction phase represents the duration of works in a different way to the Volume 5 Transport Assessment addendum (SES2 and AP2 ES Volume 5: Appendix TR-001-000). The Volume 2 scheme description is based on quarters (each representing three months), e.g. December (Quarter 4) to February (Quarter 1) is rounded to six months, whereas the Volume 5 Transport Assessment addendum counts the absolute duration e.g. three months.

⁷ The busy period is the period during which HGV traffic serving that compound will be greater than 50% of the HGV traffic in the peak month. The average daily combined two-way vehicle trips for the busy period is the lower end of the range and for the peak month is the upper end of the range.

Borrow pits

Extraction depths

- 2.2.18 The Bill provides for the acquisition of land for four borrow pits in the Fradley to Colton area to provide material to construct elements of the HS2 scheme, in particular to construct railway embankments⁸. Volume 1 of the main ES describes in detail the use of borrow pits and Volume 5: Appendix CT-009-000 of the main ES describes the borrow pits restoration strategy.
- 2.2.19 The assessment of effects associated with the borrow pits, as reported in the main ES, was based on an assumed average depth of mineral extraction, including an average topsoil and subsoil depth. Based on available geological information, the assessment of the borrow pits also considered the effects of excavating to a greater maximum depth, which could allow refinement to the proposed working arrangements for the borrow pits (e.g. reducing the footprint required for mineral extraction) and reduce sterilisation of potential mineral resources.
- 2.2.20 Since submission of the Bill, additional historical information relating to the likely ground conditions in the vicinity of all of the borrow pits in the Fradley to Colton area has become available. For three of these borrow pits, this indicated that useful aggregates may be present to a maximum depth greater than originally estimated. The new information for the fourth borrow pit (at Blithbury, located to the north of the River Trent viaduct) confirmed the previous estimated maximum depth.
- 2.2.21 There has, in addition, been a change to the assumption about the depth of topsoil and subsoil at all four borrow pits within the Fradley to Colton area. The depth of topsoil and subsoil was assumed in the main ES to be an average of 0.8m. It is now assumed that topsoil and subsoil will be excavated and restored to an average depth of 1.2m to allow a full agricultural soil profile to be restored.
- 2.2.22 Table 3 provides a summary of the changes to the estimated maximum extraction depth below existing ground level of the mineral at three of the four borrow pits in the Fradley to Colton area. The information from the main ES is provided for context.

⁸ The materials extracted from the borrow pits are intended for constructing the railway embankments. However, if the properties are suitable, and sufficient quantities are available, there may be an opportunity for minerals extracted from the borrow pits to be used to make concrete or other cement bound materials for construction of the scheme.

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Table 3: Summary of changes to estimated maximum depth of mineral extraction at borrow pits in the Fradley to Colton area

Borrow Pit location	Assumed average depth of mineral extraction (m) reported in the main ES	Estimated maximum depth of mineral extraction (m) reported in the main ES	SES2 assumed average depth of mineral extraction (m)	SES2 estimated maximum depth of mineral extraction (m) (based on additional historical information) ⁹
Kings Bromley South, located either side of Crawley Lane and to the south of Ashby Sitch, both sides of the HS2 route	4.1m	12.8m	4.1m (no change)	18.0m
Kings Bromley North, located adjacent to the realigned A515 Lichfield Road	4.1m	8.8m	4.1m (no change)	18.0m
Kings Bromley North, located adjacent to the realigned Shaw Lane	4.3m	8.8m	4.3m (no change)	18.0m

2.2.23 Since production of the SES1 and AP1 ES, HS2 Ltd has been undertaking preliminary ground investigations at all of the borrow pits and at six major cuttings to ascertain the depth, extent and suitability of the mineral resources available to construct the HS2 scheme and to allow further refinement to the proposals for use of the borrow pits.

2.2.24 Initial results from the preliminary ground investigations suggest that, in practice, the depths of mineral resources at the three borrow pits are variable, but generally less than the 18.0m maximum depths shown in Table 3. However, as the ground investigation is at an early stage and further work is required to validate the findings, the assessment has, as a precaution, considered the 18.0m maximum depth at these three borrow pits.

2.2.25 The changes in construction assumptions shown in Table 3 relating to the estimated maximum borrow pit depths are considered to require a reassessment of the environmental effects or mitigation for cultural heritage and water resources and flood risk, and this is reported in Section 3.

Water resources and flood risk

2.2.26 Hydrogeological models have been developed in the areas around each borrow pit in the Fradley to Colton area. These models have been developed to inform the scope of the ground investigation. They provide a conservative estimate of the areas where groundwater levels could potentially be temporarily affected by the scheme. Ground permeability in the areas around the borrow pits is based on British Geological Society (BGS) geological mapping data. Conservatively high permeability values have been selected with the aim of ensuring that the maximum potential extent of the impacts is identified. The model outputs therefore provide a reasonable worst-case assessment of the areas over which

⁹ The maximum extraction depth assumes that topsoil and subsoil will be excavated and restored to an average depth of 1.2m to allow a full agricultural soil profile to be restored.

groundwater levels have potential to be temporarily lowered, when each borrow pit in turn is fully dewatered over its entire footprint.

- 2.2.27 These model outputs have necessitated a review of the potential for adverse impacts on water receptors.
- 2.2.28 Details of the borrow pit hydrogeological models are provided in SES2 and AP2 ES Volume 5: Appendix WR-002-001.

SES2 engineering design changes

- 2.2.29 Table 4 provides a summary of the SES2 engineering design changes not requiring a change to the Bill which result in new or different significant effects in the Fradley to Colton area. Figure 3 shows the locations of these changes.
- 2.2.30 All dimensions in the following sections are approximate.

Table 4: Summary of changes to the engineering design not requiring a change to the Bill in the Fradley to Colton area

Name of SES2 engineering design change	Description of the SES1 scheme (and AP1 revised scheme where relevant)	Description of the SES2 scheme
<p>A new construction traffic route along Wood End Lane</p> <p>SES2-001-001</p> <p>Map TR-03-201, Map TR-03-201-L1 and Map TR-04-202-L1 in the SES2 and AP2 ES Volume 5 Traffic and transport Map Book</p>	<p>Construction traffic from the Fradley to Colton and Colwich to Yarlet (CA2) areas would use various roads, including the A515 Lichfield Road, south of Kings Bromley, and the B5013 Colton Road to join the strategic road network at the A51 Stafford Road, before travelling along the A5192 Eastern Avenue/Cappers Lane around Lichfield, to connect to the A38 Rykneld Street.</p>	<p>A new construction traffic route will be provided along Wood End Lane to route construction traffic from the A515 Lichfield Road, south-east towards the A38 Rykneld Street, to reduce the amount of additional traffic travelling along the A5192 Eastern Avenue/Cappers Lane around Lichfield during construction.</p>
<p>New temporary utility compound for the British Pipeline Agency (BPA) fuel pipeline diversion, north of Pyford Brook</p> <p>SES2-001-002</p> <p>Map CT-05-201, F5 to E5, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>Land would be required permanently for the diversion of an underground BPA 10-inch diameter fuel pipeline, which would cross beneath the HS2 route at Pyford North embankment.</p> <p>The AP1 revised scheme (AP1-001-001: Additional land required for a temporary laydown area and a change to Bill powers at Pyford North embankment) would require 0.5ha of additional land for a temporary laydown area during construction, and a change to Bill powers for the extension of the BPA 10-inch diameter pipeline diversion on both sides of the HS2 route.</p>	<p>A new utility compound, the Pyford Brook utility compound, will be provided for the management of the BPA 10-inch diameter fuel pipeline diversion works. It will be provided within land permanently required for Pyford North embankment in the original scheme.</p>
<p>Lowering of Kings Bromley viaduct, Bourne embankment and River Trent viaduct</p> <p>SES2-001-003</p> <p>Map CT-05-201, Map CT-05-202, Map CT-05-203, Map CT-05-204; and Map CT-06-201, Map CT-06-202, Map CT-06-203 and Map CT-06-204 in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>Kings Bromley viaduct, up to 15.5m in height and 980m in length, would cross over Bourne Brook, the realigned A515 Lichfield Road and the realigned Shaw Lane. An accommodation access between the viaduct piers would provide access to agricultural land at Common Lane Farm to the south of the HS2 route.</p> <p>River Trent viaduct, up to 15m in height and 1.9km in length, would pass over the A513 Rugeley Road and Pipe Lane.</p> <p>Bourne embankment, up to 16m in height and 505m in length, would be located between the two viaducts.</p>	<p>This section of route will be lowered by up to 3.5m. The length of all features will be unchanged from the original scheme. Kings Bromley viaduct will be up to 13.7m in height at its highest point, River Trent viaduct will be up to 14m in height and Bourne embankment will be up to 11.9m in height.</p> <p>All crossings beneath the viaducts will be maintained at their existing crossing locations, as provided in the original scheme. Mitigation earthworks will be reduced to reflect the lower height of Bourne</p>

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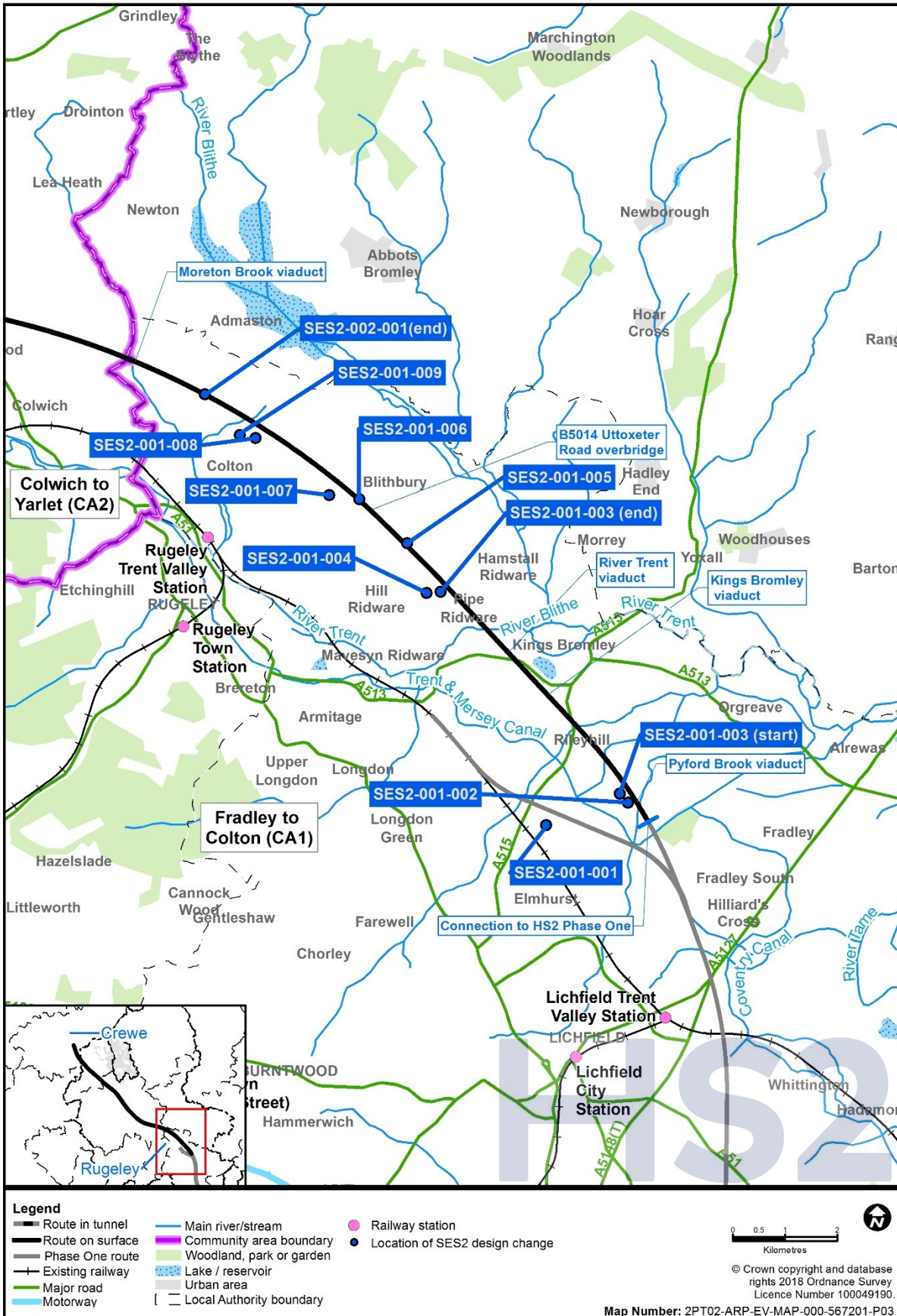
Name of SES2 engineering design change	Description of the SES1 scheme (and AP1 revised scheme where relevant)	Description of the SES2 scheme
	<p>Pyford North embankment, up to 9m in height and 1km in length, would be located to the south of Kings Bromley viaduct.</p>	<p>embankment, whilst maintaining the same slope gradient.</p> <p>Pyford North embankment will be lowered by up to 0.7m at the bridge abutment as it ties into the Kings Bromley viaduct. The height and length of the rest of this embankment will be unchanged. There will be no change to Pipe Ridware embankment.</p>
<p>Local placement of surplus excavated material to the south of Pipe Ridware embankment</p> <p>SES2-001-004</p> <p>Map CT-06-205, J6 to G6, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>Two temporary material stockpiles would be located on the south of the Pipe Ridware embankment, on the east and western sides of the stopped-up section of Pipe Lane. Pipe Lane would be stopped-up on the north side of its junction with Quintons Orchard.</p> <p>Existing hedgerow would be adjacent to the stopped-up section of Pipe Lane.</p> <p>Following construction, the land would be returned to agricultural use.</p>	<p>Surplus excavated material will be placed permanently on the south side of Pipe Ridware embankment, extending east and west across the stopped-up section of Pipe Lane, north-east of Quintons Orchard, and a retained section of Pipe Lane.</p> <p>Existing hedgerow, adjacent to the stopped-up section of Pipe Lane, will be lost as a result of the placement of surplus excavated material; this will be re-provided along its existing alignment.</p> <p>The material will be graded so that it can be returned to agricultural use.</p>
<p>Provision of a noise bund near Woodhouse Farm</p> <p>SES2-001-005</p> <p>Map CT-05-205, I6 to E5, and Map CT-06-205, I6 to E5, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>Pipe Ridware embankment would be located 100m south-west of nine residential properties at Woodhouse Farm.</p>	<p>A noise bund will be provided within land between Pipe Ridware embankment and Pipe Lane, up to 9.5m in height from ground level. This bund will provide noise attenuation during operation of the HS2 route for nine residential properties at Woodhouse Farm.</p>
<p>Relocation of a balancing pond associated with the B5014 Uttoxeter Road realignment at Blithbury Reindeer Lodge</p> <p>SES2-001-006</p> <p>Map CT-05-206, G4 to F4, and Map CT-06-206, G4 to F4, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>The realignment of the B5014 Uttoxeter Road would result in the permanent requirement for land from Blithbury Reindeer Lodge. This land would be required for a balancing pond for highway drainage and its associated turning head, a new access road to Dimble Cottage and agricultural land, and ecological mitigation planting.</p>	<p>A balancing pond for highway drainage and its turning head will be relocated from an area of land associated with Blithbury Reindeer Lodge to an area of land, included in the Bill, identified as an ecological mitigation pond. The new location of the balancing pond will be between the existing section and the realigned section of the B5014 Uttoxeter Road, to the north of the HS2 route. The ecological mitigation pond will be relocated to an area of grassland habitat creation, included in the original scheme, at Manor Farm.</p>
<p>Local placement of surplus excavated material to the south-east of Newlands Lane auto-transformer feeder station</p> <p>SES2-001-007</p> <p>Map CT-06-207, G4 to D7, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>Two temporary material stockpiles would be located on the north and south side of Blithbury South and Blithbury North cuttings, to the south-east of the Newlands Lane auto-transformer feeder station.</p> <p>Blithbury North cutting satellite compound would be located adjacent to Blithbury North cutting, south of the Newlands Lane auto-transformer station.</p> <p>Following construction, the land would be returned to agricultural use.</p>	<p>Surplus excavated material will be placed permanently to the north and south sides of Blithbury South and Blithbury North cuttings. One area for the placement of surplus excavated material will be located to the south-east of the Newlands Lane auto-transformer feeder station, to the north of the HS2 route, and two areas will be located to the south-east and south-west of the Newlands Lane auto-transformer feeder station, to the south of the route.</p>

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Name of SES2 engineering design change	Description of the SES1 scheme (and AP1 revised scheme where relevant)	Description of the SES2 scheme
		The material will be graded so that it can be returned to agricultural use.
<p>Local placement of surplus excavated material to the south of Moreton South embankment.</p> <p>SES2-001-008</p> <p>Map CT-06-209, H5 to F6, and CT-06-209, H5 to F6, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>Three temporary material stockpiles would be located to the south of Moreton South embankment, adjacent to Jonghams Lane and the HS2 route. Existing hedgerow field boundaries separate the temporary material stockpiles.</p> <p>Following construction, the land would be returned to agricultural use.</p>	<p>Surplus excavated material will be placed permanently to the south of Moreton South embankment, north of Jonghams Lane.</p> <p>Existing hedgerow, which separates the temporary stockpiles, will be lost as a result of the placement of surplus excavated material. The hedgerow will be re-provided along its existing alignment.</p> <p>The material will be graded so that it can be returned to agricultural use.</p>
<p>New utility compound for the Western Power Distribution power line diversion works, south-west of Jonghams Lane</p> <p>SES2-001-009</p> <p>Map CT-05-209, E6 to D5, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>Land would be required permanently for the underground diversion of a Western Power Distribution 132kV overhead power line, which would cross beneath the HS2 route at Moreton Brook viaduct.</p>	<p>A new utility compound, the Jonghams Lane utility compound, will be provided for the management of the Western Power Distribution overhead power line diversion works. It will be provided within land required permanently in the original scheme, for the construction of the HS2 route south-west of Jonghams Lane.</p>
<p>Extension of a noise fence barrier from Moreton North embankment to Moreton South embankment</p> <p>SES2-002-001</p> <p>Map CT-06-209, E5 to A5, in the SES2 and AP2 ES Volume 2: CA1 Map Book and Map CT-06-210, J6 to G5, in the SES2 and AP2 ES Volume 2: CA2 Map Book</p>	<p>Noise fence barriers, 1km in length and up to 3m in height, would be located along the southern and northern sides of Moreton North embankment, continuing on to Moreton cutting. The barrier on the southern side would provide acoustic screening for properties at Moreton Grange Farm and the barrier on the northern side would provide acoustic screening for properties at Moreton Farm.</p>	<p>The noise fence barrier on the southern side of the Moreton North embankment will be extended to the east by approximately 1km, at a height of up to 3m. The noise fence barrier will provide acoustic screening for properties at Moreton Grange Farm and Upper Moreton Farm.</p> <p>Part of this SES2 design change lies within the Colwich to Yarlet area (CA2). A detailed description of the SES2 design change within the Colwich to Yarlet area is reported in SES2 and AP2 ES Volume 2, Community area 2, Colwich to Yarlet.</p>

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Figure 3: Locations of SES2 engineering design changes not requiring a change to the Bill in the Fradley to Colton area



A new construction traffic route along Wood End Lane (SES2-001-001)

- 2.2.31 The original scheme provides for a temporary construction traffic route from compounds in the Fradley to Colton and Colwich to Yarlet area (CA2), using local roads including the A515 Lichfield Road and the B5013 Colton Road, to access the A51, before joining the A5192 Eastern Avenue/Cappers Lane around Lichfield, and the A51 Stafford Road to the A48 Rykneld Street, and the wider strategic road network.
- 2.2.32 The Phase One consented scheme routed construction traffic for the Whittington to Handsacre area along Wood End Lane, between the A38 Rykneld Street and Wood End Lane eastbound roadhead, with more limited volumes of traffic carrying on to the A515 Lichfield Road.
- 2.2.33 Since submission of the Bill, consultation with Staffordshire County Council regarding the routing of construction traffic around Lichfield has resulted in a new construction traffic route along Wood End Lane, to take HS2 Phase 2a construction traffic from the A515 Lichfield Road to A38 Rykneld Street, reducing the use of the A5192 Eastern Avenue/Cappers Lane in Lichfield.
- 2.2.34 This new construction traffic route will be used throughout the construction period, from 2021 to 2027.

Topics included in the SES2 assessment

- 2.2.35 The assessment of the changes to construction traffic flows and traffic related effects as a result of this SES2 design change in combination with all SES2 changes and AP2 amendments, are reported in Section 7.
- 2.2.36 This SES2 design change is not considered to require a reassessment of the environmental effects or mitigation as set out in the main ES, as amended by SES1 and SES2, with respect to any environmental topics.

New temporary utility compound for the British Pipeline Agency (BPA) fuel pipeline diversion works, north of Pyford Brook (SES2-001-002)

- 2.2.37 The Bill provides for the permanent diversion of an underground British Pipeline Agency (BPA) 10-inch diameter fuel pipeline for 150m, 50m from its existing alignment. The diversion would cross beneath the HS2 route at Pyford North embankment, 250m north-west of the Pyford Brook viaduct. See Map CT-06-201, E4 to E6, in the main ES Volume 2: CA1 Map Book. Works to divert the BPA fuel pipeline would take one year to complete, commencing in 2021, and would be managed from the Pyford North embankment satellite compound.
- 2.2.38 The AP1 revised scheme (AP1-001-001: Additional land required for a temporary laydown area and a change to Bill powers at Pyford North embankment) would extend the diverted pipeline to the north and south of the HS2 route, and would provide 0.5ha of additional land for a new temporary laydown area, which would be required during the pipeline diversion works. The diversion of the pipeline would cross the HS2 route at the same location as the original scheme, however it would be extended on both sides of the embankment increasing the total length of the diversion to 300m. See Map CT-06-201, E4 to D6, in the SES1 and AP1 ES

Volume 2: CA1 Map Book. The temporary laydown area, measuring 0.5ha, would be located 300m west of Pyford Brook viaduct. See Map CT-05-201, E7 to E8, in the SES1 and AP1 ES Volume 2: CA1 Map Book.

- 2.2.39 Since the submission of the SES1 and AP1 ES, further engagement with the utility provider has identified a requirement to provide a new utility compound for the management of the BPA 10-inch diameter fuel pipeline diversion works. The Pyford Brook utility compound will be located 170m north of Pyford Brook, within land required for the Pyford North embankment in the original scheme. See Map CT-05-201, F5 to E5, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 2.2.40 The Pyford Brook utility compound will be operational for one year and three months, commencing in 2021, and will support an average of 15 workers per day (17 workers at peak times). Access to the new compound will be from Crawley Lane and Common Lane for site preparation and set up, and then from the A515 Lichfield Road, across Common Lane and via site haul routes thereafter.
- 2.2.41 The diversion works will take one year and three months to complete, commencing in 2021.
- 2.2.42 This SES2 design change will only proceed if the AP1 amendment AP1-001-001 is enacted, as it is dependent on the additional area of land required for the site laydown area and the extension to the pipeline.

Topics included in the SES2 assessment

- 2.2.43 The assessment of the changes to construction traffic flows and traffic related effects as a result of this SES2 design change in combination with all SES2 changes and AP2 amendments, is reported in Section 7.
- 2.2.44 This SES2 design change is not considered to require a reassessment of the environmental effects or mitigation as set out in the main ES, as amended by SES1 and SES2, with respect to any environmental topics.

Lowering of Kings Bromley viaduct, Bourne embankment and River Trent viaduct (SES2-001-003)

- 2.2.45 The Bill provides for Kings Bromley viaduct, Bourne embankment and River Trent viaduct to carry the HS2 route from south of Kings Bromley, adjacent to the south bank of Bourne Brook, to north of Dawson Lane, north of Pipe Ridware. See Map CT-05-201, E5, to CT-05-204, C4, and Map CT-06-201, E5, to CT-06-204, C4, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 2.2.46 Kings Bromley viaduct, up to 15.5m in height and 980m in length, would cross over Bourne Brook, the realigned A515 Lichfield Road and the realigned Shaw Lane. A noise fence barrier, 2m in height, would be located on the north and south side of Kings Bromley viaduct. The barriers would provide acoustic screening for properties in Rileyhill and Kings Bromley. An area of habitat creation would be provided under Kings Bromley viaduct and on either side of the realigned Shaw Lane. A replacement floodplain storage area would be provided to the south of the HS2 route, 130m west of the Kings Bromley viaduct, to mitigate impacts from viaduct piers in the floodplain.

- 2.2.47 An accommodation access would be provided between Kings Bromley viaduct piers to provide access to agricultural land at Common Lane Farm to the south of the HS2 route. The A515 Lichfield Road would be realigned, 200m west of its existing alignment for 1.4km, and Shaw Lane would be realigned, 50m west of its existing alignment for 500m, to pass underneath the Kings Bromley viaduct and re-join its existing alignment to the south of the junction with the A513 Rugeley Road. Kings Bromley Footpaths 12 and 0.390 would also be realigned underneath the viaduct, as would an agricultural access.
- 2.2.48 The River Trent viaduct, up to 15m in height and 1.9km in length, would pass over the A513 Rugeley Road and Pipe Lane (also known locally as Pipe Wood Lane). A noise fence barrier, 2m in height, would be located on the north and south sides of the River Trent viaduct to provide acoustic screening for properties in Kings Bromley and Pipe Ridware.
- 2.2.49 Bourne embankment, up to 16m in height and 505m in length, is located between Kings Bromley viaduct and River Trent viaduct. The embankment slopes included landscape earthworks with landscape mitigation planting, which would help to integrate the HS2 route into the surrounding landscape. To the north of the HS2 route, adjacent to the embankment, is an area of woodland habitat creation, extending across the A513 Rugeley Road to existing woodland at Kings Bromley Gravel Pit. This area of woodland habitat creation would provide replacement habitat and ecological connectivity between areas of existing woodland. A noise fence barrier, 2m in height, would be located on the north side of the embankment to provide acoustic screening for properties in Kings Bromley.
- 2.2.50 Since the submission of the Bill, the heights of Kings Bromley viaduct and River Trent viaduct have been reviewed following engagement with Staffordshire County Council. The SES2 design change will provide a reduction to the height of the viaducts whilst maintaining sufficient headroom for the highways, public rights of way (PRoW) and accesses that pass beneath the viaducts.
- 2.2.51 Kings Bromley viaduct will be lowered by up to 3.1m with an amended height of up to 13.7m, River Trent viaduct will be lowered by up to 2.6m with an amended height of up to 14m, and Bourne embankment will be lowered by up to 3.5m with an amended height of up to 11.9m. The lengths of the viaduct and embankment will be unchanged, as will the locations and design of all highways, PRoW and accesses.
- 2.2.52 The area required for landscape earthworks at Bourne embankment will be reduced to take into account the lower height of this embankment, while maintaining the same gradient of slope. This will reduce the embankment footprint by 1.9ha. Landscape mitigation planting will be provided on the east slope of Bourne embankment, and the total area of woodland will be equivalent to that provided in the original scheme. To the west of the embankment, a length of proposed hedgerow will be relocated with the toe of the embankment.
- 2.2.53 To tie in to the HS2 route at Kings Bromley viaduct, Pyford North embankment will be lowered by up to 0.7m at the bridge abutment. There will be no change to the Pipe Ridware embankment where it ties into River Trent viaduct.

- 2.2.54 Noise fence barriers along this section of the HS2 route will not change in height or length.
- 2.2.55 Kings Bromley viaduct will take three years and three months to complete, commencing in 2022. Bourne embankment will take one year and nine months to complete, commencing in 2022. River Trent viaduct will take three years and six months to complete, commencing in 2022.

Local alternatives

- 2.2.56 The main local alternatives for lowering the route between Pyford North embankment and Pipe Ridware embankment are summarised in this section. Options were considered following consultation with Staffordshire County Council. The sensitivity of this location, particularly the proximity of the route to residential properties at Rileyhill, Kings Bromley, and Pipe Ridware, and the impact on the existing highway network have been key considerations in the development of these alternatives.
- 2.2.57 Two options for this amendment were considered as follows:
- Option 1 (SES2 scheme): The vertical alignment of the route would be lowered by as much as possible from Pyford North embankment to Pipe Ridware embankment, whilst maintaining the highways crossings under the viaducts. The height of Kings Bromley viaduct and River Trent viaduct would be lowered to up to 3.1m and 2.6m, respectively, which represents the minimum clearance requirements for highways, PRoW, and agricultural access crossings. The A515 Lichfield Road, Shaw Lane, the access to Echills Farm, the A513 Rugeley Road, Pipe Lane and Dawson Lane would all be crossed in the same way as described in the main ES. Bourne embankment would be lowered to 11.8m (maximum height above ground level). The route would remain on the same horizontal alignment as presented in the original scheme; and
 - Option 2: The vertical alignment of the route would be lowered by as much as possible from Pyford North embankment to Pipe Ridware embankment, diverting the highways crossings over the viaducts. The height of Kings Bromley viaduct and River Trent viaduct would be lowered to 8.2m and 10.5m, respectively, which represents the minimum level required for flooding requirements but not the highway, PRoW, and agricultural access crossings. Three new overbridges would be required to carry the realigned A515 Lichfield Road, Pipe Lane and Common Lane over the HS2 route. The A513 Rugeley Road would be split to provide two parallel routes either side of Bourne embankment. To the north-east of the HS2 route, a section of the A513 Rugeley Road would be retained but would be stopped-up near to Rookery Lodge, and Shaw Lane would be stopped-up, beyond Shaw Lane Farm to ensure access is maintained. To the south-west of the HS2 route, the A513 Rugeley Road would be realigned to tie in to the existing alignment of the A513 Rugeley Road, adjacent to Four Seasons Nature Study Centre, and to Shaw Lane, south of the embankment. The section of Shaw Lane that would remain open would be widened to the junction with the A515 Lichfield Road, so that it would be to the same standard as the existing A513 Rugeley Road. Bourne

embankment would be lowered to be up to 7.3m. The route would remain on the same horizontal alignment as presented in the original scheme.

2.2.58 In summary, Option 1 was identified as the preferred option, as on balance it presented the most favourable environmental and economic outcome. In comparison to Option 1, Option 2 would introduce greater environmental impacts, most notably relating to the increased construction disruption associated with the raised diversions of the A513 Rugeley Road, Pipe Lane and Common Lane, and the need for more land. Option 2 would have detrimental environmental impacts including on agricultural holdings, visual amenity, archaeological remains and the setting of heritage assets, Riley Hill Biodiversity Action Site (BAS) due to loss of habitat, residential properties and community facilities including Conservation, Horticulture, Agriculture for the Disabled Society (CHADS).

2.2.59 The analysis of engineering, cost and potential environmental impacts associated with the options is set out below, with the impacts of the preferred option presented first.

Option 1

2.2.60 When compared with the original scheme, there would be some localised reduction in visual impacts and impacts on landscape character. Option 1 would potentially result in an increased impact on ecological receptors, as the reduction in headroom beneath the viaducts would reduce the attractiveness of foraging and commuting routes for bats and barn owls. This could cause more bats and barn owls to avoid these routes, and increase habitat fragmentation effects. During operation, lowering of the viaducts would increase the movement of bats and barn owls above the viaducts resulting in an increased risk of bat and barn owl mortality from collisions with moving trains.

2.2.61 Option 1 does not introduce any technical or construction complexities, risk of safety hazards or lengthening of the construction programme. Option 1 would result in slightly reduced costs compared to the original scheme due to reduced earthworks.

Option 2

2.2.62 In comparison with Option 1, Option 2 would introduce a number of additional environmental impacts. The widening of Shaw Lane, construction of a new overbridge carrying the realigned A515 Lichfield Road and diversion of the A513 Rugeley Road would result in the loss of semi-improved grassland, mature trees and hedgerows within the Riley Hill BAS. The additional loss of mature hedgerows and trees compared to Option 1 could result in greater impacts on protected species, including bats and barn owls that are dependent upon them. The lowering of the viaduct over the River Trent may also introduce new impacts on other bird species, such as mute swan by impeding movement around the watercourse.

2.2.63 The construction of two new overbridges, to carry the realigned A515 Lichfield Road and Common Lane, and an increase in land required for the relocation of

Pyford North embankment construction compound due to the Common Lane realignment, would increase visual and noise impacts for residential properties around Kings Bromley, potentially resulting in new in-combination community impacts. The construction of the realigned A513 Lichfield Road, located to the south-west of the HS2 route, would increase visual and noise impacts at the Four Seasons Nature Study Centre, part of CHADS.

- 2.2.64 The lowering of River Trent viaduct and Kings Bromley viaduct would introduce new permanent adverse impacts on six agricultural holdings, in comparison to Option 1, including at Trentside Meadows (part of CHADS), as a result of reduced highway access to severed land parcels. At Pipe Hall Farm, the height reduction of River Trent viaduct would have a substantial impact on the ongoing operation of the dairy enterprise, in comparison to Option 1.
- 2.2.65 Construction works associated with the realigned Common Lane would result in the loss of an extensive cropmark complex at Bourne Brook (FRC020). The diverted A513 Rugeley Road would result in the loss of an Iron Age pit alignment (FRC036) and would substantially increase the impact on the buried archaeological remains of a multi-period agricultural landscape (FRC034). The closure of Shaw Lane and the new Pipe Lane overbridge would increase impacts on the historic landscape in the area.
- 2.2.66 In comparison with Option 1, Option 2 would allow for a lower grade material to be used for the highway embankments which would otherwise need to be disposed offsite, which would result in a reduction in exported construction material. This would equate to a reduction in HGV movements during the construction period, and reduced construction costs.
- 2.2.67 Option 2 would introduce construction complexities and increased safety hazards with the construction and maintenance of three new overbridges to carry the realigned A515 Lichfield Road, Pipe Lane and Common Lane over the HS2 route. This would also result in a significant level of disruption to the local highway network during construction.

Topics included in the SES2 assessment

- 2.2.68 This SES2 design change is considered to require reassessment of the environmental effects and mitigation in the main ES, as amended by SES1 and SES2, for the following topics: community; and sound, noise and vibration. This is reported in Section 3.
- 2.2.69 Landscape and visual is not considered in this section as the small nature of the change (to lower the height of Kings Bromley viaduct, Bourne embankment and River Trent viaduct) will be seen in the context of the larger scale change as a result of the original scheme in this area.
- 2.2.70 A combined assessment of new or different significant construction traffic and traffic related effects, as a result of changes in construction traffic flows, is reported in Section 7.

Local placement of surplus excavated material to the south of Pipe Ridware embankment (SES2-001-004)

- 2.2.71 The Bill provides for the temporary storage of excavated material, adjacent to the HS2 route, for reuse within the scheme during construction. Two temporary material stockpiles would be provided on the south-west side of Pipe Ridware embankment, immediately east and west of a stopped-up section of Pipe Lane, during construction. Pipe Lane, which would be stopped-up on the north side of its junction with Quintons Orchard, would be bound by existing hedgerow. Following construction, the land would be returned to agricultural use. See Map CT-05-205, G7 to I6, in the main ES Volume 2: CA1 Map Book.
- 2.2.72 As part of a route-wide review of earthworks and the movement of materials, the scope for local placement of surplus excavated material on land already required for the construction of the scheme has been considered. Use of local placement areas would reduce the need for off-site road transportation and disposal of that surplus excavated material and reduce the environmental impacts arising from HGV movements on the highway network. Volume 1 of the SES2 and AP2 ES provides further detail on the local placement of surplus excavated material.
- 2.2.73 Surplus excavated material will be placed permanently on the south side of Pipe Ridware embankment, extending east and west across the area occupied by the stopped-up section of Pipe Lane and the two temporary material stockpiles in the original scheme. The location for the placement of surplus excavated material will cover an area of 5ha and will be up to 3m in height. The surplus excavated material will be graded to allow the area to be returned to agricultural use following construction. See Map CT-06-205, J6 to E6, and Map CT-06-205, G7 to I6, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 2.2.74 Extending the placement of surplus excavated material across the stopped-up section of Pipe Lane will result in the removal of a length of existing hedgerow; to mitigate this, an equivalent length of new hedgerow habitat creation will be provided along the same alignment to provide habitat replacement.
- 2.2.75 The agricultural soil profile (i.e. the topsoil and subsoil) will be available for agricultural restoration so that agricultural soils can be returned to the same condition as their pre-excavated state, using good practice techniques to handle, store and reinstate soils. Given the currently unknown nature of the surplus excavated material beneath the restored agricultural soil profile, it is likely that agricultural land drainage works will be required when restoring this area to achieve this condition and to ensure ongoing agricultural management of the restored land.
- 2.2.76 Surplus excavated material will be placed in the local placement area throughout the construction period as suitable material arises. This process will be managed from Pipe Ridware embankment satellite compound.

Local alternatives

- 2.2.77 A process of identifying potentially suitable local placement areas in the Pipe Ridware area was undertaken.

- 2.2.78 This process identified three locations in the Pipe Ridware area for the placement of surplus excavated material. These were considered against criteria as identified in Volume 1, which set out the key considerations for the suitability of local placement sites.
- 2.2.79 When considered against the criteria, Option 1 was not taken forward for further consideration as it was not considered to be a reasonable option. This option would be located to the south-east of Woodhouse Farm, on the northern side of Pipe Ridware embankment. This option was not taken forward as it would not have sufficient capacity to accommodate a local placement site.
- 2.2.80 The remaining two options were taken forward into the SES2 scheme, collectively as SES2 change SES2-001-004:
- Option 2 would be located to the east of Quintons Orchard and Pipe Lane, on the southern side of Pipe Ridware embankment. The location for this option meets the majority of the criteria, however it is in proximity to Quintons Orchard Farm, which would potentially be subject to minor noise impacts. This option has been taken forward into the SES2 scheme as, on balance, the effects on Quintons Orchard Farm would be minor and limited to the construction period; and
 - Option 3 would be located to the east of Quintons Orchard and Quintons Orchard Farm, on the south side of Pipe Ridware embankment. The location for this option meets the majority of the criteria, however it is in proximity to Quintons Orchard Farm, which would potentially be subject to minor noise impacts. In addition, this option would potentially increase the temporary loss and severance of agricultural land during construction. This option has been taken forward into the SES2 scheme as, on balance, the effects on Quintons Orchard Farm and agricultural land would be minor and limited to the construction period.

Topics included in the SES2 assessment

- 2.2.81 The assessment of the changes to construction traffic flows and traffic related effects as a result of this SES2 design change in combination with all SES2 changes and AP2 amendments, is reported in Section 7.
- 2.2.82 This SES2 design change is not considered to require a reassessment of the environmental effects or mitigation as set out in the main ES, as amended by SES1 and SES2, with respect to any environmental topics.

Provision of a noise bund near Woodhouse Farm (SES2-001-005)

- 2.2.83 The Bill provides for Pipe Ridware embankment, 100m west of nine residential properties at Woodhouse Farm, including Woodhouse Farm, Woodhouse Farm cottage and seven new properties proposed through a proposed development (planning application 14/00614/FUL). See Map CT-06-205 in the main ES Volume 2: CA1 Map Book. Following the submission of the Bill, HS2 Ltd's understanding of the number and type of properties proposed through the committed

developments at Woodhouse Farm has changed. The SES1 and AP1 ES stated that opportunities to provide operational noise attenuation would be pursued.

- 2.2.84 Since the submission of the SES1 and AP1 ES, further design refinement has identified the form of operational noise attenuation. A noise bund will be located between Pipe Ridware embankment and Pipe Lane, to provide acoustic screening to residential properties at Woodhouse Farm. See Map CT-05-205, I6 to G5, and Map CT-06-205, I6 to G5, in the SES2 and AP2 ES Volume 2: CA1 Map Book. The noise bund will vary in height from 3.6m above rail level at the south end of the embankment, to 8.4m above rail level at the north end of the embankment. This will be up to 9.5m above the existing ground level.
- 2.2.85 To accommodate the noise bund, Woodhouse culvert will be extended by 90m, and a balancing pond for highway drainage and its associated turning head, along the Pipe Lane diversion, will be relocated 200m to the south-east. See Map CT-05-205, G5, in the SES2 and AP2 ES Volume 2: CA1 Map Book. The area of the balancing pond will increase slightly to accommodate the additional surface water run-off from the noise bund.
- 2.2.86 A small area of woodland mitigation planting in the original scheme will not be implemented due to the relocation of the balancing pond. An area of woodland habitat creation will be provided on the noise bund slopes to provide additional screening for Woodhouse Farm, to help integrate the route into the landscape, and to replace the woodland mitigation lost due to the amendment. Overall there will be a net increase of 0.9ha in landscape mitigation planting in this area. Approximately 430m of hedgerow planting, in the original scheme at the toe of the Pipe Ridware embankment, will not be implemented, as it will be replaced with landscape mitigation planting.
- 2.2.87 Approximately 2.3ha of land, which is located within the limits of the Pipe Ridware embankment, was assumed to be returned to agricultural use in the original scheme. With this design change, this land will no longer be returned to agriculture at Woodhouse Farm (CA1/21) and the noise bund will become part of the permanent design of the Pipe Ridware embankment.
- 2.2.88 This SES2 design change will be constructed within the overall programme for Pipe Ridware embankment, which will take two years to complete, from 2022.

Topics included in the SES2 assessment

- 2.2.89 This SES2 design change is considered to require reassessment of the environmental effects and mitigation in the main ES, as amended by SES1 and SES2, for the following topics: cultural heritage; landscape and visual; and sound, noise and vibration. This is reported in Section 3.
- 2.2.90 The assessment of the changes to construction traffic flows and traffic related effects as a result of this SES2 design change in combination with all SES2 changes and AP2 amendments, is reported in Section 7.

Relocation of a balancing pond associated with the B5014 Uttoxeter Road realignment at Blithbury Reindeer Lodge (SES2-001-006)

- 2.2.91 The Bill provides for the realignment of the B5014 Uttoxeter Road, 200m to the west of its existing alignment for 1.1km in length, to cross over the HS2 route on the B5014 Uttoxeter Road overbridge. Three balancing ponds for highway drainage would be provided within areas of grassland habitat creation, along the south-east of the realigned B5014 Uttoxeter Road. See Map CT-06-206, G3, G6 and H9, in the main ES Volume 2: CA1 Map Book. The northernmost of these ponds would be located within an area of land associated with Blithbury Reindeer Lodge.
- 2.2.92 To the north of the HS2 route, adjacent to the B5014 Uttoxeter Road overbridge, an ecological mitigation pond would provide replacement habitat for reptiles and amphibians, within a wider area of woodland habitat creation. Adjacent to the Manor Farm overbridge, an area of grassland and woodland habitat creation would be provided around an existing pond, to provide terrestrial habitat for great crested newts. See Map CT-06-206, F4 to F5, in the main ES Volume 2: CA1 Map Book.
- 2.2.93 Since the submission of the Bill, opportunities to reduce the area of land required from Blithbury Reindeer Lodge have been explored, in response to ongoing engagement with the stakeholder. The balancing pond for highway drainage and its associated turning head will be relocated from an area of land associated with Blithbury Reindeer Lodge to an area of land, included in the original scheme, for an ecological mitigation pond. The new location of the balancing pond will be between an existing section and the realigned section of the B5014 Uttoxeter Road, to the north-east of the HS2 route. See Map CT-06-206, G4, in the SES2 and AP2 ES Volume 2: CA1 Map Book. The relocation of the balancing pond will result in approximately 0.4ha of woodland habitat creation, included in the original scheme, no longer being implemented; and approximately 0.4ha of grassland habitat creation being provided around the relocated balancing pond. Overall, there will be a reduction of 800m² in the areas of woodland and grassland habitat creation mitigation provided, due to the increase in the size of the balancing pond.
- 2.2.94 The ecological mitigation pond will be relocated 150m further north, to an area of grassland habitat creation included in the original scheme, at Manor Farm (CA1/27). See Map CT-06-206, F4, in the SES2 and AP2 ES Volume 2: CA1 Map Book. This design change does not require any additional land from the farm holding.
- 2.2.95 The layout of the access road to Dimble Cottage and agricultural land will be amended to further reduce the land required from Blithbury Reindeer Lodge by 0.8ha. The culvert beneath this access is unaffected by this SES2 design change.
- 2.2.96 Hedgerow planting, 270m in length, which was provided along the field boundaries of the area required from Blithbury Reindeer Lodge in the original scheme for the highways balancing pond, will be removed. Approximately 75m of

hedgerow planting will be provided along the north side of the access road to Dimble Cottage and agricultural land.

- 2.2.97 The ecological mitigation ponds will be provided in advance of construction works in the area. The balancing pond will be provided as part of the works to the B5014 Uttoxeter Road overbridge and realignment, which will take one year and six months to complete, commencing in 2021. An area of 0.8ha of land will be no longer required from Blithbury Reindeer Lodge.

Topics included in the SES2 assessment

- 2.2.98 This SES2 design change is considered to require reassessment of the environmental effects and mitigation in the main ES, as amended by SES1 and SES2, for agriculture, forestry and soils. This is reported in Section 3.

Local placement of surplus excavated material to the south-east of Newlands Lane auto-transformer feeder station (SES2-001-007)

- 2.2.99 The Bill provides for the temporary storage of excavated material, adjacent to the HS2 route, for reuse within the scheme during construction. Two temporary material stockpiles would be provided adjacent to Blithbury South and Blithbury North cuttings, south-east of the Newlands Lane auto-transformer feeder station. Blithbury North cutting satellite compound would be located on the south side of Blithbury North cutting, south-west of the Newlands Lane auto-transformer station. Following construction, the land would be returned to agricultural use. See Map CT-05-207, D7 to G4, in the main ES Volume 2: CA1 Map Book.
- 2.2.100 As part of a route-wide review of earthworks and the movement of materials, the scope for local placement of surplus excavated material on /and already required for the construction of the scheme has been considered. Use of local placement areas would reduce the need for off-site road transportation and disposal of that surplus excavated material and reduce the environmental impacts arising from HGV movements on the highway network. Volume 1 of the SES2 and AP2 ES provides further detail on the local placement of surplus excavated material.
- 2.2.101 Surplus excavated material will be placed adjacent to Blithbury South and Blithbury North cuttings, in the areas occupied by the two temporary material stockpiles and Blithbury North cutting satellite compound in the original scheme. The three locations for the placement of surplus excavated material include:
- an area on the north-east side of Blithbury Central cutting, south-east of the Newlands Lane auto-transformer feeder station, which will cover an area of 1.3ha and will be up to 3m in height. See Map CT-06-207, I5 to G5, in the SES2 and AP2 ES Volume 2: CA1 Map Book; and
 - two areas on the south side of Blithbury North cutting, one to the south-east and one to the south-west of the Newlands Lane auto-transformer feeder station, which will cover an area of 5.7ha and will be up to 3m in height. See Map CT-06-207, G4 to D7, in the SES2 and AP2 ES Volume 2: CA1 Map Book.

- 2.2.102 The surplus excavated material will be graded to allow the area to be returned to agricultural use following construction.
- 2.2.103 A 9m wide gap, between the two areas of surplus excavated material to the south of Blithbury North cutting, will be provided to accommodate an existing surface water flow path.
- 2.2.104 The agricultural soil profile (i.e. the topsoil and subsoil) will be available for agricultural restoration so that agricultural soils can be returned to the same condition as their pre-excavated state, using good practice techniques to handle, store and reinstate soils. Given the currently unknown nature of the surplus excavated material beneath the restored agricultural soil profile, it is likely that agricultural land drainage works will be required when restoring this area to achieve this condition and to ensure ongoing agricultural management of the restored land.
- 2.2.105 Surplus excavated material, located in the areas occupied by the temporary material stockpiles, will be placed in the local placement area throughout the construction period as suitable material arises. This process will be managed from Blithbury North cutting satellite compound. Surplus excavated material, located in the area occupied by Blithbury North cutting satellite compound, will be placed in the local placement following restoration of the compound site.

Local alternatives

- 2.2.106 A process of identifying potentially suitable local placement areas in the area near to Newlands Lane auto-transformer feeder station was undertaken.
- 2.2.107 This process identified five locations in the area near to Newlands Lane auto-transformer feeder station for the placement of surplus excavated material. The identified locations were considered against criteria, as identified in Volume 1, which set out the key considerations for the suitability of local placement sites. The five locations are reported below.
- 2.2.108 When considered against the criteria, the following three options were not taken forward for further consideration as they were not considered to be reasonable options:
- Option 1 would be located to the north-east of the B5013 Uttoxeter Road underbridge, on the northern side of Stockwell Heath cutting. This option was not taken forward as it would conflict with the Stockwell Heath cutting satellite compound, required to support civil engineering and railway systems construction activities;
 - Option 2 would be located to the south of Newlands Lane overbridge, on the southern side of Blithbury North cutting. This option was not taken forward as it would conflict with an area of landscape planting, which would provide visual screening and landscape integration in the original scheme; and
 - Option 3 would be located immediately south-east of Newlands Lane auto-transformer feeder station, on the northern side of Blithbury North cutting. This option was not taken forward as it would conflict with an area of

landscape planting, which would provide visual screening and landscape integration in the original scheme.

- 2.2.109 The remaining two options were taken forward into the SES2 scheme, collectively as SES2 change SES2-001-007:
- Option 4 would be located to the south-east of Newlands Lane auto-transformer feeder station, on the northern side of Blithbury Central cutting. The location for this option meets with the majority of the criteria, however, it would potentially increase the temporary loss and severance of agricultural land at Town End Farm (CA1/38) during construction. This option has been taken forward into the SES2 scheme as, on balance, the effects on agricultural land would be minor and limited to the construction period; and
 - Option 5 would be located immediately south of Newlands Lane auto-transformer feeder station, on the southern side of Blithbury North cutting. Following identification of this option, the configuration of this local placement area was amended, to accommodate an existing drainage pathway across the land. The location for this option meets with the criteria and has been taken forward into the SES2 scheme.

Topics included in the SES2 assessment

- 2.2.110 The assessment of the changes to construction traffic flows and traffic related effects as a result of this SES2 design change in combination with all SES2 changes and AP2 amendments, is reported in Section 7.
- 2.2.111 This SES2 design change is not considered to require a reassessment of the environmental effects or mitigation as set out in the main ES, as amended by SES1 and SES2, with respect to any environmental topics.

Local placement of surplus excavated material to the south of Moreton South embankment (SES2-001-008)

- 2.2.112 The Bill provides for the temporary storage of excavated material, adjacent to the HS2 route, for reuse within the scheme during construction. Three temporary material stockpiles would be provided to the south of Moreton South embankment, adjacent to Jonghams Lane and the HS2 route, and would be separated by existing hedgerow field boundaries. Following construction, the land would be returned to agricultural use. See Map CT-05-209, F6 to H6, in the main ES Volume 2: CA1 Map Book.
- 2.2.113 As part of a route-wide review of earthworks and the movement of materials, the scope for local placement of surplus excavated material on land already required for the construction of the scheme has been considered. Use of local placement areas would reduce the need for off-site road transportation and disposal of that surplus excavated material and reduce the environmental impacts arising from HGV movements on the highway network. Volume 1 of the SES2 and AP2 ES provides further detail on the local placement of surplus excavated material.
- 2.2.114 Surplus excavated material will be placed permanently to the south of Moreton South embankment, extending across hedgerow field boundaries, adjacent to

Jonghams Lane and the HS2 route, in the area occupied by the three temporary material stockpiles in the original scheme. The location for the placement of surplus excavated material will cover an area of 5.3ha and will be up to 3m in height. The surplus excavated material will be graded to allow the area to be returned to agricultural use following construction. See Map CT-06-209, H5 to F6, in the SES2 and AP2 ES Volume 2: CA1 Map Book.

- 2.2.115 Extending the placement of surplus excavated material across the field boundaries, will result in the removal of a length of existing hedgerow; to mitigate this, an equivalent length of new hedgerow habitat creation will be provided along the same alignment to provide habitat replacement. The reinstatement of hedgerows will replicate the existing field boundaries, however, this will be at the new ground level created by the local placement site. See Map CT-06-209, H5 to F6, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 2.2.116 The agricultural soil profile (i.e. the topsoil and subsoil) will be available for agricultural restoration so that agricultural soils can be returned to the same condition as their pre-excavated state, using good practice techniques to handle, store and reinstate soils. Given the currently unknown nature of the surplus excavated material beneath the restored agricultural soil profile, it is likely that agricultural land drainage works will be required when restoring this area to achieve this condition and to ensure ongoing agricultural management of the restored land.
- 2.2.117 Surplus excavated material will be placed in the local placement area throughout the construction period as suitable material arises. This process will be managed from Stockwell Heath cutting satellite compound.

Local alternatives

- 2.2.118 A process of local placement sites was undertaken to identify potentially suitable locations in the Moreton area.
- 2.2.119 This process identified five locations in the Moreton area for the placement of surplus excavated material, two of which are in the Fradley to Colton area (CA1). The identified locations were considered against criteria, as identified in Volume 1, which set out the key considerations for the suitability of local placement sites. The two locations in the Fradley to Colton area are reported below.
- 2.2.120 When considered against the criteria, Option 1 was not taken forward for further consideration as it was not considered to be a reasonable option. Option 1 would be located to the north-east of the B5013 Uttoxeter Road underbridge, on the northern side of Stockwell Heath cutting. This option was not taken forward as it would conflict with the Stockwell Heath cutting satellite compound, required to support civil engineering and railway systems construction activities. Its use as a local placement site, following the removal of the compound, would give insufficient opportunity to deposit material ready for agricultural reuse.
- 2.2.121 Option 3 would be located immediately north of Jonghams Lane, on the south side of the Moreton South embankment. The location for this option meets with the majority of the criteria, however it would be in proximity to Jongham's

Cottage, which would potentially be subject to minor noise and visual impacts. In addition, this option would potentially increase the temporary loss of land and severance of agricultural land during construction. This option has been taken forward into the SES2 scheme as, on balance, the effects on Jongham's Cottage and agricultural land would be minor and limited to the construction period.

Topics included in the SES2 assessment

2.2.122 The assessment of the changes to construction traffic flows and traffic related effects as a result of this SES2 design change in combination with all SES2 changes and AP2 amendments, is reported in Section 7.

2.2.123 This SES2 design change is not considered to require a reassessment of the environmental effects or mitigation as set out in the main ES, as amended by SES1 and SES2, with respect to any environmental topics.

New temporary utility compound for the Western Power Distribution power line diversion works, south-west of Jonghams Lane (SES2-001-009)

2.2.124 The Bill provides for a permanent underground diversion of a Western Power Distribution 132kV overhead power line for 1km, on its existing alignment. The diversion would cross beneath the HS2 route at Moreton Brook viaduct. See Map CT-06-209, C6 to B4, in the main ES Volume 2: CA1 Map Book. Works to divert the Western Power Distribution 132kV overhead power line would take one year and three months to complete and would be managed from Moreton Brook viaduct satellite compound.

2.2.125 Since submission of the Bill, a requirement has been identified through further engagement with the utility provider to provide a new utility compound for the management of the Western Power Distribution 132kV overhead power line diversion works. The Jonghams Lane utility compound will be located 250m south-east of Moreton Brook viaduct, within land required for the original scheme. See Map CT-05-209, E6 to D5, in the SES2 and AP2 ES Volume 2: CA1 Map Book.

2.2.126 The Jonghams Lane utility compound will be operational for six months, commencing during 2021, and will support an average of 15 workers per day (20 workers at peak times). Access to the new compound will be from Jonghams Lane and the B5013 Uttoxeter Road.

2.2.127 The diversion works will take six months to complete, commencing in 2021.

Topics included in the SES2 assessment

2.2.128 The assessment of the changes to construction traffic flows and traffic related effects as a result of this SES2 design change in combination with all SES2 changes and AP2 amendments, is reported in Section 7.

2.2.129 This SES2 design change is not considered to require a reassessment of the environmental effects or mitigation as set out in the main ES, as amended by SES1 and SES2, with respect to any environmental topics.

Extension of a noise fence barrier from Moreton North embankment to Moreton South embankment (SES2-002-001)

- 2.2.130 Part of this SES2 design change and relevant potential receptors lie within the Colwich to Yarlet area (CA2). A detailed description of the SES2 design change and assessment of effects within the Colwich to Yarlet area is reported in SES2 and AP2 ES Volume 2, Community area 2, Colwich to Yarlet. Part of this amendment lies within the Fradley to Colton area and the works associated with this amendment and assessment of effects on receptors within the Fradley to Colton area are described in Section 3.
- 2.2.131 The Bill provides for noise fence barriers, up to 3m in height, located along the southern and northern sides of Moreton North embankment, continuing on to Moreton cutting within the Colwich to Yarlet area.
- 2.2.132 Since submission of the Bill, further consideration has been given to noise mitigation measures to reduce operational noise effects at Upper Moreton Farm in the Colwich to Yarlet area. The noise fence barrier on the southern side of the Moreton North embankment will be extended to the west along the south of Moreton North embankment, Moreton Brook viaduct and Moreton South embankment, by approximately 1km in length and up to 3m in height, of which approximately 500m will be within the Fradley to Colton area. See Map CT-06-209, E5 to A5, in the SES2 and AP2 Volume 2: CA1 Map Book and Map CT-06-210, J6 to G5, in the SES2 and AP2 ES Volume 2: CA2 Map Book.
- 2.2.133 There is no requirement to alter Moreton Brook viaduct or Moreton South embankments in order to construct the noise fence barrier.
- 2.2.134 The SES2 design change will take nine months to complete, commencing in 2024. Works will be managed from the Trent South embankment main compound in the Colwich to Yarlet area.

Topics included in the SES2 assessment

- 2.2.135 Within the Fradley to Colton area, this SES2 design change is considered to require reassessment of the environmental effects and mitigation in the main ES, as amended by SES1 and SES2, for landscape and visual. This is reported in Section 3.

Corrections to the main ES

- 2.2.136 Since submission of the main ES, the need for a number of corrections to the contents of the main ES has been identified. Table 5 provides a list of the instances where there has been a need to correct the Volume 2 Community area report for the Fradley to Colton area because of the potential to alter the significant environmental effects reported in the main ES, or a factual inaccuracy relating to a significant effect that has been identified. The table gives the location of the text that is subject to the correction in the main ES, the reason for the correction, replicates the text from the main ES, where applicable provides revised text, and identifies whether the correction changes a significant effect reported in the main ES. Where relevant, these corrections have been taken into account in the technical assessments contained within Section 3 of this SES2.

Table 5: Summary of corrections to the main ES in the Fradley to Colton area

Reference in the main ES	Reason for correction	Text in the main ES	Revised text	Change to significant effects and mitigation
Community Paragraph 6.4.1, Volume 2, CA1 of the main ES.	The community assessment states that Shaw Lane would remain open during construction of the scheme. A section of Shaw Lane near the A513 Rugeley Road will be closed during construction. The assessment was correctly reported in Volume 2, Overview of the area and description of the Proposed Scheme, Paragraph 2.3.59.	Paragraph 6.4.1 Shaw Lane will remain open during construction, maintaining connectivity south of Kings Bromley.	Paragraph 6.4.1 1.4km of Shaw Lane will be temporarily closed during construction for a period of one year and six months, with diversions along the A515 Lichfield Road and A513 Rugeley Road.	No change This correction will not lead to a new or different significant effect as it was correctly assessed in the traffic and transport assessment.
Cultural heritage Paragraph 7.4.1, Volume 2, CA1 of the main ES.	The impact on heritage asset FRC194, a Second World War pillbox near Fradley, was omitted from the main ES.	No text exists in the Volume 2, CA1 of the main ES for this correction.	New paragraph to be inserted following paragraph 7.4.21 A Second World War pillbox at Fradley (FRC194), an asset of low value, will be demolished during construction of the Trent and Mersey Canal viaduct. This will constitute a high adverse permanent impact and a moderate adverse permanent significant effect.	Yes This correction will lead to a new significant cultural heritage effect due to the demolition of a Second World War pillbox.
Landscape and visual Viewpoint 007.03.008, LV-001-002, CA1 of the main ES	A significant effect was incorrectly stated for viewpoint 007.03.008 for year 15 (Summer) and year 60 of operation. A minor adverse (non-significant) effect should have been reported rather than a moderate adverse (significant) effect.	Viewpoint 007.03.008 Operation Year 15 - As woodland habitat creation and hedgerow mitigation planting along the Moreton South embankment matures it will help to both filter views and integrate the new features within their landscape context. However, the Proposed Scheme, in particular the Moreton Brook viaduct, will remain prominent. The operation of the Proposed Scheme in year 15 will remain a medium magnitude of visual change and moderate adverse effect, which is significant.	Viewpoint 007.03.008 Operation year 15 – As woodland habitat creation and hedgerow mitigation planting along the Moreton South embankment matures it would partially screen the viaduct and the embankments and achieve greater integration of the engineered landforms into the surrounding landscape. Moreton Brook viaduct would be seen against a backdrop of landform and vegetation which would substantially reduce its perceptibility, although movement of trains still would be noticeable.	Yes. The effect changes from significant to non-significant.

Reference in the main ES	Reason for correction	Text in the main ES	Revised text	Change to significant effects and mitigation
		<p>The view of the Proposed Scheme from viewpoint 007.03.008 during operation year 15 is illustrated on the photomontage shown in Figure LV-01-634 (Volume 5: Appendix LV-001-001).</p> <p>Year 60 -</p> <p>Due to the scale and proximity of the Moreton Brook viaduct, operation of the Proposed Scheme in year 60 will remain a medium magnitude of visual change and moderate adverse effect, which is significant.</p>	<p>Therefore, the magnitude of change will decrease to low and give rise to a minor adverse (non-significant) effect.</p> <p>The view of the Proposed Scheme from viewpoint 007.03.008 during operation year 15 is illustrated on the photomontage shown in Figure LV-01-634 (Volume 5: Appendix LV-001-001).</p> <p>Year 60 -</p> <p>By Year 60, assuming the continued presence and maturation of the mitigation planting, the magnitude of change will remain low and give rise to a minor adverse (non-significant) effect.</p>	

Reference in the main ES	Reason for correction	Text in the main ES	Revised text	Change to significant effects and mitigation
<p>Sound, noise and vibration</p> <p>Paragraph 13.4.24, Paragraph 13.5.28 and Table 27, Volume 2, CA1 of the main ES</p>	<p>Bromley Hayes Cattery was stated as being located at Rose Cottage rather than Holly Cottage (the neighbouring property which is further from the scheme).</p>	<p>Paragraph 13.4.24</p> <p>Bromley Hayes Cattery is located at Rose Cottage, Rileyhill, Lichfield (assessment location ref.: 8003(N)) to the south-west of the Proposed Scheme.</p> <p>Paragraph 13.4.24</p> <p>Rose Cottage has also been assessed as a residential dwelling (assessment location ref.: 11040).</p> <p>Paragraph 13.5.28</p> <p>Bromley Hayes Cattery is located at Rose Cottage, Rileyhill, Lichfield (assessment location ref.: 8003(N)) to the south-west of the Proposed Scheme.</p> <p>Paragraph 13.5.28</p> <p>Rose Cottage has also been assessed as a residential dwelling (assessment location ref.: 11040).</p> <p>Table 27, Row 3, Column 4</p> <p>Bromley Hayes Cattery located at Rose Cottage, Rileyhill, Lichfield.</p>	<p>Paragraph 13.4.24</p> <p>Bromley Hayes Cattery is located at <i>Holly</i> Cottage, Rileyhill, Lichfield (assessment location ref.: 8003(N)) to the south-west of the Proposed Scheme.</p> <p>Paragraph 13.4.24</p> <p><i>Holly</i> Cottage has also been assessed as a residential dwelling (assessment location ref.: 11040).</p> <p>Paragraph 13.5.28</p> <p>Bromley Hayes Cattery is located at <i>Holly</i> Cottage, Rileyhill, Lichfield (assessment location ref.: 8003(N)) to the south-west of the Proposed Scheme.</p> <p>Paragraph 13.5.28</p> <p><i>Holly</i> Cottage has also been assessed as a residential dwelling (assessment location ref.: 11040).</p> <p>Table 27, Row 3, Column 4</p> <p>Bromley Hayes Cattery located at <i>Holly</i> Cottage, Rileyhill, Lichfield.</p>	<p>No change</p> <p>This correction will not lead to a new or different significant effect.</p>

3 Assessment of SES2 changes in the Fradley to Colton area

3.1 Introduction

3.1.1 Section 3 reports the assessment for agriculture, forestry and soils; community; cultural heritage; landscape and visual; sound, noise and vibration; and water resources and flood risk as a result of the SES2 changes.

3.2 Agriculture, forestry and soils

Introduction

3.2.1 The environmental baseline relevant to the agriculture, forestry and soils assessment is described below. Any new or different likely significant temporary environmental effects as a result of the changes introduced in Section 2 are then identified, compared to those reported in the main ES.

Scope, assumptions and limitations

3.2.2 The assessment scope, key assumptions and limitations for agriculture, forestry and soils are as set out in Volume 1, the Scope and Methodology Report¹⁰ (SMR) and SMR Addendum¹¹ of the main ES.

3.2.3 The SES2 design change of relevance to this assessment has the potential to result in new or different significant temporary and permanent construction effects only. Therefore, there is no operational assessment for agriculture, forestry and soils.

SES2 changes of relevance to this assessment

3.2.4 The SES2 design change to relocate a balancing pond associated with the B5014 Uttoxeter Road realignment at Blithbury Reindeer Lodge (SES2-001-006) is considered in this assessment.

Environmental baseline

Existing baseline

3.2.5 The baseline agriculture, forestry and soils information for the Fradley to Colton area is as described in Volume 2, CA1, Section 4 of the main ES.

¹⁰ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report (Appendix CT-001-001). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

¹¹ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report Addendum (Appendix CT-001-002). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

- 3.2.6 There will be a reduction in the land required from one farm holding affected by the original scheme. The land at Blithbury Reindeer Lodge has fine loamy over clayey soils in the Salop association and is classified as Subgrade 3a¹².
- 3.2.7 Blithbury Reindeer Lodge (CA1/28) is a 12ha livestock holding (reindeer, sheep, donkeys and goats) specialising in visitor attractions and workshops, with a café and shop. It is assessed as being of high sensitivity to change.

Future baseline

Construction (2020)

- 3.2.8 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 3.2.9 No avoidance or mitigation measures, additional to those reported in the main ES and draft Code of Construction Practice (CoCP)¹³, are required.

Assessment of impacts and effects

- 3.2.10 The relocation of a balancing pond associated with the B5014 Uttoxeter Road realignment (SES2-001-006) will reduce the area of land required temporarily from Blithbury Reindeer Lodge from 1ha, as reported in the main ES, to 0.2ha (2% of the total area of the holding), which is a negligible impact. This reduction in land will not change the disruption to Blithbury Reindeer Lodge during construction, and therefore there is no change to the temporary moderate adverse significant effect reported in the main ES.
- 3.2.11 The relocation of a balancing pond associated with the B5014 Uttoxeter Road realignment (SES2-001-006) will reduce the area of land required permanently from Blithbury Reindeer Lodge from 0.9ha to 0.1ha (1% of the total area of the holding). This will change the level of significance of the effect from moderate adverse to negligible, which is not significant, and therefore remove the permanent moderate adverse significant effect reported in the main ES.
- 3.2.12 For further information see SES2 and AP2 ES Volume 5: Appendix AG-001-000 and SES2 and AP2 ES Volume 5: Agriculture, forestry and soils Map Book.

¹² The quality of agricultural land in England and Wales is assessed according to the Agricultural Land Classification (ALC) system, which classifies agricultural land into five grades from excellent quality Grade 1 land to very poor quality Grade 5 land. Grade 3 is subdivided into Subgrades 3a and 3b. Grades 1, 2 and 3a are defined as the best and most versatile (BMV) land. The ALC methodology is contained in: Ministry of Agriculture, Fisheries and Food (1988), Agricultural Land Classification of England and Wales – Revised guidelines and criteria for grading the quality of agricultural land.

¹³ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, draft Code of Construction Practice (CT-003-000). Available online at <https://www.gov.uk/government/publications/draft-code-of-construction-practice-for-hs2-phase-2a>

Other mitigation measures

- 3.2.13 The land required temporarily for construction will be restored to its former agricultural condition once the works are completed, following good practice techniques in handling, storing and reinstating soils on that land, as reported in the main ES and draft CoCP. No other mitigation has been identified.

Summary of likely residual significant effects

- 3.2.14 The relocation of a balancing pond associated with the B5014 Uttoxeter Road realignment (SES2-001-006) will reduce the area of land required both temporarily and permanently from Blithbury Reindeer Lodge (CA1/28). The SES2 design change will remove the permanent moderate adverse effect reported in the main ES on Blithbury Reindeer Lodge.

Cumulative effects

- 3.2.15 There are no new or different likely significant cumulative effects for agriculture, forestry and soils as a result of the SES2 changes relevant to this assessment acting in combination with any other SES2 changes or AP1 amendments.

3.3 Community

Introduction

- 3.3.1 The environmental baseline relevant to the community assessment is described below. Any new or different likely significant environmental effects as a result of the changes introduced in Section 2 are then identified, compared to those reported in the main ES.

Scope, assumptions and limitations

- 3.3.2 The assessment scope, key assumptions and limitations for community are as set out in Volume 1, the Scope and Methodology Report¹⁴ (SMR) and SMR Addendum¹⁵ of the main ES.
- 3.3.3 The SES2 changes of relevance to this assessment have the potential to result in new or different significant temporary construction effects only. Therefore, there is no permanent construction or operational assessment for community.

SES2 changes of relevance to this assessment

- 3.3.4 The following SES2 changes are considered in this assessment:
- changes to the construction programme; and

¹⁴ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report (Appendix CT-001-001). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

¹⁵ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report Addendum (Appendix CT-001-002). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

- Lowering of Kings Bromley viaduct, Bourne embankment and River Trent viaduct (SES2-001-003).

Environmental baseline

Existing baseline

- 3.3.5 The baseline community information for the Fradley to Colton area is as described in Volume 2, CA1, Section 6 of the main ES.
- 3.3.6 The Four Seasons Nature Study Centre is owned and managed by Conservation, Horticulture, Agriculture for the Disabled Society (CHADS). The whole site is fully wheelchair accessible with the visitor centre acting as the focal point for many of the activities undertaken by the charity. The facilities are used on at least a weekly basis for activities such as surveying, planting, crafting, gardening or farming. Yoga and meditation classes are also held regularly on site, and other specialist groups hire the site on a less regular basis. The centre is used by a high proportion of people who have limited ability to cope with change.
- 3.3.7 Blithbury is a small village of approximately 25 residential properties, approximately 3.5km north-west of Rugeley. Approximately 1.1km west of Blithbury, there is a small settlement of five residential properties related to Hadley Gate Farm.

Future baseline

Construction (2020)

- 3.3.8 SES2 and AP2 ES Volume 5: Appendix CT-004-000 provides details of the developments which are assumed to have been implemented by 2020 for construction, additional to those identified in the main ES Volume 5: Appendix CT-004-000. The development relevant to the assessment of community is the conversion of outbuildings to form a three bedroom dwelling at Lake Cottage, Moor Lane, Stockwell Heath, Rugeley, Staffordshire (planning application 17/01412/COU).
- 3.3.9 This committed development forms part of the future baseline for the assessment of community effects during construction of the SES2 scheme.

Effects arising during construction

Avoidance and mitigation measures

- 3.3.10 No avoidance or mitigation measures additional to those reported in the main ES and draft Code of Construction Practice¹⁶ (CoCP) are required.

¹⁶ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, draft Code of Construction Practice (CT-003-000). Available online at <https://www.gov.uk/government/publications/draft-code-of-construction-practice-for-hs2-phase-2a>

Assessment of impacts and effects

- 3.3.11 The main ES reported that the Four Seasons Nature Study Centre would experience significant visual, noise and HGV effects. The in-combination effect would result in a temporary major adverse significant effect at the centre for approximately four years in total.
- 3.3.12 The lowering of Kings Bromley viaduct, Bourne embankment and River Trent viaduct (SES2-001-003) and changes to the construction programme will increase the duration of the construction noise effect on the facility to four years and seven months. This will change the duration of the in-combination effect on the facility from approximately four years, as reported in the main ES, to approximately four years and seven months. This will give rise to a different significant effect, however, this will not change the level of significance of the effect reported in the main ES. For further information see SES2 and AP2 ES Volume 5: Appendix CM-001-001 and SES2 and AP2 ES Volume 5: Community Map Book.
- 3.3.13 The main ES reported that all residential properties north and south of Blithbury Road would experience significant visual effects due to construction works. Seven of these properties would also experience significant noise and heavy goods vehicle (HGV) effects. The in-combination effect would result in a temporary major adverse significant effect at the seven properties for up to two years and 10 months in total.
- 3.3.14 The changes to the construction programme will result in one additional property being subject to a significant temporary noise effect, primarily arising from overbridge construction. This will increase the in-combination effect from seven properties, reported in the main ES, to eight properties north and south of Blithbury Road. In-combination with the temporary significant visual and HGV effects reported in the main ES, this will give rise to a different in-combination effect on this community. However, this will not change the level of significance of the effect reported in the main ES. For further information see SES2 and AP2 ES Volume 5: Appendix CM-001-001 and SES2 and AP2 ES Volume 5: Community Map Book.
- 3.3.15 The main ES reported that south facing residential properties, including one proposed dwelling, in Stockwell Heath would experience significant visual effects due to construction works. Six of these properties would also experience significant noise and HGV effects. The in-combination effect would result in a temporary major adverse significant effect at the six properties, for up to three years and three months in total.
- 3.3.16 The changes to the construction programme and a new committed development for one new dwelling at Lake Cottage in Stockwell Heath (planning application 17/01412/COU) will result in a different significant effect by increasing the number of properties in Stockwell Heath which will be subject to a significant temporary in-combination effect. The SES2 change to the construction programme, primarily associated with the overbridge construction and local earthworks, and changes to construction traffic flows on site haul routes, will increase the

significant noise effect from six to 10 properties (three additional existing properties and the new proposed dwelling). In combination with the significant visual and HGV effects reported in the main ES, this will increase the number of properties subject to the in-combination effect in Stockwell Heath to 12 properties. However, this will not change the level of significance of the effect reported in the main ES. For further information see SES2 and AP2 ES Volume 5: Appendix CM-001-001 and SES2 and AP2 ES Volume 5: Community Map Book.

Other mitigation measures

- 3.3.17 No mitigation measures additional to those reported in the main ES and draft CoCP are required.

Summary of likely residual significant effects

- 3.3.18 The changes to the construction programme will give rise to a different likely residual temporary significant effect, due to an increase in the number of properties north and south of Blithbury Road subject to an in-combination effect from significant noise, visual and HGV effects. However, this will not change the level of significance of the effects reported in the main ES.
- 3.3.19 The lowering of Kings Bromley viaduct, Bourne embankment and River Trent viaduct (SES2-001-003) and changes to the construction programme will give rise to a different likely residual temporary significant effect, due to an increase in the duration of the in-combination effect on the Four Seasons Nature Study Centre. However, this will not change the level of significance of the effect reported in the main ES.
- 3.3.20 The changes to the construction programme and a new committed development for one new dwelling at Lake Cottage in Stockwell Heath (planning application 17/01412/COU) will give rise to a different likely residual temporary significant effect, due to an increase in the number of properties in Stockwell Heath subject to an in-combination effect from significant noise, visual and HGV effects. However, this will not change the level of significance of the effects reported in the main ES.

Cumulative effects

- 3.3.21 There are no new or different likely significant cumulative effects for community receptors as a result of the SES2 changes relevant to this assessment acting in combination with any other SES2 changes, AP1 amendments or any relevant committed development.

3.4 Cultural heritage

Introduction

- 3.4.1 The environmental baseline relevant to the cultural heritage assessment is described below. Any new or different likely significant environmental effects as a result of the changes introduced in Section 2 are then identified, compared to those reported in the main ES.

Scope, assumptions and limitations

- 3.4.2 The assessment scope, key assumptions and limitations for cultural heritage are as set out in Volume 1, the Scope and Methodology Report (SMR)¹⁷ and SMR Addendum¹⁸ of the main ES and SMR Addendum 2 (see SES2 and AP2 ES Volume 5: Appendix CT-001-000).
- 3.4.3 As the cultural heritage impacts of the SES2 changes of relevance to this assessment are not reversible, they therefore have the potential to result in new or different significant permanent construction effects only. Therefore, there is no temporary construction or operational assessment for cultural heritage.

SES2 changes of relevance to this assessment

- 3.4.4 The following SES2 changes are considered in this assessment:
- change in the maximum extraction depth at borrow pits at Kings Bromley South, Kings Bromley North (located adjacent to the realigned A515 Lichfield Road), and Kings Bromley North (located adjacent to the realigned Shaw Lane); and
 - Provision of a noise bund near Woodhouse Farm (SES2-001-005).

Environmental baseline

Existing baseline

- 3.4.5 The baseline cultural heritage information for the Fradley to Colton area is as described in Volume 2, CA1, Section 7 of the main ES.
- 3.4.6 Cropmark complexes at Bourne Brook (FRC020), south of Ashby Sitch (FRC019), both non-designated assets of moderate value, and south of Kings Bromley (FRC030), a non-designated asset of low value, are relevant to the change in the maximum extraction depths at three borrow pits.
- 3.4.7 Woodhouse Farmhouse (FRC089), a Grade II listed building of moderate value, is located adjacent to the site of the noise bund near Woodhouse Farm (SES2-001-005).
- 3.4.8 Further information about these assets is provided in the main ES Volume 5: Appendix CH-001-001 and Map Series CH-01 and CH-02 in the main ES Volume 5: Cultural heritage Map Book.

¹⁷ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report (Appendix CT-001-001). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

¹⁸ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report Addendum (Appendix CT-001-002). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

Future baseline

Construction (2020)

- 3.4.9 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 3.4.10 No avoidance or mitigation measures, additional to those reported in the main ES and draft Code of Construction Practice (CoCP)¹⁹, are identified.

Assessment of impacts and effects

- 3.4.11 The main ES reported a permanent major adverse significant effect on the cropmark complex at Bourne Brook (FRCo20), a non-designated asset of moderate value, and a permanent moderate adverse significant effect on the cropmark complexes south of Ashby Sitch (FRCo19) and south of Kings Bromley (FRCo30), non-designated assets of moderate and low value respectively. The main ES reported that there would be no effect on any deeply buried archaeology, which could potentially exist within the Holocene/Pleistocene alluvial deposits of the Trent Valley, from the assumed or maximum extraction depths of the original scheme. The increase in the maximum extraction depth of the borrow pits at Kings Bromley South, Kings Bromley North (located adjacent to the realigned A515 Lichfield Road) and Kings Bromley North (located adjacent to the realigned Shaw Lane) has introduced the potential to impact upon any deeply buried archaeology that may exist in alluvial deposits beneath the archaeological remains reported in the main ES. Should the deeply buried archaeology exist, this would give rise to a new permanent high impact and a new permanent major adverse effect, which is significant, at each borrow pit location.
- 3.4.12 The main ES reported a permanent moderate adverse significant effect on the setting of Woodhouse Farmhouse (FRCo89), a Grade II listed building of moderate value. The building derives some of its significance from its rural setting. The provision of a noise bund near Woodhouse Farm (SES2-001-005) will further affect the setting of the building. The new bund will have a large imposing presence close to the listed building and block views towards the Trent Valley and the surrounding landscape, impacting on its heritage significance through changes in its setting. This will give rise to a different significant effect on Woodhouse Farmhouse. However, this will not change the level of significance of the effects reported in the main ES.
- 3.4.13 For further information see Map Series CH-01 and CH-02 in the SES2 and AP2 ES Volume 5: Cultural heritage Map Book and SES2 and AP2 ES Volume 5: Appendix CH-002-000 and Appendix CH-003-000.

¹⁹ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, draft Code of Construction Practice (CT-003-000). Available online at <https://www.gov.uk/government/publications/draft-code-of-construction-practice-for-hs2-phase-2a>

Other mitigation measures

- 3.4.14 No mitigation measures, additional to those identified in the main ES and draft CoCP, are identified.

Summary of likely residual significant effects

- 3.4.15 The change in the maximum extraction depth of three borrow pits in the Fradley to Colton area would on a precautionary basis give rise to new likely residual significant permanent major adverse effects on deeply buried archaeology below the cropmark complexes at Bourne Brook (FRCo20), south of Ashby Sitch (FRCo19) and south of Kings Bromley (FRCo30).

- 3.4.16 The provision of a noise bund near Woodhouse Farm (SES2-001-005) will give rise to a different likely residual significant permanent effect on Woodhouse Farm (FRCo89), a Grade II listed building, by further visually impacting on the setting of the building. However, this will not change the level of significance of the effects reported in the main ES.

Cumulative effects

- 3.4.17 There are no new or different likely significant cumulative effects for cultural heritage as a result of the SES2 changes relevant to this assessment acting in combination with any other SES2 changes or AP1 amendments.

3.5 Landscape and visual

Introduction

- 3.5.1 The environmental baseline relevant to the landscape and visual assessment is described below. Any new or different significant environmental effects as a result of the changes introduced in Section 2 are then identified, compared to those reported in the main ES as amended by SES1.

Scope, assumptions and limitations

- 3.5.2 The assessment scope, key assumptions and limitations for landscape and visual are as set out in Volume 1, the Scope and Methodology Report (SMR)²⁰ and the SMR Addendum²¹ of the main ES.
- 3.5.3 The SES2 design changes of relevance to this assessment have the potential to give rise to new or different significant operational visual effects only. Therefore, there is no construction assessment for landscape or visual and no operation assessment for landscape.

²⁰ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report (Appendix CT-001-001). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

²¹ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report Addendum (Appendix CT-001-002). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

SES2 change of relevance to this assessment

3.5.4 The following SES2 changes are considered in this assessment:

- Provision of a noise bund near Woodhouse Farm (SES2-001-005); and
- Extension of a noise fence barrier from Moreton North embankment to Moreton South embankment (SES2-002-001).

Environmental baseline

Existing baseline

3.5.5 The baseline landscape and visual information for the Fradley to Colton area is as described in Volume 2, CA1, Section 11 of the main ES and Section 3 of the SES1 and AP1 ES.

Visual baseline

3.5.6 The SES2 design change for the provision of a noise bund near Woodhouse Farm (SES2-001-005) has the potential to affect three viewpoints (004.02.004, 004.03.005 and 004.02.006), which are described in the Volume 5: Appendix LV-001-001 of the main ES and Volume 5: Appendix LV-001-001 of the SES1 and AP1 ES and summarised below. The SES2 design change for extension of a noise fence barrier from Moreton North embankment to Moreton South embankment (SES-002-001), most of which is located in the Colwich to Yarlet area (CA2), has the potential to affect two viewpoints within the Fradley to Colton area (007.03.007 and 007.03.008), which are described in the Volume 5: Appendix LV-001-001 of the main ES and summarised below.

View south-west from Woodhouse Farm (viewpoint 004.02.004)

3.5.7 This viewpoint represents the view experienced by residents of Woodhouse Farm who currently look out across Pipe Lane towards large, open, and gently rolling arable fields with patchy hedgerows and occasional mature trees. These fields extend into the middle distance where the farmland becomes more wooded and trees are prominent skyline features. Beyond these are long distance views towards the low rolling hills of Cannock Chase, with Rugeley Power station on the horizon.

View south-west from track off Blithbury Road (viewpoint 004.03.005)

3.5.8 This viewpoint represents the view experienced by users of Mavesyn Ridware Footpath 34 where it crosses the north facing slope of Hunger Hill. Footpath users have long views out across the River Trent valley towards Rugeley Power Station and the wooded hills of Cannock Chase. The arable fields on the floor of the valley are punctuated by occasional farmsteads including Woodhouse Farm and Quintons Orchard Farm.

View north-east from Mavesyn Ridware Footpath 38 (viewpoint 004.02.006)

3.5.9 This viewpoint represents the view experienced by residents of Quintons Orchard Farm and users of Mavesyn Ridware Footpath 38 who currently look out across a

large arable field in the foreground, towards gently rolling fields bounded by intermittent hedgerows with hedgerow trees. Woodhouse Farm is visible beyond Pipe Lane on the low wooded ridgeline which forms the distant horizon.

View north-east from Colton Bridleway 58 (viewpoint 007.03.007)

- 3.5.10 Users of the bridleway look out across gently sloping pastures bounded by mature hedgerows which partially enclose the view, although there are some longer views to the north where the wooded slopes of the Trent Valley form a distinctive horizon and pylons are visible on the distant skyline. The foreground comprises fences and mature hedgerows bounding medium scale pastures. Wood pole overhead lines and a pylon line cross the view in the middle and long distance. Middle distance views to the north extend to a pond fringed by trees and the tree lined Moreton Brook, which filters views of undulating well-wooded farmland to the north.

View north-east from Colton Footpath 57 (viewpoint 007.03.008)

- 3.5.11 Users of the footpath have views across hedged pastures which slope gently away from the viewpoint towards Moreton Brook and the vegetation in the valley floor. The medium-scale pastures are bounded by hedgerows which provide some enclosure and filtering of views. Long distance views focus on the slopes of the opposite valley side which rise up to a wooded horizon, punctuated by pylons which are prominent on the skyline in the middle distance.

Future baseline

Operation (2027)

- 3.5.12 The future baseline for operation in 2027 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Permanent effects arising during operation

Avoidance and mitigation measures

- 3.5.13 No avoidance or mitigation measures, additional to those reported in the main ES and SES₁, are required.

Assessment of impacts and effects

View south-west from Woodhouse Farm (viewpoint 004.02.004)

- 3.5.14 The SES₁ reported a major adverse significant effect at year 1, reducing to moderate adverse significant at year 15 and year 60. This was due to the presence of Pipe Ridware embankment and Mavesyn Ridware Footpath 38 accommodation overbridge in close distance views. These would be prominent and incongruous features within the rural landscape. Combined with the severance of the field pattern, alterations to the landform and loss of existing hedgerows, the current outlook across gently rolling arable fields would substantially change. Long distance views to Cannock Chase would also be interrupted. At year 15, the scheme would be less noticeable in the view, as the maturing hedgerow and tree planting would partially screen and achieve greater

integration of the embankment and overbridge into the rural landscape. This planting would also partially screen views of the overhead line equipment and moving trains. At year 60, mitigation planting would be mature and Pipe Ridware embankment and Mavesyn Ridware Footpath 38 accommodation overbridge would be better integrated within the view. However, the overhead line equipment and moving trains would still be visible in close distance views.

- 3.5.15 At year 1, the introduction of a noise bund near Woodhouse Farm (SES2-001-005) will slightly improve middle distance views from Woodhouse Farm. This is because the bund will screen the lower parts of the embankment on the south side of the scheme, although the overhead line equipment and the tops of moving trains will remain visible on the skyline. Also, the noise bund itself will be an engineered and incongruous feature. The SES2 design change will therefore give rise to a different significant effect at viewpoint 004.02.004. However, the level of significance of the effect will remain major adverse significant as reported in the SES1.
- 3.5.16 At year 15 and year 60, the maturing woodland mitigation planting on the noise bund will substantially screen and achieve greater integration of Pipe Ridware embankment and Mavesyn Ridware Footpath 38 accommodation overbridge within the rural landscape. The overhead line equipment and moving trains will also be increasingly screened from view. The outlook will change from farmland to developing woodland, which will interrupt views towards Cannock Chase. The outlook, however, will still be rural in context. The SES2 design change will therefore remove a significant effect at viewpoint 004.02.004, as the level of significance of the effect reported in the SES1 will reduce from moderate adverse significant to minor adverse non-significant at year 15 and year 60.
- 3.5.17 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View south-west from track off Blithbury Road (viewpoint 004.03.005)

- 3.5.18 The main ES reported a moderate adverse significant effect at year 1, reducing to minor adverse non-significant effect at year 15. This was due to the presence of Pipe Ridware embankment, the diverted section of Pipe Lane, Blithbury South cutting and Mavesyn Ridware Footpath 38 accommodation overbridge. There would also be views of moving trains, overhead line equipment and noise barriers. Footpath users would have clear views of the operational railway due to the elevation of the viewpoint. The operational railway would not, however, be uncharacteristic within a valley landscape which already includes detracting features, including large-scale agricultural buildings and views of Rugeley Power Station.
- 3.5.19 At year 1, the introduction of a noise bund near Woodhouse Farm (SES2-001-005) will slightly improve middle distance views from Mavesyn Ridware Footpath 34. This is because the noise bund will screen much of Pipe Ridware embankment, although the overhead line equipment and the tops of moving trains will remain visible on the skyline. The SES2 design change will therefore give rise to a different significant effect at viewpoint 004.03.005. However, the level of

significance of the effect will remain moderate adverse significant as reported in the main ES. At year 15 and year 60, the level of significance of the effect will remain non-significant as reported in the main ES.

- 3.5.20 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.
- 3.5.21 The view of the SES2 design change from viewpoint 004.03.005 during operation Year 1 is illustrated on the photomontage shown in Figure LV-01-511 (see SES2 and AP2 ES Volume 5: Appendix LV-001-001).

View north-east from Mavesyn Ridware Footpath 38 (viewpoint 004.02.006)

- 3.5.22 The main ES reported a major adverse significant effect at year 1 of operation, reducing to moderate adverse significant at year 15 and minor adverse non-significant at year 60. This was due to the presence of Pipe Ridware embankment, Blithbury South cutting and Mavesyn Ridware Footpath 38 accommodation overbridge. There would also be views of moving trains and overhead line equipment. The operational railway would alter the landform, sever the field pattern, and result in loss of vegetation. This would lead to long term permanent changes that are uncharacteristic of the existing view.
- 3.5.23 At year 1, the introduction of a noise bund near Woodhouse Farm (SES2-001-005) will not affect the outlook from Quintons Orchard Farm. This is because the noise bund will lie beyond the operational railway and will not be noticeable. The SES2 design change will therefore not give rise to a new or different significant effect at viewpoint 004.02.006 and will not change the level of significance of the effect reported in the main ES.
- 3.5.24 At year 15, the maturing woodland mitigation planting on top of the noise bund will be visible above the western slope of Pipe Ridware embankment. This woodland will form a backdrop to the overhead line equipment and moving trains but will also foreshorten longer rural views, including those of Woodhouse Farm which is currently a focal point on the horizon. The SES2 design change will therefore give rise to a different significant effect at viewpoint 004.02.006. However, the level of significance of effect will remain moderate adverse as reported in the main ES. At year 60, the level of significance of the effect will remain non-significant as reported in the main ES.
- 3.5.25 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View north-east from Colton Bridleway 58 (viewpoint 007.03.007)

- 3.5.26 The main ES reported a moderate adverse significant effect at year 1 and year 15 of operation, reducing to minor adverse non-significant at year 60. This was due to the presence of Moreton Brook viaduct, Moreton South embankment and Moreton North embankment. These large features would cut across the natural landform and appear incongruous in the rural landscape context. They would also add to the reduction in scenic quality caused by the presence of pylons. The overhead line equipment and noise fence barriers on top of the

embankments would break the skyline and moving trains would introduce visual disturbance. By year 15, mitigation planting would provide some integration of the engineered landforms into the rural landscape but the upper parts of the Moreton Brook viaduct, including the overhead line equipment and movement of trains, would still be noticeable.

- 3.5.27 At year 1, the SES2 design change to extend a noise fence barrier from Moreton North embankment to Moreton South embankment (SES-002-001) will be visible on the embankments and Moreton Brook viaduct. Whilst it will improve the outlook from this viewpoint by screening the lower parts of the overhead line equipment and moving trains, the upper parts of the overhead line equipment will remain visible. The SES2 design change will therefore give rise to a different significant visual effect at viewpoint 007.03.007. However, the level of significance of effect will remain moderate adverse significant as reported in the main ES.
- 3.5.28 By year 15, the maturing mitigation planting will provide some screening and integration of Moreton South embankment, Moreton Brook viaduct and Moreton North embankment into the surrounding landscape. The operational railway will remain a noticeable linear feature within the rural farmland. The SES2 design change will therefore give rise to a different significant visual effect at viewpoint 007.03.007. However, the level of significance of effect will remain moderate adverse significant as reported in the main ES. At year 60 the level of significance of effect will remain non-significant as reported in the main ES.
- 3.5.29 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View north-east from Colton Footpath 57 (viewpoint 007.03.008)

- 3.5.30 The main ES, as corrected by SES2, reported a moderate adverse significant effect at year 1 reducing to minor adverse non-significant at year 15 and year 60. This was due to the presence of Moreton South embankment, Moreton Brook viaduct and Moreton North embankment, which would cut across the natural landform and appear incongruous in the rural landscape. Due to the loss of waterside trees there would be some clear views of these new landscape features. Moving trains would introduce visual disturbance into the farmland. By year 15, maturing mitigation planting would partially screen the viaduct and the embankments and achieve greater integration of the engineered landforms into the surrounding landscape. Moreton Brook viaduct would be seen against a backdrop of landform and vegetation which would substantially reduce its perceptibility, although movement of trains would still be noticeable. The most prominent feature would be the pylons on the skyline rather than the operational railway.
- 3.5.31 At year 1, the SES2 design change to extend a noise fence barrier from Moreton North embankment to Moreton South embankment (SES-002-001) will be visible on Moreton South embankment, Moreton Brook viaduct and Moreton North embankment. Whilst it will improve the outlook from this viewpoint by screening the lower parts of the overhead line equipment and moving trains, the noise

barrier itself will be visible across much of the view. The SES2 design change will therefore give rise to a different significant visual effect at viewpoint 007.03.008. However, the level of significance of the effect will remain moderate adverse significant as reported in the main ES. At year 15 and year 60 the level of significance of effect will remain non-significant as reported in the main ES, as corrected by SES2.

3.5.32 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

3.5.33 The view of the SES2 design change from viewpoint 007.03.008 during operation year 1 and year 15 is illustrated on the photomontage shown in Figures LV-01-519 and LV-01-634 (see SES2 and AP2 ES Volume 5: Appendix LV-001-001).

Other mitigation measures

3.5.34 No mitigation measures additional to those reported in the main ES and SES1 are identified.

Summary of likely residual significant effects

3.5.35 The SES2 design change to introduce a noise bund near Woodhouse Farm (SES2-001-005) will remove the likely residual significant operational visual effect reported in SES1 at the view south-west from Woodhouse Farm (viewpoint 004.02.004). The level of significance of the effects reported in the SES1 will reduce from moderate adverse significant to minor adverse non-significant at year 15 and year 60.

3.5.36 The SES2 design change to introduce a noise bund near Woodhouse Farm (SES2-001-005) will give rise to a different likely residual significant operational visual effect at the view north-east from Quintons Orchard Farm and Mavesyn Ridware Footpath 38 (viewpoint 004.02.006). The effect will reduce but will remain moderate adverse significant at year 15. This will not change the level of significance of the effect reported in the main ES.

3.5.37 The SES2 design change to extend a noise fence barrier from Moreton North embankment to Moreton South embankment (SES-002-001) will give rise to a different likely residual significant operational visual effect at the view north-east from Colton Bridleway 58 (viewpoint 007.03.007). The effect will reduce but will remain moderate adverse significant at year 15. This will not change the level of significance of the effect reported in the main ES.

Cumulative effects

3.5.38 There are no new or different likely significant cumulative effects for landscape or visual receptors as a result of the SES2 changes relevant to this assessment acting in combination with any other SES2 changes or AP1 amendments.

Monitoring

3.5.39 Volume 1 of the main ES sets out the general approach to environmental monitoring during operation of the original scheme.

- 3.5.40 There are no changes to the monitoring requirements identified in the main ES for landscape and visual as a result of the SES2 design changes.

3.6 Sound, noise and vibration

Introduction

- 3.6.1 The environmental baseline relevant to the sound, noise and vibration assessment is described below. Any new or different likely significant environmental effects as a result of the changes introduced in Section 2 are then identified, compared to those reported in the main ES as amended by SES1.

Scope, assumptions and limitations

- 3.6.2 The assessment scope, key assumptions and limitations for sound, noise and vibration are as set out in Volume 1 and the Scope and Methodology Report²² (SMR) of the main ES.
- 3.6.3 The SES2 changes of relevance to this assessment have the potential to result in new or different significant construction and operational effects for sound, noise and vibration. Therefore, both construction and operational phases are considered in the assessment.

SES2 changes of relevance to this assessment

- 3.6.4 The following SES2 changes are considered in this assessment:
- changes to the construction programme;
 - changes to construction traffic flows on site haul routes;
 - Lowering of Kings Bromley viaduct, Bourne embankment and River Trent viaduct (SES2-001-003); and
 - Provision of a noise bund near Woodhouse Farm (SES2-001-005).

Environmental baseline

Existing baseline

- 3.6.5 The baseline sound, noise and vibration information for the Fradley to Colton area is described in Volume 2, CA1, Section 13 of the main ES. Baseline sound levels representative of the assessment locations affected by the SES2 changes have been used in the construction and operational assessments.
- 3.6.6 In the vicinity of the SES2 design change (SES2-001-003) at Kings Bromley viaduct, the existing baseline is dominated by road traffic noise from the A515 Lichfield Road, which runs through Rileyhill and Kings Bromley and the A513

²² HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report (Appendix CT-001-001). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

Rugeley Road. Close to these roads, the existing daytime sound levels are high. Lower sound levels are experienced in areas further from these sources.

- 3.6.7 In the vicinity of the SES2 design change at Woodhouse Farm (SES2-001-005), the existing baseline consists of road traffic noise from local routes and the B5014 Uttoxeter Road.

Future baseline

Construction (2020) and operation (2027)

- 3.6.8 SES2 and AP2 ES Volume 5: Appendix CT-004-000 provides details of the developments which are assumed to have been implemented by 2020 for construction, additional to those identified in the main ES Volume 5: Appendix CT-004-000. The development relevant to the assessment of sound, noise and vibration is the conversion of outbuildings to form a three bedroom dwelling at Lake Cottage, Moor Lane, Stockwell Heath, Rugeley, Staffordshire (planning application 17/01412/COU).
- 3.6.9 This committed development forms part of the future baseline for the assessment of community effects during construction of the SES2 scheme.

Effects arising during construction

Avoidance and mitigation measures

- 3.6.10 No avoidance or mitigation measures additional to those reported in the main ES and draft Code of construction Practice (CoCP)²³ are required.

Assessment of impacts and effects

- 3.6.11 The main ES and SES1 reported the likely significant sound, noise or vibration effects in the Fradley to Colton area. An assessment has been undertaken to determine whether construction noise and vibration associated with the SES2 changes will result in a new or different likely significant effect at any properties, using the significance criteria detailed in the main ES Volume 5: Appendix SV-001-000.
- 3.6.12 Where the assessment identifies receptors subject to change in effect and therefore a potential new or different likely significant effect, the relevant construction noise results are presented in SES2 and AP2 ES Volume 5: Appendix SV-002-000. The nature of construction noise is that for a given receptor there may be contributions from a number of SES2 changes, and/or those works assessed in the main ES, as amended by SES1. Where practicable, the contribution of the specific SES2 changes has been identified.

²³ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, draft Code of Construction Practice (CT-003-000). Available online at <https://www.gov.uk/government/publications/draft-code-of-construction-practice-for-hs2-phase-2a>

Residential receptors: direct effects – communities

- 3.6.13 The main ES identified a likely significant construction noise effect on a community basis at approximately 10 residential properties at Stockwell Heath in the vicinity of Moor Lane, for a period of up to three years and three months. This was denoted as CSVo1-Co4 in Volume 2, Section 13 and Volume 5: Appendix SV-002-001 of the main ES.
- 3.6.14 Changes to the construction programme, primarily associated with the overbridge construction and local earthworks, and changes to construction traffic flows on site haul routes have resulted in a change to the construction noise levels. Four additional residential properties; Sherracop, Pool Farm, Lake Cottage and the new committed development for one new dwelling at Lake Cottage in Stockwell Heath (planning application 17/01412/COU), represented by assessment location ref.: 11159, have been identified as being impacted by construction noise compared to the main ES. For further information see SES2 and AP2 ES Volume 5: Appendix SV-002-000.
- 3.6.15 The addition of these properties to the likely significant construction noise effect on a community basis at Stockwell Heath, denoted as CSVo1-Co4 in the main ES, does not result in a new or different likely significant effect or alter the duration of the residual likely significant effect, compared to that reported in the main ES.

Non-residential receptors: direct effects

- 3.6.16 In addition to those non-residential receptors identified in the main ES, the SES2 assessment identifies that the predicted airborne sound levels exceed both the relevant impact screening criteria and the noise change criterion (a change of greater than 3dB compared with the existing baseline sound level) at the Rugeley Rescue Centre: Border Collie Trust (assessment location ref.: 11166(N)). The change in construction noise levels is due to the changes in the construction programme, primarily associated with the overbridge construction and local earthworks, and changes to construction traffic flows on site haul routes. The assessment location is shown on Map SV-03-104 in the main ES Volume 5: Sound, noise and vibration Map Book.
- 3.6.17 Rugeley Rescue Centre: Border Collie Trust is located on Narrow Lane, Colton to the south of the HS2 route. The centre is a single storey building with openable windows providing ventilation. The highest predicted daytime monthly construction noise level is 4dB(A) above the impact screening criteria defined in the SMR for this use for a period of two years and two months. The typical monthly daytime construction noise level is equal to the impact screening criteria defined in the SMR. Considering the duration of the effect, Rugeley Rescue Centre: Border Collie Trust has been identified, on a precautionary basis, as being subject to a new likely significant adverse effect and is denoted by CSVo2-No5 in Table 3, SES2 and AP2 ES Volume 5: Appendix SV-002-000. No effect is identified on the animals themselves based upon the assessment approach defined in Annex F in the main ES Volume 5: Appendix SV-001-000.

Other mitigation measures

- 3.6.18 No mitigation measures, additional to those reported in the main ES and draft CoCP, are identified.

Summary of likely residual significant effects

- 3.6.19 The proposed avoidance and mitigation measures will reduce noise inside all dwellings from the construction activities such that residents will not be significantly affected.
- 3.6.20 In addition, to those properties identified in the main ES, on a precautionary basis due to the changes in the construction programme, primarily associated with the overbridge construction and local earthworks and changes to construction traffic flows on site haul routes, a significant residual temporary construction noise effect has been identified at the Rugeley Rescue Centre: Border Collie Trust located on Narrow Lane, Colton.
- 3.6.21 HS2 Ltd will continue to engage with the stakeholders to seek reasonably practicable measures to further reduce or avoid this significant effect. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the receptor, its use and the benefit of the measures.

Cumulative effects

- 3.6.22 There are no new or different likely significant cumulative effects for sound, noise and vibration as a result of the SES2 changes relevant to this assessment acting in combination with any other SES2 changes, AP1 amendments or any relevant committed development.

Effects arising from operation

- 3.6.23 In SES1, a likely significant effect was identified at approximately 10 dwellings (including the committed development at Woodhouse Farm (planning application 14/00614/FUL)) at Woodhouse Farm and denoted as OSV01-Co7 as shown on Map SV-02-103 in the SES1 and AP1 ES Volume 5: Sound, noise and vibration Map Book.
- 3.6.24 The SES2 design change providing a noise bund at Woodhouse Farm (SES2-001-005), reduces the operational airborne noise levels at the properties close to Woodhouse Farm by approximately 10dB, however, the impact magnitude is not altered.
- 3.6.25 The SES2 design change lowering the viaduct at Kings Bromley (SES2-001-003) changes, both positively and negatively, the operational airborne noise levels at the receptors in the vicinity of the change. At each of the seven properties where a change in operational airborne noise impact magnitude is identified (assessment location references: 11059 and 11071), the change compared to the main ES as amended by SES1, is less than 1dB. On this basis, there are no new or different significant operational effects for sound, noise and vibration as a result of the SES2 design change, in comparison with the main ES as amended by SES1. For further information see SES2 and AP2 ES Volume 5: Appendix SV-002-000.

Cumulative effects

- 3.6.26 There are no new or different likely significant cumulative effects for sound, noise and vibration as a result of the SES2 changes relevant to this assessment acting in combination with any other SES2 changes, AP1 amendments or any relevant committed development.

3.7 Water resources and flood risk

Introduction

- 3.7.1 The environmental baseline relevant to the water resources and flood risk assessment is described below. Any new or different likely significant environmental effects as a result of the changes introduced in Section 2 are then identified, compared to those reported in the main ES.

Scope, assumptions and limitations

- 3.7.2 The assessment scope, key assumptions and limitations for water resources and flood risk are as set out in Volume 1, the Scope and Methodology Report (SMR)²⁴ and SMR Addendum²⁵ of the main ES and SMR Addendum 2 (see SES2 and AP2 ES Volume 5: Appendix CT-001-000).
- 3.7.3 The study area has been extended to include all areas where groundwater levels have potential to be temporarily affected by excavation and back-filling of the borrow pits.
- 3.7.4 The SES2 change of relevance to this assessment has the potential to result in new or different significant temporary construction effects only. Therefore, there is no permanent construction or operational assessment for water resources and flood risk.
- 3.7.5 The hydrogeological model on which this assessment is based makes use of existing published information, primarily that associated with British Geological Survey (BGS) mapping of the area. Ground investigation is currently in progress that will provide improved information with which to develop the model prior to detailed design proceeding.
- 3.7.6 Where data are limited, a precautionary baseline has been built up. Conservatively high permeability values have been selected with the aim of ensuring that the maximum potential extent of the impacts is identified. The model outputs therefore provide a reasonable worst-case assessment of the areas over which groundwater levels have potential to be temporarily lowered, when each borrow pit in turn is fully dewatered over its entire footprint to the maximum depths stated in Section 2.

²⁴ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report (Appendix CT-001-001). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

²⁵ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report Addendum (Appendix CT-001-002). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

- 3.7.7 The precautionary approach to the assessment that has been adopted identifies the likely significant environmental effects of the SES2 scheme.

SES2 changes of relevance to this assessment

- 3.7.8 The SES2 changes considered in this assessment are the increased depths to which the borrow pits will potentially be excavated and the new modelling information related to the potential maximum extent to which groundwater levels could be temporarily lowered, as a result of dewatering of the borrow pits. This information has necessitated a review of the potential for adverse impacts on water receptors.

Environmental baseline

Existing baseline

- 3.7.9 The baseline water resources and flood risk information for the Fradley to Colton area is as described in Volume 2, CA1, Section 15 of the main ES. This baseline was updated in SES1 to include an additional spring south-west of Old Wood Farm, approximately 1.5km north-east of Rugeley. This spring will not be affected by the SES2 scheme.
- 3.7.10 Water receptors within the potential zone of groundwater influence of the borrow pits include: the River Trent; Trent and Mersey Canal; Bourne Brook; Pyford Brook; and several ordinary watercourses, springs and licensed abstractions.

Future baseline

Construction (2020)

- 3.7.11 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 3.7.12 The avoidance and mitigation measures specifically associated with the borrow pits are set out in the Volume 2, CA1, of the main ES and the Borrow pits restoration strategy (see main ES Volume 5: Appendix CT-009-000)²⁶.

Assessment of impacts and effects

Temporary effects

- 3.7.13 Details of the impacts and effects of the borrow pits on water resources are provided in SES2 and AP2 ES Volume 5: Appendix WR-002-001.

²⁶ HS2 Ltd (2017). (High Speed Rail (West Midlands - Crewe) Environmental Statement, Volume 5: Technical appendices, Borrow pits restoration strategy https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/627178/E30_CT_009_000_WEB.pdf

- 3.7.14 Dewatering of the excavations may reverse the hydraulic gradient between the aquifer and surface water features. The impacts on all local watercourses have been reassessed using the outputs from the hydrogeological model and would result in the following new or different significant effects:
- the potential impacts on the River Trent, which is a very high value receptor, would result in a major temporary adverse effect, which is significant. This is different to the main ES, which reported a moderate adverse significant temporary effect;
 - the potential impacts on Pyford Brook and Bourne Brook, which are high value receptors, would result in major temporary adverse effects, which are significant. The main ES reported a moderate adverse significant temporary effect related to Bourne Brook. With respect to Pyford Brook, this is a new significant effect;
 - the potential impacts on Crawley Brook, which is a moderate value receptor, would result in a moderate temporary adverse effect, which is significant. This is different to the main ES, which reported a minor adverse temporary effect, which is not significant;
 - the potential impacts on the unnamed tributary of the River Trent 1 and the unnamed tributary of the River Trent 2, which are all moderate value receptors, would result in new moderate temporary adverse effects, which are significant; and
 - the potential impacts on Ashby Sitch, Luth Burn and the unnamed tributary of the River Trent 3, which are all low value receptors, would result in minor temporary adverse effects, which are not significant. The main ES reported minor adverse effects, which are not significant, related to Ashby Sitch and Luth Burn. No effects were reported in relation to the unnamed tributary of the River Trent 3 in the main ES.
- 3.7.15 The main ES did not identify the potential for impacts on the Trent and Mersey Canal. The more complex groundwater modelling analysis now indicates that groundwater levels beneath the Trent and Mersey Canal, which is a high value receptor, could, on a precautionary basis, be lowered by several metres. This has potential implications for the structural integrity and operation of the canal which have been assessed.
- 3.7.16 An assessment of implications for the structural integrity of the canal has concluded that the likelihood of the temporary reduction in groundwater levels causing ground subsidence is negligible.
- 3.7.17 Available evidence suggests that the Trent and Mersey Canal has a puddle clay liner²⁷. However, until this has been confirmed in consultation with the Canal and River Trust, it has been conservatively assumed that sections of the canal may be

²⁷ Available online at: <https://www.ice.org.uk/what-is-civil-engineering/what-do-civil-engineers-do/trent-and-mersey-canal>

unlined. In the absence of mitigation, if the canal is not lined, the borrow pit dewatering could cause a loss of water from the canal through its bed and banks, which could affect its operation. This would comprise a new temporary moderate adverse effect on a high value receptor, which would be significant.

- 3.7.18 The main ES did not identify the potential for impacts on springs or potential spring features. The new groundwater modelling information indicates that the borrow pit excavations could reduce the flow to a potential spring feature at Shaw Lane, and a number of further potential springs at the outer edge of the area that could be affected by the dewatering of the borrow pits. This will result in new moderate temporary adverse effects on the spring features, which will be significant. The locations of these potential spring features are shown in the SES2 and AP2 ES Volume 5: Appendix WR-002-001.
- 3.7.19 The new information also indicates that dewatering the borrow pit excavations has the potential to result in a reduction of groundwater flow to the licensed private abstraction at Luthburn pool reservoir. The measures within the draft Code of Construction Practice (CoCP)²⁸ require the contractor to undertake a risk assessment for excavations associated with impacts on private water supplies. If this risk assessment confirms the potential for significant effects to occur, mitigation proposals will be developed and discussed with the owner, with a view to an alternative supply being provided. Consequently, this potential impact will not give rise to a significant effect related to this groundwater abstraction.

Permanent effects

- 3.7.20 The SES2 changes will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the main ES as amended by SES1. This is because implementation of the measures within the borrow pits restoration strategy will restore the existing hydrological regime.

Other mitigation measures

- 3.7.21 Ground investigation being undertaken will provide detailed information on the permeability of the ground in the areas adjacent to the borrow pits, which will allow the hydrogeological models to be updated. If these hydrogeological models continue to identify potential impacts on the canal and watercourses, then additional mitigation measures will be incorporated into the design. Mitigation could take the form of:
- a wider buffer strip, or shallower batter on the excavations;
 - installation of groundwater cut-off structures;
 - adoption of wet working techniques that reduce the need for dewatering;

²⁸ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, draft Code of Construction Practice (CT-003-000). Available online at <https://www.gov.uk/government/publications/draft-code-of-construction-practice-for-hs2-phase-2a>

- consideration of phasing the excavation within each borrow pit to avoid cumulative effects of multiple borrow pits being dewatered; or
- recirculation of treated water from the borrow pits to the canal and watercourses at an appropriate rate and location including:
 - Additional land for new pipework from the Kings Bromley South borrow pit for groundwater recharge to Pyford Brook, Trent and Mersey Canal and Bourne Brook (AP2-001-003);
 - Additional land required for new pipework from Kings Bromley North (Shaw Lane) borrow pit for groundwater recharge to Bourne Brook and the Trent and Mersey Canal (AP2-001-008); and
 - Additional land required for new pipework from the Blithbury borrow pit for groundwater recharge to Luth Burn and River Trent (AP2-001-009).

3.7.22 Any such additional measures will be designed in consultation with the Canal and River Trust and the Environment Agency.

3.7.23 A survey of the potential spring features will be undertaken to determine their value and to identify whether further mitigation is required. If they are confirmed to be springs, measures would be implemented, similar to those outlined above, to ensure any significant adverse effects are mitigated.

Summary of likely residual significant effects

3.7.24 The SES2 changes will give rise to the following new or different likely residual significant effects:

- the potential impacts on the River Trent, which is a very high value receptor will change the level of significance of the effects reported in the main ES from moderate to major;
- the potential impacts on Bourne Brook, which is a high value receptor will change the level of significance of the effects reported in the main ES from moderate to major;
- the potential impacts on Pyford Brook, which is a high value receptor would result in a new major temporary adverse effect, which is significant;
- the potential impacts on Crawley Brook, which is a moderate value receptor will change the level of significance of the effects reported in the main ES from minor to moderate, which is significant;
- the potential impacts on the unnamed tributary of the River Trent 1, and the unnamed tributary of the River Trent 2 both of which are moderate value receptors, would result in new moderate temporary adverse effects, which are significant;
- the potential impacts on the Trent and Mersey Canal, which is a high value receptor, would result in a new moderate temporary adverse effect, which is significant; and

- the potential impacts on potential spring features including one spring near Shaw Lane, which are potentially high value receptors. This will result in new moderate temporary adverse effects, which are significant.

3.7.25 It is currently anticipated that a means of mitigating these impacts will be developed, to ensure that there are no residual significant effects arising from construction.

Cumulative effects

3.7.26 There are no new or different likely significant cumulative effects for water resources and flood risk as a result of the SES2 changes relevant to this assessment acting in combination with any other SES2 changes or AP1 amendments.

3.8 Summary of new or different likely residual significant effects as a result of the SES2 changes

3.8.1 A correction to the content of the main ES has identified a new significant cultural heritage effect in the original scheme which was omitted from the main ES. A Second World War pillbox at Fradley (FRC194), an asset of low value, will be demolished during construction of the Trent and Mersey Canal viaduct. This will constitute a high adverse permanent impact and a moderate adverse permanent significant effect.

3.8.2 A further correction to the content of the main ES has changed an operational visual effect identified in the original scheme. A minor adverse non-significant effect should have been reported on the view north-east from footpaths to the west of Hamley Heath (viewpoint 007.03.008) at year 15 and 60, rather than a moderate adverse significant effect.

3.8.3 The relocation of a balancing pond associated with the B5014 Uttoxeter Road realignment (SES2-001-006) will reduce the area of land required both temporarily and permanently from Blithbury Reindeer Lodge. The SES2 design change will remove the permanent moderate adverse effect reported in the main ES on Blithbury Reindeer Lodge.

3.8.4 The changes to the construction programme will give rise to a different likely residual temporary significant community effect, due to an increase in the number of properties north and south of Blithbury Road subject to an in-combination effect. However, this will not change the level of significance of the effects reported in the main ES. The lowering of Kings Bromley viaduct, Bourne embankment and River Trent viaduct (SES2-001-003) and changes to the construction programme will give rise to a different likely residual temporary significant effect, due to an increase in the duration of the in-combination effect on the Four Seasons Nature Study Centre. However, this will not change the level of significance of the effect reported in the main ES. The changes to the construction programme and a new committed development for one new dwelling at Lake Cottage in Stockwell Heath (planning application 17/01412/COU) will give rise to a different likely residual temporary significant effect, due to an increase in the number of properties in Stockwell Heath subject to an

in-combination effect. However, this will not change the level of significance of the effects reported in the main ES.

- 3.8.5 The change in the maximum extraction depth of three borrow pits in the Fradley to Colton area would, on a precautionary basis, give rise to new likely residual significant permanent major adverse effects on deeply buried archaeology below the cropmark complexes at Bourne Brook (FRCo20), south of Ashby Sitch (FRCo19) and south of Kings Bromley (FRCo30). In addition, the provision of a noise bund near Woodhouse Farm (SES2-001-005) will result in a different significant permanent effect on the setting of Woodhouse Farm (FRCo89). However, this will not change the level of significance of the effects reported in the main ES.
- 3.8.6 The provision of a noise bund near Woodhouse Farm (SES2-001-005) will remove the likely residual significant operational visual effect at viewpoint 004.02.004. In addition, this SES2 design change will give rise to a different likely residual significant operational visual effect at viewpoint 004.02.006. However, this will not change the level of significance of the effects reported in the main ES, as amended by SES1. The extension of a noise fence barrier from Moreton North embankment to Moreton South embankment (SES-002-001) will give rise to a different likely residual significant operational visual effect at viewpoint 007.03.007. However, this will not change the level of significance of the effects reported in the main ES.
- 3.8.7 Changes in the construction programme, primarily associated with the overbridge construction and local earthworks, and changes to construction traffic flows on site haul routes will give rise to a new significant residual temporary construction noise effect at the Rugeley Rescue Centre: Border Collie Trust located on Narrow Lane, Colton.
- 3.8.8 New groundwater modelling information related to the potential maximum extent to which groundwater levels could be temporarily lowered, as a result of dewatering of the borrow pits, has been considered and the following new and different significant effects have been identified:
- the level of significance of the effect on the River Trent and Bourne Brook will change from moderate temporary adverse to major temporary adverse;
 - a new major temporary adverse significant effect on Pyford Brook;
 - a new moderate temporary adverse significant effect on the unnamed tributary of the River Trent 1 and the unnamed tributary of the River Trent 2, the Trent and Mersey Canal, Crawley Brook and potential spring features including one near Shaw Lane.

Part 2: Additional Provision 2 Environmental Statement

4 Summary of AP2 amendments in the Fradley to Colton area

4.1 Introduction

4.1.1 In the Fradley to Colton area, the following types of amendments are proposed in the AP2 revised scheme:

- engineering amendments; and
- minor utility amendments.

4.1.2 All dimensions in the following sections are approximate.

4.2 Engineering amendments

4.2.1 Engineering amendments will be required in the Fradley to Colton area that will result in changes to the land or Bill powers required for the SES2 scheme and separately the AP1 revised scheme where relevant. Table 6 provides a summary of the engineering amendments.

4.2.2 Figure 4 shows the locations of the engineering amendments.

Table 6: Summary of AP2 engineering amendments in the Fradley to Colton area

Name of the AP2 amendment	Description of the SES2 scheme (and AP1 revised scheme where relevant)	Description of the AP2 revised scheme
<p>Additional land and a change to Bill powers required to make alterations to the Handsacre Junction connection into the West Coast Main Line (WCML)</p> <p>AP2-001-001</p> <p>Map CT-06-148, Map CT-06-149, Map CT-06-129b-L1, Map CT-06-129, Map CT-06-128, Map CT-06-130b, Map CT-06-142, Map CT-06-143, Map CT-06-143-R1, Map CT-06-144, Map CT-06-145, Map CT-06-146 and Map CT-06-147 in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>A connection from the HS2 route to the WCML fast lines, via the Handsacre Spur, providing a connection via Stafford for up to seven trains per hour (one-way train flow).</p>	<p>A connection from the HS2 route to the WCML slow lines, via the Handsacre Spur, providing a connection via Stafford for up to seven trains per hour (one-way train flow), reducing to one train per hour following construction of Phase 2a.</p>
<p>Additional land required for modifications to A515 Lichfield Road and Wood End Lane junction and widening of Wood End Lane</p> <p>AP2-001-002</p> <p>Map CT-05-129b-L1, G1 to D1, Map CT-05-129, J9 to G8, and Map CT-05-128, Eg to A10, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>The original scheme includes a route for construction traffic to travel along the A515 Lichfield Road to the A51.</p> <p>The SES2 scheme includes an additional construction traffic route along Wood End Lane (SES2-001-001: A new construction traffic route along Wood End Lane).</p>	<p>Additional land will be required for the permanent widening and signalisation to the A515 Lichfield Road and Wood End Lane junction.</p> <p>Additional land will be required for the permanent widening of Wood End Lane for 1.1km, from its junction with the A515 Lichfield Road to the end of the Wood End Lane widening works proposed as part of the HS2 Phase One consented scheme.</p>

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Name of the AP2 amendment	Description of the SES2 scheme (and AP1 revised scheme where relevant)	Description of the AP2 revised scheme
<p>Additional land for new pipework from the Kings Bromley South borrow pit for groundwater recharge to Pyford Brook, Trent and Mersey Canal and Bourne Brook</p> <p>AP2-001-003</p> <p>Map CT-05-201, H7 to E4, Map CT-05-202-L1, J2 to J4, and Map CT-05-201, B5 to Map CT-05-201-L1, F9, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>A borrow pit would be introduced at Kings Bromley South for the extraction of sand and gravel for construction. The borrow pit would be located on either side of Crawley Lane on the east side and to the south of Ashby Sitch, both sides of the HS2 route.</p> <p>The main ES assumed that mitigation for the management of groundwater baseflows at the River Trent and Bourne Brook would be provided during excavation and dewatering of the borrow pits. This would include the recirculation of treated water to the River Trent and Bourne Brook.</p> <p>Within the land required for the original scheme, a temporary pipe route, identified through further design refinement, would be provided to facilitate the pumping of water upstream to augment the low flow regimes at Bourne Brook during excavation of the Kings Bromley North (A515) borrow pit.</p>	<p>Three new temporary pipe routes will be provided to facilitate the pumping of water upstream to augment the low flow regimes at Pyford Brook, the Trent and Mersey Canal and Bourne Brook during excavation of the Kings Bromley South borrow pit.</p> <p>The temporary pipe routes will run largely within a shallow trench (approximately 1m deep), or below ground where required. A temporary access road will be provided alongside the temporary pipe route, which will be approximately 3m in width. Overall, the pipework and access tracks will be accommodated within a corridor, approximately 10m in width.</p>
<p>Additional land and a change to Bill powers for the realignment of HS2 maintenance access under Pyford Brook viaduct</p> <p>AP2-001-004</p> <p>Map CT-06-201, H6 to G4, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>A shared HS2 maintenance and accommodation access would be provided underneath the Trent and Mersey Canal viaduct (part of the HS2 Phase One consented scheme) to a balancing pond for railway drainage and land to the west of the HS2 route, adjacent to Pyford South embankment.</p>	<p>Additional land and a change to Bill powers will be required for the permanent realignment of the shared HS2 maintenance and accommodation access to pass underneath the Pyford Brook viaduct for access to the balancing pond for railway drainage and to maintain accommodation access on the west side of the HS2 route.</p>
<p>Additional land required for the diversion of a Cadent gas pipeline and a new utility compound, north of Pyford Brook</p> <p>AP2-001-005</p> <p>Map CT-05-201, D3 to C4, and Map CT-06-201, E5 to A1, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>Land would be required permanently for the diversion of an underground National Grid Gas Distribution 600mm diameter high pressure gas pipeline, which would cross beneath the HS2 route at the Pyford North embankment.</p> <p>The gas pipeline diversion would pass through Kings Bromley South borrow pit.</p>	<p>Additional land will be required temporarily at each end of the pipeline diversion for works to connect the new pipeline to the existing pipeline, whilst maintaining a gas supply during construction.</p> <p>A section of Cadent 600mm diameter high pressure gas pipeline, will be realigned 15m south of its location in the original scheme.</p> <p>A 30m protection zone will be required between the diverted pipeline and excavation at Kings Bromley South borrow pit, therefore reducing the footprint of the borrow pit.</p> <p>A new temporary utility compound, the Common Lane utility compound, will be provided for the management of the Cadent 600mm diameter fuel pipeline diversion works. It will be provided within land permanently required for the original scheme for the Kings Bromley south borrow pit, east of A51 Lichfield Road.</p>
<p>Additional land and a change to Bill powers required to divert Common Lane to the A515 Lichfield Road</p> <p>AP2-001-006</p>	<p>A section of Common Lane (South) would be closed where it would be crossed by Pyford North embankment. An accommodation access would be provided from Common Lane (north-east of the HS2 route) and would follow parallel and to the north side of Pyford North embankment before turning south and passing</p>	<p>A new road will be provided north-east of the HS2 route to connect Common Lane to the A515 Lichfield Road; replacing part of the access route and bridleway around Pyford North embankment provided in the original scheme; partly replacing a short length</p>

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Name of the AP2 amendment	Description of the SES2 scheme (and AP1 revised scheme where relevant)	Description of the AP2 revised scheme
<p>Map CT-06-202, H4 to B3, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>beneath Kings Bromley viaduct.</p> <p>After passing under Kings Bromley viaduct, the accommodation access would connect to the existing A515 Lichfield Road and continue in an easterly direction and to the south side of Pyford North embankment to provide access to agricultural land. The accommodation access would provide access to agricultural land holdings.</p>	<p>of the existing A515; and partly providing a new road.</p> <p>A new junction will be provided from the Common Lane diversion to join the access track around Pyford North embankment. A bridleway will be provided from this junction, along the south-east side of Pyford North embankment, to join the stopped-up sections of Common Lane (south).</p> <p>The access track from the A515 Lichfield Road diversion under Kings Bromley viaduct will no longer be required with the Common Lane diversion, and so the track will be removed and replaced with a new field access off the Common Lane diversion.</p>
<p>Additional land required for the amendment to a National Grid Electricity Transmission 400kV overhead power line and a new utility compound, near Kings Bromley viaduct</p> <p>AP2-001-007</p> <p>Map CT-05-202, E4 to E2, Map CT-06-202, E6 to E5, Map CT-06-202-R1, E7, and Map CT-06-202-R2, F8 to F9 and F7 to E8, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>Land would be required permanently for the raising of a National Grid Electricity Transmission 400kV overhead power line along its existing alignment. The power line would be raised by 14m, to cross the HS2 route at Kings Bromley viaduct.</p> <p>The pylon closest to Kings Bromley viaduct would be replaced by a new pylon, which would be 12m taller than the existing.</p> <p>Access to pylons, from both sides of Kings Bromley viaduct, would be from Crawley Lane via a temporary access through existing woodland, adjacent to Kings Bromley Footpath 11 and The Old Farmhouse. Access would be provided for earthing purposes and cable replacement works.</p>	<p>Additional land and a change to Bill powers for the relocation of a pylon to the north-east of the River Trent viaduct and additional working areas.</p> <p>Additional land will be required for the temporary access to the existing pylons near Eastfield Farm for earthing purposes and cable replacement works.</p> <p>Land required near to Woodgate Farm Cottage, adjacent to Kings Bromley Footpath 11, will be reduced. There will be a reduction in the loss of existing woodland.</p> <p>A new utility compound, Lichfield Road utility compound, will be provided for the management of the National Grid Electricity Transmission 400kV overhead power line raising works. It will be provided within land temporarily required for the original scheme, north-east of Kings Bromley viaduct.</p>
<p>Additional land required for new pipework from the Kings Bromley North (Shaw Lane) borrow pit for groundwater recharge to Bourne Brook and the Trent and Mersey Canal</p> <p>AP2-001-008</p> <p>Map CT-05-202, E8 to B7, and Map CT-05-202-L1, C4 to A1, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>A borrow pit would be introduced at Kings Bromley North (Shaw Lane) for the extraction of sand and gravel for construction. The borrow pit would be located adjacent to Shaw Lane.</p> <p>The main ES assumed that mitigation for the management of groundwater baseflows at the River Trent and Bourne Brook would be provided during excavation and dewatering of the borrow pits. This would include the recirculation of treated water to the River Trent and Bourne Brook.</p> <p>Within the land required for the original scheme, a temporary pipe route, identified through further design refinement, would be provided to facilitate the pumping of water upstream to augment the low flow regimes at Bourne Brook during excavation of the Kings Bromley North (A515) borrow pit.</p>	<p>Two new temporary pipe routes will be provided to facilitate the pumping of water upstream to augment the low flow regimes at Bourne Brook and the Trent and Mersey Canal during excavation of the Kings Bromley South borrow pit.</p> <p>The temporary pipe routes will run largely within a shallow trench (approximately 1m deep), or below ground where required. A temporary access road will be provided alongside the temporary pipe route, which will be approximately 3m in width. Overall, the pipework and access tracks will be accommodated within a corridor, approximately 10m in width.</p>

SES2 and AP2 ES Volume 2 – Community area 1, Fradley to Colton

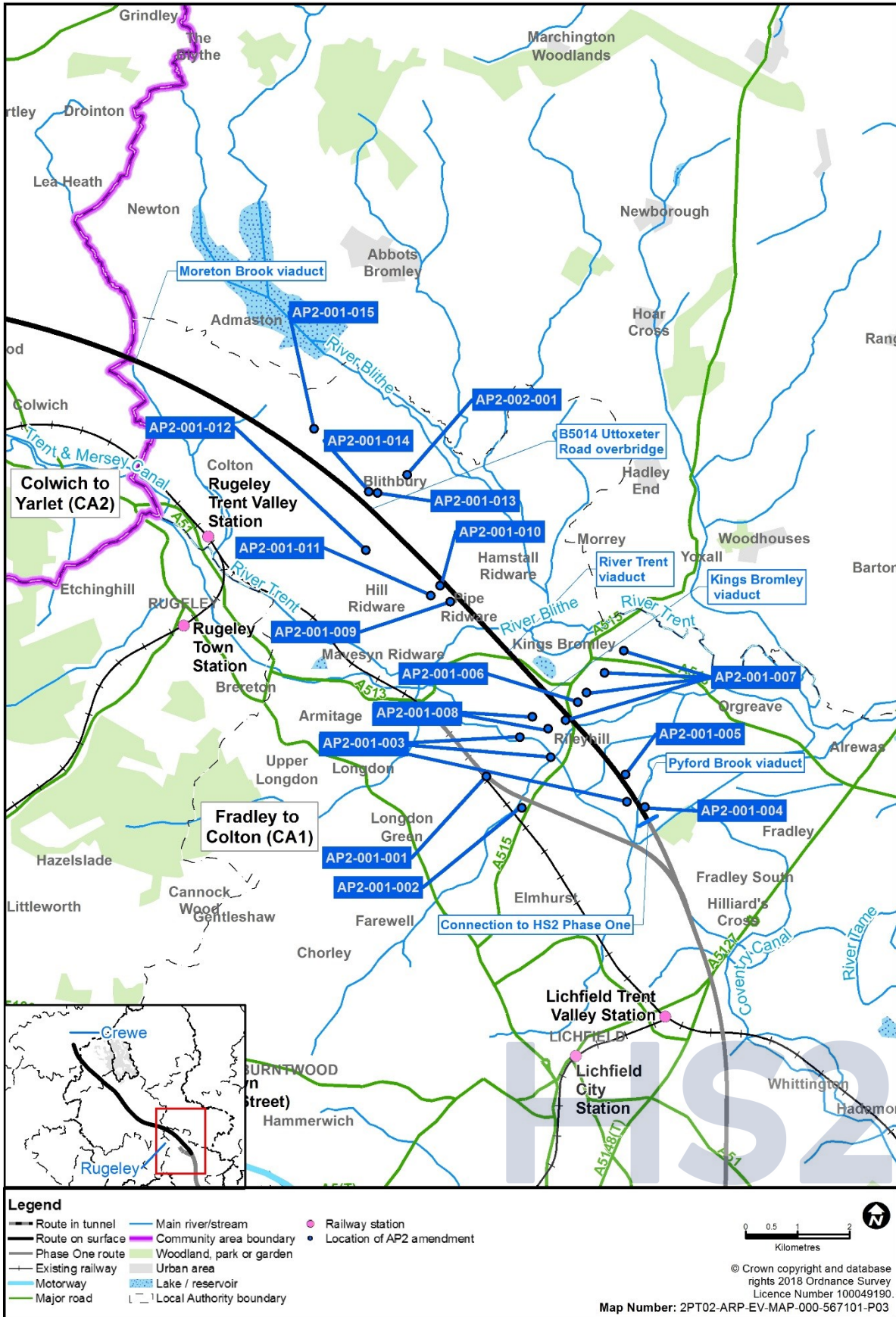
Name of the AP2 amendment	Description of the SES2 scheme (and AP1 revised scheme where relevant)	Description of the AP2 revised scheme
<p>Additional land required for new pipework from the Blithbury borrow pit for groundwater recharge to Luth Burn and River Trent</p> <p>AP2-001-009</p> <p>Map CT-05-204, F6 to E8, and Map CT-05-204, D5 to C7, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>A borrow pit would be introduced at Blithbury for the extraction of sand and gravel for construction. The borrow pit would be located to the north of the River Trent viaduct.</p> <p>The main ES assumed that mitigation for the management of groundwater baseflows at the River Trent and Bourne Brook would be provided during excavation and dewatering of the borrow pits. This would include the recirculation of treated water to the River Trent and Bourne Brook.</p>	<p>Two new temporary pipe routes will be provided to facilitate the pumping of water upstream to augment the low flow regimes at Luth Burn and the River Trent during excavation of the Blithbury borrow pit.</p> <p>The temporary pipe routes will run largely within a shallow trench (approximately 1m deep), or below ground where required. A temporary access road will be provided alongside the temporary pipe route, which will be approximately 3m in width. Overall, the pipework and access tracks will be accommodated within a corridor, approximately 10m in width.</p>
<p>Additional land required for the diversion of a National Grid Gas Transmission gas pipeline and a new utility compound, north of Pipe Ridware</p> <p>AP2-001-010</p> <p>Map CT-06-204, E4 to B7, and Map CT-05-204, E4 to B7, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>Land would be required permanently for the diversion of an underground National Grid Gas Transmission 1,050mm diameter high pressure gas pipeline, which would cross beneath the HS2 route at the River Trent viaduct.</p>	<p>Additional land will be required at each end of the pipeline diversion for works to connect the new pipeline to the existing pipeline, whilst the gas supply is maintained during the pipeline construction.</p> <p>A new utility compound, Pipe Lane utility compound, will be provided for the management of the National Grid Gas Transmission 1,050mm diameter high pressure gas pipeline diversion works. It will be provided partly within land permanently required for the original scheme, and partly within an area of additional land.</p>
<p>Additional land and a change to Bill powers for the revised alignment of a site haul route and removal of HS2 maintenance access at Pipe Lane</p> <p>AP2-001-011</p> <p>Map CT-05-204, D9 to B8, in the SES2 and AP2 ES Volume 2: CA1 Map Book.</p>	<p>The original scheme included the provision of a construction traffic route along Pipe Lane, through Pipe Ridware during construction. Permanent widening of Pipe Lane would be required from the junction with Common Lane into Pipe Ridware to accommodate two-way heavy goods vehicle (HGV) traffic.</p> <p>The AP1 revised scheme (AP1-001-003; Additional land permanently required for a new site haul route and HS2 maintenance access route from Pipe Lane and modifications to existing highways), included a new site haul route and HS2 maintenance access route that would connect two sections of Pipe Lane, 350m to the west of Pipe Ridware. Permanent widening of Common Lane and a section of Pipe Lane, north-west of Pipe Ridware for 200m, would be required.</p>	<p>Additional land will be required for the revised alignment of the site haul route connecting Pipe Lane to the west of Pipe Ridware.</p> <p>Permanent provision of a HS2 maintenance access through agricultural land to the west of Pipe Ridware included in the AP1 revised scheme will no longer be required. Permanent maintenance access will be provided through Pipe Ridware via Pipe Lane.</p>
<p>Additional land required for agricultural access off Stonyford Lane</p> <p>AP2-001-012</p> <p>Map CT-06-206, G9, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>The B5014 Uttoxeter Road would be realigned to cross over the Blithbury Central cutting. Stonyford Lane would be realigned to the east of its existing alignment to join the realigned B5014 Uttoxeter Road.</p> <p>Existing farm accesses off the highway network would be retained, where possible.</p>	<p>Additional land will be required for the provision of two agricultural accesses off Stonyford Lane. The accesses will require 260m of existing hedgerow habitat to be relocated to comply with visibility requirements.</p>

SES2 and AP2 ES Volume 2 – Community area 1, Fradley to Colton

Name of the AP2 amendment	Description of the SES2 scheme (and AP1 revised scheme where relevant)	Description of the AP2 revised scheme
<p>Additional land and a change to Bill powers required for HS2 maintenance access along an agricultural access track from Blithbury Road</p> <p>AP2-001-013</p> <p>Map CT-06-206, F3 to E2, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>Manor Farm overbridge would provide access to agricultural land for Manor Farm across Blithbury Central cutting and 300m of agricultural track would be provided to the south-west of the HS2 route.</p>	<p>Additional land will be required and a change to Bill powers to upgrade an agricultural access track from Blithbury Road and provide permanent HS2 maintenance access to Manor Farm overbridge.</p>
<p>Additional land required for agricultural access off Blithbury Road</p> <p>AP2-001-014</p> <p>Map CT-06-206, E2 to D3, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>A section of Blithbury Road would be realigned to cross over the Blithbury Central cutting.</p> <p>Existing farm accesses off the highway network would be retained, where possible.</p>	<p>Additional land will be required for the provision of an agricultural access off Blithbury Road. The access will require 150m of existing hedgerow habitat to be relocated to comply with visibility requirements.</p>
<p>Additional land and a change to Bill powers required for a grid supply point connection to National Grid Parkgate substation</p> <p>AP2-001-015</p> <p>Map CT-05-206-R1, Map CT-05-207, Map CT-05-207-R1, Map CT-05-207-R2, Map CT-05-207-R3, Map CT-05-207-R4, Map CT-05-207-R5, Map CT-05-207-R6, Map CT-05-207-R7, Map CT-06-206-R1, Map CT-06-207, Map CT-06-207-R1, Map CT-06-207-R2, Map CT-06-207-R3, Map CT-06-207-R4, Map CT-06-207-R5, Map CT-06-207-R6 and Map CT-06-207-R7 in the SES2 and AP2 ES Volume 2: CA1 Map Book for the Parkgate grid supply point connection</p> <p>Map CT-05-207-L1, Map CT-05-207-L2, Map CT-05-207-L3, Map CT-06-207-L1, Map CT-06-207-L2 and Map CT-06-207-L3 in the SES2 and AP2 ES Volume 2: CA1 Map Book for the Rugeley grid supply point connection</p>	<p>A connection from a grid supply point at the former Rugeley Power Station would provide traction power supply for HS2 Phase 2a, via a three-circuit power line, 4km in length, between the National Grid Rugeley substation and Newlands Lane auto-transformer feeder station. The Newlands Lane auto-transformer feeder station would provide power to the overhead line equipment and to a number of auto-transformer stations along the HS2 route.</p> <p>The Rugeley connection route would be underground for 670m from the National Grid Rugeley substation, above ground on three parallel lines of wooden poles for 2.3km, and underground for a further 1km before connecting to the Newlands Lane auto-transformer feeder station.</p>	<p>Replacement of the grid supply point connection at Rugeley, with a new permanent grid supply point connection between a new National Grid Parkgate substation and the Newlands Lane auto-transformer feeder station, via a three-circuit power line 7.7km in length.</p> <p>The Parkgate connection route will be all overhead, on two parallel lines of steel pylons between 23m and 38m in height, depending on the underlying topography.</p> <p>A new National Grid Newlands Lane substation will be provided adjacent to the Newlands Lane auto-transformer feeder station, and the access will be amended accordingly.</p>
<p>Additional land required for the provision of a replacement facility for Mayfield Children's Home</p> <p>AP2-002-001</p> <p>Map CT-06-206-R1, J8 to I7, in the SES2 and AP2 ES, Volume 2: CA1 Map Book.</p>	<p>The HS2 route would pass approximately 40m from Mayfield Children's Home, which occupies the Grade II listed Moreton House in the Colwich to Yarlet area (CA2).</p> <p>Mayfield Children's Home is a specialist residential children's home linked to an independent specialist school, Rugeley School, which is located on the outskirts of Blithbury in Lichfield in the Fradley to Colton area.</p>	<p>Additional land will be required for a permanent replacement facility for Mayfield Children's Home on the site of the former Westwood School, adjacent to Rugeley School, on the outskirts of Blithbury in Lichfield in the Fradley to Colton area.</p> <p>This amendment is relevant to both the Fradley to Colton area and the Colwich and Yarlet area (CA2). A description of the amendment within the Colwich to Yarlet area is reported in SES2 and AP2 ES Volume 2, Community area 2, Colwich to Yarlet.</p>

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Figure 4: Locations of AP2 engineering amendments in the Fradley to Colton area



4.2.3 Amendments in the Fradley to Colton area result in changes to waste arisings, which are reported in Volume 5: Appendix WM-001-000 of the SES2 and AP2 ES.

4.2.4 An assessment of the likely significant environmental effects associated with the disposal of construction, demolition, excavation and operational waste has been undertaken route-wide for the AP2 revised scheme. See Volume 3, Section 11 of the SES2 and AP2 ES for details of this assessment.

4.3 Minor utility amendments

4.3.1 Amendments to minor utilities will be required in the Fradley to Colton area to provide connections to construction compounds and to maintain continuity of supply in the area. This will result in changes to the land or Bill powers required for the SES2 scheme and separately the AP1 revised scheme where relevant. Typically, works associated with minor utility amendments will be small in scale and similar to the types of works undertaken routinely by utility providers in the normal course of their activities. The duration of minor utility works will generally be short term. Provision of access to adjacent properties will usually be maintained during the works with alternative access arrangements being made where necessary. Where relevant, the implementation of the works will be subject to appropriate traffic management measures to ensure that disruption to non-motorised users and vehicular traffic is reduced insofar as reasonably practicable. Table 7 provides a summary of the minor utility amendments and the changes to land or Bill powers required. Consideration has been given to the potential for new or different likely significant effects cumulative effects as a result of the minor utility amendments acting in combination with other SES2 changes and AP1 amendments and reported where relevant.

4.3.2 Figure 5 shows the general location of the minor utility amendments.

Table 7: Summary of AP2 minor utility amendments in the Fradley to Colton area

Name of the AP2 minor utility amendment	Description of the SES2 scheme (and AP1 revised scheme where relevant)	Description of the AP2 revised scheme
<p>Additional land for the underground diversion of a Western Power Distribution 11kV underground cable north-west of Echills Farm</p> <p>AP2-001-101</p> <p>Map CT-05-203, F7, and Map CT-06-203, F7, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>Land would be permanently required for the permanent underground diversion of a Western Power Distribution 11kV underground cable, 200m in length, from a Western Power Distribution pole 50m south-east of the Bourne embankment satellite compound, crossing under the HS2 route 50m east of Echills Farm.</p> <p>The AP1 revised scheme (AP1-001-104: Additional land for the permanent diversion of BT Openreach overhead telecommunications line along the A513 Rugeley Road and access road to Echills Farm), provides for additional land which overlaps with the land required for this amendment.</p>	<p>Additional land will be required for the diversion of a Western Power Distribution 11kV underground cable, 590m in length, along the A513 Rugeley Road and an access road under the River Trent viaduct to Echills Farm.</p> <p>This amendment is dependent on the AP1-001-104 (Additional land for the permanent diversion of BT Openreach overhead telecommunications line along the A513 Rugeley Road and access road to Echills Farm) being approved, as part of the additional land included within the AP1 revised scheme is also required for the utility works described in the AP2 amendment</p>
<p>Additional land to extend an underground Openreach telecommunications cable to Pipe Ridware embankment satellite compound</p>	<p>Land would be permanently required for a new temporary underground Openreach telecommunications cable, 90m in length, running along Pipe Lane diversion to the Pipe Ridware</p>	<p>Additional land will be required to extend a temporary underground Openreach telecommunications cable, a total of 300m in length from a point 200m east of the River Trent viaduct, along Pipe Lane, east of the junction with Pipe Lane</p>

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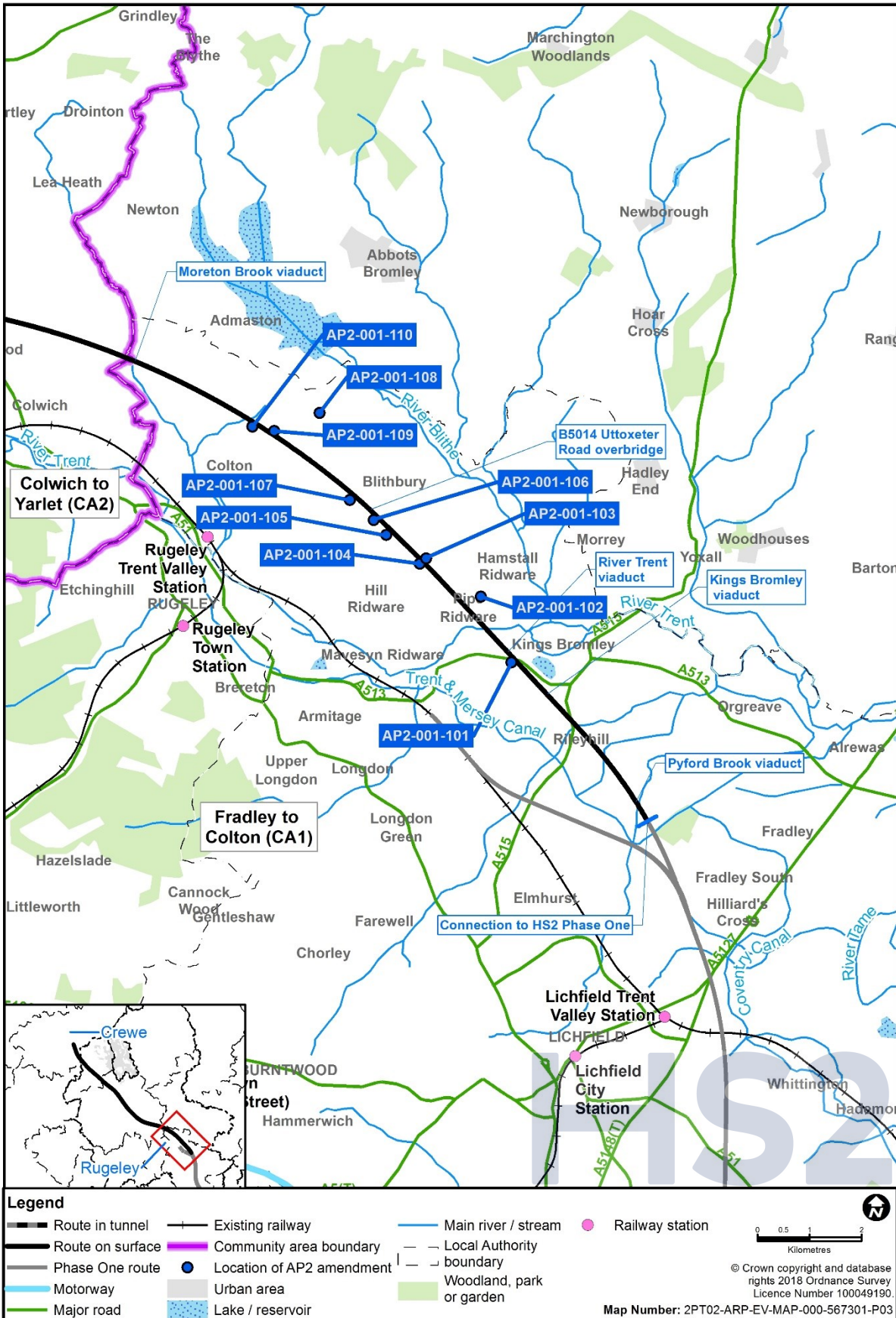
Name of the AP2 minor utility amendment	Description of the SES2 scheme (and AP1 revised scheme where relevant)	Description of the AP2 revised scheme
<p>AP2-001-102</p> <p>Map CT-05-204, E4, and Map CT-06-204, E4, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>embankment satellite compound.</p>	<p>diversion, to the Pipe Ridware embankment satellite compound.</p>
<p>Additional land for the diversion of an existing South Staffordshire Water water mains supply along Pipe Lane diversion</p> <p>AP2-001-103</p> <p>Map CT-05-205, G5 to F4, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>No provision was made for the permanent diversion of the South Staffordshire Water water mains supply along the Pipe Lane diversion.</p>	<p>Additional land will be required for the permanent diversion of the South Staffordshire Water water mains supply, 1.3km in length, running from the junction with Pipe Lane to Woodhouse Farm, along the Pipe Lane diversion.</p>
<p>Additional land for the diversion of a South Staffordshire Water water mains supply to Quintons Orchard</p> <p>AP2-001-104</p> <p>Map CT-06-205, F7, and Map CT-05-205, F7, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>No provision was made for the permanent diversion of a South Staffordshire Water water mains supply to Quintons Orchard.</p> <p>The AP1 revised scheme (AP1-001-105: Additional land for the permanent diversion of BT Openreach overhead telecommunications line at Quintons Orchard Farm), provides for additional land which overlaps with the land required for this amendment.</p>	<p>Additional land will be required for the permanent diversion of an existing South Staffordshire Water water mains supply to Quintons Orchard, 650m in length, running from Pipe Lane along the access road to Quintons Orchard.</p> <p>This amendment is dependent on the AP1-001-105 (Additional land for the permanent diversion of BT Openreach overhead telecommunications line at Quintons Orchard Farm) being approved, as part of the additional land included within the AP1 revised scheme is also required for the utility works described in the AP2 amendment.</p>
<p>Additional land for the diversion of an Openreach telecommunications cable to Bentley Hall Farm</p> <p>AP2-001-105</p> <p>Map CT-05-205, E6 to D7 and D4, and Map CT-06-206, E6 to D7 and D4, in the SES2 and AP2 ES Volume 1, CA1 Map Book</p>	<p>No provision was made for the permanent diversion of an existing underground and overhead Openreach telecommunications line to Bentley Hall Farm.</p> <p>The AP1 revised scheme (AP1-001-004: Additional land permanently required to improve the visibility at the junction of Pipe Lane and an accommodation track), provides for additional land which overlaps with the land required for this amendment.</p>	<p>Additional land will be required for a diversion of an overhead Openreach telecommunications line, 770m in length, to Bentley Hall Farm.</p> <p>This amendment is dependent on the AP1-001-004 (Additional land permanently required to improve the visibility at the junction of Pipe Lane and an accommodation track) being approved, as part of the additional land included within the AP1 revised scheme is also required for the utility works described in the AP2 amendment.</p>
<p>Additional land for the underground diversion of a Western Power Distribution 11kV overhead line near Pipe Lane Farm</p> <p>AP2-001-106</p> <p>Map CT-06-206, J3 to H5, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>Land would be permanently required for the permanent underground diversion of a Western Power Distribution 11kV overhead line, 310m in length, from a pole 150m west of Pipe Lane Farm, crossing the HS2 route, to a pole 230m north-west of Bentley Hall Farm.</p>	<p>Additional land will be required for the permanent underground diversion of a Western Power Distribution 11kV overhead line near Pipe Lane Farm, 700m in length, from a pole 150m west of Pipe Lane Farm, crossing the HS2 route 250m further to the north-west, to a pole 230m north-west of Bentley Hall Farm.</p>
<p>Additional land for the underground diversion of a Western Power Distribution 11kV overhead line from Hadley Gate Farm to near Stoneyford House</p> <p>AP2-001-107</p> <p>Map CT-05-206, A7 to A6, and Map CT-06-206, A7 to A6, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>Land would be permanently required for the permanent diversion of a Western Power Distribution 11kV overhead line, 300m in length, crossing the HS2 route, 220m west of Blithbury Road overbridge, running from Hadley Gate Farm to near Stoneyford House.</p>	<p>Additional land will be required for the underground diversion of a Western Power Distribution 11kV overhead line, 1.3km in length, from Hadley Gate Farm along the Hadley Gate Lane diversion, Blithbury Road realignment, Blithbury Road overbridge, parallel to the south side of the HS2 route near to Stoneyford House.</p>

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Name of the AP2 minor utility amendment	Description of the SES2 scheme (and AP1 revised scheme where relevant)	Description of the AP2 revised scheme
<p>Additional land for the provision of a new underground Openreach telecommunications cable to Newlands Lane auto-transformer feeder station railway systems satellite compound</p> <p>AP2-001-108</p> <p>Map CT-05-207, E1 to D2, to Map CT-05-207-R1, C10 to B8, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>No provision was made for a temporary telecommunications connection for the Newlands Lane auto-transformer feeder station railway systems satellite compound.</p>	<p>Additional land will be required for a new temporary Openreach telecommunications cable, 1.5km in length, running along Newlands Lane from Croft Cottage to Newlands Lane auto-transformer feeder station railway systems satellite compound.</p>
<p>Additional land for the underground diversion of a Western Power Distribution 11kV overhead line east of Newlands Lane underbridge</p> <p>AP2-001-109</p> <p>Map CT-05-208, J6 to H5, and Map CT-06-208, J6 to H5, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>Land would be permanently required for the permanent diversion of a Western Power Distribution 11kV overhead line, 230m in length, running from an existing Western Power Distribution pole and crossing the HS2 route, 270m west of Newlands Lane overbridge.</p>	<p>Additional land will be required for the underground diversion of a Western Power Distribution 11kV overhead line, 680m in length, from an existing pole, 150m west of Colton Footpath 34 diversion, to another existing pole, 250m west of the Newlands Lane overbridge.</p>
<p>Additional land and a change to Bill powers for the underground diversion of Western Power Distribution 11kV overhead lines near Stockwell Heath</p> <p>AP2-001-110</p> <p>Map CT-05-208, E5 to D6, and Map CT-06-208, E5 to D6, in the SES2 and AP2 ES Volume 2: CA1 Map Book</p>	<p>Land would be permanently required for the permanent underground diversion of two existing Western Power Distribution 11kV overhead lines. The first underground diversion would be 270m in length, crossing the HS2 route 160m west of Newlands Lane underbridge from Bleak Cottage to Tinkerlow Farm. The second underground diversion would be 330m in length, crossing the HS2 route 350m west of Newlands Lane underbridge from Bleak Cottage to a Western Power Distribution pole, 100m north-west of Hamley House Farm.</p>	<p>Additional land will be required for the permanent underground diversion of two Western Power Distribution 11kV overhead lines, 700m in length, from an existing pole, crossing the HS2 route 430m west of Newlands Lane underbridge, to another existing pole, 5m north of the Moor Lane diversion.</p>

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Figure 5: Locations of AP2 minor utility amendments in the Fradley to Colton area



5 Assessment of engineering amendments in the Fradley to Colton area

5.1 Additional land and a change to Bill powers required to make alterations to the Handsacre Junction connection into the West Coast Main Line (AP2-001-001)

- 5.1.1 The High Speed Rail (London to West Midlands) Act 2017 provides for a connection to the West Coast Main Line (WCML) south of Handsacre, within the Whittington to Handsacre community forum area (CFA22). HS2 trains would connect to the WCML via the Handsacre Spur, providing a connection via Stafford capable of providing up to seven trains per hour (one-way train flow). Following completion of HS2 Phase 2a in 2027, the number of trains would reduce to one train per hour (one-way train flow). Six of the trains going north of Birmingham would use the Phase 2a infrastructure, with one train joining onto the conventional network at the Handsacre Junction connection into the WCML.
- 5.1.2 The amendment to make alterations to the Handsacre Junction connection has been identified to reduce disruption to the WCML during construction, optimise the design in terms of construction and maintenance, and reduce costs of the HS2 railway.
- 5.1.3 Due to the complexity and extent of the change proposed, the description of this amendment is split into two parts for both the Phase One consented scheme and the Phase 2a AP2 revised scheme:
- description of the scheme; and
 - construction of the scheme.

Phase One consented scheme

Description of the scheme

- 5.1.4 The Handsacre Spur would split from the Phase One Manchester Spur (which connects to the Phase 2a route) west of Fradley Park, passing close to the Trent and Mersey Canal. The Handsacre Spur would cross over the existing A515 Lichfield Road and Bourne Brook on the Ravenshaw Wood embankment for 1.9km, Bourne Book viaduct for 125m and the Shaw Lane embankment for 550m. Landscape earthworks and woodland mitigation planting would be provided on the north side of the HS2 route on the Shaw Lane embankment. See Map CT-06-129, F6 to A3, in the Phase One, SES and AP2 ES Volume 2: CFA22 Map Book²⁹.

²⁹ HS2 Ltd (2015). *High Speed Rail (London-West Midlands) Supplementary Environmental Statement and Additional Provision 2 Environmental Statement*, Volume 2: CFA22 Whittington to Handsacre. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/443660/X50_VOL2_CFA22_RAW_DCS_WATE_R.pdf

- 5.1.5 The two easternmost tracks of the WCML would be realigned approximately 40m to the east of their current position. The WCML tracks would be realigned for approximately 1.6km from the A515 Lichfield Road to a point just south of Handsacre, located on earthworks which widen the WCML corridor. Retaining walls would be required in four locations to separate the HS2 lines from the WCML. See Map CT-06-129, D6 to C6, and Map CT-06-130a, J6, I6 and I6, in the Phase One, SES and AP2 ES Volume 2: CFA22 Map Book.
- 5.1.6 From Shaw Lane embankment, the Harvey's Rough flyover would carry the HS2 route over the two realigned WCML tracks for 130m, continuing onto the Lilac embankment for 1km, before joining the WCML fast lines at the centre of the now widened WCML corridor. Shaw Lane embankment would be up to 13m in height, Harvey's Rough flyover would be up to 18m in height, and Lilac embankment would be up to 10.6m in height. A false cutting would be provided on the north side of the HS2 route alongside Shaw Lane embankment and Lilac embankment for visual screening. Landscape mitigation planting would also be provided on these earthworks. See Map CT-06-129, J7 to H6, in the Phase One, SES and AP2 ES Volume 2: CFA Map Book.
- 5.1.7 A shared HS2 and accommodation access to Ravenshaw Cottage would be provided on the north side of Ravenshaw Wood embankment, south of the A515 Lichfield Road, and would connect into Kings Bromley Footpath 0.392. Approximately 2.4ha of woodland planting would be provided between this new access and the embankment. See Map CT-06-129, J7 to H6, in the Phase One, SES and AP2 ES Volume 2: CFA22 Map Book.
- 5.1.8 Shaw Lane would be closed and a new diversion, referred to as the Tuppenhurst Lane extension, would connect across Shaw Lane to the A515 Lichfield Road. See Map CT-06-129, H6 to D5, in the Phase One, SES and AP2 ES Volume 2: CFA22 Map Book. A balancing pond would be provided to the north of the Tuppenhurst Lane diversion, adjacent to the Tuppenhurst Lane culverts which will convey the Bourne Brook under the road. The balancing pond would have an access road and turning space and would be surrounded by woodland planting. See Map CT-06-129, F6, in the Phase One, SES and AP2 ES Volume 2: CFA22 Map Book
- 5.1.9 An HS2 access would be provided from the A515 Lichfield Road to mitigation planting proposed between Shaw Lane embankment and the WCML. See Map CT-06-129, G9 to D7, in the Phase One, SES and AP2 ES Volume 2: CFA22 Map Book.
- 5.1.10 Kings Bromley Footpath 6 would be diverted for 451m along the north side of the realigned WCML embankment near Ashton Hays Farm, and would cross the HS2 route and WCML via the Kings Bromley Footpath 6 underpass. See Map CT-06-130a, H7 to G5, in the Phase One, SES and AP2 ES Volume 2: CFA22 Map Book.
- 5.1.11 An access road would be provided from Spode Avenue to a new relocatable relay equipment building and a balancing pond. See Map CT-06-130a, F6 to C5, in the Phase One, SES and AP2 ES Volume 2: CFA22 Map Book.

- 5.1.12 Woodland and hedgerow mitigation planting would be provided along the south side of the unchanged WCML, north of Shaw Lane. See Map CT-06-129, D7 to A5, in the Phase One, SES and AP2 ES Volume 2: CFA22 Map Book.
- 5.1.13 Modifications to the WCML would be required in discrete sections, located within an approximately 17.2km section of the WCML between Lichfield Junction just north of the Lichfield Trent Valley station (see Map CT-06-148, I4, in the Phase One Volume 4 Map Book) to Colwich Junction (see Map CT-06-147, B6 and B7, in the Phase One Volume 4 Map Book). The modifications to the WCML for the Phase One consented scheme would include:
- the alteration of track at Colwich and Rugeley within the existing WCML rail boundary;
 - new signalling layout, which entails the removal and replacement of gantries and/or cantilever structures;
 - installation of new relocatable equipment buildings; and
 - installation of new track switches³⁰ and crossovers³¹.
- 5.1.14 The modifications to the WCML would allow an increase in speed of some services between Handsacre and Colwich. The speed on the outer (slow) lines of the WCML between Handsacre and Colwich would be capable of increasing speeds to 125mph (200kph), which matches the existing speed of the central (fast) tracks. Through the junction at Colwich, the modification would permit an increase in speeds of up to 100mph (160kph) on the WCML and up to 60mph (100kph) on the North Staffordshire Line.

Construction of the scheme

- 5.1.15 Construction of the Handsacre Junction connection and WCML modification works would be managed from the following compounds set out in Table 8.

³⁰ A switch is a mechanical installation enabling railway trains to be guided from one track to another, such as at a railway junction or where a spur or siding branches off.

³¹ A crossover is a pair of switches that connect two parallel rail tracks, allowing a train on one track to cross over to the other.

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Table 8: Construction of the Phase One scheme at the Handsacre Junction

Location	Principal construction activity	Start date	Estimated duration of use	Number of workers (average/peak)	Highways access route
A515 Lichfield Road underbridge main compound (Map CT-05-129, G6 to F6).	Kings Bromley Footpath 0.392 underpass Ravenshaw Wood embankment A515 Lichfield Road underbridge and temporary realignment Bourne Brook viaduct Shaw Lane embankment Lilac embankment	2018	Five years and six months	91/150	via A515 Lichfield Road
A515 Lichfield Road underbridge satellite compound (Map CT-05-129, G9 to G10)	A515 Lichfield Road underbridge	2018	Two years	20/30	via A515 Lichfield Road
Harvey's Rough flyover satellite compound (Map CT-05-129, D7 to D8).	Harvey's Rough flyover and approach structures. Tie in to WCML	2019	One year	20/30	via Shaw Lane/ B5014 Lichfield Road/A515 Lichfield Road
Handsacre (A515) main compound (Map CT-05-129, F8 to D8).	WCML modifications from Lichfield to Colwich Diversion and connection to the WCML Railways systems installation	2021	Five years	37/138	A515 Lichfield Road and permanent connection to an existing Network Rail access road
Shaw Lane satellite compound (Map CT-05-129, D7 to D8)	Modifications to the WCML	2023	4 months	64/64	Shaw Lane/B5014 Lichfield Road/A515 Lichfield Road
Armitage Shanks satellite compound (reported in Volume 4, see Map CT-05-142, G6)	WCML track works and signal installation	2022	One year ³²	25/65	via Old Road then A513 New Road
A51 satellite compound (reported in Volume 4, Map CT05-121, E5 and F5)	WCML track works and signal installation	2022	One year ³² .	30/170	via A51 Tamworth Road

³² The compound would not be operational throughout this one year period as works will be organised around available track possessions.

- 5.1.16 Although certain elements of the WCML modifications could be constructed from within Network Rail land using rail mounted construction plant, land would be required on a temporary basis to install the signal structures. Temporary crane platforms would be provided alongside the WCML to remove and replace signal structures. These works would be undertaken under temporary track possessions, which would typically be taken overnight to minimise disruption to daytime use of the line, either on weekday nights or at weekends, or over bank holidays. The temporary crane platforms would only be operational for the track possessions and they would not have staff welfare facilities.
- 5.1.17 Rail mounted construction plant would be used for the track alterations and for the installation of signal foundations, which were likely to be piled. As with the gantry installations, the track and foundation works would take place during temporary line possessions using a phased approach. Construction works would be planned and integrated with the Network Rail route programme in accordance with industry planning timescales.
- 5.1.18 The A515 Lichfield Road would be temporarily realigned north of the existing A515 Lichfield Road for one year and six months, to facilitate the construction of the A515 Lichfield Road underbridge. See Map CT-05-129, H6 to G8, in the Phase One, SES and AP2 ES Volume 2: CFA22 Map Book.
- 5.1.19 Kings Bromley Footpath 6 would be closed for approximately six months to facilitate the construction of the Kings Bromley Footpath 6 underpass through the realigned WCML and Lilac embankment.

Operation of the scheme

- 5.1.20 With Phase One in operation, from 2026, there would be seven trains per hour each way passing through the Whittington to Handsacre area in the morning and evening peak hours, and fewer during other times. All trains would use the Handsacre spur and connect onto the WCML. The first trains of the day would leave the terminus stations no earlier than 05:00 Monday to Saturday (and 08:00 on Sundays) and the last would arrive no later than midnight.
- 5.1.21 With Phase 2a in place, from 2027, there would be one train per hour each way on the Handsacre spur.
- 5.1.22 Trains on the Handsacre spur would run at speeds up to 125mph (200kph) which is the same as the WCML in this area. The trains would be either single 200m-long trains or two 200m-long trains coupled together, depending on demand and time of day.

Phase 2a AP2 amendment

- 5.1.23 Since the acceleration of the Phase 2a programme, further consideration has been given to identify opportunities to reduce the disruption to the WCML during construction and reduce cost. Design development identified that a slow line connection was feasible and offers advantages in terms of reduced disruptive possessions on the WCML and reduced construction costs.

Description of the scheme

- 5.1.24 All early works required to enable the main civils works of the AP2 revised scheme, such as the establishing of ecological mitigation areas and utility diversions, are unchanged from the Phase One consented scheme, and will be undertaken in line with the Phase One programme and Bill powers. As such, these works are excluded from the assessment of this amendment. This will include:
- utility works to the east side of the WCML, along Watery Lane and Eastern Avenue. See Map CT-05-148, B5, to Map CT-05-129, F4, in the SES2 and AP2 ES Volume 2: CA1 Map Book;
 - utility works that cross Wood End Lane near Black Slough Farm, before crossing the WCML twice and the A515 Lichfield Road. See Map CT-05-128, G10, to Map CT-05-129, G4, in the SES2 and AP2 ES Volume 2: CA1 Map Book; and
 - utility works across and south of Hanch reservoir. See Map CT-05-202-L2 and CT-05-129b-L1 in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 5.1.25 A revised rail connection into the WCML slow lines will be provided, with the HS2 lines connecting to the outside lines of the WCML corridor, therefore removing the need to realign the easternmost tracks of the WCML.
- 5.1.26 The HS2 northbound and southbound lines will split at the Shaw Lane embankment before crossing Shaw Lane. The southbound line will cross Shaw Lane via a new Shaw Lane underbridge, then continue along the north-east side of the WCML on the Lilac North embankment for approximately 1.7km. The southbound HS2 line will connect to the WCML approximately 90m south of residential properties on Chestnut Close in Handsacre. See Map CT-06-129, F7, to Map CT-06-130b, E6, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 5.1.27 The northbound line will be located further south than the southbound line and will cross over Shaw Lane and the WCML on the Harvey's Rough viaduct for 550m. The Handsacre retaining walls in the Phase One consented scheme will be removed. The HS2 northbound line will connect to the south-west side of the WCML, to the WCML northbound slow line, approximately 160m south of the same residential properties on Chestnut Close in Handsacre. See Map CT-06-129, F7, to Map CT-06-130b, E6, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 5.1.28 Maintenance access points will be provided along the shared HS2 and accommodation access to Ravenshaw Cottage, and landscape mitigation planting will be reduced to accommodate this. See Map CT-06-129, J7 to H6, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 5.1.29 A new HS2 access will be provided within an area of landscape mitigation planting to the west of the A515 Lichfield Road, and south of Ravenshaw Wood embankment. See Map CT-06-129, G8 to G7, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 5.1.30 Shaw Lane will remain open, and therefore the Tuppenhurst Lane extension will no longer be required. Approximately 300m of the Tuppenhurst Lane extension,

east of Shaw Lane, will be repurposed to provide access to a relocated balancing pond and maintenance access point, north of Shaw Lane embankment. There will be no public access along this track. Approximately 0.7ha of land will no longer be required from Hunt's Farm (CA1/12) due to the relocation of the balancing pond. See Map CT-06-129, F6 to E5, in the SES2 and AP2 ES Volume 2: CA1 Map Book. West of A515 Lichfield Road, adjacent to Ravenshaw Wood embankment, an area of landscape mitigation planting will no longer be required, due to the removal of the Tuppenhurst Lane extension. See Map CT-06-129, G6 to F6, in the SES2 and AP2 ES Volume 2: CA1 Map Book.

- 5.1.31 On the north side of the WCML, the 650m long maintenance access road from the A515 Lichfield Road to woodland planting between the WCML and Shaw Lane embankment will not be provided. See Map CT-06-129, E8 to D6, in the SES2 and AP2 ES Volume 2: CA1 Map Book. South of Shaw Lane underbridge, a new 350m access will be provided instead.
- 5.1.32 A new shared Network Rail and HS2 maintenance access route will be provided from Shaw Lane, approximately 70m south of Tuppenhurst Lane, under the Shaw Lane underbridge, between Lilac North embankment and the WCML. See Map CT-06-06-129, D6 to C6, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 5.1.33 A new shared HS2 and Network Rail access will be provided from the B5014 Lichfield Road, along an upgraded section of the Kings Bromley Footpath 6, around the Lilac South embankment to Harvey's Rough viaduct. See Map CT-06-130b, I7 to H9, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 5.1.34 The shared HS2 and Network Rail access road from Spode Avenue in Handsacre will remain on the same alignment as described in the Phase One consented scheme for the northernmost 580m. However, a larger area will be provided for a Network Rail rail systems equipment compound, causing the access road to move slightly further north, away from the WCML. The balancing pond in this location will be reshaped, and a new additional area for Network Rail rail systems equipment will be provided. Woodland and grassland habitat creation will be provided around the turning heads to replace lost habitat and integrate the scheme into the landscape. See Map CT-06-130b, F6 to D6, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 5.1.35 The false cutting north of Lilac South embankment, east of Ashton Hays Farm, will be replaced by standard landscape earthworks. See Map CT-06-129, B4, in the SES2 and AP2 ES Volume 2: CA1 Map Book. West of Ashton Hays Farm, the false cutting will no longer be required. See Map CT-06-130b, H6 to G6, in the SES2 and AP2 ES Volume 2: CA1 Map Book. The diversion of Kings Bromley Footpath 6 will be amended slightly, so that it follows the amended tree line.
- 5.1.36 Beyond the area where the HS2 route will tie into the WCML, the modification works to the WCML will no longer be required, with the exception of a new crossover which will be provided north of Handsacre, to provide greater flexibility in the network for southbound trains, allowing trains on both the fast and slow lines to access the HS2 route.

Construction of the scheme

5.1.37 Construction of the Handsacre spur and WCML modification works will be managed from the compounds set out in Table 9.

Table 9: Construction of the Phase 2a AP2 revised scheme at Handsacre Junction

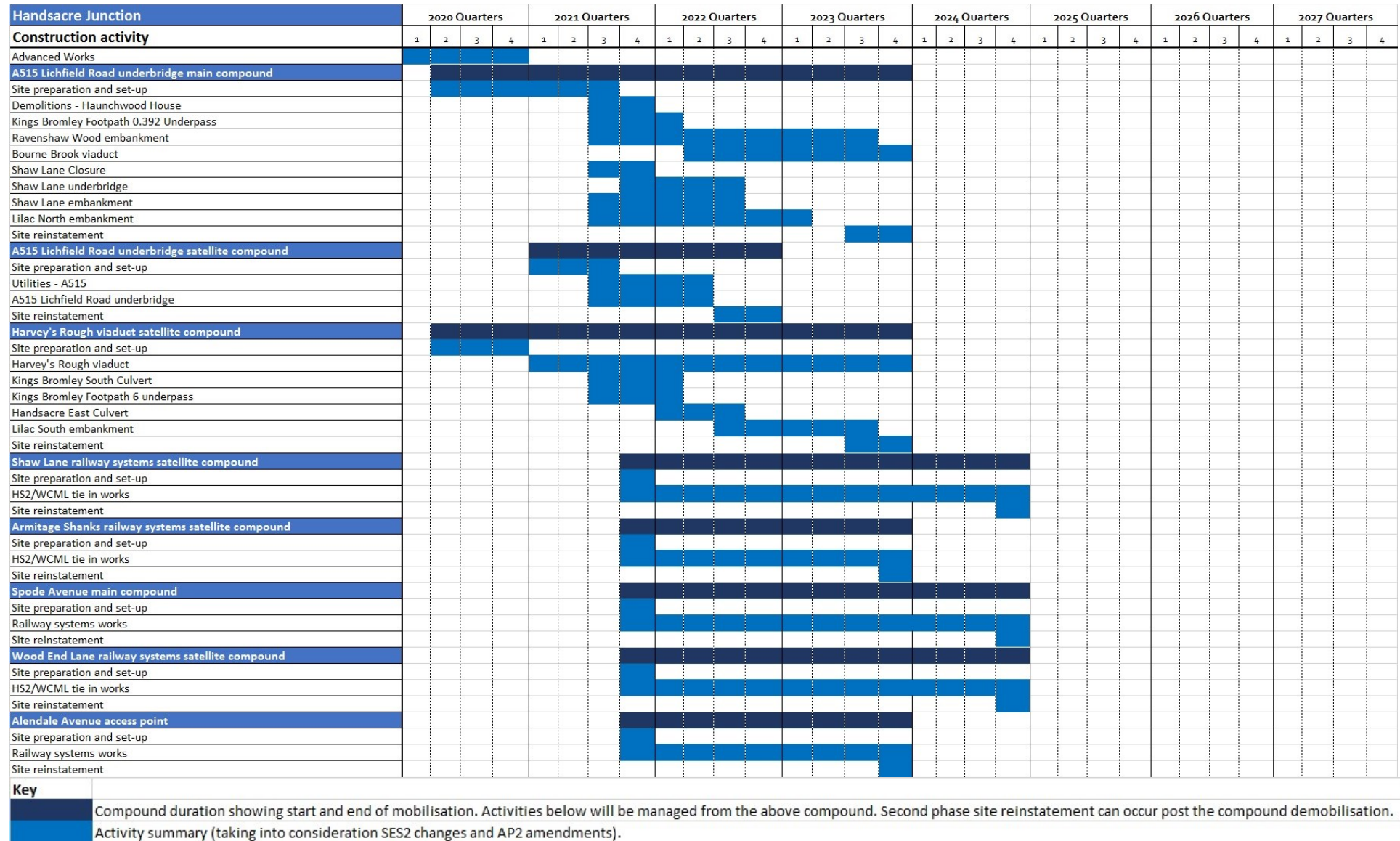
Location	Principal construction activity	Start date	Estimated duration of use	Number of workers (average/peak)	Highways access route
A515 Lichfield Road underbridge main compound (Map CT-05-129, G6 to F6)	Kings Bromley Footpath 0.392 underpass Ravenshaw Wood embankment A515 Lichfield Road underbridge Bourne Brook viaduct Shaw Lane embankment Lilac North embankment	2020	Three years and nine months	91/150	via A515 Lichfield Road
A515 Lichfield Road underbridge satellite compound (Map CT-05-129, G9 to G10)	A515 Lichfield Road underbridge	2021	Two years and three months	20/30	via A515 Lichfield Road
Harvey's Rough viaduct satellite compound (Map CT-05-129, D7 to D8)	Harvey's Rough viaduct Kings Bromley Footpath 6 underpass Lilac South embankment	2020	Three years and six months	20/30	via Shaw Lane/B5014 Lichfield Road/A515 Lichfield Road
Shaw Lane satellite compound (Map CT-05-129, D7 to D8)	HS2/WCML tie in works	2021	Two years and seven months	19/50	Shaw Lane/B5014 Lichfield Road/A515 Lichfield Road
Armitage Shanks satellite compound (Map CT-05-142, G6)	HS2/WCML tie in works	2021	Two years and two months	11/50	Via Old Road then A513 New Road
Spode Avenue main compound (Map CT-05-130b, E6)	High speed turnout installation Laydown area for future maintenance	2021	Two years and seven months	19/50	Via Shaw Lane/B5014 Lichfield Road/A515 Lichfield Road
Wood End Lane satellite and railways systems compound (Map CT-05-129b-L1, H2 to F2)	HS2/WCML tie in works	2021	Two years and seven months	8/8	Via Old Road/A513 Rugeley Road
Alendale Avenue access point	WCML modifications	2021	Two years and two months	11/50	Via B15014 Lichfield Road/A515

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Location	Principal construction activity	Start date	Estimated duration of use	Number of workers (average/peak)	Highways access route
(Map CT-05-130b, B6 to A6)					Lichfield Road

- 5.1.38 Handsacre (A515) railway systems main compound and A51 satellite compound will no longer be required, as the works that they would have managed have been removed.
- 5.1.39 The new Spode Avenue main compound will manage two new rail systems satellite compounds; Wood End Lane satellite and railways systems compound and Alendale Avenue access point. See Map CT-05-129b-L1, H2 to F2, and Map CT-05-130b, B6 to A6, in the SES2 and AP2 ES Volume 2: CA1 Map Book. Alendale Avenue access point will not include facilities normally associated with a compound and will be used as a point for drop-off and access only, similar to the way it is currently used by Network Rail.
- 5.1.40 The need for alterations to signal gantries along the WCML will be reduced substantially and will only be required in the area of the connection, and in relation to the new crossover north of Handsacre. Temporary crane platforms provided alongside the WCML in the Phase One consented scheme will no longer be required. Land included in the Phase One consented scheme for access to these crane platforms between Hill Ridware and the WCML will also no longer be required. See Map CT-05-143, G4 to A6, to Map CT-05-143-R1, F5 to E10, in the SES2 and AP2ES Volume 2: CA1 Map Book.
- 5.1.41 The use of rail mounted construction plant for track alterations will remain as in the Phase One consented scheme, using existing and proposed railway access points.
- 5.1.42 To construct Harvey's Rough viaduct across Shaw Lane and WCML, a new launching yard will be required. Harvey's Rough viaduct launching yard will be in place for approximately one year and nine months. See Map CT-05-129, E7 to D7, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 5.1.43 The size and location of stockpiles have been amended, and generally increased, in line with the requirement for additional earthworks with the Phase 2a Handsacre spur.
- 5.1.44 The temporary realignment of A515 Lichfield Road will still be required, in the same location, for one year and six months. The timing of the diversion has been amended in line with the new construction programme for the Handsacre spur.
- 5.1.45 During construction, Shaw Lane will be required to close temporarily, for two years and six months, to facilitate the construction of the Harvey's Rough viaduct and Shaw Lane underbridge.
- 5.1.46 The temporary closure of Kings Bromley Footpath 6 would take place later, in line with the new construction programme for the Handsacre spur.
- 5.1.47 A construction programme illustrating indicative periods for each of the core construction activities described above is provided in Figure 6.

Figure 6: Phase 2a construction programme for the Handsacre Junction



Operation of the scheme

- 5.1.48 The WCML Handsacre spur connection will be available for use as part of Phase One operations from 2026. Up to seven trains an hour will run along the Handsacre Spur, connecting onto the WCML, reducing to one train an hour from 2027, when Phase 2a opens.
- 5.1.49 Trains on the Handsacre spur will connect to the WCML slow lines at a speed of up to 100mph for both the north and southbound lines.

Summary

- 5.1.50 The changes to the Handsacre junction connection into the WCML are outside the limits of the High Speed Rail (London to West Midlands) Act 2017, therefore a change to Bill powers and 10.1ha of additional land are required through the Phase 2a Bill. See Map CT-05-148, I3, to Map CT-05-147, A8, and Map CT-06-148, I3, to Map CT-06-147, A8, in the AP2 and SES2 Volume 2: CA1 Map Book. It is assumed that 3.6ha of the additional land will be returned to its existing use following construction. Due to the amendment, 32.9ha of land identified for the Handsacre junction connection in the High Speed Rail (London to West Midlands) Act 2017 will no longer be required.

Local alternatives

- 5.1.51 A preliminary options appraisal was undertaken of six options of the HS2 connection with the WCML south of Handsacre, of which three options were not taken forward for further consideration as they were not considered to be reasonable alternatives:
- Option B: the HS2 route would connect to the WCML slow lines at a speed of 110mph (180kph) for both the HS2 southbound and northbound lines. Shaw Lane would be retained as a bridleway only and would not provide the same transport connectivity as the other options considered. This option would not be compliant with the HS2 track standard where the HS2 route connects into the WCML southbound and northbound line. This option is similar to Option E;
 - Option D: the HS2 route would connect to the WCML slow lines at a speed of 110mph (180kph) for both the HS2 southbound and northbound lines. Shaw Lane would be retained as a bridleway only and would not provide the same transport connectivity as the other options considered. This option would not be compliant with the HS2 track standard where the HS2 route connects into the WCML northbound line; and
 - Option G: the HS2 route would connect to the WCML slow lines at a speed of 110mph (180kph) for both the HS2 southbound and northbound lines. The track alignment for this option would require a considerable amount of additional land to be acquired for the construction and operation of the HS2 Phase One scheme. It would also require the construction of additional structures as the HS2 route would pass over the A515 Lichfield Road and Bourne Brook.

5.1.52 The following three options were taken forward to a more detailed appraisal where engineering, construction feasibility, cost and environmental impacts were considered:

- Option C: the HS2 route would run along the Ravenshaw Wood embankment, with the A515 Lichfield Road passing beneath the Ravenshaw Wood embankment via an underbridge. The route would then pass over the Bourne Brook and associated floodplain on the Bourne Brook viaduct before continuing on to an embankment. On this embankment, the HS2 southbound and northbound alignment would separate. The northbound line would cross over Shaw Lane and the WCML on the Harvey's Rough Flyover viaduct, approximately 542m in length, continuing along on an embankment on the western side of the WCML. The HS2 northbound line would connect to the WCML slow line on the western side of the WCML, approximately 400m north of Ashton Hayes Farm. The HS2 southbound line would continue on embankment, on the east side of the WCML, and would cross Shaw Lane via an underbridge. The HS2 northbound line would connect to the western side of the WCML, to the WCML northbound slow line, approximately 400m north of Ashton Hayes Farm. An additional WCML crossover would be required to the north of Handsacre to allow HS2 southbound services running on the WCML southbound fast line to connect to the WCML southbound slow line, to continue travelling on the southbound HS2 mainline. The HS2 route would connect to the WCML slow lines at a speed 110mph (180kph) for the southbound line and 100mph (160kph) for the northbound line. Shaw Lane would remain open and Tuppenhurst Lane would not be extended;
- Option E (AP2 revised scheme): the HS2 route would run along the Ravenshaw Wood embankment, with the A515 Lichfield Road passing beneath the Ravenshaw Wood embankment via an underbridge. The route would then pass over the Bourne Brook and associated floodplain on the Bourne Brook viaduct before continuing on to an embankment. On this embankment, the HS2 southbound and northbound lines would separate. The northbound line would cross over Shaw Lane and the WCML on the Harvey's Rough Flyover viaduct, approximately 540m in length, continuing along an embankment on the western side of the WCML. The HS2 northbound line would connect to the WCML northbound slow line on the western side of the WCML, approximately 450m north of Ashton Hayes Farm. The HS2 southbound line would continue on embankment on the east side of the WCML, adjacent to Ashton Hayes Farm. The HS2 southbound line would connect to the east side of the WCML slow line, approximately 520m north of Ashton Hayes Farm. An additional crossover would be required to the north of Handsacre to allow HS2 southbound services running on the WCML southbound fast line to connect to the WCML southbound slow line, coming off WCML at the connection to continue travelling on the southbound HS2 mainline. The HS2 route would connect to the WCML slow lines at a speed of 100mph (160kph) for both the southbound and northbound lines Shaw Lane would remain open and Tuppenhurst Lane would not be extended; and

- Option F: the HS2 route would run along the Ravenshaw Wood embankment, with the A515 Lichfield Road passing beneath the Ravenshaw Wood embankment via an underbridge. The route would then pass over the Bourne Brook and associated floodplain on the Bourne Brook viaduct before continuing on to an embankment. On this embankment, the HS2 southbound and northbound line would separate. The HS2 northbound line would cross over Shaw Lane and the WCML on the Harvey's Rough Flyover viaduct, approximately 500m in length, continuing along on an embankment on the western side of the WCML. The HS2 northbound line would connect to the WCML northbound slow line on the western side, approximately 500m north of Ashton Hayes Farm. The HS2 southbound line would continue on embankment on the eastern side of the WCML, adjacent to Ashton Hayes Farm. The HS2 southbound line would connect to the eastern side of the WCML approximately 500m north of Ashton Hayes Farm. An additional crossover would be required to the north of Handsacre to allow HS2 southbound services running on the WCML southbound fast line to connect to the WCML southbound slow line, coming off the WCML at the connection to continue travelling on the southbound HS2 mainline. The HS2 route would connect to the WCML slow lines at a speed of 110mph (180kph) for both the southbound and northbound lines. Shaw Lane would remain open and Tuppenhurst Lane would not be extended.

5.1.53 Option E was identified as the preferred option, as on balance it presented the most favourable outcome in reducing disruption to existing the WCML network and in terms of cost. Options C and F would provide greater environmental benefits overall, however, when compared to Option E the benefits were not considered sufficient to justify the additional cost as well as technical complexity and operational risk due to the use of non-standard turnouts³³, which are bespoke.

5.1.54 The analysis of engineering, cost and potential environmental impacts associated with the options is set out below, with the impacts of the preferred option presented first.

Option E

5.1.55 Option E would no longer require the closure of Shaw Lane and therefore removes the need to demolish the existing Shaw Lane overbridge crossing the WCML and removes the need for the Tuppenhurst Lane extension. The Tuppenhurst Lane extension, in the Phase One consented scheme, spans the Bourne Brook and its floodplain on embankment. By no longer providing this road the impact from the road alignment on this watercourse and the resulting impact of flood risk is removed. A small area of floodplain storage would still be required, associated with the viaduct piers, but this would be much smaller than that required for the Phase One consented scheme.

³³ A turnout is a mechanical installation enabling trains to be guided from one track to another, such as at a railway junction or where a spur or siding branches off.

- 5.1.56 As Shaw Lane would no longer be closed there would be no change in journey length for motorised users and non-motorised users in the permanent case. This option would also reduce the visual impact of construction works associated with the Tuppenhurst Lane extension.
- 5.1.57 This option does not require significant realignment of WCML tracks, and therefore is significantly less disruptive to the existing rail network than the Phase One consented scheme.
- 5.1.58 Option E would increase the land required for construction and operation and would require a greater area of land from the polytunnels and agricultural enterprise associated with New Farm (CFA22/18) and land from Brownfields Farm (CFA22/16). This option would be marginally closer to Ashton Hayes Farm and may increase the visual impact on the residents of this property as the HS2 route would be on embankment at this point. There is also a risk of contamination associated with an infilled pond and potentially a small infilled marl pit at Ashton Hayes Farm.
- 5.1.59 There would be an additional loss of lowland mixed woodland from Harvey's Rough Woodland. As the HS2 route would cross over Shaw Lane via an overbridge, there would be the potential for increased operational noise at Shaw Lane Farm.
- 5.1.60 Option E would present an increase in journey time (30 seconds) in comparison to the Phase One consented scheme.
- 5.1.61 Although the general construction method of the flyover over the WCML is more complex than the Phase One consented scheme, due to the direct interface with the operational railway, this option demonstrates significant benefits as it would not require the re-alignment of existing WCML tracks. In addition, the location of the connection to the WCML would reduce the need to construct adjacent to an operational railway over a long distance. This option would use Network Rail approved turnouts and a reduced gradient on the southbound line which are closer to HS2 track standards than the Phase One consented scheme. Construction traffic volumes would increase, due to the increased import of fill required to construct the scheme.
- 5.1.62 Overall, Option E presents a cost saving in comparison to the Phase One consented scheme and reduces disruption to the existing railway network. Whilst there would be an additional cost associated with acquiring additional land and the increase in import fill, there would be a reduction in the works which are required to the WCML.

Option C

- 5.1.63 In comparison to Option E, Option C would require marginally less agricultural land overall, but a greater area of land from the polytunnels and agricultural enterprise associated with New Farm (CFA22/18).
- 5.1.64 Option C would be further away from Ashton Hayes Farm and therefore there would be a marginally reduced visual impact on the residents of this property in

comparison to Option E. The risk of contamination associated with an infilled pond and potentially a small infilled marl pit at Ashton Hayes Farm would be avoided.

- 5.1.65 Option C would provide broadly the same benefits as Option E in terms of removing the need to close Shaw Lane and the removal of impacts associated with the construction of the Tuppenhurst Lane extension.
- 5.1.66 In comparison with Option E, Option C requires an increase in works adjacent to the WCML (350m on the HS2 southbound line and 190m on the HS2 northbound line) which would require restrictions on the operation of the existing railway to ensure safe working and therefore would be more disruptive to the existing rail network.
- 5.1.67 There would no change in journey time in comparison to Option E.
- 5.1.68 Option C would increase the technical and construction complexity in comparison to Option E. This option would use non-standard Network Rail turnouts where the HS2 route would connect to the WCML, adding costs and project risks to the scheme. Construction traffic volumes would increase, due to the increased import fill required to construct the scheme.
- 5.1.69 Option C would result in additional construction cost in comparison to Option E due to additional fill required and an increase in works associated with the WCML, with consequential disruption to that line.

Option F

- 5.1.70 In comparison to Option E, Option F would require marginally less agricultural land overall, but a greater area of land from the polytunnels and agricultural enterprise associated with New Farm (CFA22/18).
- 5.1.71 Option F would be further away from Ashton Hayes Farm and therefore there would be a marginally reduced visual impact on the residents of this property in comparison with Option E. The risk of contamination associated with an infilled pond and potentially a small infilled marl pit at Ashton Hayes Farm would be avoided.
- 5.1.72 Option F would provide broadly the same benefits as Option E in terms of removing the need to close Shaw Lane and the removal of impacts associated with the construction of the Tuppenhurst Lane extension.
- 5.1.73 In comparison with Option E, Option F requires an increase in works adjacent to the WCML (400m on the HS2 southbound line and 300m on the HS2 northbound line) which would require restrictions on the operation of the existing railway to ensure safe working and therefore would be more disruptive to the existing rail network.
- 5.1.74 There would no change in journey time in comparison to Option E.
- 5.1.75 Option F would increase the technical and construction complexity in comparison to Option E. This option would use non-standard Network Rail turnouts where the HS2 route would connect to the WCML, adding costs and project risks to the

scheme. Construction traffic volumes would increase, due to the increased import fill required to construct the scheme.

- 5.1.76 This option would result in additional construction cost in comparison to Option E due to additional fill required and an increase in works associated with the WCML, with consequential disruption to that line.

Topics included in the AP2 assessment

- 5.1.77 This amendment is considered to require reassessment of the environmental effects and mitigation in the main ES, as amended by SES1 and SES2, for the following topics: agriculture, forestry and soils; air quality; community; cultural heritage; ecology and biodiversity; landscape and visual; sound, noise and vibration; traffic and transport; and water resources and flood risk.
- 5.1.78 The assessment of the changes to construction traffic flows and traffic related effects as a result of this SES2 design change in combination with all SES2 changes and AP2 amendments, is reported in Section 7.

Agriculture, forestry and soils

Scope, assumptions and limitations

- 5.1.79 The assessment scope, key assumptions and limitations for agriculture, forestry and soils are as set out in Volume 1, the Scope and Methodology Report³⁴ (SMR) and SMR Addendum³⁵ of the main ES.
- 5.1.80 The amendment has the potential to result in new or different temporary and permanent significant construction effects only. Therefore, there is no operational assessment for agriculture, forestry and soils.

Existing environmental baseline

- 5.1.81 The baseline agriculture, forestry and soils information for the amendment is as described in Volume 2, CA1, Section 4 of the main ES and Volume 2, CFA22, Section 7 of the Phase One SES and AP2 ES³⁶.
- 5.1.82 The area of land required for the amendment has soil predominantly in the Newport 1 association, as described in Volume 2, CA1, Section 4 of the main ES. Newport 1 association soils are formed in glaciofluvial sand and gravel deposits

³⁴ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report (Appendix CT-001-001). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

³⁵ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report Addendum (Appendix CT-001-002). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

³⁶ HS2 Ltd (2015). *High Speed Rail (London-West Midlands) Supplementary Environmental Statement and Additional Provision 2 Environmental Statement*, Volume 2: CFA22 Whittington to Handsacre. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/443660/X50_VOL2_CFA22_RAW_DCS_WATER.pdf

and comprise deep, well drained sandy and sandy loam soils. They are classified as Grades 2 and 3a³⁷.

- 5.1.83 Table 10 sets out the farm holdings within the land required for the amendment. This table also sets out the sensitivity of individual holdings to change. The holdings are shown in Volume 5: Agriculture, forestry and soils Map Book of the main ES and Volume 5: Agriculture, forestry and soils Map Book of the SES2 and AP2 ES.

Table 10: Summary characteristics of holdings within the land required for the amendment

Holding reference/name ³⁸	Holding type	Holding size (ha)	Diversification	Agri-environment scheme ³⁹	Sensitivity to change
CA1/12 (CFA22/17) Hunts Farm	Mixed arable and livestock	32	None	Higher Level Scheme (HLS) and Entry Level Scheme (ELS)	Medium
CA1/5 (CFA22/15 and CFA22/19) ⁴⁰ Common Lane Farm	Dairy and beef cattle	385	Commercial, industrial and residential lets	None	Medium (affected land not part of grazing block)
CA1/61 (CFA 22/20) Tuppenhurst Field	General cropping (cereals and potatoes)	7	None	None	Medium
CA1/62 (CFA22/18) New Farm	Horticulture – fruit grower	33	Processing and packing facility	None	High
CA1/63 (CFA 22/16) Brownfields Farm	Mixed arable (irrigated) and livestock	283	None	None	High

Future environmental baseline

Construction (2020)

- 5.1.84 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

³⁷ The quality of agricultural land in England and Wales is assessed according to the Agricultural Land Classification (ALC) system, which classifies agricultural land into five grades from excellent quality Grade 1 land to very poor quality Grade 5 land. Grade 3 is subdivided into Subgrades 3a and 3b. Grades 1, 2 and 3a are defined as the best and most versatile (BMV) land. The ALC methodology is contained in: Ministry of Agriculture, Fisheries and Food (1988), Agricultural Land Classification of England and Wales – Revised guidelines and criteria for grading the quality of agricultural land.

³⁸ The reference for each holding comprises the Community Forum Area (for Phase One) or Community Area (for Phase 2a) number, followed by a unique identifier.

³⁹ Agri-environment schemes seek to retain and enhance the landscape and biodiversity qualities and features of farmland. The main scheme is now the Countryside Stewardship Scheme (CSS), which from 2015 replaced the Environmental Stewardship Scheme (the Entry Level Scheme (ELS) or Higher Level Scheme (HLS)), although existing Environmental Stewardship agreements will run their course.

⁴⁰ Phase One SES and AP2 ES refers to Hanchwood (CFA22/15) and Ashton Hayes Farm (CFA22/19). Subsequent Farm Impact Assessment surveys have established that both these parcels of land form part of Common Lane Farm (CA1/5).

Effects arising during construction

Avoidance and mitigation measures

- 5.1.85 No avoidance or mitigation measures, additional to those reported in the main ES, draft Code of Construction Practice (CoCP)⁴¹ and Phase One SES and AP2 ES, are required.

Assessment of impacts and effects

- 5.1.86 The amendment will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the main ES and Phase One SES and AP2 ES on best and most versatile (BMV) agricultural land or forestry land within the Fradley to Colton area as it is not of a scale to change the magnitude of impact. The route-wide effects on BMV land and forestry land are reported in Volume 3 of the SES2 and AP2 ES.
- 5.1.87 The main ES and Phase One SES and AP2 ES reported a permanent moderate adverse effect on Hunts Farm (CA1/12 (CFA22/17)), which is significant. Approximately 4.4ha (14% of the total area of the land holding) would be required permanently, resulting in a medium impact. The amendment requires an additional 0.9ha for Ravenshaw Wood embankment, but also removes the requirement for 0.7ha of land for a balancing pond in the HS2 Phase One AP2 revised scheme. Overall, the amendment will require an additional 0.2ha of land permanently, resulting in a total area of land required permanently of 4.6ha (14% of the total area of the land holding). The amendment will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the main ES and Phase One SES and AP2 ES.
- 5.1.88 The main ES and the Phase One SES and AP2 ES reported a temporary moderate adverse effect on the land at Common Lane Farm (CA1/5 (CFA22/15 and CFA22/19)), which is significant. Approximately 50.5ha (13% of the total area of the land holding) would be required temporarily, resulting in a medium impact. The amendment will require an additional 1.9ha of land temporarily from the land holding, resulting in a total area of land required temporarily of 52.4ha (14% of the total area of the land holding). The amendment will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the main ES and the Phase One AP2 ES. There is no change to the permanent land required from this land holding.
- 5.1.89 The Phase One SES and AP2 ES reported a temporary major/moderate adverse effect on Tuppenhurst Field (CA1/61 (CFA 22/20)), which is significant. Approximately 5.5ha (79% of the total area of the land holding) would be required temporarily, resulting in a high impact. The amendment will require an additional 0.5ha of land temporarily from the land holding, resulting in a total of area land required temporarily of 6ha (86% of the total area of the land holding).

⁴¹ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, draft Code of Construction Practice (CT-003-000). Available online at <https://www.gov.uk/government/publications/draft-code-of-construction-practice-for-hs2-phase-2a>

The amendment will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the Phase One SES and AP2 ES. There is no change to the permanent land required from this land holding.

- 5.1.90 The Phase One SES and AP2 ES reported a temporary major/moderate adverse effect on New Farm (CA1/62 (CFA22/18)), which is significant. Approximately 4.4ha (13% of the total area of the land holding) would be required temporarily, resulting in a medium impact. The amendment will require an additional 6.2ha of land temporarily from the land holding, resulting in a total of area land required temporarily of 10.6ha (32% of the total area of the land holding). The additional land required will change the impact from medium to high. The amendment will give rise to a different significant effect and will change the level of significance of the effect reported in the Phase One SES and AP2 ES from major/moderate adverse to major adverse.
- 5.1.91 The Phase One SES and AP2 ES reported a permanent major/moderate adverse effect on New Farm, which is significant. Approximately 3.8ha (12% of the total area of the land holding) would be required permanently, resulting in a medium impact. The amendment will require an additional 3.6ha of land permanently from the land holding, resulting in a total of area land required permanently of 7.4ha (22% of the total area of the land holding). The additional land required will change the impact from medium to high. The polytunnels will need to be demolished which is also a high impact. The amendment will give rise to a different significant effect and will change the level of significance of the effect reported in the Phase One SES and AP2 ES from major/moderate to major adverse.
- 5.1.92 The Phase One SES and AP2 ES reported a temporary major/moderate adverse effect on Brownfields Farm (CA1/63 (CFA 22/16)), which is significant. Approximately 20.1ha (7% of the total area of the land holding) would be required temporarily, resulting in a low impact. The amendment will require an additional 1ha of land temporarily from the land holding, resulting in a total of area land required temporarily of 21.1ha (7% of the total area of the land holding). The amendment will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the Phase One AP2 ES.
- 5.1.93 The Phase One SES and AP2 ES reported a permanent major/moderate adverse effect on Brownfields Farm, which is significant. Approximately 17.5ha (6% of the total area of the land holding) would be required permanently, resulting in a low impact. The amendment will require an additional 0.5ha of land permanently from the land holding, resulting in a total of area land required permanently of 18ha (6% of the total area of the land holding). The amendment will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the Phase One SES and AP2 ES.
- 5.1.94 For further information see SES2 and AP2 ES Volume 5: Appendix AG-001-000 and SES2 and AP2 ES Volume 5: Agriculture, forestry and soils Map Book.

Mitigation and residual effects

Other mitigation measures

- 5.1.95 The land required temporarily for construction will be restored to its former agricultural condition once the works are completed, following good practice techniques in handling, storing and reinstating soils on that land, as reported in the main ES and draft CoCP. No other mitigation has been identified.

Summary of likely residual significant effects

- 5.1.96 The amendment will give rise to a different likely residual significant effect on New Farm (CA1/62 (CFA22/18)) where the significance of the temporary and permanent effects, as reported in the Phase One SES and AP2 ES, will change from major/moderate adverse to major adverse, due to the increase in land required from the land holding and the demolition of polytunnels.

Cumulative effects

- 5.1.97 There are no new or different likely significant cumulative effects for agriculture, forestry and soils as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Air quality

Scope, assumptions and limitations

- 5.1.98 The assessment scope, key assumptions and limitations for air quality are as set out in Volume 1, the SMR and SMR Addendum of the main ES.
- 5.1.99 This amendment has the potential to result in new or different significant temporary construction effects only. Therefore, there is no permanent construction or operational assessment for air quality. This section only considers effects from construction dust. Any air quality effects from construction traffic are reported in Section 7.

Existing environmental baseline

- 5.1.100 The baseline air quality information for the Fradley to Colton area is as described in Volume 2, CA1, Section 5 of the main ES and Volume 2, CFA 22, Section 8 of the Phase One AP2 ES. The updated background pollutant concentrations from the Department for Environment, Food and Rural Affairs (Defra) have only minor changes compared to the information used in the main ES.

Future environmental baseline

Construction (2020)

- 5.1.101 The future committed development baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 5.1.102 No avoidance or mitigation measures additional to those reported in the main ES, draft CoCP and Phase One SES and AP2 ES are required.

Assessment of impacts and effects

- 5.1.103 The main ES and the Phase One CFA22 SES and AP2 ES reported no significant effects on air quality from dust generating activities in this area. With the application of the mitigation measures, as set out in the draft CoCP, no significant effects are anticipated from dust generating activities associated with this amendment. Therefore, this amendment will not give rise to any new or different likely residual significant effects and will not change the level of significance of the effects reported in the main ES and Phase One AP2 ES. For further information see SES2 and AP2 ES Volume 5: Appendix AQ-001-001.

Cumulative effects

- 5.1.104 There are no new or different likely significant cumulative effects for air quality as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Community

Scope, assumptions and limitations

- 5.1.105 The assessment scope, key assumptions and limitations for community are as set out in Volume 1, the SMR and SMR Addendum of the main ES.
- 5.1.106 This amendment has the potential to result in new or different significant temporary construction effects only. Therefore, there is no permanent construction or operational assessment for community.

Existing environmental baseline

- 5.1.107 The baseline community information for the Fradley to Colton area is as described in Volume 2, CA1, Section 6 of the main ES and Section 3 and 5 of the SES1 and AP1 ES.
- 5.1.108 Handsacre is a village located approximately 9km north-west of Lichfield and 5.6km south-east of Rugeley. Community facilities in the village include a convenience store, halls, churches, open spaces and pubs, together with a GP surgery, day care nursery and primary school.

Future environmental baseline

Construction (2020)

- 5.1.109 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 5.1.110 No avoidance or mitigation measures, additional to those reported in the main ES, draft CoCP, and Phase One SES and AP2 ES are identified.

Assessment of impacts and effects

- 5.1.111 The alterations to the Handsacre Junction connection into the WCML was not included in the original scheme and therefore the main ES did not report any significant community effects associated with it. This amendment has been assessed for potential noise, heavy goods vehicle (HGV) traffic and visual effects to determine if these give rise to a new significant in-combination effect on community resources in this area. The assessment has concluded that this amendment will not give rise to any new likely residual significant effects.

Cumulative effects

- 5.1.112 There are no new or different likely significant cumulative effects for community as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Cultural heritage

Scope, assumptions and limitations

- 5.1.113 The assessment scope, key assumptions and limitations for cultural heritage are as set out in Volume 1, the SMR and SMR Addendum of the main ES and SMR Addendum 2 (see SES2 and AP2 ES Volume 5: Appendix CT-001-000).
- 5.1.114 The amendment has the potential to result in new or different temporary or permanent significant construction effects only. Therefore, there is no operational assessment for cultural heritage.
- 5.1.115 There will be no physical impact on a former farmhouse at Hanch Hall (FRC015), a Grade II listed building.

Existing environmental baseline

- 5.1.116 The baseline cultural heritage information for the Fradley to Colton area is as described in Volume 2, CA1, Section 7 of the main ES and Volume 2, CFA22, Section 10 of the Phase One SES and AP2 ES.
- 5.1.117 A former farmhouse at Hanch Hall (FRC015), a Grade II listed building of moderate value, lies wholly within the land required for the amendment.
- 5.1.118 Seedy Mill, farmhouse and cart shed (FRC149), three Grade II listed buildings of moderate value, are in proximity to the land required for the amendment.
- 5.1.119 Ring ditches and linear features, south of Kings Bromley Wharf (FRC021), a non-designated asset of moderate value, lies partially within the land required for the amendment.

5.1.120 The following non-designated assets of low value lie wholly or partially within the land required for the amendment, all of which were within the land required for the Phase One consented scheme:

- a possible rectilinear enclosure east of Hanch Reservoir (FRC275);
- a water meadow, south of Kings Bromley (FRC195);
- a mound at Kings Bromley (FRC182);
- a possible ring ditch north of Wood End Lane junction with A515 (FRC274);
- Shaw House brick cottage, Shaw Lane (FRC281);
- Ashton Hayes Farm, Tuppenhurst Lane (FRC285);
- Longdon piecemeal enclosure, Longdon (FRC282);
- Hanchwood House (FRC279);
- Hanch reservoir (FRC270);
- a possible ring ditch, east of Hanch Hall Park (FRC273);
- an area of wide ridge and furrow, Shaw Lane (FRC283);
- Lysways Park, Longdon Green (FRC267);
- Seedy Mill pond sluice (FRC264);
- Ravenshaw Wood relict fields (FRC269);
- New Farm farmstead, Elmhurst (FRC261); and
- Landscape Park, Elmhurst Hall (FRC253).

5.1.121 Further information about these assets is provided in the main ES Volume 5: Appendix CH-001-001 and Map Series CH-01, CH-02 and CH-03 in the main ES Volume 5: Cultural heritage Map Book and in Volume 5: Appendix CH-002-022 of the Phase One SES and AP2 ES.

Future environmental baseline

Construction (2020)

5.1.122 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

5.1.123 No avoidance or mitigation measures additional to those reported in the main ES, draft CoCP and Phase One SES and AP2 ES, are identified.

Assessment of impacts and effects

- 5.1.124 The additional land required for the amendment is within areas where no heritage assets have been identified. Therefore, the amendment will not give rise to any new or different significant effects and will not change the level of significance of the effects reported in the main ES and Phase One SES and AP2 ES. For further information see SES2 and AP2 ES Volume 5: Appendix CH-003-000 and Phase One SES and AP2 ES Volume 5: Appendix CH-003-022.

Cumulative effects

- 5.1.125 There are no new or different likely significant cumulative effects for cultural heritage as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Ecology and biodiversity

Scope, assumptions and limitations

- 5.1.126 The assessment scope, key assumptions and limitations for ecology and biodiversity are as set out in Volume 1, the SMR and SMR Addendum of the main ES and SMR Addendum 2 (see SES2 and AP2 ES Volume 5: Appendix CT-001-000).
- 5.1.127 This amendment has the potential to result in new or different significant construction effects only. Therefore, there is no operational assessment for ecology and biodiversity.
- 5.1.128 Where data are limited, a precautionary baseline has been built up according to the guidance provided in the SMR and SMR Addendum. This constitutes a 'reasonable worst case' basis for the subsequent assessment.
- 5.1.129 The precautionary approach to the assessment that has been adopted identifies the likely significant environmental effects of the amendment.

Existing environmental baseline

- 5.1.130 The ecological baseline of the area subject to the amendment has been based on field data collated for the main ES and SES1, the baseline information presented in the Phase One SES and AP2 ES, aerial photography, and relevant information from regional and local sources. For this amendment, the data that are most relevant to the assessment for each receptor from the main ES and SES1 and/or Phase One SES and AP2 ES are reported below.
- 5.1.131 A summary of the baseline information relevant to the assessment of the amendment is provided below. Further detail on the relevant new or updated baseline information is provided in BID-EC-019-000, including Map Series EC-02 which accompanies the SES2 and AP2 ES, and SES2 and AP2 ES Volume 5: Appendix EC-001-000, including Map Series EC-01.
- 5.1.132 For those receptors described in the Phase One SES and AP2 ES, further details are provided in Volume 2, CFA22, Section 11, and Volume 5: Appendix

EC-001-003 and Appendix EC-004-003, including Map Series EC-01; EC-04; EC-05; EC-11 and EC-12.

- 5.1.133 For those receptors described in the main ES, further details are provided in Volume 2, CA1, Section 8, and Volume 5: Appendix EC-001-000, including Map Series EC-01. Baseline ecology reports that accompanied the main ES are provided in BID-EC-002-000 to BID-EC-014-000, including Map Series EC-02 to EC-12⁴².
- 5.1.134 For those receptors described in SES1, further details are provided in Volume 2, CA1, Section 3. The baseline ecology report that accompanied SES1 and AP1 ES is provided in BID EC-004-000, including Map Series EC-02, EC-04, EC-05, EC-10, EC-11 and EC-12⁴³.

Designated sites

- 5.1.135 The area subject to the amendment is located within a Natural England Impact Risk Zone⁴⁴ (IZR) for Stowe Pool and Walk Mill Clay Pit Site of Special Scientific Interest (SSSI), which is of national value. The SSSI, covering an area of approximately 8.4ha, is nationally important for white-clawed crayfish and also supports a nationally scarce species of stonewort. Stowe Pool and Walk Mill Clay Pit SSSI is adjacent to Stowe Road, south of Nether Stowe in Lichfield, approximately 3.4km south of the area subject to the amendment. This SSSI was not reported in the main ES, SES1 or Phase One SES and AP2 ES, as it was not relevant to the assessment of the original scheme, SES1 scheme or Phase One SES and AP2 ES scheme.
- 5.1.136 There are two Local Wildlife Sites (LWS) of relevance to the assessment of the amendment, which are of county value. These are:
- John's Gorse LWS and Ancient Woodland Inventory (AWI) site, covering an area of approximately 2.4ha, which comprises two areas of ancient semi-natural broadleaved woodland with a canopy including sycamore, hazel, rowan, elder, birch and alder. John's Gorse LWS and Ancient Woodland AWI site is located partially within the area subject to the amendment; and
 - Tuppenhurst Lane (west of) LWS, covering an area of approximately 3.2ha, which is designated for a range of habitats, including marshy grassland and unimproved grassland and swamp, and is bisected by a narrow stream which joins a tributary of the River Trent. The wooded canopy adjacent to the stream is dominated by alder with hawthorn, grey willow and goat willow also

⁴² HS2 Ltd (2017). *High Speed Two (HS2) Phase 2a (West Midlands - Crewe)*, Background Information and Data, Available online at: <https://www.gov.uk/government/publications/hs2-phase-2a-background-information-and-data-ecology-and-biodiversity>

⁴³ HS2 Ltd (2018). *High Speed Two (HS2) Phase 2a (West Midlands - Crewe)*, Supplementary ecological baseline data (BID EC-004-000), Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/692664/G33_Ecological_baseline_BID-EC-004-000_WEB.pdf

⁴⁴ The Impact Risk Zones is a GIS tool developed by Natural England to make a rapid initial assessment of the potential risks to SSSI is posted by development proposal and indicate the types of development proposals which could potentially have adverse impacts.

present. Tuppenhurst Lane (west of) LWS is partially within the area subject to the amendment.

- 5.1.137 There is one further AWI site of relevance to the assessment, which is of county value. Hanch Wood (also known as Hanchwood House Wood) AWI site, covering an area of approximately 1ha, is similar in its composition to woodland at John's Gorse LWS and was formerly part of this LWS designation. Hanch Wood AWI site is within the area subject to the amendment.

Habitats

- 5.1.138 Habitats within the area subject to the amendment include semi-natural broadleaved woodland, unimproved grassland, marshy grassland, improved grassland, amenity grassland, arable, hedgerows, scattered scrub, watercourses, ditches and ponds. The habitats of relevance to the assessment of the amendment are described in further detail below.
- 5.1.139 Three semi-natural broadleaved woodlands occur within or partially within the area subject to the amendment and are likely to qualify as lowland mixed deciduous woodland, which is a habitat of principal importance listed under the provisions of Section 41 of the Natural Environment and Rural Communities (NERC) Act (2006)⁴⁵ and a conservation priority of the Staffordshire Biodiversity Action Plan⁴⁶ (BAP). These are:
- John's Gorse, covering an area of approximately 2.4ha, which comprises two grazed woodland blocks. The northern block is dominated by oak and birch above a grassy field layer. The southern block has relatively few mature broadleaved trees and it includes large areas of hawthorn and elder scrub. The southern block has been extensively planted with conifers. The woodland habitat at John's Gorse is of county value;
 - Hanch Wood covers an area of approximately 1ha. The woodland habitat at Hanch Wood is of county value; and
 - Harvey's Rough, covering an area of approximately 0.8ha, is bisected by the WCML. Given the small size of the woodland, the woodland habitat at Harvey's Rough is of local/parish value.
- 5.1.140 Areas of marshy grassland and unimproved grassland are present at Tuppenhurst Lane (west of) LWS. These habitats are likely to qualify as lowland meadow, a habitat type of principal importance and a conservation priority of the Staffordshire BAP. These grasslands are of up to county value.
- 5.1.141 Hedgerows within the area subject to the amendment are assumed to be predominantly species-rich. Hedgerow with at least 80% cover of native woody species is a habitat of principal importance and a conservation priority of the

⁴⁵ Natural Environment and Rural Communities Act 2006. Available online at: <http://www.legislation.gov.uk/ukpga/2006/16/section/41>

⁴⁶ Staffordshire Biodiversity Partnership. Staffordshire Biodiversity Action Plan. Available online at <http://sbap.org.uk>

Staffordshire BAP. These contribute to a wider hedgerow network within the Whittington to Handsacre area that is of district/borough level.

- 5.1.142 Bourne Brook flows through the area subject to the amendment. This watercourse includes sinuous sections supporting a diverse range of in-channel habitats. Common aquatic plants are present in unshaded sections and the channel has the potential to support spawning coarse and salmonid fish. Bourne Brook is likely to qualify as a habitat of principal importance and a conservation priority of the Staffordshire BAP. This watercourse is of county value.
- 5.1.143 A small unnamed narrow stream flows through the area subject to the amendment, including through Tuppenhurst Lane (west of) LWS. Several sections of ditch connect to the stream. This watercourse is of local/parish value.
- 5.1.144 Twelve ponds occur within the area subject to the amendment. On a precautionary basis it is assumed that these qualify as habitats of principal importance and a conservation priority of the Staffordshire BAP. Each of these ponds is of up to district/borough value.

Species

- 5.1.145 Protected and/or notable species that are known or assumed to occur within the area subject to the amendment include bats, great crested newt, common amphibian species, otter, fish, aquatic macro-invertebrates, badger, polecat, harvest mouse, European hedgehog, brown hare, wintering birds and common reptile species.
- 5.1.146 The Phase One SES and AP2 ES reported an assemblage of bats associated with habitats fronting Shaw Lane and Tuppenhurst Lane, including Bourne Brook, John's Gorse and Harvey's Rough. Field surveys in this area recorded common pipistrelle and brown long-eared bat roosts and other species foraging and commuting including soprano pipistrelle, Nathusius' pipistrelle, Myotis species, noctule, Leisler's and serotine. The area subject to the amendment contains potential bat roosting, foraging and commuting habitats that are likely to be used by this assemblage. The bat assemblage includes several species of principal importance and species that are conservation priorities of the Staffordshire BAP. The bat assemblage associated with habitats fronting Shaw Lane and Tuppenhurst Lane is of district/borough value.
- 5.1.147 The Phase One SES and AP2 ES reported an assemblage of bats associated with urban and arable habitats south-east of Handsacre between Lichfield Road and Tuppenhurst Lane. Field surveys in this area recorded a roost of brown long-eared bat and other species foraging and commuting including common pipistrelle, soprano pipistrelle, Myotis species, noctule, Leisler's and serotine. The area subject to the amendment contains potential bat roosting, foraging and commuting habitats that are likely to be used by this assemblage. The bat assemblage includes several species of principal importance and species that are conservation priorities of the Staffordshire BAP. The bat assemblage associated with urban and arable habitats south-east of Handsacre between Lichfield Road and Tuppenhurst Lane is of local/parish value.

- 5.1.148 The 12 ponds within the area subject to the amendment do not form part of any previously reported great crested newt population or metapopulation. Field surveys reported within the Phase One SES and AP2 ES concluded the absence of great crested newt in four of these ponds. Two sections of ditch within the land subject to the amendment were identified to have the potential to support great crested newt. Therefore, there are eight ponds and two sections of ditch within the area subject to the amendment, which on a precautionary basis are assumed to support breeding populations of great crested newt of medium size class. The area subject to the amendment contains terrestrial habitats with potential to be used for foraging and shelter by any great crested newt populations that occur within these ponds and ditches. Great crested newt is an Annex 2⁴⁷ species, a species of principal importance and a conservation priority of the Staffordshire BAP. The assumed populations within the land required for the amendment are of up to county value.
- 5.1.149 The main ES and Phase One SES and AP2 ES reported populations of amphibian species including palmate newt, smooth newt, common toad and common frog, identified through field surveys, within ponds throughout the Fradley to Colton area. Amphibian species are assumed to be present in ponds and ditches that have not yet been surveyed. The area subject to the amendment includes ponds, ditches, grassland, hedgerow and woodland habitats that are likely to be used by these species. Common toad is a species of principal importance. The populations of common amphibians throughout the Whittington to Handsacre area are of local/parish value.
- 5.1.150 The main ES and Phase One SES and AP2 ES reported the presence of a population of otter using Bourne Brook. The area subject to the amendment crosses a section of Bourne Brook that offers shelter, foraging and dispersal opportunities for otter and which potentially could support breeding habitat. Otter is an Annex 2 species, a species of principal importance and conservation priority of the Staffordshire BAP. The otter population using Bourne Brook is of district/borough value.
- 5.1.151 The main ES reported the presence of bullhead and the Phase One SES and AP2 ES reported the presence of brown trout, both of which are within Bourne Brook. Bullhead is an Annex 2 species and brown trout is a species of principal importance. It is assumed that these species occur within the section of Bourne Brook that is located within the area subject to the amendment. The fish assemblage within Bourne Brook is of up to district/borough value.
- 5.1.152 The main ES and Phase One SES and AP2 ES reported a moderate diversity of aquatic macroinvertebrates on Bourne Brook. The watercourse includes a 'regionally notable' species of conservation interest, the caddisfly *Brachycentrus subnubilis*. It is assumed that a notable diversity of invertebrates occurs within the section of Bourne Brook that is located within the area subject to the

⁴⁷ Annex 2 of the EU's Habitats Directive (1992) lists priority species whose conservation requires the designation of Special Areas of Conservation.

amendment. The aquatic macroinvertebrate assemblage associated with Bourne Brook is of district/borough value.

- 5.1.153 The Phase One SES and AP2 ES reported at least eight social groups of badgers throughout the Whittington to Handsacre area, identified through field survey. The area subject to the amendment includes suitable sett building and foraging habitats for badgers. The badger populations throughout the Whittington to Handsacre area are of local/parish value.
- 5.1.154 The main ES reported populations of other mammals including polecat, harvest mouse, European hedgehog and brown hare, identified through desk study records, as being potentially present throughout the Fradley to Colton area. The area subject to the amendment includes habitats that are suitable for these species. If present, these populations are of local/parish value.
- 5.1.155 The Phase One SES and AP2 ES reported an assemblage of wintering birds within arable fields to the south of Handsacre. Field surveys recorded eight notable species including yellowhammer, which is a species of principal importance. The habitats within the area subject to the amendment are likely to support this assemblage. The assemblage of wintering birds to the south of Handsacre is of local/parish value.
- 5.1.156 The Phase One SES and AP2 ES reported populations of common reptile species such as grass snake and slow-worm, identified through desk study records, as being potentially present in low numbers throughout the Fradley to Colton area. Grass snake and slow-worm are both species of principal importance. Grass snake is also a conservation priority of the Staffordshire BAP. The area subject to the amendment includes suitable habitats for these species. If present, these populations are of local/parish value.

Future environmental baseline

Construction (2020)

- 5.1.157 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 5.1.158 The assessment assumes implementation of the measures set out within the draft CoCP.
- 5.1.159 No avoidance or mitigation measures, additional to those reported in the main ES and draft CoCP, are required.

Assessment of impacts and effects

- 5.1.160 All of the effects within this section are reported in the absence of other mitigation.

Designated sites

- 5.1.161 No effects on Stowe Pool and Walk Mill Clay Pit SSSI were reported within the main ES. This SSSI will not be directly impacted by construction of the amendment. The closest point of construction of the amendment will be over 3km north of the SSSI. The SSSI is designated for its white-clawed crayfish population and also supports a nationally scarce species of stonewort. The amendment will not give rise to a new significant effect on the designated features of this SSSI.
- 5.1.162 The Phase One SES and AP2 ES reported the loss of 1.7ha (71%) of John's Gorse LWS and AWI site, which would result in a permanent adverse effect on the structure and function of the site that is significant at the county level. The amendment will not alter the extent of habitat loss at John's Gorse LWS and AWI site. The amendment will not give rise to any new or different significant effect upon John's Gorse LWS and AWI site and will not change the level of significance of the effects reported in the Phase One SES and AP2 ES.
- 5.1.163 The Phase One SES and AP2 ES reported the loss of approximately 0.1ha (4%) of habitat within Tuppenhurst Lane (west of) LWS, which would not result in a significant effect on the structure and function of the LWS. The amendment will result in the additional loss of approximately 0.7ha (22%) of marshy grassland and unimproved grassland from the LWS. The amendment will give rise to a new permanent adverse effect on the structure and function of Tuppenhurst Lane (west of) LWS that is significant at the county level.
- 5.1.164 The Phase One SES and AP2 ES reported the loss of 1ha (100%) of ancient woodland at Hanch Wood, which would result in a permanent adverse effect on the conservation status of the ancient woodland that is significant at up to county level. The amendment will not alter the extent of habitat loss at Hanch Wood AWI site. The amendment will not give rise to any new or different significant effect on Hanch Wood AWI site and will not change the level of significance of the effects reported in the Phase One SES and AP2 ES.

Habitats

- 5.1.165 The Phase One SES and AP2 ES reported the loss of lowland mixed deciduous woodland at John's Gorse LWS and AWI site (1.7ha) and at Hanch Wood AWI site (1ha), which would result in permanent adverse effects that are significant at the county level. The amendment will not alter the extent of habitat loss at John's Gorse or Hanch Wood. The amendment will not give rise to any new or different significant effects on lowland mixed deciduous woodland at John's Gorse or Hanch Wood and will not change the level of significance of the effects reported in the Phase One SES and AP2 ES.
- 5.1.166 The Phase One SES and AP2 ES reported the loss of approximately 0.1ha of lowland meadow habitat within Tuppenhurst Lane (west of) LWS as part of the assessment of effects on the LWS, which was not reported as significant. The amendment will result in the loss of an additional 0.7ha of lowland meadow habitat from the LWS. The amendment will give rise to a new permanent adverse

effect on lowland meadow habitat at Tuppenhurst Lane (west of) LWS that is significant at up to the county level.

- 5.1.167 On a precautionary basis, the Phase One SES and AP2 ES reported the loss of up to 29.5km of existing hedgerow within the land required for construction of the Phase One consented scheme within the Whittington to Handsacre area, which would result in a permanent adverse effect that is significant at the district/borough level. The amendment will result in the additional loss of approximately 200m of hedgerow to the north and west of Harvey's Rough woodland, which on a precautionary basis is assumed to be species-rich hedgerow. In the context of the hedgerow network within the Whittington to Handsacre area, this additional loss does not represent a new or different significant effect.
- 5.1.168 The main ES reported the loss of a section of Bourne Brook as a result of provision of a culvert for the realigned A515 Lichfield Road, which would result in a permanent adverse effect that is significant at up to district/borough level. The main ES also reported the removal of an existing culvert where Bourne Brook passes under the existing A515 Lichfield Road and the re-naturalising of this section of watercourse, which would result in a permanent beneficial effect that is significant at up to district/borough level. The Phase One consented scheme included the culverting of Bourne Brook beneath Tuppenhurst Lane extension through Tuppenhurst Lane culverts. The amendment will remove the need for Tuppenhurst Lane extension and culverts and will therefore avoid the permanent loss of a section of open watercourse habitat of Bourne Brook. The amendment will not result in a new or different significant effect on Bourne Brook and will not change the significance of the effects reported in the main ES.
- 5.1.169 The Phase One SES and AP2 ES reported the loss of 11 ponds with the land required for the Phase One consented scheme. The loss was reported in the Phase One SES and AP2 ES as a permanent adverse effect on the conservation status of ponds that is significant, in each case, at up to district/borough level. One additional pond will be lost as a result of the amendment. The amendment will give rise to a new adverse effect on the conservation status of this pond that is significant at the district/borough level.
- 5.1.170 It is not likely that any other effects on habitats of relevance at more than the local/parish level will occur as a result of the amendment. Additional local/parish level effects arising from the AP2 revised scheme are listed in SES2 and AP2 ES Volume 5: Appendix EC-016-000.

Species

- 5.1.171 The Phase One SES and AP2 ES reported the direct loss of bat roosts and loss and severance of foraging and commuting habitat used by the assemblage of bats using habitats fronting Shaw Lane and Tuppenhurst Lane, which would result in a permanent adverse effect that is significant at the district/borough level. The amendment will result in the additional loss of 0.2ha of woodland at Harvey's Rough (an effect on woodland habitat at local/parish level), and approximately 200m of hedgerow to the north and west of this woodland. The amendment will

result in the additional loss of mature trees, which on a precautionary basis are assumed to support bat roosts and provide foraging and commuting habitats for the bat assemblage. The assumed loss of additional roosts and foraging and commuting habitats will give rise to a different significant effect on the bat assemblage using habitats fronting Shaw Lane and Tuppenhurst Lane. However, the amendment will not change the level of significance of the effect as reported in the SES and Phase One AP2 ES.

- 5.1.172 The Phase One AP2 ES reported the absence of great crested newt within the additional pond that will be lost as a result of the amendment. The Phase One SES and AP2 ES did, however, report the potential for great crested newt populations to occur within two sections of ditch that will be lost as result of the amendment. These occur on the boundary of the Tuppenhurst Lane (west of) LWS, and to the west of Ashton Hays Farm between the WCML and the B5014 Lichfield Road. The amendment will also result in the additional loss of terrestrial habitats likely to be used by assumed great crested newt populations within these ditches, including hedgerow, scrub, woodland and grassland. The amendment will give rise to a new permanent adverse effect on two assumed great crested newt populations that is significant at up to the county level in each case.
- 5.1.173 It is not likely that any other effects on species of relevance at more than the local/parish level will occur as a result of the amendment. Additional local/parish level effects arising from the AP2 revised scheme are listed in SES2 and AP2 ES Volume 5: Appendix EC-016-000.

Mitigation and residual effects

Other mitigation measures

- 5.1.174 The amendment includes the provision of an additional 0.7ha of grassland habitat creation within the existing boundary of Tuppenhurst Lane (west of) LWS. This habitat creation will occur within land only required for construction of the amendment, to compensate for the loss of 0.7ha of lowland meadow habitat within the LWS. The target habitat type for this grassland habitat creation is lowland meadow, a habitat of principal importance. A temporary adverse effect upon lowland meadow habitat will occur until the grassland habitat creation has become established, after which this measure will reduce the effects upon the lowland meadow to a level that is not significant.
- 5.1.175 The amendment will result in a change in the extent and distribution of hedgerow habitat creation. Approximately 200m of hedgerow habitat creation, as reported in the Phase One SES and AP2 ES, to the south of Lilac South embankment will no longer be provided, however approximately 670m of new hedgerow habitat will be created along the shared HS2 and Network Rail access track adjacent to Lilac South embankment. The combined result of these changes will be an increase in hedgerow habitat creation to the south of Lilac South embankment of approximately 470m. This will compensate for the loss of approximately 200m of existing hedgerow to the north and west of Harvey's Rough woodland. The main ES reported that at least one pond would be created for every pond lost. The amendment includes the provision of two new ponds within the grassland habitat

creation area within the existing boundary of Tuppenhurst Lane (west of) LWS. Once these ponds are established it is anticipated that any adverse effect upon pond habitats will be reduced to a level that is not significant.

- 5.1.176 The Phase One SES and AP2 ES reported the provision of woodland habitat creation areas and alternative roosting structures that would compensate for the loss of bat roosting, foraging and commuting habitats to the Phase One consented scheme. Additional artificial roosting provision will be provided within the woodland habitat creation area between Shaw Lane embankment and the WCML to replace bat roosts that will be lost to construction of the amendment, in accordance with the Ecological Principles of Mitigation within the SMR Addendum. Once established, the additional net 470m of hedgerow planting provided by the amendment will compensate for the impact on bat foraging and commuting from the additional loss of approximately 200m of existing hedgerow to the north and west of Harvey's Rough woodland. These measures will reduce the different adverse effect resulting from this amendment on the bat assemblage using habitats fronting Shaw Lane and Tuppenhurst Lane to a level that is not significant.
- 5.1.177 SES1 reported the absence of great crested newt in 27 ponds within the Fradley to Colton area, where they were assumed present on a precautionary basis for the main ES. Whilst the amendment will result in the loss of two ditches that are assumed to support great crested newt, the impacts of the AP2 revised scheme on great crested newt are reduced from those reported in the main ES. Therefore, the provision of compensatory habitats as reported in the main ES, once established, will reduce the new adverse effects resulting from this amendment on the assumed great crested newt populations within the land required for the amendment to a level that is not significant.

Summary of likely residual significant effects

- 5.1.178 With the implementation of the mitigation proposed, the ecological effects arising from the amendment are reduced to a level where they are not considered to be significant. The significant effects of the amendment in this area are therefore unchanged from those reported in the main ES and Phase One SES and AP2 ES.

Cumulative effects

- 5.1.179 There are no new or different likely significant cumulative effects for ecology and biodiversity as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments. The combined effect on hedgerows as a result of the AP2 revised scheme is reported at a route-wide level in SES2 and AP2 ES, Volume 3, Route-wide effects.

Landscape and visual

Scope, assumptions and limitations

- 5.1.180 The assessment scope, key assumptions and limitations for landscape and visual are as set out in Volume 1, the SMR and the SMR Addendum of the main ES.

- 5.1.181 This amendment has the potential to give rise to new or different significant temporary construction and operational effects for landscape and visual. Therefore, both temporary construction and operational phases are considered in this assessment.

Existing environmental baseline

- 5.1.182 The baseline landscape and visual information relevant to this amendment is as described in Volume 2, CFA22, Section 13 of the Phase One SES and AP2 ES and summarised below.

Landscape baseline

- 5.1.183 The amendment has the potential to affect one landscape character area (LCA), which is described in Volume 2, CFA22, Section 13 of the Phase One SES and AP2 ES and is summarised below.

Settled Heathlands LCA

- 5.1.184 The Settled Heathlands LCA comprises an area of regular hedged pastures and arable fields bounded by hedgerows with bracken and birch woodlands. Individual properties and farmsteads are dispersed throughout the LCA. The Trent and Mersey Canal attracts recreational waterway users, but the otherwise attractive scenery is locally affected by the presence of the Fradley Business Park, the A515 Lichfield Road and the existing WCML. Overall it is considered to have a medium sensitivity to change.

Visual baseline

- 5.1.185 The amendment has the potential to affect ten viewpoints, which are described in Volume 2, CFA22, Section 13 of the HS2 Phase One SES and AP2 ES and summarised below.

View south-west from the A515 Lichfield Road (viewpoint 365.4.005)

- 5.1.186 Users of the A515 Lichfield Road have views along the road corridor contained to either side by hedgerows with occasional hedgerow trees. Filtered close and middle distance views through the roadside vegetation look out across arable fields with hedgerows and woodland blocks. There are no long distance views due to the presence of mature woodland blocks in the middle distance.

View north-west from The Elms on Shaw Lane, close to the junction with the B5014 Lichfield Road, Handsacre (viewpoint 364.2.002)

- 5.1.187 Residents of The Elms and users of Shaw Lane currently have close distance views of large polytunnels through and above the roadside vegetation. Where available, middle distance views comprise individual mature hedgerow trees and occasional blocks of woodland set within rolling farmland.

View north from residences adjoining Hanch Hall, B5014 Lichfield Road, Handsacre (viewpoint 366.2.007)

- 5.1.188 Residents of Hanch Hall and other nearby properties, and users of the B5014 Lichfield Road currently look out across large scale and relatively flat arable fields bounded by hedgerows with hedgerow trees. Views from the B5014 Lichfield Road are filtered by mature roadside trees and shrub vegetation. Large polytunnels and groups of mature trees are visible in the middle distance and foreshorten many longer views across the wooded farmland, although low hills and some pylons can be seen on the distant horizon. The overhead line equipment associated with the WCML is also visible between the trees in the middle distance.

View south-west from Tuppenhurst Lane near Shaw Lane Farm and Shaw House (viewpoint 365.2.004)

- 5.1.189 Residents of Shaw Lane Farm and Shaw House, and users of Tuppenhurst Lane currently have views across large scale and relatively flat arable fields bounded by mature trees. The overhead line equipment of the WCML, an accommodation bridge over the railway and some large polytunnels are visible in the middle distance. Long distance views are generally screened by mature woodland along the WCML.

View south-west from Tuppenhurst Lane near Shaw House (viewpoint 367.4.003)

- 5.1.190 Users of Tuppenhurst Lane look out across a large, open and undulating pasture towards the palisade fencing and overhead line equipment of the WCML which crosses the view in the middle distance. To the left of the view, and partially screened by a clump of trees and farm buildings, is a WCML overbridge. Ashton Hayes Farm is visible, alongside more distant views of Rugeley Power Station. Beyond the WCML the farmland rises up to a distant wooded horizon, which is punctuated by pylons.

View south-west from Ashton Hayes Farm/Ashton Hayes, off Tuppenhurst Lane (viewpoint 367.2.001)

- 5.1.191 Residents of Ashton Hayes Farm currently have views across an open and relatively flat pasture which adjoins the WCML on low embankment. Mature garden vegetation with trees, an adjacent agricultural building and agricultural equipment around the property, limit views from the farm. The overhead line equipment of the WCML, fields and mature trees in the middle distance screen most distant views, although the tops of some pylons are seen on the skyline above the trees.

View north-east from 'Newtown' located on the B5014 Lichfield Road, Handsacre (viewpoint 366.2.001)

- 5.1.192 Residents of the property 'Newtown' and users of the B5014 Lichfield Road currently have close distance views of roadside verges backed by hedgerows and mature trees. These screen most views out from the road corridor.

View south-west from Westview Cottages, Tuppenhurst Lane (viewpoint 367.2.002)

- 5.1.193 Residents of Westview Cottages and users of Tuppenhurst Lane currently have views across an open and relatively flat pasture with some agricultural buildings visible in the foreground. The pasture continues into the middle distance where mature woodland restricts most long distance views, although Cannock Chase and Rugeley Power Station are visible, particularly in winter when views are more open.

View south-east from residences located along Chestnut Lane (viewpoint 368.2.001)

- 5.1.194 Residents of properties along Chestnut Lane and Chestnut Close currently have close distance views along the B5014 Lichfield Road and across the large open and flat arable field which lies beyond. The overhead line equipment of the WCML, which bounds the east side of the field, is very noticeable. Beyond this a linear belt of woodland foreshortens more distant views, although pylons are visible amongst and above the trees. In the middle distance, the edge of a large area of polytunnels sits low in the view and is noticeable but is not particularly prominent.

View south from residences on Bridge Road (viewpoint 369.2.001)

- 5.1.195 Residents of properties along Bridge Road and Woodlands Way currently have oblique views across a large open and flat arable field. The overhead line equipment of the WCML is visible in the middle distance on the far side of the field. Woodland forms the boundary to the eastern side of the field and the tops of pylons can be seen above the trees. The distant horizon is low and wooded.

Future environmental baseline

Construction (2020) and operation (2027)

- 5.1.196 The future baseline for construction in 2020 and operation in 2027 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Temporary effects arising during construction

Avoidance and mitigation measures

- 5.1.197 No avoidance or mitigation measures additional to those reported in the main ES, draft CoCP and Phase One SES and AP2 ES are required.

Assessment of impacts and effects

Landscape assessment

Settled Heathlands LCA

- 5.1.198 The Phase One SES and AP2 ES reported a major adverse significant effect. There would be localised removal of hedgerows, trees and areas of woodland at Fradley, Fradley Wood, Ravenshaw Wood and Black Slough Wood, which are

distinctive features within this LCA. There would also be loss of agricultural land and temporary disruption of field access. Construction of large scale earthworks, a viaduct for the Manchester spur over the Trent and Mersey Canal, and the alignment of the Handsacre link, west of the canal corridor cutting through the canalside woods, would affect the canal conservation area and recreation and reduce seclusion and tranquillity. Construction activity would extend the urban influence of Fradley Business Park and locally reduce the sense of seclusion and tranquillity currently experienced.

- 5.1.199 As part of the amendment to change the Handsacre Junction connection into the WCML, Harvey's Rough flyover will be replaced with Harvey's Rough viaduct and will give rise to similar construction effects on the character of the LCA. Retaining Shaw Lane as a transport route will slightly reduce the impact compared to the Phase One consented scheme. The amendment will therefore give rise to a different significant effect on the landscape character of the Settled Heathlands LCA. However, the level of significance of the effect will remain major adverse significant as reported in the Phase One SES and AP2 ES.
- 5.1.200 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

Visual assessment

View south-west from the A515 Lichfield Road (viewpoint 365.4.005)

- 5.1.201 The Phase One SES and AP2 ES reported a major adverse significant visual effect. This was due to construction activity associated with the A515 Lichfield Road underbridge, Bourne Brook viaduct and the embankments to the north and south of the viaduct. These structures would substantially alter middle distance views across arable fields with hedgerows and woodland blocks. Construction of the Tuppenhurst Lane extension and presence of the A515 Lichfield Road underbridge main compound would also be present in close distance views.
- 5.1.202 In this location, the amendment will remove the construction activity associated with Tuppenhurst Lane extension and the balancing pond east of the WCML proposed in the Phase One consented scheme. This will slightly reduce the predicted effect on close distance views from the A515 Lichfield Road. The amendment will therefore give rise to a different significant effect at viewpoint 365.4.005. However, the level of significance of the effect will remain major adverse as reported in the Phase One SES and AP2 ES.
- 5.1.203 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View north-west from the Elms on Shaw Lane, close to the junction with the B5014 Lichfield Road, Handsacre (viewpoint 364.2.002)

- 5.1.204 The Phase One SES and AP2 ES reported a major adverse significant visual effect. This was because the upper elements of construction plant and movements within Harvey's Rough satellite compound/Shaw Lane satellite compound would be visible in the middle distance. There would be long distance views of

construction of Harvey's Rough flyover at the tie-in with the WCML, over and beyond the polytunnels and partially screened by intervening garden and roadside vegetation.

5.1.205 The amendment will involve the replacement of Harvey's Rough flyover with Harvey's Rough viaduct. This will bring construction activity closer to this viewpoint and in front of the WCML, which will increase its prominence compared to the Phase One consented scheme. Construction of Harvey's Rough viaduct will require a launching yard and the use of tall cranes which will affect skyline views and further increase the prominence of the construction activity in middle distance views, although a number of temporary crane platforms for installation/removal of signal gantries along the WCML will not be required. The amendment will therefore give rise to a different significant effect at viewpoint 364.2.002. However, the level of significance of the effect will remain major adverse significant as reported in the Phase One SES and AP2 ES.

5.1.206 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View north from residential properties adjoining Hanch Hall, B5014 Lichfield Road, Handsacre (viewpoint 366.2.007)

5.1.207 The Phase One SES and AP2 ES reported a moderate adverse significant visual effect on middle distance views from properties at Hanch Hall. This was due to construction activity associated with the WCML tie-in and the embankments and flyover at Harvey's Rough. Harvey's Rough satellite compound and Shaw Lane satellite compound would be visible in the middle distance, although garden and field boundary vegetation and polytunnels would screen most of the smaller construction elements.

5.1.208 The replacement of Harvey's Rough flyover with Harvey's Rough viaduct will bring construction activity closer to this viewpoint than in the Phase One consented scheme. Construction of Harvey's Rough viaduct will require a launching yard and use of tall cranes which will affect skyline views and further increase the prominence of construction activity in middle distance views, although a number of temporary crane platforms for installation/removal of signal gantries along the WCML will not be required. The smaller construction elements will remain mostly screened by intervening garden and field boundary vegetation and poly-tunnels. The amendment will therefore give rise to a different significant effect at viewpoint 366.2.007. The level of significance of the effect reported in the Phase One SES and AP2 ES will increase from moderate adverse significant to major adverse significant.

5.1.209 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View south-west from Tuppenhurst Lane near Shaw Lane Farm and Shaw House (viewpoint 365.2.004)

5.1.210 The Phase One SES and AP2 ES reported a major adverse significant effect. This was due to construction activity associated with the embankment and

flyover at Harvey's Rough on the approach to and tie-in with the WCML and Shaw Lane embankment, which would substantially alter close distance views of large scale and relatively flat arable fields bounded by mature trees. Also visible in the foreground would be areas for the temporary storage of material south of Shaw Lane. Although garden hedgerows and outbuildings would provide some screening, the proximity of construction activity would substantially change the view.

5.1.211 The replacement of Harvey's Rough flyover with Harvey's Rough viaduct and the introduction of Shaw Lane underbridge will alter the composition of the view during construction and slightly increase its effect compared to that predicted for the Phase One consented scheme. A long materials stockpile will be present in front of Lilac North embankment construction activity, bringing construction activity closer to the viewpoint. Construction of Harvey's Rough viaduct will require a launching yard and use of tall cranes which will affect skyline views and further increase the prominence of the construction activity in middle distance views, although a number of temporary crane platforms for installation/removal of signal gantries along the WCML will not be required. The amendment will therefore give rise to a different significant effect at viewpoint 365.2.004. However, the level of significance of the effect will remain major adverse significant as reported in the Phase One SES and AP2 ES.

5.1.212 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001.

5.1.213 The view of the amendment from viewpoint 365.2.004 during construction is illustrated on the photomontage shown in Figure LV-01-212 (SES and AP2 ES Volume 5: Appendix LV-001-001).

View south-west from Tuppenhurst Lane near Shaw House (viewpoint 367.4.003)

5.1.214 The Phase One SES and AP2 ES reported a major adverse significant effect. This was due to construction activity associated with Harvey's Rough flyover, the embankments to the south and north of the flyover, and the tie-in with the WCML which would dominate close distance views. Harvey's Rough flyover satellite compound and Shaw Lane satellite compound on Shaw Lane would also be visible, west of the WCML. Although the construction activity for the route would ultimately screen some existing close distance views of the WCML, the proximity and elevation of the route would substantially change the view.

5.1.215 The replacement of Harvey's Rough flyover with Harvey's Rough viaduct will bring construction activity associated with the Lilac North embankment closer to this viewpoint than in the Phase One consented scheme and slightly increase its overall effect compared to that predicted for the Phase One consented scheme. A long materials stockpile will be present in the foreground, bringing construction closer to the view, although it will partially screen the construction activity to the north and west. Construction of Harvey's Rough viaduct will require a launching yard and use of tall cranes, although a number of temporary crane platforms for installation/removal of signal gantries along the WCML will not be required. Cranes for constructing the viaduct will be visible behind the extensive earth moving associated with Lilac North embankment in the middle distance.

They will further affect skyline views and increase the prominence of the construction activity. The amendment will therefore give rise to a different significant effect at viewpoint 367.4.003. However, the level of significance of the effect will remain major adverse significant as reported in the Phase One SES and AP2 ES.

- 5.1.216 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View south-west from Ashton Hayes Farm/Ashton Hayes, off Tuppenhurst Lane (viewpoint 367.2.001)

- 5.1.217 The Phase One SES and AP2 ES reported a major adverse significant effect. This was because close distance views would be dominated by the immediately adjacent construction activities at the WCML tie-in. Railway systems crane platforms for gantry installations as part of the WCML modification works would be prominent in the foreground, east of the WCML and HS2 route. Despite the viewpoint's location next to the WCML, the proximity of construction and presence of crane platforms on the skyline would substantially change the view. The Phase One SES and AP2 ES also reported a major adverse significant effect at night due to the night-time working associated with the WCML tie-in. This would be visible in close distance views within the largely unlit landscape.

- 5.1.218 The amendment will involve construction of Lilac North embankment and the southbound HS2 route close to Ashton Hayes Farm. There will be a reduction in the size of Lilac North embankment compared to the Phase One consented scheme. The temporary crane platforms for installation/removal of signal gantries along the WCML will no longer be present in the view and the material stockpiles will be slightly further back in the view to the north and south of the viewpoint. The effect on the view will be slightly reduced compared to the Phase One consented scheme, but the scale and proximity of the construction activity means that the view will still be substantially altered. The amendment will therefore give rise to a different significant effect at viewpoint 367.2.001. However, the level of significance of the effect will remain major adverse significant as reported in the Phase One SES and AP2 ES.

- 5.1.219 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View north-east from 'Newtown' located on the B5014 Lichfield Road, Handsacre (viewpoint 366.2.001)

- 5.1.220 The Phase One SES and AP2 ES reported a moderate adverse significant effect. This was because the upper elements of the construction of the WCML tie-in on flyover at Harvey's Rough, and two compounds (Handsacre A515 railway systems main compound and A51 satellite compound) for gantry installations as part of the WCML modification works would be visible in the middle distance. Intervening garden vegetation and roadside and field hedgerows would screen the lower elements of construction activity. The Phase One SES and AP2 ES also reported a major adverse significant effect due to night-time working associated

with the WCML tie-in and for the railway systems gantry installation works which would be visible in the middle distance, although partially filtered by existing vegetation along the B5014 Lichfield Road. Night-time lighting of the main compound would also be visible.

- 5.1.221 The amendment will involve construction of Lilac South embankment which will be closer to this viewpoint than construction activity associated with the Phase One consented scheme and slightly increase its effect. The temporary crane platform for installation/removal of signal gantries along the WCML will no longer be present in the view, but construction of the higher parts of Lilac South embankment will be visible in the middle distance above the intervening roadside vegetation. Handsacre A515 railway systems main compound and the A51 satellite compound will be removed. There will be views towards construction of Harvey's Rough viaduct on the skyline. These additional elements in the view will further increase the overall effect on this viewpoint. The amendment will therefore give rise to a different significant effect at viewpoint 366.2.001. However, the level of significance of the effect will remain moderate adverse significant as reported in the Phase One SES and AP2 ES.
- 5.1.222 At night, the Phase One SES and AP2 ES reported a major adverse significant effect due to night-time lighting of railway systems gantry installation works being visible in the middle distance, which will be within a largely unlit area. The removal of these works, in addition to the removal of the Handsacre A515 railway systems main compound, will remove the major adverse significant night-time lighting effect reported in the Phase One SES and AP2 ES.
- 5.1.223 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.
- View south-west from Westview Cottages, Tuppenhurst Lane (viewpoint 367.2.002)*
- 5.1.224 The Phase One SES and AP2 ES did not report a significant effect for this viewpoint.
- 5.1.225 The amendment will involve construction of the HS2 southbound line of the WCML tie-in immediately south of Handsacre. The most noticeable change will be the removal of the intervening linear woodland that screened construction activity in the Phase One consented scheme. The opening up of views means that construction activity will be seen in the middle distance and replace the existing rural views of pasture with woodland beyond. The amendment will therefore give rise to a new significant effect at viewpoint 367.2.002. This effect will be moderate adverse significant.
- 5.1.226 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

*View south-east from residences located along Chestnut Close
(viewpoint 368.2.001)*

- 5.1.227 The Phase One SES and AP2 ES reported a major adverse effect. This was because the taller elements of construction plant associated with the WCML tie-in would be visible to both east and west of the WCML in both close and middle distance views. A materials storage area, an access track leading to a balancing pond and a railway systems maintenance access point associated with the WCML modification works would be visible in the close distance views to the west of the WCML. Temporary crane platforms associated with the WCML modification works, would also be very noticeable west of the WCML. The proximity and elevation of the construction activity would substantially change the view.
- 5.1.228 The amendment will involve construction of the HS2 northbound line of the WCML tie-in immediately south of Handsacre. The amendment will not change the construction effects described in the Phase One SES and AP2 ES as the effect of the additional activity to remove a section of woodland on the opposite side of the WCML will be minimal in comparison to the scale and extent of the construction in this location. The amendment will therefore not give rise to a new or different significant effect at viewpoint 368.2.001 and will not change the level of significance of the effect reported in the Phase One SES and AP2 ES.
- 5.1.229 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View south from residences on Bridge Road (viewpoint 369.2.001)

- 5.1.230 The Phase One SES and AP2 ES reported a major adverse significant effect. This was due to construction of a permanent access from Bridge Road to the eastern side of the WCML, and excavation of a balancing pond which would be visible in close and middle distance views. Construction activity associated with the WCML tie-in would be also be noticeable, extending towards Harvey's Rough viaduct in the middle distance together with a temporary crane platform associated with the WCML modification works. The top of the north end of Harvey's Rough embankment would be visible in long distance views beyond the intervening vegetation. The scale and proximity of the works in this location would substantially alter the rural view.
- 5.1.231 The amendment will involve construction of the HS2 southbound line of the WCML tie-in immediately south of Handsacre. The temporary crane platform for installation/removal of signal gantries along the WCML will no longer be present in the view. Overall, the visual effect on properties along Bridge Road and Woodlands Way will be slightly increased compared to the Phase One consented scheme. This is due to the removal of trees within the linear woodland to the eastern side of the field, which will open up middle distance views of construction activity associated with Lilac North embankment. The amendment will therefore give rise to a different significant effect at viewpoint 369.2.001. However, the level of significance of the effect will remain major adverse significant as reported in the Phase One SES and AP2 ES.

- 5.1.232 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

Mitigation and residual effects

Other mitigation measures

- 5.1.233 No mitigation measures additional to those reported in the main ES, draft CoCP and Phase One SES and AP2 ES are identified.

Summary of likely residual significant effects

- 5.1.234 The temporary residual significant effects during construction remain as described above. These effects will be temporary and reversible in nature lasting only for the duration of the construction works. These residual effects will generally arise from the widespread presence of construction activity and construction plant within the landscape and viewed by surrounding residents, and users of public rights of ways (PRoW) and main roads within the study area. The significant effects that will remain after implementation of construction phase mitigation are summarised below.
- 5.1.235 The amendment to change the Handsacre Junction connection into the WCML will give rise to a different likely residual significant construction effect on the landscape character of the Settled Heathlands LCA. The effect will reduce but will remain major adverse significant. This will not change the level of significance of the effect reported in the Phase One SES and AP2 ES.
- 5.1.236 The amendment will give rise to a different likely residual significant construction effect at the view north from residential properties adjoining Hanch Hall, B5014 Lichfield Road, Handsacre (viewpoint 366.2.007). This will increase the level of significance of the effect reported in the Phase One SES and AP2 ES from moderate adverse significant to major adverse significant.
- 5.1.237 The amendment will give rise to a new likely residual significant construction effect at the view south-west from Westview Cottages, Tuppenhurst Lane (viewpoint 367.2.002). This effect will be moderate adverse significant.
- 5.1.238 The amendment will give rise to a different likely residual significant construction effect at the following viewpoints. However, this will not change the level of significance of the effect reported in the Phase One SES and AP2 ES:
- view south-west from Lichfield Road (viewpoint 365.4.005) – the effect will reduce but will remain major adverse significant;
 - view north-west from the Elms on Shaw Lane, close to the junction with the B5014 Lichfield Road, Handsacre (viewpoint 364.2.002) – the effect will increase but will remain major adverse significant;
 - view south-west from Tuppenhurst Lane near Shaw Lane Farm and Shaw House (viewpoint 365.2.004) – the effect will increase but will remain major adverse significant;

- view south-west from Tuppenhurst Lane near Shaw House (viewpoint 367.4.003) – the effect will increase but will remain major adverse significant;
- south-west from Ashton Hayes Farm/Ashton Hayes, off Tuppenhurst Lane (viewpoint 367.2.001) – the effect will increase but will remain major adverse significant;
- view north-east from 'Newtown' located on the B5014 Lichfield Road, Handsacre (viewpoint 366.2.001) – the effect will reduce but will remain moderate adverse significant; and
- view south from residences on Bridge Road (viewpoint 369.2.001) – the effect will increase but will remain major adverse significant effect.

5.1.239 The amendment will remove the major adverse likely residual significant night-time visual effect on views north-east from 'Newtown' (viewpoint 366.2.001).

Cumulative effects

5.1.240 There are no new or different likely significant cumulative effects for landscape and visual as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Permanent effects arising during operation

Avoidance and mitigation measures

5.1.241 No avoidance or mitigation measures additional to those reported in the main ES and Phase One SES and AP2 ES are required.

Assessment of impacts and effects

Landscape assessment

Settled Heathlands LCA

5.1.242 The Phase One SES and AP2 ES reported a moderate adverse significant effect at year 1 and year 15, reducing to minor adverse non-significant at year 60 on the Settled Heathlands LCA. The amendment to replace Harvey's Rough flyover with Harvey's Rough viaduct will change the arrangement of the different scheme components but the effects of this on the character of the landscape within this LCA will be comparable to the extensive changes resulting from the Phase One consented scheme.

5.1.243 The amendment will therefore not give rise to any new or different significant effects on the landscape character of the Settled Heathlands LCA and will not change the level of significance of the effect reported in the Phase One AP2 ES.

5.1.244 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001.

Visual assessment

View south-west from the A515 Lichfield Road (viewpoint 365.4.005)

- 5.1.245 The Phase One SES and AP2 ES reported a major adverse significant effect at year 1, reducing to moderate adverse significant at year 15 and minor adverse non-significant at year 60. This was due to the presence of the Phase One consented scheme, which would be visible in the middle distance on embankment crossing the A515 Lichfield Road on overbridge and extending northwards to Bourne Brook viaduct and the embankments at Harvey's Rough. The A515 Lichfield Road underbridge would be noticeable, together with the overhead line equipment and moving trains along the elevated sections of the route. Overall the view would be substantially changed.
- 5.1.246 At year 1, removal of Tuppenhurst Lane extension and the balancing pond east of the WCML, as included in the amendment, will slightly improve the view from the A515 Lichfield Road compared to the Phase One consented scheme. However, road users will still have middle distance views of Bourne Brook viaduct, Ravenshaw Wood embankment, Shaw Lane embankment and A515 Lichfield Road underbridge. The overhead line equipment and moving trains will also be visible. The amendment will therefore give rise to a different significant effect at viewpoint 365.4.005. However, the level of significance of the effect will remain major adverse significant as reported in the Phase One SES and AP2 ES.
- 5.1.247 At year 15, the maturing woodland mitigation planting will provide some visual screening, although Bourne Brook viaduct and the upper elements of the overhead line equipment and moving trains will remain visible. There will be slightly less mitigation planting close to the viaduct than for the Phase One consented scheme, but the more open views will be balanced by the absence of the Tuppenhurst Lane extension. The amendment will therefore not give rise to a new or different significant effect and will not change the level of significance of the effect reported in the Phase One SES and AP2 ES. At year 60 the level of significance of the effect will remain non-significant as reported in the Phase One SES and AP2 ES.
- 5.1.248 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View north-west from The Elms on Shaw Lane, close to the junction with the B5014 Lichfield Road, Handsacre (viewpoint 364.2.002)

- 5.1.249 The Phase One main ES reported a moderate adverse significant effect at year 1, reducing to non-significant at year 15. This was due to the presence of the operational railway which would be visible beyond the WCML. Harvey's Rough flyover on approach to the tie-in with the WCML would be visible in the middle distance. Views of the Phase One consented scheme would be partially filtered by intervening garden and field boundaries and woodland, which would lessen its overall effect.
- 5.1.250 At year 1, the replacement of Harvey's Rough flyover with Harvey's Rough viaduct, as included in the amendment, will slightly increase the effect on views

from The Elms compared to the Phase One consented scheme. This is because Harvey's Rough viaduct will increase the highest vertical element of the operational railway by up to 10m. This increase in height means that the viaduct will be more noticeable above the WCML and poly-tunnels in the foreground. Overhead line equipment and moving trains will also be more noticeable than in the Phase One consented scheme. The amendment will therefore give rise to a different significant effect at viewpoint 364.2.002. However, the level of significance of the effect will remain moderate adverse significant as reported in the Phase One SES and AP2 ES.

5.1.251 At year 15 and year 60, the outlook will be one of maturing woodland mitigation planting on the south side of Lilac North embankment. This will screen most views of the operational railway other than Harvey's Rough viaduct, which due to its size and proximity will remain prominent. The amendment will therefore give rise to a new significant effect at viewpoint 364.2.002, as the level of significance of the effect reported in the Phase One SES and AP2 ES will increase from non-significant to moderate adverse significant.

5.1.252 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View north from residential properties adjoining Hanch Hall, B5014 Lichfield Road, Handsacre (viewpoint 366.2.007)

5.1.253 The Phase One SES and AP2 ES reported a moderate adverse significant effect at year 1 of operation, reducing to non-significant at year 15. This was due to the filtered views of Harvey's Rough flyover in the middle distance beyond the WCML.

5.1.254 At year 1, replacement of Harvey's Rough flyover with Harvey's Rough viaduct, as included in the amendment, will slightly increase the effect on views from properties at Hanch Hall compared to the Phase One consented scheme. This is because Harvey's Rough viaduct will increase the highest vertical element of the operational railway by up to 10m. This increase in height means that the viaduct will be more noticeable above the WCML and poly-tunnels in the middle distance. Lilac South embankment will be clearly visible and the overhead line equipment and moving trains will also be noticeable. The amendment will therefore give rise to a different significant effect at viewpoint 366.2.007. However, the level of significance of the effect will remain moderate adverse significant as reported in the Phase One AP2 ES. At year 15, the level of significance of the effect will remain non-significant as reported in the Phase One AP2 ES.

5.1.255 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View south-west from Tuppenhurst Lane near Shaw Lane Farm and Shaw House (viewpoint 365.2.004)

5.1.256 The Phase One SES and AP2 ES reported a major adverse significant effect at year 1, year 15 and year 60. This was due to the proximity of Shaw Lane embankment, Lilac North embankment and Harvey's Rough flyover on the

approach to the tie-in with the WCML. The embankments would be large engineered landforms which would foreshorten rural views. Overhead line equipment and moving trains would introduce further visual disturbance. Due to the proximity and elevation of the route, the view would be substantially changed.

- 5.1.257 At year 1, replacement of Harvey’s Rough flyover with Harvey’s Rough viaduct, as included in the amendment, will slightly reduce the effect on views from Shaw House compared to the Phase One consented scheme. This is because Harvey’s Rough viaduct and Lilac North embankment will be further away from Shaw House than Harvey’s Rough flyover, which will slightly reduce their prominence. The outlook will also be improved by the removal of Harvey’s Rough flyover from middle distance views, although the operational railway will still be noticeable. The amendment will therefore give rise to a different significant effect at viewpoint 365.2.004. However, the level of significance of the effect will remain major adverse significant as reported in the Phase One SES and AP2 ES.
- 5.1.258 At year 15 and year 60, maturing woodland mitigation planting will screen most views of the operational railway and Lilac North embankment, although the upper parts of Harvey’s Rough viaduct will remain visible above the trees. The outlook will change from open fields to developing woodland, which will foreshorten views across the rural farmland but the outlook will still be rural. More of the field in front of the embankment will remain open as there is less mitigation planting than in the Phase One consented scheme, but there will continue to be a substantial change in the outlook from this viewpoint. The amendment will therefore not give rise to any new or different significant effect at viewpoint 365.2.004 and will not change the level of significance of the effect reported in the Phase One SES and AP2 ES.
- 5.1.259 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.
- 5.1.260 The view of the amendment from viewpoint 365.2.004 during operation Year 1 and Year 15 is illustrated on the photomontages shown in Figure LV-01-161 and LV-01-262 (SES2 and AP2 ES Volume 5: Appendix LV-001-001).

View south-west from Tuppenhurst Lane near Shaw House (viewpoint 367.4.003)

- 5.1.261 The Phase One SES and AP2 ES reported a major adverse significant effect at year 1, reducing to moderate adverse significant at year 15 and year 60. This was due to the proximity of the Phase One consented scheme on Lilac North embankment and Harvey’s Rough flyover, and presence of retaining structures at Harvey’s Rough, on the approach to the tie-in with the WCML. The presence of Lilac North embankment would foreshorten longer views across the rural farmland. Overhead line equipment and moving trains would be visible in addition to those on the nearby WCML.
- 5.1.262 At year 1, replacement of Harvey’s Rough flyover with Harvey’s Rough viaduct, as included in the amendment, will slightly reduce the effect on views from Tuppenhurst Lane compared to the Phase One consented scheme. This is because Harvey’s Rough viaduct and Lilac North embankment will be further

away from Shaw House than Harvey's Rough flyover, which will reduce their prominence in the view. The amendment will therefore give rise to a different significant visual effect at viewpoint 367.4.003. However, the level of significance of the effect will remain major adverse significant as reported in the Phase One SES and AP2 ES.

5.1.263 At year 15 and year 60, maturing woodland mitigation planting will screen most views of the operational railway and Lilac North embankment, although the upper parts of Harvey's Rough viaduct will remain visible above the trees. The outlook will change from open fields to developing woodland on embankment, which will foreshorten views across the rural farmland. Although there will continue to be a noticeable change in the view, the effects will be less than for the Phase One consented scheme. This is because more of the field in front of the embankment will remain open as there is less mitigation planting than in the Phase One consented scheme. The amendment will therefore give rise to a different significant effect at viewpoint 367.4.003. However, the level of significance of the effect will remain moderate adverse significant as reported in the Phase One SES and AP2 ES.

5.1.264 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View south-west from Ashton Hayes Farm/Ashton Hayes, off Tuppenhurst Lane (viewpoint 367.2.001)

5.1.265 The Phase One SES and AP2 ES reported a major adverse significant effect at year 1 and year 15, reducing to moderate adverse significant at year 60. This was due to proximity of the WCML tie-in north of Harvey's Rough which, together with environmental mitigation earthworks, would be visible in the foreground. Kings Bromley Footpath 6 underbridge would be adjacent to the viewpoint and views of overhead line equipment and moving trains would add to those on the nearby WCML. Overall the outlook from this viewpoint would be substantially changed.

5.1.266 At year 1, the only noticeable change from the Phase One consented scheme will be a slight realignment of Kings Bromley Footpath 6 diversion, as included in the amendment. A small area of landscape earthworks will be removed, reducing the scheme footprint with the result that the edge of the Lilac North embankment will be further away from the viewpoint. The northbound line of the WCML tie-in on Lilac South embankment will be visible beyond the WCML. These changes will be minimal given the proximity of this viewpoint to the operational railway. The amendment will therefore not give rise to any new or different significant effect at viewpoint 367.2.001 and will not change the level of significance of the effect reported in the Phase One SES and AP2 ES.

5.1.267 At year 15 and year 60, the amendment will slightly reduce the effect on views from Ashton Hayes Farm compared to the Phase One consented scheme. This is because the maturing woodland mitigation planting will provide some integration of the embankment and landscape earthworks into the surrounding landscape. The amendment will therefore give rise to a different significant effect at

viewpoint 367.02.001. However, the level of significance of the effect will remain major adverse significant for year 15 and moderate adverse significant for year 60 as reported in the Phase One SES and AP2 ES.

- 5.1.268 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View north-east from 'Newtown' located on the B5014 Lichfield Road, Handsacre (viewpoint 366.2.001)

- 5.1.269 The Phase One SES and AP2 ES reported a moderate adverse significant effect at year 1, year 15 and year 60. This was due to the presence of Kings Bromley Footpath 6 underbridge in middle distance views and more distant views of Harvey's Rough flyover at the tie-in with the WCML. Views of overhead line equipment and moving trains would be additional to those on the WCML. Together these elements would substantially change the outlook from this viewpoint as reported in the Phase One SES and AP2 ES.

- 5.1.270 At year 1, year 15 and year 60, the replacement of Harvey's Rough flyover with Harvey's Rough viaduct, as included in the amendment, will slightly increase the effect on the view from 'Newtown' compared to the Phase One consented scheme. This is because the northbound line of the WCML tie-in on Lilac South embankment will be introduced into middle distance views. As a result, the operational railway will be closer and more elevated than the tie-in with the WCML in the Phase One consented scheme. In addition, a new maintenance access track will be visible in the middle distance to the south-east. The amendment will therefore give rise to a different significant effect at viewpoint 366.02.001. However, the level of significance of the effect will remain moderate adverse significant as reported in the Phase One SES and AP2 ES.

- 5.1.271 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View south-west from Westview Cottages, Tuppenhurst Lane (viewpoint 367.2.002)

- 5.1.272 The Phase One SES and AP2 ES did not report a significant effect at this viewpoint.

- 5.1.273 At year 1, the loss of a linear woodland belt, as included in the amendment, will open up middle distance views of a balancing pond, Network Rail facilities and associated access tracks and turning head. The overhead line equipment and moving trains on the northbound and eastbound line of the WCML tie-in and on the WCML will be visible. The amendment will therefore give rise to a new significant effect at viewpoint 367.2.002. This effect will be moderate adverse significant.

- 5.1.274 At year 15 and year 60, the maturing woodland mitigation planting around the balancing pond will provide some screening and filtering of views, although elements of the scheme described above will remain visible and will increase the effects on views from Westview Cottages compared to the Phase One consented

scheme. The amendment will therefore give rise to a new significant effect at viewpoint 367.2.002. This effect will be moderate adverse significant.

- 5.1.275 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View south-east from residences located along Chestnut Close (viewpoint 368.2.001)

- 5.1.276 The Phase One SES and AP2 ES reported a major adverse significant effect at year 1, year 15 and year 60. This was due to the presence of the Phase One consented scheme in close and middle distance views beyond the WCML on Harvey's Rough flyover and embankment, reducing in height on the approach to the WCML tie-in. Overhead line equipment and moving trains would be noticeable, in addition to those already visible on the WCML. The combined presence of these features would substantially change the view.

- 5.1.277 At year 1, the amendment means that Lilac South embankment and associated overhead line equipment and moving trains will be noticeable in middle and long distance views where they will add to the urbanising effect of the WCML. The Handsacre Junction connection into the WCML will also be visible from properties along Chestnut Lane and the rear of properties along Chestnut Close. The effect on the view will be comparable to that of the Phase One consented scheme. The amendment will therefore not give rise to any new or different significant effect at viewpoint 368.2.001 and will not change the level of significance of the effect reported in the Phase One SES and AP2 ES.

- 5.1.278 At year 15, the maturing mitigation planting along the northbound line of the WCML tie-in and on the western slope of Lilac South embankment will partially screen views and achieve greater integration of the engineered embankment and operational railway into the surrounding landscape. The amendment will therefore give rise to a different significant effect at viewpoint 368.2.001. The level of significance of the effect reported in the Phase One SES and AP2 ES will reduce from major adverse significant to moderate adverse significant.

- 5.1.279 At year 60, the mature mitigation planting along the northbound line of the WCML tie-in and on the western slope of Lilac South embankment will further screen views and integrate the engineered embankment and operational railway into the surrounding landscape. The amendment will therefore remove the significant effect at viewpoint 368.02.001, as the level of significance of the effect reported in the Phase One SES and AP2 ES will reduce from major adverse significant to minor adverse non-significant.

- 5.1.280 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View south from residences on Bridge Road (viewpoint 369.2.001)

- 5.1.281 The Phase One SES and AP2 ES did not report a significant effect at this viewpoint.

- 5.1.282 At year 1, the amendment will give rise to an increase in the effect on the view compared to the Phase One consented scheme. This is due to the loss of trees within the linear woodland belt on the far side of the field, which will open up middle and long distance views of the operational railway on Lilac South embankment. This will include views of the overhead line equipment and moving trains on the southbound line of the WCML tie-in and on the WCML. The fenced balancing pond area will also be visible in the middle distance. The outlook from this viewpoint will become less rural in character and the new structures and moving trains will be closer to the viewpoint than the WCML. The amendment will therefore give rise to a new significant effect at viewpoint 369.2.001. The level of effect will be moderate adverse significant. At year 15 and year 60 the level of significance of effect will remain non-significant.
- 5.1.283 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

Mitigation and residual effects

Other mitigation measures

- 5.1.284 No mitigation measures additional to those reported in the main ES and Phase One SES and AP2 ES are identified.

Summary of likely residual significant effects

- 5.1.285 The amendment will give rise to a new likely residual significant operational visual effect at the view north-west from the Elms on Shaw Lane, close to the junction with the B5014 Lichfield Road, Handsacre (viewpoint 364.2.002). The level of significance of the effect reported in the Phase One SES and AP2 ES will increase from non-significant to moderate adverse significant at year 15 and year 60.
- 5.1.286 The amendment will give rise to a new likely residual significant operational visual effect at the view south-west from Westview Cottages, Tuppenhurst Lane (viewpoint 367.2.002). The level of effect will be moderate adverse significant at year 15 and year 60.
- 5.1.287 The amendment will give rise to a different likely residual significant operational visual effect at the view south-east from residences located along Chestnut Close (viewpoint 368.2.001). The level of significance of the effects reported in the Phase One SES and AP2 ES will reduce from major adverse significant to moderate adverse significant at year 15. At year 60, the level of significance of the effect will reduce from moderate adverse significant to minor adverse non-significant. The amendment will therefore remove a likely significant operational effect reported in the Phase One SES and AP2 ES.
- 5.1.288 The amendment will give rise to a different likely residual significant operational visual effect at the following viewpoints. However, this will not change the level of significance of the effect reported in the Phase One AP2 ES:
- view south-west from Ashton Hayes Farm/Ashton Hayes, off Tuppenhurst Lane (viewpoint 367.2.001) – the effect will reduce but will remain major adverse significant at year 15 and moderate adverse significant at year 60;

- view south-west from Tuppenhurst Lane near Shaw House (viewpoint 367.4.003) – the effect will reduce but will remain moderate adverse significant at year 15 and year 60; and
- view north-east from 'Newtown' located on the B5014 Lichfield Road, Handsacre (viewpoint 366.2.001) – the effect will increase but will remain moderate adverse significant at year 15 and year 60.

Cumulative effects

- 5.1.289 There are no new or different likely significant cumulative effects for landscape and visual as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Monitoring

- 5.1.290 Volume 1 of the main ES sets out the general approach to environmental monitoring during operation of the original scheme.
- 5.1.291 There are no changes to the monitoring requirements identified in the main ES for landscape and visual as a result of the amendment.

Sound, noise and vibration

Scope, assumptions and limitations

- 5.1.292 The assessment scope, key assumptions and limitations for sound, noise and vibration are as set out in Volume 1 and the SMR of the main ES.
- 5.1.293 This amendment has the potential to result in new or different significant temporary construction and operational effects for sound, noise and vibration. Therefore, both temporary construction and operational phases are considered in this assessment.

Existing environmental baseline

- 5.1.294 The baseline sound, noise and vibration information for the Handsacre area is as described in Volume 2, CFA22, Section 15 of the Phase One SES and AP2 ES. Baseline sound levels representative of the assessment locations affected by the amendment have been used in the assessment.
- 5.1.295 In the vicinity of the amendment, the existing environmental baseline is dominated by noise from trains operating on the WCML and road traffic noise on the B5014 Lichfield Road.

Future environmental baseline

Construction (2020) and operation (2027)

- 5.1.296 The future baseline for construction in 2020 and operation in 2027 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 5.1.297 No avoidance or mitigation measures additional to those reported in the main ES, draft CoCP and Phase One SES and AP2 ES are required.

Assessment of impacts and effects

- 5.1.298 The Phase One SES and AP2 ES, did not identify any likely direct significant construction noise effects on a community basis close to the amendment.
- 5.1.299 The assessment has considered the construction noise and vibration levels associated with the amendment and those identified in the main ES, the construction programme for the amendment, and local mitigation identified in the Phase One SES and AP2 ES.
- 5.1.300 The HS2 Phase One Volume 4: Off-route effects report⁴⁸, reported residual adverse construction noise effects as a result of works north of the Handsacre junction on the following community areas:
- Handsacre: dwellings located closest to the proposed works on the A513 New Road: adverse noise effects due to night-time works at Armitage Shanks satellite compound;
 - Rugeley: approximately five dwellings located closest to the proposed works on Blithbury Road: adverse noise effects due to a night-time track modification works; and
 - Colwich: approximately 10 dwellings located closest to the proposed works on Dobree Close: adverse noise effects due to night-time track modification works.
- 5.1.301 The amendment will remove the requirement to undertake the works north of Handsacre junction and therefore, the residual indirect likely significant effects on a community basis are removed at: Handsacre, in the vicinity of the A512 New Road; Rugeley, in the vicinity of Blithbury Road; and Colwich, in the vicinity of Dobree Close.

Mitigation and residual effects

Other mitigation measures

- 5.1.302 No mitigation measures additional to those reported in the main ES, draft CoCP and Phase One SES and AP2 ES are required.

⁴⁸ HS2 Ltd (2015). *High Speed Rail (London-West Midlands) main ES*, Volume 4: Off Route Effects. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/259489/Volume_4_Off-route_effects.pdf

Summary of likely residual significant effects

- 5.1.303 The amendment will remove the likely residual indirect construction noise significant effects on a community basis at Handsacre, in the vicinity of A512 New Road, Rugeley, in the vicinity of Blithbury Road, and Colwich, in the vicinity of Dobree Close.

Cumulative effects

- 5.1.304 There are no new or different likely significant cumulative effects for sound, noise and vibration as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Effects arising from operation

Avoidance and mitigation measures

- 5.1.305 No avoidance or mitigation measures additional to those reported in the main ES and Phase One SES and AP2 ES are required.

Assessment of impacts and effects

- 5.1.306 The Phase One SES and AP2 ES did not identify any likely significant effects on a community basis close to this amendment.
- 5.1.307 The potential effect on residential properties of the amendment has been assessed. The amendment is located at the Handsacre junction, where the existing noise levels are dominated by railway noise from the WCML. Whilst the contribution from the HS2 and WCML railways are different to those proposed by the Phase One consented scheme, overall the change in railway noise levels are generally unchanged. Therefore, the amendment will not give rise to any new or different likely residual significant effects compared to the HS2 Phase One SES and AP2 ES. For further information see SES2 and AP2 ES Volume 5: Appendix SV-002-000.

Cumulative effects

- 5.1.308 There are no new or different likely significant cumulative effects for sound, noise and vibration as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Traffic and transport

Scope, assumptions and limitations

- 5.1.309 The assessment scope, key assumptions and limitations for traffic and transport are as set out in Volume 1, the SMR and SMR Addendum of the main ES.
- 5.1.310 This amendment has the potential to result in new or different significant construction and operational effects for traffic and transport. Therefore, both construction and operational phases are considered in this assessment.

- 5.1.311 The assessment of the changes to construction traffic flows as a result of this amendment in combination with all SES2 changes and AP2 amendments is reported in Section 7.

Existing environmental baseline

- 5.1.312 The baseline traffic and transport information for the Fradley to Colton area is as described in Volume 2, CA1, Section 14 of the main ES. The baseline transport information for the Handsacre area is as described in Volume 2, CFA22, Section 16 of the Phase One SES and AP2 ES
- 5.1.313 The A515 Lichfield Road, which connects Kings Bromley with Lichfield, is a primary 'A' road in the Fradley to Colton area and can get busy at peak times and delays can be experienced.
- 5.1.314 The local roads in the area that are relevant to the assessment of the amendment are: the B5014 Lichfield Road, which connects Handsacre to Lichfield and beyond via the A515 Lichfield Road; Wood End Lane, which connects the A515 Lichfield Road with the A38 Rykneld Street, which is the main strategic route in the area; and Shaw Lane, which connects to the B5014 Lichfield Road and Uttoxeter Road, Tuppenhurst Lane, Proctors Road, Spode Avenue and Alendale Avenue, which provide local access in the area. The local road network in this area generally operates well although some localised delays can be experienced, particularly at peak times at the junction of the A38 Rykneld Street.

Future environmental baseline

Construction (2023) and operation (2027 and 2041)

- 5.1.315 The future baseline for construction in 2023 and operation in 2027 and 2041 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 5.1.316 No avoidance or mitigation measures additional to those reported in the main ES, draft CoCP and Phase One SES and AP2 ES are required.

Assessment of impacts and effects

- 5.1.317 The Phase One SES and AP2 ES reported the permanent stopping-up of Shaw Lane and the extension of Tuppenhurst Lane in an easterly direction, from Shaw Lane, to a new junction with the A515 Lichfield Road to provide an alternative route for road users. As the stopping-up of Shaw Lane was permanent, and no temporary diversion route was proposed, no associated temporary construction effects were reported.
- 5.1.318 The amendment revises the rail connection into the WCML slow lines with the HS2 lines connecting to the outside lines of the WCML corridor, removing the need to realign the easternmost tracks of the WCML. The HS2 northbound and southbound lines will split at the Shaw Lane embankment before crossing Shaw

Lane, enabling Shaw Lane to remain open following construction and removing the need for the Tuppenhurst Lane extension.

- 5.1.319 The amendment will require the temporary closure of Shaw Lane for a period of up to two years and six months with an alternative diversion route available via the existing A515 Lichfield Road and the B5014 Lichfield Road. The temporary diversion, adding up to 2.4km to journeys, will not affect a large number of vehicle users or give rise to any new likely significant effects on traffic flows or delays for road users. However, the amendment will give rise to a new temporary minor adverse severance effect, which is significant, on non-motorised users due to increased travel of 2.4km for non-motorised users' journeys on Shaw Lane.
- 5.1.320 The amendment will require local worker access and occasional HGV movements on Uttoxeter Road, Tuppenhurst Lane, Proctors Road, Spode Avenue and Alendale Avenue. However, these will not be substantial and will not result in any new or different significant effects.
- 5.1.321 The Phase One SES and AP2 ES also reported that there would be a temporary closure of Kings Bromley Footpath 6 for approximately six months. The amendment will require the temporary closure of Kings Bromley Footpath 6 for a period of up to six months with users diverted via Handsacre. The temporary closure will give rise to a temporary minor adverse severance effect, which is significant, for non-motorised users as a result of the increase in travel distance of up to 1.2km for users of Kings Bromley Footpath 6.
- 5.1.322 For further information see SES2 and AP2 ES Volume 5: Appendix TR-001-000, and the SES2 and AP2 ES Volume 5: Traffic and transport Map Book.

Mitigation and residual effects

Other mitigation measures

- 5.1.323 No mitigation measures additional to those reported in the main ES, draft CoCP and Phase One SES and AP2 ES are required.

Summary of likely residual significant effects

- 5.1.324 The amendment will give rise to a new likely residual significant temporary minor adverse severance effect for non-motorised users due to the temporary closure of Shaw Lane as a result of the increase in travel distance of up to 2.4km.
- 5.1.325 The amendment will give rise to a likely residual significant temporary minor adverse severance effect for non-motorised users due to the temporary closure of Kings Bromley Footpath 6 as a result of the increase in travel distance of up to 1.2km.

Cumulative effects

- 5.1.326 There are no new or different likely significant cumulative effects for traffic and transport as a result of the amendment acting in combination with any other AP2 amendments, AP1 amendments or any relevant committed development.

Effects arising from operation

Avoidance and mitigation measures

- 5.1.327 No avoidance or mitigation measures additional to those reported in the main ES and Phase One SES and AP2 ES are identified.

Assessment of impacts and effects

- 5.1.328 The Phase One SES and AP2 ES reported the permanent stopping-up of Shaw Lane and the extension of Tuppenhurst Lane in an easterly direction, from Shaw Lane, to a new junction with the A515 Lichfield Road to provide an alternative route for road users. This would result in an increased journey distance of 2.2km for users of Shaw Lane and give rise to a minor adverse significant traffic delay effect. The Phase One SES and AP2 ES further reported that the travel distance for non-motorised users of Kings Bromley Footpath 6 would be increased in length by less than 100m, the effect of which would not be significant.
- 5.1.329 The amendment will remove the permanent stopping up of Shaw Lane and the extension of Tuppenhurst Lane and therefore remove the minor adverse significant effect for users of Shaw Lane, as reported in the Phase One SES and AP2 ES. The amendment will locally modify the diversion of Kings Bromley Footpath 6. However, as the overall increase in length will still be less than 100m, the effect will not be significant.
- 5.1.330 For further information see SES2 and AP2 ES Volume 5: Appendix TR-001-000, and the SES2 and AP2 ES Volume 5: Traffic and transport Map Book.

Mitigation and residual effects

Other mitigation measures

- 5.1.331 No mitigation measures additional to those reported in the main ES and Phase One SES and AP2 ES are required.

Summary of likely residual significant effects

- 5.1.332 The amendment will remove the likely permanent residual minor adverse significant effect for users of Shaw Lane reported in the Phase One SES and AP2 ES.

Cumulative effects

- 5.1.333 There are no new or different likely significant cumulative effects for traffic and transport as a result of the amendment acting in combination with any other AP2 amendments, AP1 amendments or any relevant committed development.

Monitoring

- 5.1.334 Volume 1 of the main ES sets out the general approach to environmental monitoring during operation of the original scheme.
- 5.1.335 There are no changes to the monitoring requirements identified in the main ES for traffic and transport as a result of the amendment.

Water resources and flood risk

Scope, assumptions and limitations

- 5.1.336 The assessment scope, key assumptions and limitations for water resources and flood risk are as set out in Volume 1, the SMR and SMR Addendum of the main ES and SMR Addendum 2 (see SES2 and AP2 ES Volume 5: Appendix CT-001-000).
- 5.1.337 This amendment has the potential to result in new or different significant temporary construction effects only. Therefore, there is no permanent construction or operational assessment for water resources and flood risk.

Existing environmental baseline

- 5.1.338 The baseline water information for the Handsacre area is as described in Volume 2, CFA22, Section 17 of the Phase One SES and AP2 ES. The baseline water resources information for the Fradley to Colton area is as described in Volume 2, CA1, Section 15 of the main ES. Further details relating to water resources and flood risk for this area are provided in Volume 5: Appendix WR-002-001 and Appendix WR-003-001, and the Volume 5: Water resources and flood risk Map Book of the main ES.
- 5.1.339 This amendment is located near to the River Trent, which is a very high value receptor. There are nearby surface water abstractions from this river, which are high value receptors. This amendment will involve construction activities of a nature and scale that have potential water quality implications.

Future environmental baseline

Construction (2020)

- 5.1.340 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

- 5.1.341 The main ES reported no significant effects on surface water or groundwater quality due to site runoff and increased pollution risk in the vicinity of this amendment. The amendment has the potential to give rise to temporary adverse impacts on surface water and groundwater quality which could affect the abstractions and the water environment. However, the amendment will be constructed in accordance with the measures specifically designed to safeguard water resources outlined in the draft CoCP.
- 5.1.342 Therefore, the amendment will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the main ES.

Cumulative effects

- 5.1.343 There are no new or different likely significant cumulative effects for water resources and flood risk as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Summary of new or different likely residual significant effects as a result of the amendment

- 5.1.344 The amendment will give rise to a different likely residual significant effect on New Farm (CA1/62 (CFA22/18)). The significance of the temporary and permanent effects will change from major/moderate adverse to major adverse, due to the increase in land required from the land holding and the demolition of polytunnels.
- 5.1.345 During construction, the amendment will give rise to a different likely residual significant effect on the landscape character of the Settled Heathlands LCA. However, this will not change the level of significance of the effect reported in the Phase One SES and AP2 ES. The amendment will result in a new likely residual moderate adverse significant visual effect at viewpoint 367.2.002. In addition, the amendment will give rise to a different likely residual significant visual effect at viewpoint 366.2.007. The significance of the effect will increase from moderate adverse to major adverse. There will also be different likely residual significant visual effects at viewpoints 365.4.005, 364.2.002, 365.2.004, 367.4.003, 366.2.001 and 369.2.001. However, this will not change the level of significance of the effects reported in the Phase One SES and AP2 ES. The amendment will remove the major adverse night-time significant visual effect at viewpoint 367.2.001.
- 5.1.346 During operation, the amendment will give rise to a new likely residual moderate adverse significant visual effect at year 15 and year 60 at viewpoint 364.2.002. In addition, the amendment will result in a different likely residual significant visual effect at viewpoint 368.2.001. At year 15, the significance of the effect will reduce from major adverse to moderate adverse. At year 60, the significance of the effect reported in the Phase One SES and AP2 ES will be removed. There will also be different significant visual effects at viewpoints 367.2.001, 367.4.003 and 366.2.001. However, this will not change the level of significance of the effects reported in the Phase One SES and AP2 ES.
- 5.1.347 The amendment will remove the likely residual indirect construction noise significant effects on a community basis at: Handsacre, in the vicinity of A512 New Road; Rugeley, in the vicinity of Blithbury Road; and Colwich, in the vicinity of Dobree Close.
- 5.1.348 During construction, the amendment will give rise to new likely residual temporary minor adverse severance significant effects for non-motorised users due to the temporary closure of Shaw Lane and Kings Bromley Footpath 6, and associated increase in travel distance. During operation, the amendment will remove the likely residual minor adverse significant effect for users of Shaw Lane reported in the Phase One SES and AP2 ES.

5.2 Additional land required for modifications to A515 Lichfield Road and Wood End Lane junction and widening of Wood End Lane (AP2-001-002)

- 5.2.1 The Bill provides for a temporary construction traffic route along the A515 Lichfield Road. The main ES reported significant construction traffic effects on

the A515 Lichfield Road and Wood End Lane junction in terms of queues and delays.

- 5.2.2 The SES2 scheme provides for an additional construction traffic route along Wood End Lane (SES2-001-001: A new construction traffic route along Wood End Lane) to reduce the volume of HS2 construction traffic travelling south of Kings Bromley towards the A51. This additional route would reduce the volume of construction traffic using the A5192 Eastern Avenue and also the junction of the A51 with the A515 Lichfield Road. Wood End Lane is also identified as a construction traffic route in the HS2 Phase One Whittington to Handsacre, CFA22, main ES⁴⁹. Modifications to the south side of Wood End Lane were included within the Phase One consented scheme.
- 5.2.3 Since the submission of the Bill, it has been identified that there is a need to manage traffic queues through the A515 Lichfield Road and Wood End Lane junction. To improve junction capacity, localised modifications will be provided in the form of permanent widening and signalisation of the junction of the A515 Lichfield Road and Wood End Lane. This junction will also provide access to the A515 Lichfield Road underbridge satellite compound and to the existing Network Rail access track. To accommodate these modifications, an additional 5.4ha of land will be required. The traffic signals will allow safe turning manoeuvres in to and out of the A515 Lichfield Road, and manage the impact of additional traffic on delays at the junction. See Map CT-05-129b, G9, Map CT-05-129, J9 to G8, and Map CT-05-128, E9 to A10, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 5.2.4 Approximately 320m of hedgerow habitat will be provided alongside the junction to replace the 320m hedgerow habitat that will be removed as part of the works to widen the junction.
- 5.2.5 Wood End Lane will also be widened over a length of 1.1km to provide a carriageway width of at least 6m. The widening will tie in with the Wood End Lane diversion works proposed in the Phase One consented scheme, to the west of Big Lyntus woodland. Widening works will alternate from the north and south side of Wood End Lane to avoid taking land from residential properties or woodlands where reasonably practicable. Along the full length of the widening, where hedgerow is required to be removed to undertake the widening it will be replaced. See Map CT-05-201-L1, F6, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 5.2.6 Up to 0.1ha of woodland habitat creation, provided for in the Phase One consented scheme, adjacent to Kings Bromley Footpath 0.392, will not be implemented in this area until after the widening of Wood End Lane is complete, as it is located within the area required to construct the amendment. The widening of Wood End Lane in this location will be on the north side (where the woodland habitat creation is to be provided) to avoid a residential property.

⁴⁹ HS2 Ltd Phase One, Whittington to Handsacre, CFA22, main ES available:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/397889/Vol2_CFA_22_Whittington_to_Handsacre.pdf

A smaller part of this woodland, approximately 100m², will no longer be provided due to the land being required permanently for the widening.

- 5.2.7 The junction modification and widening of Wood End Lane will be constructed over a period of up to six months, commencing in 2020. Works will be managed from Pyford North embankment satellite compound.
- 5.2.8 The land required for the permanent junction modification and the widening of Wood End Lane is outside the limits of the Bill and will result in the requirement for an additional 5.4ha of land, some of which will be from Brownfields Farm (CA1/63). See Map CT-05-129b-L1, G1 to D1, Map CT-05-129, J9 to G8, and Map CT-05-128, E9 to A10, in the SES2 and AP2 ES Volume 2: CA1 Map Book.

Topics included in the AP2 assessment

- 5.2.9 This amendment is considered to require reassessment of the environmental effects and mitigation in the main ES, as amended by SES1 and SES2, for the following topics: ecology and biodiversity; landscape and visual; and traffic and transport.
- 5.2.10 The assessment of the changes to construction traffic flows and traffic related effects as a result of this SES2 design change in combination with all SES2 changes and AP2 amendments, is reported in Section 7.

Ecology and biodiversity

Scope, assumptions and limitations

- 5.2.11 The assessment scope, key assumptions and limitations for ecology and biodiversity are as set out in Volume 1, the Scope and Methodology Report⁵⁰ (SMR) and SMR Addendum⁵¹ of the main ES and SMR Addendum 2 (see SES2 and AP2 ES Volume 5: Appendix CT-001-000).
- 5.2.12 This amendment has the potential to result in new or different significant construction effects only. Therefore, there is no operational assessment for ecology and biodiversity.
- 5.2.13 Where data are limited, a precautionary baseline has been built up according to the guidance provided in the SMR and SMR Addendum. This constitutes a 'reasonable worst case' basis for the subsequent assessment.
- 5.2.14 The precautionary approach to the assessment that has been adopted identifies the likely significant environmental effects of the amendment.

⁵⁰ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report (Appendix CT-001-001). Available online at <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

⁵¹ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report Addendum (Appendix CT-001-002). Available online at <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

Existing environmental baseline

- 5.2.15 The ecological baseline of the land subject to the amendment has been based on field data collated for the main ES and SES₁, the baseline information presented in the Phase One SES and AP₂ ES, aerial photography, and relevant information from regional and local sources. For this amendment, the data that are most relevant to the assessment for each receptor from the main ES and SES₁ and/or Phase One SES and AP₂ ES are reported below.
- 5.2.16 A summary of the baseline information relevant to the assessment of the amendment is provided below. Further detail on the relevant new or updated baseline information is provided in BID-EC-019-000, including Map Series EC-02 which accompanies the SES₂ and AP₂ ES.
- 5.2.17 For those receptors described in the Phase One SES and AP₂ ES⁵², further details are provided in Volume 2, CFA₂₂, Section 11, and Volume 5: Appendix EC-001-003 and Appendix EC-004-003, including Map Series EC-01; EC-04; EC-05; EC-11 and EC-12.
- 5.2.18 For those receptors described in the main ES, further details are provided in Volume 2, CA₁, Section 8, and Volume 5: Appendix EC-001-000, including Map Series EC-01. Baseline ecology reports that accompanied the main ES are provided in BID-EC-002-000 to BID-EC-014-000, including Map Series EC-02 to EC-12⁵³.
- 5.2.19 For those receptors described in SES₁, further details are provided in Volume 2, CA₁, Section 3. The baseline ecology report that accompanied SES₁ and AP₁ ES is provided in BID EC-004-000, including Map Series EC-02, EC-04, EC-05, EC-10, EC-11 and EC-12⁵⁴.

Designated sites

- 5.2.20 The land that is subject to the amendment is located within a Natural England Impact Risk Zone⁵⁵ for Stowe Pool and Walk Mill Clay Pit Site of Special Scientific Interest (SSSI), which is of national value. The SSSI, covering an area of approximately 8.4ha, is nationally important for white-clawed crayfish and also supports a nationally scarce plant species stonewort. Stowe Pool and Walk Mill Clay Pit SSSI is adjacent to Stowe Road, south of Nether Stowe in Lichfield, over 3km south of the area subject to the amendment. This SSSI was not reported in the main ES, SES₁ or Phase One SES and AP₂ ES, as it was not relevant to the

⁵² HS₂ Ltd (2015). *High Speed Two (HS₂) Phase One (London - West Midlands) Supplementary Environmental Statement and Additional Provision 2 Environmental Statement*, Volume 2 CFA₂₂. Available online at:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/442226/SES_and_AP2_ES_Volume_2_CFA22.pdf

⁵³ HS₂ Ltd (2017). *High Speed Two (HS₂) Phase 2a (West Midlands - Crewe)*, Background Information and Data, Available online at:

<https://www.gov.uk/government/publications/hs2-phase-2a-background-information-and-data-ecology-and-biodiversity>

⁵⁴ HS₂ Ltd (2018). *High Speed Two (HS₂) Phase 2a (West Midlands - Crewe)*, Supplementary ecological baseline data (BID EC-004-000), Available online at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/692664/G33_Ecological_baseline_BID-EC-004-000_WEB.pdf

⁵⁵ The Impact Risk Zones are a GIS tool developed by Natural England to make a rapid initial assessment of the potential risks to SSSIs posed by development proposals and indicate relevant development categories which could potentially have adverse impacts.

assessment of the original scheme, SES1 scheme or Phase One SES and AP2 ES scheme.

- 5.2.21 There is one Local Wildlife Site (LWS) of relevance to the assessment of the amendment, which is also an Ancient Woodland Inventory (AWI) site. Tomhay Wood LWS and AWI site, covering an area of approximately 9.3ha, is designated for remnant ancient woodland, including areas of planted larch, spruce and the exotic species turkey oak. The wood is in a degraded state with rhododendron, Himalayan balsam and bracken becoming dominant in places. Tomhay Wood LWS and AWI site is located between Wood End Lane and the WCML, immediately adjacent to the area subject to the amendment. Tomhay Wood LWS and AWI site is of county value.
- 5.2.22 There are two Biodiversity Alert Sites (BAS) of relevance to the assessment of the amendment, one of which is also an AWI site. These are:
- Woodend Lane (hedge 1) BAS, a species-rich hedgerow, approximately 690m in length, with a number of standard trees. Species in the hedge include gorse, hazel, crab apple and both black and white bryony. The BAS is located along Wood End Lane, north-east of Elmhurst, partially within the area subject to the amendment. Woodend Lane (hedge 1) BAS is of district/borough value; and
 - Vicars Coppice BAS and AWI site, covering an area of approximately 7.9ha, is designated for ancient semi-natural broadleaved woodland and has a degraded ground flora due to recreational impact. The BAS is located to the south of King's Bromley Wharf adjacent to the A515 Lichfield Road and Wood End Lane, immediately adjacent to the area subject to the amendment. Vicars Coppice BAS and AWI site is of county value.

Habitats

- 5.2.23 Habitats within and/or adjacent to the area subject to the amendment include semi-natural broadleaved woodland, improved grassland, arable farmland, hedgerow, scrub and a pond. The habitats of potential relevance to the assessment of the amendment are described in further detail below.
- 5.2.24 Semi-natural broadleaved woodland is present at Tomhay Wood LWS and AWI site and Vicar's Coppice BAS and AWI site. This habitat qualifies as lowland mixed deciduous woodland, which is a habitat of principal importance listed under the provisions of Section 41 of the Natural Environment and Rural Communities (NERC) Act (2006)⁵⁶ and a conservation priority of the Staffordshire Biodiversity Action Plan⁵⁷ (BAP). These woodlands are partially within the area subject to the amendment and they are each of county value.
- 5.2.25 Approximately 90m of hedgerow within the area subject to the amendment is species-rich hedgerow within Woodend Lane (hedge 1) BAS. Approximately 2.1km of further hedgerows along Wood End Lane occur within the area subject

⁵⁶ Natural Environment and Rural Communities Act 2006. Available online at: <http://www.legislation.gov.uk/ukpga/2006/16/section/41>

⁵⁷ Staffordshire Biodiversity Partnership. Staffordshire Biodiversity Action Plan. Available online at <http://sbap.org.uk>

to the amendment. The hedgerows within the area subject to the amendment are assumed to be species-rich and are likely to qualify as a habitat of principal importance and a conservation priority of the Staffordshire BAP.

These contribute to a wider hedgerow network within the Whittington to Handsacre area that is of district/borough value.

- 5.2.26 One pond occurs within the area subject to the amendment, adjacent to Wood End Lane and to the west of Black Slough Farm. On a precautionary basis it is assumed that this pond qualifies as a habitat of principal importance and a conservation priority of the Staffordshire BAP. This pond is of up to district/borough value.

Species

- 5.2.27 Protected and/or notable species that are known or assumed to occur within the area subject to the amendment include bats, breeding birds, badger, European hedgehog, common amphibian species and common reptile species.
- 5.2.28 The main ES and Phase One SES and AP2 ES reported a bat assemblage using the Trent and Mersey Canal, adjacent woodlands (Ravenshaw Wood, Black Slough, the Slaish and Fradley Wood) and Cranberry Wood. Field surveys in this area recorded roosting common pipistrelle, Daubenton's bat, Natterer's bat, Brandt's bat and noctule and other species foraging and commuting including soprano pipistrelle, Leisler's bat, brown long-eared bat and whiskered bat. The area subject to the amendment contains potential bat roosting, foraging and commuting habitats that are likely to be used by this assemblage. The bat assemblage includes several species of principal importance and species that are conservation priorities of the Staffordshire BAP. The bat assemblage associated with Trent and Mersey Canal, adjacent woodlands (Ravenshaw Wood, Black Slough, the Slaish and Fradley Wood) and Cranberry Wood is of regional value.
- 5.2.29 Field surveys reported within the Phase One SES and AP2 ES concluded the absence of great crested newt within the pond that occurs within the area subject to the amendment. No populations of great crested newt are considered to be of relevance to the area subject to the amendment.
- 5.2.30 The main ES reported populations of amphibian species including palmate newt, smooth newt, common toad and common frog, identified through field surveys, within ponds throughout the Fradley to Colton area. Amphibian species are assumed to be present in ponds that have not yet been surveyed. The area subject to the amendment includes a pond and hedgerow habitat that are likely to be used by these species. Common toad is a species of principal importance. If present, these populations of common amphibian species are of local/parish value.
- 5.2.31 The Phase One SES and AP2 ES reported a breeding bird assemblage within Ravenshaw Wood, Black Slough and Black Slough Farm, to the west of Fradley. Field surveys in this area recorded 36 bird species of which 16 are notable, including grey partridge and skylark. The semi-natural broadleaved woodland, improved grassland, arable farmland and hedgerows within or adjacent to the area subject to the amendment are likely to be used by this breeding bird

assemblage. The breeding bird assemblage includes several species of principal importance and species that are conservation priorities of the Staffordshire BAP. The breeding bird assemblage within Ravenshaw Wood, Black Slough and Black Slough Farm is of local/parish value.

5.2.32 The Phase One SES and AP2 ES reported at least eight social groups of badgers throughout the Whittington to Handsacre area, identified through field survey. The area subject to the amendment includes suitable sett building and foraging habitats for badgers. The badger populations throughout the Whittington to Handsacre area are of local/parish value.

5.2.33 The main ES reported populations of other mammals including European hedgehog, identified through desk study records, as being potentially present throughout the Fradley to Colton area. The area subject to the amendment includes habitats that are suitable for hedgehog. If present, the population of European hedgehog is of local/parish value.

5.2.34 The Phase One SES and AP2 ES reported populations of common reptile species such as grass snake and slow-worm, identified through desk study records, as being potentially present in low numbers throughout the Whittington to Handsacre area. Grass snake and slow-worm are both species of principal importance. Grass snake is also a conservation priority of the Staffordshire BAP. The area subject to the amendment includes suitable habitats for these species. If present, these populations are of local/parish value.

Future environmental baseline

Construction (2020)

5.2.35 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

5.2.36 The design of the amendment alternates from the north and south side of Wood End Lane to avoid the loss of valuable ecological features, where reasonably practicable. These include: Tomhay Wood LWS and AWI site; Vicar's Coppice BAS and AWI site; Woodend Lane (hedge 1) BAS; the single pond within the area subject to the amendment; and woodland habitat. As a result of this approach, approximately 1.1km of the hedgerow within the area subject to the amendment along Wood End Lane will be retained.

Assessment of impacts and effects

5.2.37 All of the effects within this section are reported in the absence of other mitigation.

Designated sites

5.2.38 No effects on Stowe Pool and Walk Mill Clay Pit SSSI were reported within the main ES. Stowe Pool and Walk Mill Clay Pit SSSI will not be directly impacted by

construction of the amendment. The closest point of construction of the amendment will be over 3km north of the SSSI. The SSSI is designated for its white-clawed crayfish population and also supports a nationally scarce species of stonewort. The amendment will not give rise to a new significant effect on the designated features of this SSSI.

- 5.2.39 The amendment will not give rise to new or different significant effects on any other designated sites due to the scale of the works and their distance from the works. It will not change the level of significance of the effects reported in the Phase One SES and AP2 ES or the main ES.

Habitats

- 5.2.40 On a precautionary basis, the Phase One SES and AP2 ES reported the loss of up to 29.5km of existing hedgerow within the land required for construction of the Phase One consented scheme within the Whittington to Handsacre area, which would result in a permanent adverse effect that is significant at the district/borough level. The amendment will result in the additional loss of approximately 1.1km of hedgerow along Wood End Lane and 320m of hedgerow at the junction with the A515 Lichfield Road, which on a precautionary basis is assumed to be species-rich hedgerow. The amendment will give rise to a different significant effect on hedgerow habitats within the Whittington to Handsacre area. However, this will not change the level of significance of the effect reported in the Phase One SES and AP2 ES.

- 5.2.41 It is not likely that any other effects on habitats of relevance at more than the local/parish level will occur as a result of the amendment. Additional local/parish level effects arising from the AP2 revised scheme are listed in SES2 and AP2 ES Volume 5: Appendix EC-016-000.

Species

- 5.2.42 The Phase One SES and AP2 ES reported the direct loss of bat roosts and loss and severance of foraging and commuting habitat used by the assemblage of bats using the Trent and Mersey Canal and adjacent woodlands (Ravenshaw Wood, Black Slough, the Slaish and Fradley Wood) and Cranberry Wood, which was reported as an adverse effect that is significant at the regional level. The amendment will result in the additional loss of approximately 1.1km of hedgerow along Wood End Lane and approximately 320m at the junction with the A515 Lichfield Road. The removal of sections of hedgerow will result in the additional loss of mature trees, which on a precautionary basis are assumed to support bat roosts and provide foraging and commuting habitats for the bat assemblage. The assumed loss of additional roosts and foraging and commuting habitats will give rise to a different significant effect on the bat assemblage using the Trent and Mersey Canal and adjacent woodlands (Ravenshaw Wood, Black Slough, the Slaish and Fradley Wood) and Cranberry Wood. However, the amendment will not change the level of significance of the effect as reported in the Phase One SES and AP2 ES.
- 5.2.43 It is not likely that any other effects on species of relevance at more than the local/parish level will occur as a result of the amendment. Additional local/parish

level effects arising from the AP2 revised scheme are listed in SES2 and AP2 ES Volume 5: Appendix EC-016-000.

Mitigation and residual effects

Other mitigation measures

- 5.2.44 The amendment will result in a change in the extent and distribution of woodland habitat creation. Up to 100m² of woodland habitat creation, provided within the Phase One consented scheme, adjacent to Kings Bromley Footpath 0.392 will no longer be provided due to the land being required permanently for the road widening. The small reduction in woodland habitat creation as a result of the amendment will not give rise to a new or different significant effect.
- 5.2.45 The amendment will provide replacement hedgerow along the full length of the widened Wood End Lane (up to 1.1km of hedgerow planting) and at the junction with the A515 Lichfield Road (up to 320m of hedgerow planting), wherever hedgerow removal is unavoidable. There will be no decrease in hedgerow length within the area of the amendment following the implementation of the mitigation. The replacement of this habitat will reduce the different effect upon hedgerow within the Whittington to Handsacre area arising from the amendment to a level that is not significant.
- 5.2.46 The Phase One SES and AP2 ES reported the provision of woodland habitat creation areas and alternative roost provision that would compensate for the loss of bat roosting, foraging and commuting habitats to the Phase One consented scheme. Once established, the replacement hedgerow planting of up to 1.1km of hedgerow along the widened Wood End Lane and 320m at the junction with the A515 Lichfield Road will provide suitable bat foraging and commuting habitat. Artificial roosting provision will be provided within and adjacent to retained hedgerows along Wood End Lane to replace bat roosts that will be lost to construction, in accordance with the Ecological Principles of Mitigation within the SMR Addendum. These measures will reduce the different adverse effect resulting from this amendment on the bat assemblage using Trent and Mersey Canal and adjacent woodlands (Ravenshaw Wood, Black Slough, the Slaish and Fradley Wood) and Cranberry Wood to a level that is not significant.

Summary of likely residual significant effects

- 5.2.47 With the implementation of the mitigation proposed, the ecological effects arising from the amendment are reduced to a level where they are not considered to be significant. The significant effects of the amendment in this area are therefore unchanged from those reported in the main ES and Phase One SES and AP2 ES.

Cumulative effects

- 5.2.48 There are no new or different likely significant cumulative effects for ecology and biodiversity as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments. The combined effect on hedgerows as a

result of the AP2 revised scheme is reported at a route-wide level in SES2 and AP2 ES, Volume 3, Route-wide effects.

Landscape and visual

Scope, assumptions and limitations

- 5.2.49 The assessment scope, key assumptions and limitations for landscape and visual are as set out in Volume 1, the SMR and SMR Addendum of the main ES.
- 5.2.50 The amendment has the potential to give rise to new or different significant construction and operational effects for landscape only. This is because the effects on views will be small-scale in the context of the wider effects of the Phase One consented scheme and the original scheme. Therefore, there is no construction or operational assessment for visual.

Existing environmental baseline

- 5.2.51 The baseline landscape and visual information for the Fradley to Colton area is as described in Volume 2, CA1, Section 11 of the main ES.

Landscape baseline

- 5.2.52 The amendment is located within one landscape character area (LCA), which is described in Volume 5: Appendix LV-001-001 of the main ES and summarised below.

Fradley Settled Heathlands LCA

- 5.2.53 The Fradley Settled Heathlands LCA is an area of flat to gently undulating arable and pastoral farmland which is mostly scenic and tranquil, although the Fradley Industrial Estate, disused Fradley airfield and a number of busy roads are locally detracting features. Away from these developments, a strong hedgerow pattern and high woodland cover imparts a sense of tranquillity and scenic quality, whilst the Trent and Mersey Canal and Kings Bromley Marina provide locally valued recreational resources.

Future environmental baseline

Construction (2020) and operation (2027)

- 5.2.54 The future baseline for construction in 2020 and operation in 2027 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Temporary effects arising during construction

Avoidance and mitigation measures

- 5.2.55 No avoidance or mitigation measures, additional to those reported in the main ES and draft Code of Construction Practice (CoCP)⁵⁸, are required.

Assessment of impacts and effects

Landscape assessment

Fradley Settled Heathlands LCA

- 5.2.56 The main ES reported a moderate adverse significant effect due to landform changes and removal of vegetation arising from construction activity associated with Pyford Brook viaduct, Pyford North and South embankments, and the presence of associated earth moving equipment and material stockpiles. Removal of vegetation would open up views of the works. However, the resulting reduction in scenic quality and tranquillity would be localised, with much of the LCA remaining unaffected.
- 5.2.57 Construction of the amendment will be additional to, and completed in advance of, the wider construction activity reported in the main ES. It will also influence a part of the Fradley Settled Heathlands LCA which was unaffected by the original scheme. The most noticeable change will be the removal of approximately 1.1km of roadside vegetation along one side of Wood End Lane. Although the removal of this roadside vegetation will affect local landscape character and will be additional to the wider construction effects on this LCA, the changes are small-scale and will not affect the overall conclusion of the assessment reported in the main ES. The amendment will therefore give rise to a different significant effect on the landscape character of the Fradley Settled Heathlands LCA. However, the level of significance of the effect will remain moderate adverse significant, as reported in the main ES.
- 5.2.58 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

Mitigation and residual effects

Other mitigation measures

- 5.2.59 No mitigation measures additional to those reported in the main ES and draft CoCP are identified.

Summary of likely residual significant effects

- 5.2.60 The amendment to acquire land permanently for modifications to the A515 Lichfield Road and Wood End Lane junction and widening of Wood End Lane will

⁵⁸ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, draft Code of Construction Practice (CT-003-000). Available online at <https://www.gov.uk/government/publications/draft-code-of-construction-practice-for-hs2-phase-2a>

give rise to a different likely residual significant construction effect on the landscape character of the Fradley Settled Heathlands LCA. The effect will increase but the level of significance of the effect will remain moderate adverse significant. This will not change the level of significance of the effect reported in the main ES.

Cumulative effects

- 5.2.61 There are no new or different likely significant cumulative effects for landscape and visual receptors as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Permanent effects arising during operation

Avoidance and mitigation measures

- 5.2.62 No avoidance or mitigation measures additional to those reported in the main ES are identified.

Assessment of impacts and effects

Landscape assessment

Fradley Settled Heathlands LCA

- 5.2.63 The main ES reported a moderate adverse significant effect during year 1 and year 15 of operation, reducing to non-significant at year 60. This was due to the presence of Pyford Brook viaduct and Pyford North and South embankments, which would result in changes to the flat and gently undulating landform, severance of the field pattern, and changes to field sizes. The embankments and presence of overhead line equipment and moving trains would interrupt the rural skyline and contribute to the loss of rural character and scenic quality. These effects would, however, be localised with much of the LCA remaining unaffected. At year 60, the mature mitigation planting would partially screen and achieve greater integration of the viaduct and embankments into the wider landscape.
- 5.2.64 At year 1, the amendment to widen Wood End Lane will result in the loss of approximately 1.1km of vegetation. The loss of this vegetation will open up the landscape which currently has an enclosed character, and slightly increase the effect on the view compared to the Phase One consented scheme. This effect will however be localised and much of the LCA will be unaffected. The amendment will therefore give rise to a different significant effect on the landscape character of the Fradley Settled Heathlands LCA. However, the level of significance of the effect will remain moderate adverse significant as reported in the main ES.
- 5.2.65 At year 15, the maturing hedgerow mitigation planting will integrate the road corridor into the surrounding landscape and restore much of the rural character and scenic quality. As with the original scheme, views of Pyford Brook viaduct and associated embankments will be partially screened. The amendment will therefore not give rise to any new or different significant effects on the landscape of the Fradley Settled Heathlands LCA and will not change the level of

significance of the effect reported in the main ES. At year 60 the level of significance of the effect will remain non-significant as reported in the main ES.

- 5.2.66 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-000 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

Cumulative effects

- 5.2.67 There are no new or different likely significant temporary cumulative effects for landscape and visual as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Traffic and transport

Scope, assumptions and limitations

- 5.2.68 The assessment scope, key assumptions and limitations for traffic and transport are as set out in Volume 1, the SMR and SMR Addendum of the main ES.
- 5.2.69 This amendment has the potential to result in new or different significant temporary construction and operational effects for traffic and transport. Therefore, both temporary construction and operational phases are considered in this assessment.
- 5.2.70 The assessment of the changes to construction traffic flows as a result of this amendment in combination with all SES2 changes and AP2 amendments is reported in Section 7.

Existing environmental baseline

- 5.2.71 The baseline traffic and transport information for the Fradley Colton area is as described in Volume 2, CA1, Section 14 of the main ES.
- 5.2.72 The A515 Lichfield Road, which connects Kings Bromley with Lichfield is a primary 'A' road in the Fradley to Colton area and can be busy at peak times and delays can be experienced.
- 5.2.73 Wood End Lane connects the A515 Lichfield Road with the A38 Rykneld Street, the main strategic route in the area. The east side of Wood End Lane provides access to the Fradley Park commercial area. Wood End Lane continues west from the Fradley Park commercial area and provides access from the A38 Rykneld Street to the local areas including King's Bromley and Handsacre. The local road network in this area generally operates well although some localised delays can be experienced, particularly at peak times at the junction of the A38 Rykneld Street.

Future environmental baseline

Construction (2023) and operation (2027) and (2041)

- 5.2.74 SES2 and AP2 ES Volume 5: Appendix CT-004-000 provides details of the developments which are assumed to have been implemented by 2023 for construction and 2027 and 2041 for operation, additional to those identified in the main ES Volume 5: Appendix CT-004-000.

- 5.2.75 Land North East of Watery Lane, Curborough, Lichfield, Staffordshire (14/00057/OUTMEI) is relevant to the assessment of traffic and transport.

Effects arising during construction

Avoidance and mitigation measures

- 5.2.76 No avoidance or mitigation measures additional to those reported in the main ES and draft CoCP are required.

Assessment of impacts and effects

- 5.2.77 The main ES reported that construction of the original scheme would result in queues and delays for vehicle occupants at the A515 Lichfield Road and Wood End Lane junction, which would give rise to a minor adverse significant traffic congestion and delay effect.
- 5.2.78 Although the amendment will reduce the impacts of construction traffic at the junction (considered in combination with all SES2 changes and AP2 amendments in Section 7), the temporary construction works, which are expected to take six months to implement, associated with the modifications to the A515 Lichfield Road and Wood End Lane junction and upgrade to Wood End Lane and associated traffic management measures will be likely to result in a temporary reduced capacity and some delays on the junction. Although once completed the changes will reduce congestion and delays, this amendment will give rise to a new temporary minor adverse effect on traffic flows and delays for road users during construction, which is significant.
- 5.2.79 For further information see SES2 and AP2 ES Volume 5: Appendix TR-001-000, and the SES2 and AP2 ES Volume 5: Traffic and transport Map Book.

Mitigation and residual effects

Other mitigation

- 5.2.80 No mitigation measures additional to those reported in the main ES and draft CoCP are identified.

Summary of likely residual significant effects

- 5.2.81 The amendment will give rise to a new likely residual significant temporary minor adverse effect on traffic flows and delays for road users at the junction of the A515 Lichfield Road and Wood End Lane.

Cumulative effects

- 5.2.82 There are no new or different likely significant cumulative effects for traffic and transport as a result of the amendment acting in combination with any other AP2 amendments, AP1 amendments or any relevant committed development.

Effects arising from operation

Avoidance and mitigation measures

- 5.2.83 No avoidance or mitigation measures, additional to those reported in the main ES, are required.

Assessment of impacts and effects

- 5.2.84 Whilst the amendment is not required to support the AP2 revised scheme in the operational phase, as the scheme does not add any substantial permanent traffic to the area, the junction will be retained following construction.
- 5.2.85 The main ES reported that the existing junction operates within but approaching capacity in the future assessment years of 2027 and 2041. With the amendment, the junction is still forecast to operate within capacity in the future assessment years of 2027 and 2041.
- 5.2.86 The amendment will facilitate turning manoeuvres for vehicles by managing the turning movements under signal control on an on-going basis and the junction will operate within capacity. This amendment will give rise to a new permanent minor beneficial traffic effect for vehicle occupants in 2027 and 2041, which is significant.
- 5.2.87 For further information see SES2 and AP2 ES Volume 5: Appendix TR-001-000, and the SES2 and AP2 ES, Volume 5: Traffic and transport Map Book.

Mitigation and residual effects

Other mitigation measures

- 5.2.88 No mitigation measures, additional to those reported in the main ES, are required.

Summary of likely residual significant effects

- 5.2.89 The amendment will give rise to a new likely residual significant permanent minor beneficial effect for road users at the junction of the A515 Lichfield Road and Wood End Lane in the future assessment years of 2027 and 2041.

Cumulative effects

- 5.2.90 There are no new or different likely significant cumulative effects for traffic and transport as a result of the amendment acting in combination with any other AP2 amendments, AP1 amendments or any relevant committed development.

Monitoring

- 5.2.91 Volume 1 of the main ES sets out the general approach to environmental monitoring during operation of the original scheme.
- 5.2.92 There are no changes to the monitoring requirements identified in the main ES for traffic and transport as a result of the amendment.

Summary of new or different likely residual significant effects as a result of the amendment

- 5.2.93 During construction, the amendment will give rise to a different likely residual significant effect on the landscape character of the Fradley Settled Heathlands LCA. However, this will not change the level of significance of the effects reported in the main ES.
- 5.2.94 During construction, the amendment will give rise to a new likely residual significant temporary minor adverse effect on traffic flows and delays for road users at the junction of the A515 Lichfield Road and Wood End Lane. During operation, the amendment will give rise to a new likely residual significant permanent minor beneficial effect for road users at the junction of the A515 Lichfield Road and Wood End Lane.

5.3 Additional land for new pipework from the Kings Bromley South borrow pit for groundwater recharge to Pyford Brook, Trent and Mersey Canal and Bourne Brook (AP2-001-003)

- 5.3.1 The Bill provides for a borrow pit at Kings Bromley South for the extraction of sand and gravel for construction. The borrow pit would be located on either side of Crawley Lane on the eastern side and to the south of Ashby Sitch, both sides of the HS2 route. See CT-05-201, E8 to A1, and Map CT-05-201, D10 to B8, in the SES1 and AP1 ES Volume 2: CA1 Map Book.
- 5.3.2 Excavation and dewatering of the borrow pits could result in localised and controlled impacts on groundwater flows, which would be minimised through the implementation of the Code of Construction Practice (CoCP). However, potential would remain for baseflows in nearby watercourses to be impacted while groundwater levels are lowered in the borrow pits during excavation.
- 5.3.3 The main ES assumed that mitigation for the management of groundwater baseflows into the River Trent and Bourne Brook would be provided during excavation and dewatering of the borrow pits; including recirculation of treated water to the River Trent and Bourne Brook at an appropriate rate and location.
- 5.3.4 Within the land required for the original scheme, a temporary pipe route, identified through further design refinement, would be provided to facilitate the pumping of water upstream to augment the low flow regimes at Bourne Brook during excavation of the Kings Bromley North (A515) borrow pit.
- 5.3.5 Since submission of the Bill, additional design development and groundwater modelling has identified suitable discharge points at nearby watercourses for groundwater recharge. Three pipe routes have been identified from the Kings Bromley South borrow pit to pump water into Pyford Brook, Trent and Mersey Canal and Bourne Brook, upstream of the borrow pit.
- 5.3.6 All of the pipe routes, which are temporary, will largely run within a shallow trench (approximately 1m deep), or below ground where required. A temporary access road will be provided alongside the entire length of the recharge pipework, which will be approximately 3m in width. Overall, the pipe route and access tracks

will be accommodated within a corridor, approximately 10m in width. Three pipe routes will be provided:

- the first pipe route will convey water from the Kings Bromley South borrow pit, on the north-east side of the Pyford North embankment (see Map CT-05-201, H7 to E4, in the SES2 and AP2 ES Volume 2: CA1 Map Book) heading south-east, before crossing the HS2 route under the Pyford North viaduct. The pipe will then follow alongside Pyford Brook for approximately 300m before discharging into Pyford Brook (see Map CT-05-201, H7, in the SES2 and AP2 ES Volume 2: CA1 Map Book). No additional land would be required for this pipe route;
- the second pipe route will convey water from the Kings Bromley South borrow pit, on the south-west side of the Pyford North embankment (see Map CT-05-201, C10, in the SES2 and AP2 ES Volume 2: CA1 Map Book) heading west alongside Ashby Sitch for approximately 250m. The pipe will continue west from Ashby Sitch along a field boundary, before discharging into the Trent and Mersey Canal (see Map CT-05-201-L1, B3, in the SES2 and AP2 ES Volume 2: CA1 Map Book). This pipe route will temporarily require 0.3ha of additional land; and
- the third pipe route will convey water from the Kings Bromley South borrow pit, on the south-west side of the Pyford North embankment (see Map CT-05-201, B5, in the SES2 and AP2 ES Volume 2: CA1 Map Book) heading north-west alongside the Pyford North embankment, crossing Common Lane (south), before heading west and crossing the A515 Lichfield Road to follow a south-west direction alongside the National Grid 400kV power line for approximately 1km. The pipe will then discharge into a pond which drains into Bourne Brook (see Map CT-05-202-L1, F8, in the SES2 and AP2 ES Volume 2: CA1 Map Book). No additional land would be required for this pipe route, however the route crosses land required for the Pyford North embankment satellite compound and its associated stockpiles. Therefore, in this location, the pipe route would be buried in advance of other construction work taking place, and no access road will be provided. Part of this pipe route, alongside the National Grid 400kV power line, was identified through design development to serve the Kings Bromley North (A515) borrow pit and would also be used as part of the recharge of Kings Bromley North (Shaw Lane) borrow pit (AP2-001-008).

5.3.7 Where the pipes join the watercourses, measures will be provided to protect the bed and banks from scour.

5.3.8 The works will be undertaken early within the period required for extraction from the Kings Bromley South borrow pit and will be removed and the site reinstated once extraction ceases.

5.3.9 The land required to provide groundwater recharge from the Kings Bromley South borrow pit is outside the limits of the Bill and will result in the requirement for an additional 0.3ha of land, some of which will be from Common Farm (CA1/4). See Map CT-05-201, Map CT-05-201-L1 and Map CT-05-202 in the SES2 and AP2 ES Volume 2:

CA1 Map Book. It is assumed that all of the additional land will be returned to its existing use following construction.

Topics included in the AP2 assessment

- 5.3.10 This amendment is considered to require reassessment of the environmental effects and mitigation in the main ES, as amended by SES1 and SES2, for the following topics: cultural heritage; and ecology and biodiversity.

Cultural heritage

Scope, assumptions and limitations

- 5.3.11 The assessment scope, key assumptions and limitations for cultural heritage are as set out in Volume 1, the Scope and Methodology Report⁵⁹ (SMR) and SMR Addendum⁶⁰ of the main ES and SMR Addendum 2 (see SES2 and AP2 ES Volume 5: Appendix CT-001-000).
- 5.3.12 The amendment has the potential to result in new or different significant temporary construction effects only. Therefore, there is no permanent construction or operational assessment for cultural heritage.

Existing environmental baseline

- 5.3.13 The baseline cultural heritage information for the Fradley to Colton area is as described in Volume 2, CA1, Section 7 of the main ES.
- 5.3.14 The Trent and Mersey Canal Conservation Area (FRCo08), a designated asset of moderate value, lies partially within the land required for the amendment.
- 5.3.15 Further information about this asset is provided in the main ES Volume 5: Appendix CH-001-001 and Map Series CH-01 and CH-02 in the main ES Volume 5: Cultural heritage Map Book.

Future environmental baseline

Construction (2020)

- 5.3.16 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

⁵⁹ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report (Appendix CT-001-001). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

⁶⁰ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report (Appendix CT-001-001). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

Effects arising during construction

Avoidance and mitigation measures

- 5.3.17 No avoidance or mitigation measures additional to those reported in the main ES and draft Code of Construction Practice (CoCP)⁶¹ are identified.

Assessment of impacts and effects

- 5.3.18 The main ES reported a temporary minor adverse effect, which is not significant, on the Trent and Mersey Canal Conservation Area (FRCoo8), a designated asset of moderate value. The main ES further reported that in combination with HS2 Phase One there would be a temporary moderate adverse cumulative significant effect on the conservation area. The relationship between the various locks, cottages and bridges along the canal, and between the canal and the surrounding landscape are all important aspects of the historic setting of the conservation area. The amendment will further affect the rural setting of the conservation area. This will give rise to a different significant effect, however this will not change the level of significance of the effects (both the effect from the Phase 2a scheme in isolation and the cumulative effect with the Phase One scheme) reported in the main ES.
- 5.3.19 For further information see Map Series CH-01 and CH-02 in the SES2 and AP2 ES Volume 5: Cultural heritage Map Book and the SES2 and AP2 ES Volume 5: Appendix CH-003-000.

Mitigation and residual effects

Other mitigation measures

- 5.3.20 No mitigation measures additional to those reported in the main ES and draft CoCP are identified.

Summary of likely residual significant effects

- 5.3.21 The temporary effects of construction activity on the setting of the Trent and Mersey Canal Conservation Area (FRCoo8) have been considered. However, they are largely reversible in nature and will be restricted to the duration of the construction works. The amendment will not change the level of significance of the effects reported in the main ES.

Cumulative effects

- 5.3.22 There are no new or different likely significant cumulative effects for cultural heritage as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

⁶¹ HS2 Ltd (2017), *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, draft Code of Construction Practice (CT-003-000). Available online at <https://www.gov.uk/government/publications/draft-code-of-construction-practice-for-hs2-phase-2a>

Ecology and biodiversity

Scope, assumptions and limitations

- 5.3.23 The assessment scope, key assumptions and limitations for ecology and biodiversity are as set out in Volume 1, the SMR and SMR Addendum of the main ES and SMR Addendum 2 (see SES2 and AP2 ES Volume 5: Appendix CT-001-000).
- 5.3.24 This amendment has the potential to result in new or different construction effects only. Therefore, there is no operational assessment for ecology and biodiversity.
- 5.3.25 Where data are limited, a precautionary baseline has been built up according to the guidance provided in the SMR and SMR Addendum. This constitutes a 'reasonable worst case' basis for the subsequent assessment.
- 5.3.26 The precautionary approach to the assessment that has been adopted identifies the likely significant environmental effects of the amendment.

Existing environmental baseline

- 5.3.27 The ecological baseline of the land subject to the amendment has been based on field data collated for the main ES as amended by SES1, the baseline information presented in the Phase One SES and AP2 ES⁶², aerial photography, and relevant information from regional and local sources. In addition, the baseline has been informed by additional Phase 1 habitat surveys. For this amendment, the data that are most relevant to the assessment for each receptor from the main ES and SES1 and/or Phase One SES and AP2 ES are reported below.
- 5.3.28 A summary of the baseline information relevant to the assessment of the amendment is provided below. Further detail on the relevant new or updated baseline information is provided in BID EC-019-000, including Map Series EC-02 which accompanies the SES2 and AP2 ES.
- 5.3.29 For those receptors described in the Phase One SES and AP2 ES, further details are provided in Volume 2, CFA22, Section 11, and Volume 5: Appendix EC-001-003 and Appendix EC-004-003, including Map Series EC-01; EC-04; EC-05; EC-11 and EC-12.
- 5.3.30 For those receptors described in the main ES, further details are provided in Volume 2, CA1, Section 8, and Volume 5: Appendix EC-001-000, including Map Series EC-01. Baseline ecology reports that accompanied the main ES are provided in BID-EC-002-000 to BID-EC-014-000, including Map Series EC-02 to EC-12⁶³.

⁶² HS2 Ltd (2015). *High Speed Two (HS2) Phase One (London - West Midlands) Supplementary Environmental Statement and Additional Provision 2 Environmental Statement*, Volume 2 CFA22. Available online at:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/442226/SES_and_AP2_ES_Volume_2_CFA22.pdf

⁶³ HS2 Ltd (2017). *High Speed Two (HS2) Phase 2a (West Midlands - Crewe)*, Background Information and Data, Available online at: www.gov.uk/hs2

- 5.3.31 For those receptors described in SES₁, further details are provided in Volume 2, CA1, Section 3. The baseline ecology report that accompanied SES₁ and AP₁ ES is provided in BID EC-004-000, including Map Series EC-02, EC-04, EC-05, EC-10, EC-11 and EC-12⁶⁴.

Designated sites

- 5.3.32 The land that is subject to the amendment is located within a Natural England Impact Risk Zone⁶⁵ for Stowe Pool and Walk Mill Clay Pit Site of Special Scientific Interest (SSSI), which is of national value. The SSSI, covering an area of approximately 8.4ha, is nationally important for white-clawed crayfish and also supports a nationally scarce species of stonewort. Stowe Pool and Walk Mill Clay Pit SSSI is adjacent to Stowe Road, south of Nether Stowe in Lichfield, over 4km south of the area subject to the amendment. This SSSI was not reported in the main ES, SES₁ or Phase One SES and AP₂ ES, as it was not relevant to the assessment of the original scheme, SES₁ scheme or Phase One SES and AP₂ ES scheme.
- 5.3.33 There are two Local Wildlife Sites (LWS) of relevance to the assessment of the amendment, which are of county value:
- Kings Bromley Wharf to Fradley Junction, Coventry Canal LWS, covering an area of 11.1ha, is designated for two lengths of canal that meet at Fradley Junction, which support diverse bands of both marginal and emergent vegetation. Kings Bromley Wharf to Fradley Junction, Coventry Canal LWS is located to the west of Fradley and north of Curborough, partially within the area subject to the amendment; and
 - Ravenshaw Wood, Black Slough and Slaish LWS, covering an area of approximately 28.6ha, comprises of three contiguous woodlands designated for ancient semi-natural woodland and part ancient replanted woodland with a canopy of pedunculate oak. Ravenshaw Wood, Black Slough and Slaish LWS is located to the south of Riley Hill, approximately 20m west of the area subject to the amendment, on the opposite side of Trent and Mersey canal.
- 5.3.34 There is one Biodiversity Alert Site (BAS) of relevance to the assessment of the amendment, which is of district/borough value. Riley Hill BAS, covering an area of approximately 5.7 ha, comprises a large pool and a narrow band of broadleaved woodland also known as Shaw Lane Gap Wood. Riley Hill BAS is located off Shaw Lane, partially within the area subject to the amendment.
- 5.3.35 There is one Ancient Woodland Inventory (AWI) site of relevance to the assessment of the amendment, which is of county value. It covers an area of 2.6ha and forms part of Ravenshaw Wood, Black Slough and Slaish LWS and is

⁶⁴ HS2 Ltd (2018). *High Speed Two (HS2) Phase 2a (West Midlands - Crewe)*, Supplementary ecological baseline data (BID EC-004-000), Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/692664/G33_Ecological_baseline_BID-EC-004-000_WEB.pdf

⁶⁵ The Impact Risk Zones is a GIS tool developed by Natural England to make a rapid initial assessment of the potential risks to SSSI is posted by development proposal and indicate the types of development proposals which could potentially have adverse impacts.

located approximately 20m west of the area subject to the amendment on the opposite side of the Trent and Mersey canal.

Habitats

- 5.3.36 Habitats within or adjacent to the land required for the amendment include semi-natural broadleaved woodland, broadleaved plantation, semi-improved grassland, improved grassland, amenity grassland, arable, hedgerows and watercourses. The habitats of potential relevance to the assessment of the amendment are described below in further detail.
- 5.3.37 Semi-natural broadleaved woodland is present within a narrow belt of woodland that is present alongside the Trent and Mersey Canal and forms part of the Kings Bromley Wharf to Fradley Junction, Coventry Canal LWS. This habitat qualifies as lowland mixed deciduous woodland, which is a habitat of principal importance listed under the provisions of Section 41 of the Natural Environment and Rural Communities (NERC) Act (2006)⁶⁶ and a conservation priority of the Staffordshire Biodiversity Action Plan⁶⁷ (BAP). This woodland forms part of the designating feature of the Kings Bromley Wharf to Fradley Junction, Coventry Canal LWS and falls partially within the area subject to the amendment. The woodland is of up to county value.
- 5.3.38 Semi-natural broadleaved woodland is present at Shaw Lane Gap Wood, which forms part of Riley Hill BAS. This woodland is assumed to qualify as lowland mixed deciduous woodland, a habitat of principal importance and a conservation priority of the Staffordshire BAP. The woodland at Shaw Lane Gap Wood is located partially within the area that is subject to the amendment. The woodland is of district/borough value.
- 5.3.39 Semi-natural broadleaved woodland and broadleaved plantation is present at an unnamed woodland east of Woodend Common Barn. The semi-natural broadleaved woodland qualifies as lowland mixed deciduous woodland, which is a habitat of principal importance and a conservation priority of the Staffordshire BAP. This woodland is located partially within the area subject to the amendment. The woodland is of district/borough value.
- 5.3.40 Semi-natural broadleaved woodland is also present at Rice's Gorse, Rice's Spinney, and Cranberry Wood. This woodland qualifies as lowland mixed deciduous woodland, which is a habitat of principal importance and a conservation priority of the Staffordshire BAP. These woodlands are within or adjacent to the area subject to the amendment and they are each of local/parish value.
- 5.3.41 Semi-improved neutral grassland is present on either side of the Pyford Brook to the north of Cranberry Wood. This grassland is likely to qualify as lowland meadow, a habitat of principal importance and a conservation priority of the

⁶⁶ Natural Environment and Rural Communities Act 2006. Available online at: <http://www.legislation.gov.uk/ukpga/2006/16/section/41>

⁶⁷ Staffordshire Biodiversity Partnership. Staffordshire Biodiversity Action Plan. Available online at <http://sbap.org.uk>

Staffordshire BAP. The grassland is partially within the area subject to the amendment. The grassland is of up to district/borough value.

- 5.3.42 Hedgerows within the area subject to the amendment are predominantly species-rich. Hedgerow with at least 80% cover of native woody species is a habitat of principal importance and a conservation priority of the Staffordshire BAP. These contribute to a wider hedgerow network within the Fradley to Colton area that is of county value.
- 5.3.43 The Trent and Mersey Canal is located partially within the area subject to the amendment, east of Handsacre. The Trent and Mersey Canal in this location forms part of the Kings Bromley Wharf to Fradley Junction, Coventry Canal LWS and is a conservation priority of the Staffordshire BAP. The Trent and Mersey Canal is of county value.
- 5.3.44 Pyford Brook and Bourne Brook are located partially within the area subject to the amendment. These watercourses are assumed to qualify as a habitat of principal importance and are a conservation priority of the Staffordshire BAP. Pyford Brook and Bourne Brook are of county value. Ashby Sitch is also located within the land required for the amendment. This smaller watercourse is of district/borough value.

Species

- 5.3.45 Protected and/or notable species that are known or assumed to occur within the land required for the amendment include bats, otter, badger, polecat, harvest mouse, European hedgehog and brown hare.
- 5.3.46 The main ES and Phase One SES and AP2 ES reported a bat assemblage using the Trent and Mersey Canal, adjacent woodlands (Ravenshaw Wood, Black Slough, the Slaish and Fradley Wood) and Cranberry Wood. Field surveys in this area recorded roosting common pipistrelle, Daubenton's bat, Natterer's bat, Brandt's bat and noctule and other species foraging and commuting including soprano pipistrelle, Leisler's bat, brown long-eared bat and whiskered bat. The area subject to the amendment contains potential bat roosting, foraging and commuting habitats that are likely to be used by this assemblage. The bat assemblage includes several species of principal importance and species that are conservation priorities of the Staffordshire BAP. The bat assemblage associated with Trent and Mersey Canal, adjacent woodlands (Ravenshaw Wood, Black Slough, the Slaish and Fradley Wood) and Cranberry Wood is of regional value.
- 5.3.47 The main ES, as amended by SES1, reported an assumed metapopulation⁶⁸ (AMP⁶⁹ 31) of great crested newts in a network of seven ponds, west of Fradley Lock (north and south of the Trent and Mersey Canal). The three ponds within Cranberry Wood form part of this assumed metapopulation. The area subject to the amendment includes terrestrial habitats which offer foraging and shelter

⁶⁸ A metapopulation is a group of spatially separated populations which interact.

⁶⁹ AMP refers to Amphibian Meta Population.

opportunities for great crested newts within this metapopulation. Great crested newt is an Annex 2⁷⁰ species, a species of principal importance and a conservation priority of the Staffordshire BAP. The great crested newt metapopulation west of Fradley Lock (north and south of the Trent and Mersey Canal) is of county value.

- 5.3.48 The main ES reported populations of amphibian species including palmate newt, smooth newt, common toad and common frog, identified through field surveys, within ponds throughout the Fradley to Colton area. Amphibian species are assumed to be present in ponds that have not yet been surveyed. The area subject to the amendment includes woodland and grassland habitats that are likely to be used by these species. Common toad is a species of principal importance. If present, these populations of common amphibians are of local/parish value.
- 5.3.49 The main ES reported an assumed otter population on the Trent and Mersey Canal, Ashby Sitch, Pyford Brook and Bourne Brook, on a precautionary basis in the absence of complete survey information and based on the presence of nearby records of this species. The area subject to the amendment includes these watercourses and associated habitats that are likely to offer shelter, foraging and dispersal opportunities for otter. Otter is an Annex 2 species, a species of principal importance and conservation priority of the Staffordshire BAP. This assumed otter population on the Trent and Mersey Canal, Ashby Sitch, Pyford Brook and Bourne Brook is of district/borough value.
- 5.3.50 The main ES as amended by SES1, reported at least 10 social groups of badgers, identified through field surveys, throughout the Fradley to Colton area. The area subject to the amendment includes suitable sett building and foraging habitats for badgers. The badger populations throughout the Fradley to Colton area are of local/parish value.
- 5.3.51 The main ES reported populations of other mammals including polecat, harvest mouse, European hedgehog and brown hare, identified through desk study records, as being potentially present throughout the Fradley to Colton area. The area subject to the amendment includes habitats that are suitable for these species. If present, these populations are of local/parish value.
- 5.3.52 The main ES reported populations of common reptile species such as grass snake and slow-worm, identified through desk study records, as being potentially present at low numbers throughout the Fradley to Colton area. Grass snake and slow-worm are both species of principal importance. Grass snake is also a conservation priority of the Staffordshire BAP. The area subject to the amendment includes suitable habitats for these species. If present, these populations are of local/parish value.

⁷⁰ Annex 2 of the EU's Habitats Directive (1992) lists priority species whose conservation requires the designation of Special Areas of Conservation.

Future environmental baseline

Construction (2020)

- 5.3.53 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 5.3.54 The assessment assumes implementation of the measures set out within the draft CoCP.
- 5.3.55 No avoidance or mitigation measures additional to those reported in the main ES, SES1 and draft CoCP are required.

Assessment of impacts and effects

- 5.3.56 All of the effects within this section are reported in the absence of other mitigation.

Designated sites

- 5.3.57 No effects on Stowe Pool and Walk Mill Clay Pit SSSI were reported within the main ES. Stowe Pool and Walk Mill Clay Pit SSSI will not be directly impacted by construction of the amendment. The closest point of construction of the areas subject to the amendment will be over 4km north of the SSSI. The SSSI is designated for its white-clawed crayfish population and also supports a nationally scarce species of stonewort. The amendment will not give rise to a new significant effect on the designated features of this SSSI.
- 5.3.58 The main ES reported the loss of approximately 0.6ha (5%) of canal bank and canal habitat within Kings Bromley Wharf to Fradley Junction, Coventry Canal LWS, which would result in a permanent adverse effect on the structure and function of the LWS that is significant at district/borough level. The amendment will result in the additional loss of approximately 100m² of canal bank habitat, including semi-natural broadleaved woodland which forms part of the wooded belt along the canal, within the Kings Bromley Wharf to Fradley Junction, Coventry Canal LWS. The amendment will result in a different effect on Kings Bromley Wharf to Fradley Junction, Coventry Canal LWS. However, this will not change the level of significance of this effect as reported in the main ES.
- 5.3.59 The amendment will not give rise to new or different significant effects on any other designated sites due to the scale of the works and their distance from the works. It will not change the level of significance of the effects reported in the Phase One SES and AP2 ES or the main ES.

Habitats

- 5.3.60 The main ES reported the loss of lowland mixed deciduous woodland at an unnamed woodland east of Woodend Common Barn (2.4ha) and at Shaw Lane Gap Wood (which is part of Riley Hill BAS) (0.3ha), which would result in

permanent adverse effects that are significant at up to the district/borough level. The main ES also reported the loss of lowland mixed deciduous woodland at Cranberry Wood (0.4ha) and at Rice's Spinney (1.1ha), which would result in a permanent adverse effect at the local/parish level. The amendment will result in the loss of approximately 100m² of woodland within a narrow strip of semi-natural broadleaved woodland alongside the Trent and Mersey Canal, which forms part of the Kings Bromley Wharf to Fradley Junction, Coventry Canal LWS. The amendment will result in a different effect on lowland mixed deciduous woodland within Kings Bromley Wharf to Fradley Junction, Coventry Canal LWS. However, this will not change the level of significance of this effect as reported in the main ES.

- 5.3.61 On a precautionary basis, the main ES reported the loss of 64.8km of hedgerow habitats within the Fradley to Colton area, which would result in a permanent adverse effect that is significant at the county level. The amendment will not result in the loss of additional hedgerow habitats and will not therefore result in a new or different significant effect on the hedgerow network within the Fradley to Colton area.
- 5.3.62 The main ES reported the combined loss of 16.3ha of semi-improved neutral grassland throughout the Fradley to Colton area to construction of the original scheme. This was reported as a local/parish level effect. The amendment will not give rise to any new or different significant effects on semi-improved neutral grassland.
- 5.3.63 The main ES reported the loss of 0.6ha of canal bank and canal habitat on the Trent and Mersey Canal, which was reported as a permanent adverse effect on the structure and function of the canal that is significant at the district/borough level. The implementation of measures set out in the draft CoCP will avoid significant effects on the watercourse of the canal from the amendment. Where the pipes join the watercourse, measures will be provided to protect the bed and banks from scour. The amendment will not give rise to any new or different significant effects on the Trent and Mersey Canal and will not change the level of significance of the effect, reported in the main ES.
- 5.3.64 It is not likely that any other effects on habitats of relevance at more than the local/parish level will occur as a result of the amendment. Additional local/parish level effects arising from the AP2 revised scheme are listed in SES2 and AP2 ES Volume 5: Appendix EC-016-000.

Species

- 5.3.65 The Phase One SES and AP2 ES reported the direct loss of bat roosts and loss and severance of foraging and commuting habitat used by the assemblage of bats using the Trent and Mersey Canal and adjacent woodlands (Ravenshaw Wood, Black Slough, the Slaish and Fradley Wood) and Cranberry Wood, which was reported as an adverse effect that is significant at the regional level. The amendment will result in the additional loss of approximately 100m² of semi-natural broadleaved woodland from the wooded belt along the Trent and Mersey Canal. The amendment will result in the additional loss of mature trees, which on

a precautionary basis are assumed to support bat roosts and provide foraging and commuting habitats for the bat assemblage. The assumed loss of additional roosts and foraging and commuting habitats will give rise to a different significant effect on the bat assemblage using the Trent and Mersey Canal and adjacent woodlands (Ravenshaw Wood, Black Slough, the Slaish and Fradley Wood) and Cranberry Wood. However, the amendment will not change the level of significance of the effect as reported in the Phase One SES and AP2 ES.

- 5.3.66 The main ES as amended by SES₁, reported the fragmentation and loss of terrestrial habitats known or assumed to be used by the great crested newt metapopulation (AMP 3₁) west of Fradley Lock (north and south of the Trent and Mersey Canal), which would result in a permanent adverse effect that is significant at up to county level. The additional land required for the amendment is located approximately 1km from the nearest pond within the assumed metapopulation west of Fradley Lock (north and south of the Trent and Mersey Canal) and therefore the habitats within the additional land required for the amendment are not considered to offer terrestrial habitat opportunities for the metapopulation. The amendment will not result in a new or different significant effect on the assumed great crested newt metapopulation (AMP 3₁) west of Fradley Lock (north and south of the Trent and Mersey Canal) and will not change the level of significance of the effect, reported in the main ES.
- 5.3.67 It is not likely that any other effects on species of relevance at more than the local/parish level will occur as a result of the amendment. Additional local/parish level effects arising from the AP₂ revised scheme are listed in SES₂ and AP₂ ES Volume 5: Appendix EC-016-000.

Mitigation and residual effects

Other mitigation measures

- 5.3.68 Following completion of the works associated with the amendment the approximate 100m² of wooded belt along the Trent and Mersey Canal will be reinstated. Once established the habitat creation measures will reduce the effect upon the lowland mixed deciduous woodland within the Kings Bromley Wharf to Fradley Junction, Coventry Canal LWS to a level that is not significant.
- 5.3.69 The main ES reported habitat creation measures including the provision of woodland habitat creation along Ashby Sitch and along Pyford Brook and wetland habitat creation along Pyford Brook. Once established these habitats will provide suitable bat foraging and commuting habitats. Artificial roosting provision will be provided within and adjacent to these habitat creation areas to replace bat roosts that will be lost to construction, in accordance with the Ecological Principles of Mitigation within the SMR Addendum. These measures will reduce the different adverse effect resulting from this amendment on the bat assemblage using the Trent and Mersey Canal, adjacent woodlands (Ravenshaw Wood, Black Slough, the Slaish and Fradley Wood) and Cranberry Wood to a level that is not significant.

Summary of likely residual significant effects

- 5.3.70 With the implementation of the mitigation proposed, the ecological effects arising from the amendment are reduced to a level where they are not considered to be significant. The significant effects of the amendment in this area are therefore unchanged from those reported in the main ES and Phase One SES and AP2 ES.

Cumulative effects

- 5.3.71 There are no new or different likely significant cumulative effects for ecology and biodiversity as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

5.4 Additional land and a change to Bill powers for the realignment of HS2 maintenance access under Pyford Brook viaduct (AP2-001-004)

- 5.4.1 The Bill provides for a permanent HS2 maintenance access to a balancing pond for railway drainage, to the west of the HS2 route, passing beneath the Trent and Mersey Canal viaduct (part of the Phase One consented scheme). See Map CT-06-201, J6 to G3, in the main ES Volume 2: CA1 Map Book. Where the access track passes around the part of Pyford South embankment provided through the Phase One consented scheme, it would pass partially through an existing area of woodland, adjacent to the Trent and Mersey Canal. Woodland habitat creation and hedgerow habitat creation would be provided along the track to integrate it into the existing woodland.
- 5.4.2 Since submission of the Bill, further engagement with Canal & River Trust has identified a preferred alternative alignment of the HS2 maintenance access, which would move the access away from the Trent and Mersey Canal and towpath. The HS2 maintenance access will be realigned 520m north-west, in comparison to the HS2 maintenance access provided in the original scheme, passing underneath the Pyford Brook viaduct.
- 5.4.3 The realignment of the HS2 maintenance access, east of Pyford South embankment, will pass through a section of Cranberry Wood, resulting in the loss of 0.1ha of woodland.
- 5.4.4 The realigned HS2 maintenance access underneath the Pyford Brook viaduct will result in the reduction of 850m² of wetland habitat creation, included in the original scheme, alongside Pyford Brook. Hedgerow habitat creation, included in the original scheme, along the removed section of the maintenance access will no longer be provided.
- 5.4.5 The woodland habitat creation provided in the original scheme around Pyford South embankment will remain and be extended by 1.4ha to infill the location of the maintenance access in the original scheme. This woodland habitat creation will compensate for the loss of woodland and wetland habitat creation and enable ecological connectivity with existing wooded areas. See Map CT-06-201, H6 to G4, in the SES2 and AP2 ES Volume 2: CA1 Map Book.

- 5.4.6 Construction of the amendment will take three months to complete and will be managed from the Pyford Brook viaduct satellite compound.
- 5.4.7 The land required to realign the HS2 maintenance access is outside the limits of the Bill and will result in the requirement for an additional 0.1ha of land and a change to Bill powers. See Map CT-o6-201 H6 to G4 in the SES2 and AP2 ES Volume 2: CA1 Map Book.

Topics included in the AP2 assessment

- 5.4.8 This amendment is considered to require reassessment of the environmental effects and mitigation in the main ES, as amended by SES1 and SES2, for the following topics: ecology and biodiversity; and water resources and flood risk. These are reported within this section.

Ecology and biodiversity

Scope, assumptions and limitations

- 5.4.9 The assessment scope, key assumptions and limitations for ecology and biodiversity are as set out in Volume 1, the Scope and Methodology Report⁷¹ (SMR) and SMR Addendum⁷² of the main ES and SMR Addendum 2 (see SES2 and AP2 ES Volume 5: Appendix CT-001-000).
- 5.4.10 This amendment has the potential to result in new or different significant construction effects only. Therefore, there is no operational assessment for ecology and biodiversity.
- 5.4.11 Where data are limited, a precautionary baseline has been built up according to the guidance provided in the SMR and SMR Addendum. This constitutes a 'reasonable worst case' basis for the subsequent assessment.
- 5.4.12 The precautionary approach to the assessment that has been adopted identifies the likely significant environmental effects of the amendment.

Existing environmental baseline

- 5.4.13 The ecological baseline of the land subject to the amendment has been based on field data collated for the main ES as amended by SES1, the baseline information presented in the Phase One SES and AP2 ES⁷³, aerial photography, and relevant information from regional and local sources. For this amendment, the data that are most relevant to the assessment for each receptor from the main ES and SES1

⁷¹ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report (Appendix CT-001-001). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

⁷² HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report (Appendix CT-001-001). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

⁷³ HS2 Ltd (2015). *High Speed Two (HS2) Phase One (London - West Midlands) Supplementary Environmental Statement and Additional Provision 2 Environmental Statement*, Volume 2 CFA22. Available online at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/442226/SES_and_AP2_ES_Volume_2_CFA22.pdf

and/or Phase One SES and AP2 ES are reported below. In addition, the baseline has been informed by additional Phase 1 habitat surveys.

- 5.4.14 A summary of the baseline information relevant to the assessment of the amendment is provided below. Further detail on the relevant new or updated baseline information is provided in BID EC-019-000, including Map Series EC-02 which accompanies the SES2 and AP2 ES.
- 5.4.15 For those receptors described in the Phase One SES and AP2 ES, further details are provided in Volume 2, CFA22, Section 11, and Volume 5 Appendix EC-001-003 and Appendix EC-004-003, including Map Series EC-01; EC-04; EC-05; EC-11 and EC-12.
- 5.4.16 For those receptors described in the main ES, further details are provided in Volume 2, CA1, Section 8, and Volume 5: Appendix EC-001-000, including Map Series EC-01. Baseline ecology reports that accompanied the main ES are provided in BID-EC-002-000 to BID-EC-014-000, including Map Series EC-02 to EC-12⁷⁴.
- 5.4.17 For those receptors described in SES1, further details are provided in Volume 2, CA1, Section 3. The baseline ecology report that accompanied SES1 and AP1 ES is provided in BID EC-004-000, including Map Series EC-02, EC-04, EC-05, EC-10, EC-11 and EC-12⁷⁵.

Designated sites

- 5.4.18 The land that is subject to the amendment is located within a Natural England Impact Risk Zone⁷⁶ for Stowe Pool and Walk Mill Clay Pit Site of Special Scientific Interest (SSSI), which is of national value. The SSSI, covering an area of approximately 8.4ha, is nationally important for white-clawed crayfish and also supports a nationally scarce species of stonewort. Stowe Pool and Walk Mill Clay Pit SSSI is adjacent to Stowe Road, south of Nether Stowe in Lichfield, approximately 3.9km south of the area subject to the amendment. This SSSI was not reported in the main ES, SES1 or Phase One SES and AP2 ES, as it was not relevant to the assessment of the original scheme, SES1 scheme or Phase One SES and AP2 ES scheme.
- 5.4.19 There is one Local Wildlife Site (LWS) of relevance to the assessment of the amendment, which is of county value. Kings Bromley Wharf to Fradley Junction, Coventry Canal LWS, covering an area of 11.1ha, is designated for two lengths of canal that meet at Fradley Junction, which support diverse bands of both marginal and emergent vegetation. Kings Bromley Wharf to Fradley Junction,

⁷⁴ HS2 Ltd (2017). *High Speed Two (HS2) Phase 2a (West Midlands - Crewe), Background Information and Data*, Available online at: www.gov.uk/hs2

⁷⁵ HS2 Ltd (2018). *High Speed Two (HS2) Phase 2a (West Midlands - Crewe), Background Information and Data*, Supplementary ecological baseline data (BID EC-004-000), Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/692664/G33_Ecological_baseline_BID-EC-004-000_WEB.pdf

⁷⁶ The Impact Risk Zones are a GIS tool developed by Natural England to make a rapid initial assessment of the potential risks to SSSIs posed by development proposals and indicate relevant development categories which could potentially have adverse impacts.

Coventry Canal LWS is located to the west of Fradley and north of Curborough, partially within the area subject to the amendment.

- 5.4.20 There is one Biodiversity Alert Site (BAS) of relevance to the assessment of the amendment, which is of district/borough value. Fradley Wood BAS, covering an area of approximately 29.2ha, is designated for its large blocks of mixed plantation woodland. Fradley Wood BAS is located to the west of Fradley on either side of the Kings Bromley Wharf to Fradley Junction, Coventry Canal LWS, partially within the area subject to the amendment.

Habitats

- 5.4.21 Habitats within and/or adjacent to the area subject to the amendment include semi-natural broadleaved and mixed woodland, semi-improved grassland, arable, watercourse and ponds. The habitats of relevance to the assessment of the amendment are described in further detail below.
- 5.4.22 Semi-natural broadleaved and mixed woodland is present at Cranberry Wood and Brokendown Wood (part of Fradley Wood LWS). This habitat qualifies as lowland mixed deciduous woodland, which is a habitat of principal importance listed under the provisions of Section 41 of the Natural Environment and Rural Communities (NERC) Act (2006)⁷⁷ and a conservation priority of the Staffordshire Biodiversity Action Plan⁷⁸ (BAP). These woodlands are partially within the area subject to the amendment and they are each of district/borough value.
- 5.4.23 Semi-improved grassland is present on either side of the Pyford Brook to the north of Cranberry Wood. This is likely to qualify as lowland meadow, a habitat of principal importance and a conservation priority of the Staffordshire BAP. The grassland is adjacent to the area that is subject to the amendment. The grassland is of up to district/borough value.
- 5.4.24 Pyford Brook is located directly adjacent to the land subject to the amendment, to the west of Fradley. Pyford Brook is likely to qualify as a habitat of principal importance and a conservation priority of the Staffordshire BAP. Pyford Brook is of county value.
- 5.4.25 Three ponds occur within the area subject to the amendment, located within Cranberry Wood to the east of Pyford Brook. On a precautionary basis it is assumed that these qualify as habitats of principal importance and a conservation priority of the Staffordshire BAP. Each of these ponds is of up to district/borough value.

Species

- 5.4.26 Protected and/or notable species that are known or assumed to occur within or adjacent to the land subject to the amendment include bats, great crested newt, common amphibian species, otter, badgers, polecat, harvest mouse, European

⁷⁷ Natural Environment and Rural Communities Act 2006. Available at: <http://www.legislation.gov.uk/ukpga/2006/16/section/41>

⁷⁸ Staffordshire Biodiversity Partnership. Staffordshire Biodiversity Action Plan. Available online at <http://sbap.org.uk>

hedgehog, brown hare and common reptile species. The species of relevance to the assessment of the amendment are described in further detail below.

- 5.4.27 The main ES and Phase One SES and AP2 ES reported a bat assemblage using the Trent and Mersey Canal, adjacent woodlands (Ravenshaw Wood, Black Slough, the Slaish and Fradley Wood) and Cranberry Wood. Field surveys in this area recorded roosting common pipistrelle, Daubenton's bat, Natterer's bat, Brandt's bat and noctule and other species foraging and commuting, including soprano pipistrelle, Leisler's bat, brown long-eared bat and whiskered bat. The area subject to the amendment contains potential bat roosting, foraging and commuting habitats that are likely to be used by this assemblage. The bat assemblage includes several species of principal importance and species that are conservation priorities of the Staffordshire BAP. The bat assemblage associated with Trent and Mersey Canal, adjacent woodlands (Ravenshaw Wood, Black Slough, the Slaish and Fradley Wood) and Cranberry Wood is of regional value.
- 5.4.28 The main ES, as amended by SES1, and the Phase One SES and AP2 ES reported an assumed great crested newt metapopulation⁷⁹ (AMP⁸⁰ 31) in a network of seven ponds, west of Fradley Lock (north and south of the Trent and Mersey Canal). The three ponds within Cranberry Wood form part of this assumed metapopulation. The woodland within the area subject to the amendment is within 50m of the ponds and is assumed to offer foraging and shelter opportunities for great crested newts within this metapopulation. Great crested newt is an Annex 2⁸¹ species, a species of principal importance and a conservation priority of the Staffordshire BAP. The great crested newt metapopulation west of Fradley Lock (north and south of the Trent and Mersey Canal) is of county value.
- 5.4.29 The main ES reported populations of common amphibian species including palmate newt, smooth newt, common toad and common frog, identified through field surveys, within ponds throughout the Fradley to Colton area. Amphibian species are assumed to be present in ponds that have not yet been surveyed. The area subject to the amendment includes woodland habitats and grassland that are likely to be used by these species. Common toad is a species of principal importance. The populations of common amphibians throughout Fradley to Colton area are of local/parish value.
- 5.4.30 The main ES reported an assumed population of otter on Pyford Brook, on a precautionary basis in the absence of complete survey information and based on the presence of nearby records of this species. The area subject to the amendment is adjacent to this watercourse and includes habitats that are likely to offer shelter, foraging and dispersal opportunities for otter. Otter is an Annex 2 species, a species of principal importance and conservation priority of the Staffordshire BAP. The assumed otter population on Pyford Brook is of district/borough value.

⁷⁹ A metapopulation is a group of spatially separated populations that interact. Metapopulations are described in BID-EC-007-000 (which accompanied the main ES) and BID-EC-004-000 (which accompanied the SES1 and AP1 ES).

⁸⁰ AMP refers to Amphibian Meta Population.

⁸¹ Annex 2 of the EU's Habitats Directive (1992) lists priority species whose conservation requires the designation of Special Areas of Conservation.

- 5.4.31 The main ES as amended by SES1, reported at least 10 social groups of badgers, identified through field surveys, throughout the Fradley to Colton area. The area subject to the amendment includes suitable sett building and foraging habitats for badgers. The badger populations throughout the Fradley to Colton area are of local/parish value.
- 5.4.32 The main ES reported populations of other mammals including polecat, harvest mouse, European hedgehog and brown hare, identified through desk study records, as being potentially present throughout the Fradley to Colton area. The area subject to the amendment includes habitats that are suitable for these species. If present, these populations are of local/parish value.
- 5.4.33 The main ES reported populations of common reptile species such as grass snake and slow-worm, identified through desk study records, as being potentially present at low numbers throughout the Fradley to Colton area. Grass snake and slow-worm are both species of principal importance. Grass snake is also a conservation priority of the Staffordshire BAP. The area subject to the amendment includes suitable habitats for these common reptile species. If present, these populations are of local/parish value.

Future environmental baseline

Construction (2020)

- 5.4.34 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 5.4.35 The assessment assumes implementation of the measures set out within the draft Code of Construction Practice⁸² (CoCP).
- 5.4.36 No avoidance or mitigation measures additional to those reported in the main ES, SES1 and draft CoCP are required.

Assessment of impacts and effects

- 5.4.37 All of the effects within this section are reported in the absence of other mitigation.

Designated sites

- 5.4.38 No effects on Stowe Pool and Walk Mill Clay Pit SSSI were reported within the main ES. Stowe Pool and Walk Mill Clay Pit SSSI will not be directly impacted by construction of the amendment. The closest point of construction of the amendment will be over 3km north of the SSSI. The SSSI is designated for its white-clawed crayfish population and also supports a nationally scarce species of

⁸² HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, draft Code of Construction Practice (CT-003-000). Available online at <https://www.gov.uk/government/publications/draft-code-of-construction-practice-for-hs2-phase-2a>

stonewort. The amendment will not give rise to a new significant effect on the designated features of this SSSI.

- 5.4.39 The amendment will not give rise to new or different significant effects on Kings Bromley Wharf to Fradley Junction, Coventry Canal LWS or Fradley Wood BAS due to the scale of the works and their distance from the works. It will not change the level of significance of the effects reported in the main ES.

Habitats

- 5.4.40 The main ES reported the loss of lowland mixed deciduous woodland at Cranberry Wood (0.4ha) and Brokendown Wood (part of Fradley Wood BAS) (0.5ha), which would result in permanent adverse effects at the local/parish level, which is not significant. The amendment will result in the additional loss of approximately 0.1ha of lowland mixed deciduous woodland at Cranberry Wood. The increased loss of Cranberry Wood will remain as a permanent adverse effect at the local/parish level. The amendment will not give rise to any new or different significant effects and will not change the level of significance of the effect, reported in the main ES.
- 5.4.41 The main ES reported the loss of ponds within the land required for the original scheme which would result in a permanent adverse effect on the conservation status of ponds that is significant, in each case, at up to district/borough level. The amendment will not result in the loss of additional ponds. The amendment will not result in a new or different significant effect on ponds and will not change the level of significance of the effects reported in the main ES.
- 5.4.42 It is not likely that any other effects on habitats of relevance at more than the local/parish level will occur as a result of the amendment. Additional local/parish level effects arising from the AP2 revised scheme are listed in SES2 and AP2 ES Volume 5: Appendix EC-016-000.

Species

- 5.4.43 The Phase One SES and AP2 ES reported the direct loss of bat roosts and loss and severance of foraging and commuting habitat used by the assemblage of bats using the Trent and Mersey Canal and adjacent woodlands (Ravenshaw Wood, Black Slough, the Slaish and Fradley Wood), which would result in a permanent adverse effect that is significant at the regional level. The amendment will result in the additional loss of approximately 0.1ha of lowland mixed deciduous woodland at Cranberry Wood. The amendment will result in the additional loss of mature trees, which on a precautionary basis are assumed to support bat roosts and provide foraging and commuting habitats for the bat assemblage. The assumed loss of additional roosts and foraging and commuting habitats will give rise to a different significant effect on the bat assemblage using the Trent and Mersey Canal and adjacent woodlands (Ravenshaw Wood, Black Slough, the Slaish and Fradley Wood) and Cranberry Wood. However, the amendment will not change the level of significance of the effect as reported in the Phase One SES and AP2 ES.

- 5.4.44 The main ES reported the fragmentation and loss of terrestrial habitats known or assumed to be used by the great crested newt metapopulation (AMP 31) west of Fradley Lock (north and south of the Trent and Mersey Canal), which would result in a permanent adverse effect that is significant at up to county level. The amendment will result in the loss of approximately 0.1ha of additional woodland at Cranberry Wood, which is within 50m of ponds assumed to be used by this metapopulation. The additional loss of terrestrial habitats will give rise to a different significant effect on the great crested newt metapopulation west of Fradley Lock (north and south of the Trent and Mersey Canal). However, this will not change the level of significance of this effect as reported in the main ES.
- 5.4.45 It is not likely that any other effects on species of relevance at more than the local/parish level will occur as a result of the amendment. Additional local/parish level effects arising from the AP2 revised scheme are listed in SES2 and AP2 ES Volume 5: Appendix EC-016-000.

Mitigation and residual effects

Other mitigation measures

- 5.4.46 The main ES reported the loss of approximately 19.7ha of woodland and creation of 40.6ha of woodland throughout the Fradley to Colton area. The target habitat type for woodland creation is lowland mixed deciduous woodland. The amendment will result in a change in the extent and distribution of woodland habitat creation. The amendment includes approximately 1.4ha of additional woodland planting. This will improve connectivity between Cranberry Wood and Brokendown Wood and between woodland and grassland habitat creation areas around Pyford South Embankment and Pyford Brook and compensate for the non-significant loss of an additional 0.1ha of woodland from Cranberry Wood.
- 5.4.47 The amendment will result in a change in the extent and distribution of wet grassland habitat creation. Approximately 850m² of wet grassland habitat creation proposed in the original scheme will no longer be provided due to the realignment of the HS2 maintenance access. This grassland creation area formed part of the route-wide approach to compensate for loss of grassland. The small reduction in grassland habitat creation as a result of the amendment will not give rise to a new or different significant effect.
- 5.4.48 The main ES as amended by SES1, reported approximately 50.9km of new hedgerow planting across the Fradley to Colton area. Approximately 190m of hedgerow planting near Cranberry Wood, included in the original scheme, will no longer be provided as a result of the realignment of the HS2 maintenance access and the provision of woodland habitat creation at this location. In the context of the hedgerow network within the Fradley to Colton area, this reduction in hedgerow planting does not represent a new or different significant effect.
- 5.4.49 The amendment includes approximately 1.4ha of additional woodland habitat creation adjacent to Pyford South embankment, improving connectivity between Cranberry Wood and Brokendown Wood. Once established, these habitat creation measures will provide suitable bat foraging and commuting habitat. Artificial roosting provision will be provided within and adjacent to these habitat

creation areas to replace bat roosts that will be lost to construction, in accordance with the Ecological Principles of Mitigation within the SMR Addendum.

These measures will reduce the different adverse effect resulting from this amendment on the bat assemblage using the Trent and Mersey Canal and adjacent woodlands (Ravenshaw Wood, Black Slough, the Slaish and Fradley Wood) and Cranberry Wood to a level that is not significant.

- 5.4.50 The main ES reported the provision of ponds, species-rich neutral grassland and broadleaved woodland to compensate for the loss of breeding sites, foraging habitat and places of shelter used by great crested newts, including habitat creation areas near Pyford Brook. The amendment includes the provision of 1.4ha of additional woodland habitat creation adjacent to Pyford South embankment, improving connectivity between Cranberry Wood, Brokendown Wood and habitat creation areas near Pyford Brook. Once established this woodland will provide suitable terrestrial habitat for great crested newt. These measures will reduce the different adverse effect resulting from this amendment on the great crested newt metapopulation (AMP 31) west of Fradley Lock (north and south of the Trent and Mersey Canal) to a level that is not significant.

Summary of likely residual significant effects

- 5.4.51 With the implementation of the mitigation proposed, the ecological effects arising from the amendment are reduced to a level where they are not considered to be significant. The significant effects of the amendment in this area are therefore unchanged from those reported in the Phase One SES and AP2 ES and the main ES as amended by SES1.

Cumulative effects

- 5.4.52 There are no new or different likely significant cumulative effects for ecology and biodiversity as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Water resources and flood risk

Scope, assumptions and limitations

- 5.4.53 The assessment scope, key assumptions and limitations for water resources and flood risk are as set out in Volume 1, the SMR and SMR Addendum of the main ES and SMR Addendum 2 (see SES2 and AP2 ES Volume 5: Appendix CT-001-000).
- 5.4.54 This amendment has the potential to result in new or different significant construction effects only. Therefore, there is no operational assessment for water resources and flood risk.

Existing environmental baseline

- 5.4.55 The baseline water resources information for the Fradley to Colton area is as described in Volume 2, CA1, Section 15 of the main ES. Further details relating to water resources and flood risk for this area are provided in Volume 5: Appendix WR-002-001 and Appendix WR-003-001 and the Volume 5: Water resources and flood risk Map Book of the main ES.

- 5.4.56 This amendment is located near Pyford Brook, which is a high value receptor. This amendment will involve construction activities of a nature and scale that have potential water quality implications.

Future environmental baseline

Construction (2020)

- 5.4.57 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

- 5.4.58 The main ES reported no significant effects on surface water quality due to site runoff and increased pollution risk in the vicinity of this amendment. This amendment has the potential to give rise to temporary adverse impacts on surface water quality in Pyford Brook during construction of the new access under Pyford Brook viaduct. However, the amendment will be constructed in accordance with the measures specifically designed to safeguard water resources outlined in the draft Code of Construction Practice (CoCP)⁸³.
- 5.4.59 Therefore, the amendment will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the main ES.

Cumulative effects

- 5.4.60 There are no new or different likely significant cumulative effects for water resources and flood risk as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

5.5 Additional land required for the diversion of a Cadent⁸⁴ gas pipeline and a new utility compound, north of Pyford Brook (AP2-001-005)

- 5.5.1 The Bill provides for the permanent diversion of an underground National Grid Gas Distribution 600mm diameter high pressure gas pipeline for 400m, 150m north of its existing alignment. The diversion would cross beneath the HS2 route at Pyford North embankment, 400m north-west of the Pyford Brook viaduct. The diversion would pass through Kings Bromley South borrow pit, to the east and west of the HS2 route. See Map CT-06-201, D3 to D5, in the main ES Volume 2: CA1 Map Book. Works to divert the National Grid Gas Distribution pipeline would take one year to complete, commencing in 2022, and would be managed from Pyford North embankment satellite compound.

⁸³ HS2 Ltd (2017), *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, draft Code of Construction Practice (CT-003-000). Available online at <https://www.gov.uk/government/publications/draft-code-of-construction-practice-for-hs2-phase-2a>

⁸⁴ In 2017, National Grid Gas Distribution was rebranded as Cadent, which is an independent organisation. The two utility providers describe the same asset differently.

- 5.5.2 Since the submission of the Bill, further engagement with the utility provider has identified a requirement to realign the diverted pipeline, provide an additional working area to enable the connection of the new and existing pipelines, and provide a new utility compound for the management of the Cadent 600mm diameter high pressure gas pipeline diversion works.
- 5.5.3 The pipeline diversion connects to the existing pipelines at approximately the same locations as in the original scheme at the northern connection, but the southern connection will begin 15m further south than in the original scheme. Overall, the pipeline diversion will be up to 135m north of its existing alignment. At each end of the pipeline diversion, works to connect the new section of pipeline to the existing pipeline, whilst maintaining gas supply during construction, will result in the temporary requirement for an additional 0.9ha of land. See Map CT-06-201, D3 to C4, and Map CT-06-201, E5 to A1, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 5.5.4 A 30m protection zone will be required between the diverted pipeline and excavation at Kings Bromley South borrow pit, therefore reducing the footprint of the borrow pit.
- 5.5.5 A new utility compound will be provided for the management of the Cadent 600mm gas pipeline diversion works. The Common Lane utility compound will be located 450m north of Pyford Brook viaduct, within land required for the original scheme for the Kings Bromley South borrow pit. See Map CT-06-201, D3 to C4, and Map CT-06-201, E5 to A1, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 5.5.6 The Common Lane utility compound will be operational for nine months, commencing during 2023, and will support an average of 15 workers per day (20 workers at peak times). Access to the new compound will be from the A515 Lichfield Road via site haul routes and Crawley Lane and Common Lane. The diversion works will take nine months to complete, commencing in 2023. Extraction from the Kings Bromley South borrow pit will be phased around the utility works.
- 5.5.7 The working area required to enable the connection of the new and existing pipelines, is outside the limits of the Bill and will result in the requirement for an additional 0.9ha of land, some of which will be from the following agricultural holdings: Woodend Farm (CA1/2); and Land North of Lichfield (CA1/1). See Map CT-05-201, F5 to E5, in the SES2 and AP2 ES Volume 2: CA1 Map Book. It is assumed that all of the additional land will be returned to its existing use following construction.

Topics included in the AP2 assessment

- 5.5.8 The assessment of the changes to construction traffic flows and traffic related effects as a result of this AP2 amendment in combination with all SES2 changes and AP2 amendments, is reported in Section 7.
- 5.5.9 This amendment is not considered to require a reassessment of the environmental effects or mitigation as set out in the main ES, as amended by SES1 and SES2, with respect to any environmental topics.

5.6 Additional land and a change to Bill powers required to divert Common Lane to the A515 Lichfield Road (AP2-001-006)

- 5.6.1 The Bill provides for the permanent closure of Common Lane at Pyford North embankment, and accommodation access from Common Lane (South) around Pyford North embankment. The accommodation access would be provided from the Common Lane (South) closure, to the north-east of the HS2 route, and would follow parallel and to the north side of Pyford North embankment before turning south and passing beneath Kings Bromley viaduct. After passing under Kings Bromley viaduct, the access would continue in an easterly direction and to the south side of Pyford North embankment. The accommodation access would be 840m in length and 3.5m in width.
- 5.6.2 An HS2 maintenance access would also be provided along part of the existing A515 Lichfield Road, south of the HS2 route, to provide access to Bourne Brook auto-transformer station, sharing a short section of the access around Pyford North embankment. See Map CT-06-202, F6 to F7, in the main ES Volume 2: CA1 Map Book.
- 5.6.3 In addition, an access track would be provided between the A515 Lichfield Road diversion and the current A515 Lichfield Road for agricultural access under Kings Bromley viaduct, located 1km south of the junction between the A515 Lichfield Road and A513 Rugeley Road. See Map CT-06-202, D6 to D5, in the main ES Volume 2: CA1 Map Book.
- 5.6.4 Since the submission of the Bill, there has been further design refinement to address concerns in the area relating to vehicular movements. Following further consultation with Staffordshire County Council and local stakeholders, it has been identified that there is a need to maintain vehicular access across Common Lane to avoid agricultural traffic associated with local farm holdings and vehicles associated with local businesses passing through the village of Kings Bromley and close to Richard Crosse Primary School. A diversion of Common Lane is proposed, to the north-east of the HS2 route, to provide public vehicular access between the A515 Lichfield Road and Common Lane.
- 5.6.5 The diverted Common Lane will replace the accommodation access track to the north of Pyford North embankment, and a new junction will be provided to maintain agricultural and bridleway access beneath Kings Bromley viaduct. New culverts will be provided to cross Bourne Brook. The Common Lane diversion will then continue north-west towards the A515 Lichfield Road, to a new junction 360m south of the junction between the A515 Lichfield Road and the A513 Rugeley Road. See Map CT-06-202, H4 to B3, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 5.6.6 Approximately 290m of hedgerow will be provided along the Common Lane diversion.
- 5.6.7 The access track from the A515 Lichfield Road diversion under Kings Bromley viaduct will no longer be required with the Common Lane diversion, and so the track will be removed and replaced with a new field access off the Common Lane

diversion. See Map CT-06-202, D5, in the SES2 and AP2 ES Volume 2: CA1 Map Book.

- 5.6.8 A new junction will be provided between the existing Common Lane and the Common Lane diversion to maintain the access to Barn Farm, replacing the Common Lane (South) closure. See Map CT-06-202, G4, in the SES2 and AP2 ES Volume 2: CA1 Map Book. A bridleway will be provided along this route, to provide a shorter connection for non-motorised users.
- 5.6.9 Construction of the Common Lane diversion will be managed from Pyford North embankment satellite compound. This amendment will take one year and three months to complete, commencing in 2021. Due to the proximity to the borrow pit excavation and other construction works, the road will remain closed for the duration of the construction period. HS2 Ltd will work to open the road as soon as reasonably practicable.
- 5.6.10 The land required to construct the Common Lane diversion is outside of the limits of the Bill. This will result in a change to Bill powers and the requirement for an additional 0.5ha of land, some of which will be from the following agricultural land holdings: Common Lane Farm (CA1/5); and Woodend Farm (CFA1/2)). See Map CT-06-202, H4 to B3, in the SES2 and AP2 ES Volume 2: CA1 Map Book. It is assumed that 0.1ha of the additional land will be returned to its existing use following construction.

Local alternatives

- 5.6.11 The main local alternatives for improving connectivity around Common Lane are summarised in this section. Options were considered following consultation with stakeholders and were compared to the original scheme at the time of appraisal.
- 5.6.12 A preliminary options appraisal was undertaken of seven options, of which the following three options were not taken forward for further consideration since they were not considered to be reasonable alternatives:
- Options 1 and 2 included the realignment of Common Lane via an overbridge over Pyford North embankment. Due to the height required to maintain headroom beneath the bridge, the road would be a highly prominent feature in the landscape. These options were also considerably more intrusive, technically challenging and costly than other identified options; and
 - Option 4 would provide a diversion of Common Lane to the A515 Lichfield Road. This option was very similar to Option 3 and would not provide any additional benefit, and therefore it was not progressed further.
- 5.6.13 The following four options were taken forward to a more detailed appraisal where engineering and construction feasibility, cost and environmental impacts were further considered:
- Option 3 (AP2 revised scheme): Common Lane would be diverted to the north-east of the HS2 route, connecting to the existing A515 Lichfield Road and then to the A515 Lichfield Road realignment. There would be a junction between Common Lane and an accommodation access track which would

then pass beneath Kings Bromley viaduct to maintain connectivity for
bridleway users and agricultural access around Pyford North embankment;

- Option 5: Common Lane would be realigned beneath Pyford North embankment via an underbridge, 25m north-west of the existing Common Lane. A highways drainage pumping station to the south-west of the HS2 route would be required for the road, which would be below the surrounding ground level and at risk of flooding. No accommodation access would be provided around Pyford North embankment and beneath Kings Bromley viaduct;
- Option 6: Common Lane would be diverted around Pyford North embankment and beneath Kings Bromley viaduct, along a similar route as the agricultural access proposed as part of the original scheme. The crossing under Kings Bromley viaduct would be restricted to 4.8m, which is less than the 5.7m required for public highways. The accommodation access would no longer be provided as access would be provided along Common Lane; and
- Option 7: An alternative east-west route would be provided, from a roundabout at the junction of A513 Rugeley Road and A515 Lichfield Road, which would be provided permanently rather than temporarily as set out in the original scheme, connecting to Crawley Lane via a new road. The accommodation access would be provided as in the original scheme.

5.6.14 Option 3 was identified as the preferred option as on balance it presented the most favourable option from a maintenance, cost and construction perspective, whilst only being a minor increase in the environmental impact in comparison to the original scheme. Option 5 would provide greater environmental benefits overall, however, when compared to Option 3 the benefits were not considered sufficient to justify the increase in flood risk, requirements for a highway pumping station and increased construction complexity. Option 6 would result in increased environmental impacts compared to Options 3 and 5 as well as introducing a restricted headroom and the need for a public vehicle route through the site during construction of the Pyford North embankment. Option 7 would also introduce greater environmental impacts compared to Options 3, particularly in relation to buried heritage assets at Crawley deserted settlement (FRC031), as well as increasing the land required for construction and increasing construction complexity due to utilities and culverts at the tie-ins.

5.6.15 The analysis of engineering, cost and potential environmental impacts associated with the options is set out below, with the impacts of the preferred option presented first.

Option 3

5.6.16 In comparison to the original scheme, Option 3 would increase connectivity for motorised road users and remove the permanent severance impact on non-motorised users from the permanent closure of Common Lane, although it was considered that there may be a need for traffic management during construction. Option 3 would remove the need for any additional traffic, including heavy goods vehicles (HGV), to access/egress the area via Crawley Lane and the

junction with the A515 Lichfield Road. It would also remove the conflict with parked vehicles on Crawley Lane. There is also a reduced risk of contamination at Barn Farm in comparison to the original scheme due to avoidance of an area of potential contaminated land.

- 5.6.17 Option 3 would increase the impact on three farms, requiring 1.2ha of additional land from Common Lane Farm, 1.4ha from Common Farm and 0.1ha from Woodend Farm. Most of the land required from Common Lane Farm and Common Farm is associated with severed land parcels, which would be too small to be agriculturally viable and therefore the impact of the loss of this land on these holdings would be similar to the original scheme. Option 3 would impact on a Roman cropmark record (FRC020) due to the additional land required for construction. Vibration impacts from construction at Barn Farm would remain as reported in the main ES.
- 5.6.18 Option 3 would require an additional road crossing of Bourne Brook and associated flood plain, compared to the original scheme. The loss of floodplain, if not mitigated, would increase flood risk, including along the new road. Construction works associated with this road crossing have the potential to impact on ecological habitat and aquatic species and wildlife found along the Bourne Brook corridor. There would also be additional loss of hedgerow along Common Lane.
- 5.6.19 There would be traffic movements along Common Lane, which would result in increased noise impacts on residential properties alongside the road, when compared to the closure of Common Lane in the original scheme.
- 5.6.20 Option 3 does not introduce high levels of technical or construction complexity, risk of safety hazards or lengthening of the construction programme as set out in the main ES. This option would result in additional cost compared to the original scheme due to the construction of the new road and the permanent requirement for additional land.

Option 5

- 5.6.21 In comparison to Option 3, the alignment of Common Lane in Option 5 is closer to its existing alignment and would reduce the journey distance for non-motorised and motorised users.
- 5.6.22 Option 5 would require less land from agricultural holdings compared to Option 3. Land would only be required from Common Lane Farm and the area permanently required (0.7ha) would be less than that required in Option 3. No land would be required from Common Farm or Woodend Farm with this option. Option 5 has the potential to reduce vibration impacts at Barn Farm during construction as the realignment of Common Lane is further away from this property, however vibration impacts would only be short-term in Option 3.
- 5.6.23 Option 5 would introduce a new crossing beneath the HS2 route via the provision of an underbridge. This would result in Common Lane being below the surrounding ground-level, which would be at risk of flooding. A new highway drainage pumping station would be required to mitigate this risk.

- 5.6.24 Option 5 increases the technical and construction complexity due to the proximity to the existing highway, impacts on construction traffic routes for the movement of excavated material, and requires a new highways drainage pumping station. This option would result in additional cost compared to Option 3 due to construction of the underbridge, construction and maintenance of the new highways drainage pumping station and the permanent requirement for additional land.

Option 6

- 5.6.25 It was considered that Option 6 would require the temporary closure of Common Lane to construct Pyford North embankment and Kings Bromley viaduct, whereas at the time of comparison it was not considered that Option 3 would require temporary closure. This closure would result in an increase in travel distance for vehicle occupants (of up to 4km for general traffic) and result in traffic congestion and delay. During operation, Option 6, like Option 3, would remove the need for any additional traffic, to access/egress the area via Crawley Lane and the junction with the A515 Lichfield Road. However, with Option 6, the headroom clearance beneath Kings Bromley viaduct would be restricted, which may increase the risk of accidents.
- 5.6.26 Option 6 would require less land from agricultural holdings compared to Option 3, however the area of land required permanently from Common Lane Farm would increase (to 2.1ha). Option 6 would avoid impacts to aquatic species and wildlife at Bourne Brook and there would no increase in local flood risk as the Bourne Brook main channel and associated floodplain would be avoided.
- 5.6.27 Option 6 would also increase the impact on the local landscape character and visual impacts compared to Option 3. This would be due to the increased visual prominence of the realigned highway beneath Kings Bromley viaduct which would be evident in mid-range views from properties in Rileyhill and recreational users of King's Bromley Footpath 12.
- 5.6.28 Option 6 would require land for construction from an area of potential contaminated land near Barn Farm, which may increase the risk of creating contamination pathways. This option would result in a reduced cost compared to Option 3.

Option 7

- 5.6.29 Option 7 would require less land from agricultural holdings compared to Option 3, requiring 0.6ha from Common Farm permanently. No land would be required from Common Lane Farm or Woodend Farm. To connect to Common Lane, a section of Crawley Lane (which is single-track) would be required, which is not impacted with Option 3. This track is used by two farms as well as the industrial units at Woodgate Farm. Due to the potential for traffic conflict between the farms and additional traffic along Crawley Lane and Common Lane, and the distance from the access onto the severed parcels of land at Common Lane, this option would increase agricultural severance impacts on both Common Lane Farm and Barn Farm in comparison to Option 3.

- 5.6.30 Option 7 would avoid impacts to aquatic species and wildlife at Bourne Brook and there would be no increase in local flood risk, as the Bourne Brook main channel and associated floodplain would be avoided. However, in Option 7 the new road would be within the Crawley Brook floodplain, resulting in the loss of floodplain and an increase in flood risk on the proposed road.
- 5.6.31 Option 7 would increase the extent of a mineral safeguarding area (MSA) resource that would be permanently sterilised through inaccessibility under the road. Option 7 would have a greater impact on heritage assets when compared to Option 3. The impact on a roman cropmark record (FRC020) would increase and additionally there would be an impact on the remains of Crawley deserted settlement (FRC031).
- 5.6.32 Option 7 does not introduce any technical or construction complexities, risk of safety hazards or lengthening of the construction programme compared to Option 3. This option would result in a reduced cost compared to Option 3.

Interaction with the lowering of the Kings Bromley viaduct

- 5.6.33 The conclusion of this options appraisal remains unchanged when considered cumulatively with the SES2 design change, SES2-001-003 to lower Kings Bromley viaduct, Bourne embankment and River Trent viaduct. Option 3 remains the preferred option. Issues relating to headroom restrictions highlighted in the appraisal of Options 5 and 6 would be exacerbated by the route lowering, which would make these options less feasible.

Topics included in the AP2 assessment

- 5.6.34 This amendment is considered to require reassessment of the environmental effects and mitigation in the main ES, as amended by SES1 and SES2, for the following topics: air quality; traffic and transport; and water resources and flood risk.
- 5.6.35 The assessment of the changes to construction traffic flows and traffic related effects as a result of this AP2 amendment in combination with all SES2 changes and AP2 amendments, is reported in Section 7.

Air quality

Scope, assumptions and limitations

- 5.6.36 The assessment scope, key assumptions and limitations for air quality are as set out in Volume 1, the Scope and Methodology Report⁸⁵ (SMR) and SMR Addendum⁸⁶ of the main ES.

⁸⁵ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report (Appendix CT-001-001). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

⁸⁶ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report (Appendix CT-001-001). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

- 5.6.37 This amendment has the potential to result in new or different significant temporary construction effects only. Therefore, there is no operational permanent construction or assessment for air quality.

Environmental baseline

- 5.6.38 The baseline air quality information for the Fradley to Colton area is as described in Volume 2, CA1, Section 5 of the main ES. The updated background pollutant concentrations from the Department for Environment, Food and Rural Affairs (Defra) have only minor changes compared to the information used in the main ES.

Future environmental baseline

Construction (2020)

- 5.6.39 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 5.6.40 No avoidance or mitigation measures additional to those reported in the main ES and draft Code of Construction Practice (CoCP)⁸⁷ are required.

Assessment of impacts and effects

- 5.6.41 The main ES reported no significant effects on air quality from dust generating activities in this area. With the application of the mitigation measures, as set out in the draft CoCP, no significant effects are anticipated from dust generating activities associated with this amendment. Therefore, this amendment will not give rise to any new or different likely residual significant effects and will not change the level of significance of the effects reported in the main ES. For further information see SES2 and AP2 ES Volume 5: Appendix AQ-001-001.

Cumulative effects

- 5.6.42 There are no new or different likely significant cumulative effects for air quality as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Traffic and transport

Scope, assumptions and limitations

- 5.6.43 The assessment scope, key assumptions and limitations for traffic and transport are as set out in Volume 1, the SMR and SMR Addendum of the main ES.

⁸⁷ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, draft Code of Construction Practice (CT-003-000). Available online at <https://www.gov.uk/government/publications/draft-code-of-construction-practice-for-hs2-phase-2a>

- 5.6.44 This amendment has the potential to result in new or different significant construction and operational effects for traffic and transport. Therefore, both construction and operational phases are considered in this assessment.
- 5.6.45 The assessment of the changes to construction traffic flows as a result of this amendment in combination with all SES2 changes and AP2 amendments is reported in Section 7.

Existing environmental baseline

- 5.6.46 The baseline traffic and transport information for the Fradley to Colton area is as described in Volume 2, CA1, Section 14 of the main ES.
- 5.6.47 The A515 Lichfield Road, which connects Kings Bromley with Lichfield, is a primary 'A' road in the Fradley to Colton area and can get busy at peak times and delays can be experienced.
- 5.6.48 Common Lane is an unclassified local road in the area, which is lightly trafficked and provides access from the A515 Lichfield Road to a number of residential properties and farm buildings south of Kings Bromley. The local road network in this area generally operates well although some localised delays can be experienced, particularly at peak times, where the local network meets the main road network.

Future environmental baseline

Construction (2023) and operation (2027 and 2041)

- 5.6.49 The future baseline for construction in 2023 and operation in 2027 and 2041 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 5.6.50 No avoidance or mitigation measures additional to those reported in the main ES and draft CoCP are required.

Assessment of impacts and effects

- 5.6.51 The main ES reported that Common Lane would be intersected by the HS2 route and a section would be permanently stopped-up on both sides of the route. The stopping-up would lead to an increase in travel distance for vehicle occupants of up to 4km for general traffic and result in a permanent minor adverse traffic delay significant effect, due to increased journey times for vehicle occupants.
- 5.6.52 The amendment provides a new connection for Common Lane to the A515 Lichfield Road. Due to the proximity to the borrow pit excavation and other construction works, the connection will not be available until the completion of the construction period. During the closure of the Common Lane diversion, Common Lane would still be intersected by the HS2 route and a section will be permanently stopped-up on both sides of the route. This will lead to an increase

in travel distance for vehicle occupants of Common Lane of up to 4km for general traffic and result in a temporary minor adverse traffic delay effect, due to increased journey times for vehicle occupants, which is significant.

- 5.6.53 For further information see SES2 and AP2 ES Volume 5: Appendix TR-001-000 and BID document BID-TR-001-000 that accompanies the SES2 and AP2 ES.

Mitigation and residual effects

Other mitigation measures

- 5.6.54 No mitigation measures additional to those reported in the main ES and draft CoCP are required.

Summary of likely residual significant effects

- 5.6.55 This amendment will give rise to a new likely residual significant temporary minor adverse traffic delay effect on vehicle occupants of Common Lane due to increased journey times.

Cumulative effects

- 5.6.56 There are no new or different likely significant cumulative effects for traffic and transport as a result of the amendment acting in combination with any other AP2 amendments, AP1 amendments or any relevant committed development.

Effects arising from operation

Avoidance and mitigation measures

- 5.6.57 No avoidance or mitigation measures additional to those reported in the main ES are required.

Assessment of impacts and effects

- 5.6.58 The main ES reported the permanent stopping-up of Common Lane, either side of the HS2 route. Vehicles would be diverted via Crawley Lane which would result in an increased journey distance of up to 4km for vehicle users of Common Lane and give rise to a minor adverse significant traffic delay effect.
- 5.6.59 The main ES further reported that the stopping-up of Common Lane would increase the travel distance for non-motorised users by up to 2.5km which would give rise to a moderate adverse significant severance effect.
- 5.6.60 Following construction, the amendment will provide for vehicular access to Common Lane from the A515 Lichfield Road, via the Common Lane diversion, removing the need for vehicles to be diverted via Crawley Lane. The amendment will reduce the diversion distance for vehicle occupants from up to 4km, to up to 1.2km and remove the minor adverse significant traffic delay effect reported in the main ES for users of Common Lane.
- 5.6.61 Connectivity across the HS2 route will be provided for non-motorised users and agricultural vehicles via a new bridleway which extends from the Common Lane (South) closure, south of the HS2 route, to the junction with the Common Lane

diversion. Other vehicular traffic, south of the Hs2 route, remains diverted to the A515 Lichfield Road. The amendment will reduce the diversion distance for non-motorised users from up to 2.5km to up to 700m. Therefore, this amendment will not give rise to any new or different likely residual significant effects and will not change the level of significance of the effects reported in the main ES.

- 5.6.62 For further information see SES2 and AP2 ES Volume 5: Appendix TR-001-000, and the SES2 and AP2 ES Volume 5 Map Book.

Mitigation and residual effects

Other mitigation measures

- 5.6.63 No mitigation measures additional to those reported in the main ES have been identified.

Summary of likely residual significant effects

- 5.6.64 The amendment will remove the likely residual minor adverse significant traffic delay effect for users of Common Lane, reported in the main ES.

Cumulative effects

- 5.6.65 There are no new or different likely significant cumulative effects for traffic and transport as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Monitoring

- 5.6.66 Volume 1 of the main ES sets out the general approach to environmental monitoring during operation of the original scheme.
- 5.6.67 There are no changes to the monitoring requirements identified in the main ES for traffic and transport as a result of this amendment.

Water resources and flood risk

Scope, assumptions and limitations

- 5.6.68 The assessment scope, key assumptions and limitations for water resources and flood risk are as set out in Volume 1, the SMR and SMR Addendum of the main ES and SMR Addendum 2 (see SES2 and AP2 ES Volume 5: Appendix CT-001-000).
- 5.6.69 This amendment has the potential to result in new or different temporary and permanent construction effects only. Therefore, there is no operational assessment for water resources and flood risk.
- 5.6.70 In undertaking the assessment, it was identified that the hydraulic model used to assess flood risk uses Light Detection and Ranging (LiDAR) data and includes several interpolated channel cross-sections. This information will be verified on site prior to detailed design commencing. Where data are limited, a precautionary baseline has been built up. This constitutes a 'reasonable worst case' basis for the subsequent assessment.

- 5.6.71 The precautionary approach to the assessment that has been adopted identifies the likely significant environmental effects of the AP2 revised scheme.

Existing environmental baseline

- 5.6.72 The baseline water resources and flood risk information for the Fradley to Colton area is as described in Volume 2, CA1, Section 15 of the main ES. Further details relating to water resources and flood risk for this area are provided in Volume 5: Appendix WR-002-001 and Appendix WR-003-001, and the Volume 5: Water resources and flood risk Map Book of the main ES. An updated flood risk assessment is provided in SES2 and AP2 ES Volume 5: Appendix WR-003-001.
- 5.6.73 The study area includes extensive areas of floodplain associated with Bourne Brook. Land use within the floodplain principally comprises agricultural land, which is of moderate sensitivity to increases in flood risk.
- 5.6.74 Bourne Brook itself is a high value receptor and there are several licensed abstractions from the brook, all of which are sensitive to the impacts of pollution. Construction works are of a nature and scale that could impact water quality.

Future environmental baseline

Construction (2020)

- 5.6.75 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 5.6.76 No avoidance or mitigation measures additional to those reported in the main ES and the draft CoCP are required.

Assessment of impacts and effects

- 5.6.77 The main ES reported no significant effects on surface water quality due to site runoff and increased pollution risk in the vicinity of the amendment. This amendment has the potential to give rise to temporary adverse impacts on surface water quality in Bourne Brook and abstractions from this watercourse. However, the amendment will be constructed in accordance with the measures specifically designed to safeguard water resources outlined in the draft CoCP, which includes a range of measures to safeguard water resources. The amendment will not give rise to a new or different significant effect related to water quality.
- 5.6.78 A moderate adverse permanent significant effect related to flood risk on Bourne Brook in this area was reported in the main ES. Bourne Brook will be culverted where Common Lane passes over the channel. This amendment will increase peak flood levels in the Bourne Brook channel and its floodplain, inundating a larger area of farmland than under existing conditions. Details of this are provided in the SES2 and AP2 ES Volume 5: Appendix WR-002-000 and WR-003-000.

The amendment will give rise to a different significant effect but will not change the level of significance of the effects reported in the main ES.

- 5.6.79 The diversion of Common Lane over Bourne Brook will have a minor permanent impact on the hydromorphology of Bourne Brook, which is a high value receptor. Details of this are provided in SES2 and AP2 ES Volume 5: Appendix WR-001-000 Addendum to the Water Framework Directive Compliance Assessment. This results in a new moderate adverse effect, which is significant.

Mitigation and residual effects

Other mitigation measures

- 5.6.80 As the hydraulic model of Bourne Brook is developed further and the detailed design refined, the flood risk issues on Bourne Brook floodplain related to this culvert will be considered in more detail. Local widening of the channel, use of a bridge as opposed to a culvert and/or local widening of the channel may be required to mitigate the flood risk impacts. This work will be undertaken in consultation with the Environment Agency and, if any residual effects are identified, with the affected landowners.
- 5.6.81 The culvert will be designed in line with environmental avoidance and mitigation principles for structures of this kind included in the original scheme. However, given the high value of Bourne Brook, this mitigation will be developed further during the detailed design stage in consultation with the Environment Agency.

Summary of likely residual significant effects

- 5.6.82 The amendment will give rise to one different and one new likely residual permanent significant effect. These are:
- a different moderate adverse permanent effect on flood risk in the Bourne Brook floodplain, which is significant; and
 - a new moderate adverse permanent effect related to the hydromorphological impacts of the installation of a new culvert on Bourne Brook, which is significant.
- 5.6.83 It is anticipated that means of mitigating these impacts will be developed, to ensure that there are no residual significant effects arising from construction of the amendment.

Cumulative effects

- 5.6.84 There are no new or different likely significant cumulative effects for water resources and flood risk as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Summary of new or different likely residual significant effects as a result of the amendment

5.6.85 During construction, the amendment will give rise to a new likely residual significant temporary minor adverse traffic delay effect on vehicle occupants of Common Lane due to increased journey times. During operation, the amendment will remove the likely residual minor adverse significant traffic delay effect for users of Common Lane, reported in the main ES.

5.6.86 During construction, the amendment will give rise to different likely residual adverse significant effect on flood risk in the Bourne Brook floodplain, as there will be an increase in peak flood levels, and a new likely residual moderate adverse permanent significant effect related to the hydromorphological impacts of the installation of a new culvert on Bourne Brook.

5.7 Additional land required for the amendment to a National Grid Electricity Transmission 400kV overhead power line and a new utility compound, near Kings Bromley viaduct (AP2-001-007)

5.7.1 The Bill provides for the permanent raising of an 800m section of a National Grid Electricity Transmission 400kV overhead power line by 14m, along its existing alignment, to cross the HS2 route at Kings Bromley viaduct. See Map CT-05-202-L2, F6, to Map CT-06-202-R2, D9, in the main ES Volume 2: CA1 Map Book. Access to the existing pylons would be from Crawley Lane, along a temporary access through existing woodland, adjacent to Kings Bromley Footpath 11 and The Old Farmhouse. See Map CT-05-202-R1, E7, in the main ES Volume 2: CA1 Map Book. Works associated with the raising of the National Grid Electricity Transmission would take nine months to complete, commencing in 2021, and would be managed from Bourne embankment satellite compound.

5.7.2 The works to raise the power line would include the direct replacement of an existing pylon closest to Kings Bromley viaduct with a new pylon, 12m taller than currently exists, to provide sufficient clearance between the power line and the overhead infrastructure along Kings Bromley viaduct. See Map CT-05-202, E6, in the main ES Volume 2: CA1 Map Book. During installation of the new pylon, access would be required to the existing pylons along the route for earthing purposes and cable replacement works to enable the overhead line to be raised. A temporary pylon diversion would be provided to enable the raising of the existing pylon.

5.7.3 Since submission of the Bill, a requirement has been identified, through further engagement with the utility provider, to reposition the new pylon to the north-east of Kings Bromley viaduct rather than to the south-east, as proposed in the original scheme. The height of the replacement pylon will be unchanged. See Map CT-06-202, E5, in the SES2 and AP2 ES Volume 2: CA1 Map Book. Either side of the A515 Lichfield Road realignment, 1.7ha of additional land will be required for laydown and working areas around the temporary pylon.

- 5.7.4 Access to the existing pylons, for earthing and cable replacement works, will be from the A513 Alrewas Road, via Eastfields Farm house, to the north of the HS2 route, as set out in the main ES. The temporary access will require 0.1ha of additional land at Eastfields Farm and within the highway, which was not included in the original scheme, to ensure sufficient turning room for construction vehicles within and into the farm. See Map CT-06-202-R2, F8 to F9 and F7 to E8, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 5.7.5 The land required for access adjacent to Kings Bromley Footpath 11 and The Old Farmhouse, in the original scheme, will be reduced by 0.2ha following a review of access requirements, resulting in a reduction in the loss of woodland compared to the original scheme. See CT-05-202-R1, E7, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 5.7.6 A new utility compound will be provided for the management of the works associated with the raising of the National Grid Electricity Transmission 400kV overhead power line. The Lichfield Road utility compound will be located 300m north-east of Kings Bromley viaduct, within land required for the original scheme. See CT-05-202, E2 to E3, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 5.7.7 The Lichfield Road utility compound will be operational for six months, commencing during 2021, and will support an average of 30 workers per day (45 workers at peak times). Access to the new compound will be from the A515 Lichfield Road via the new temporary access. The diversion works will take six months to complete, commencing in 2021.
- 5.7.8 The new temporary access and working area are outside the limits of the Bill and will result in the requirement for an additional 1.8ha of land, some of which will be from Moreton Farm (CA2/2). See Map CT-05-202, D6 to D7, and Map CT-05-202-R2, F8 to E7, in the SES2 and AP2 ES Volume 2: CA1 Map Book. It is assumed that all of the additional land will be returned to its existing use following construction.

Topics included in the AP2 assessment

- 5.7.9 This amendment is considered to require reassessment of the environmental effects and mitigation in the main ES, as amended by SES1 and SES2, for cultural heritage; ecology and biodiversity; and water resources and flood risk.
- 5.7.10 The assessment of the changes to construction traffic flows and traffic related effects as a result of this AP2 amendment in combination with all SES2 changes and AP2 amendments, is reported in Section 7.

Cultural heritage

Scope, assumptions and limitations

- 5.7.11 The assessment scope, key assumptions and limitations for cultural heritage are as set out in Volume 1, the Scope and Methodology Report⁸⁸ (SMR) and SMR Addendum⁸⁹ of the main ES and SMR Addendum 2 (see SES2 and AP2 ES Volume 5: Appendix CT-001-000).
- 5.7.12 As the cultural heritage impacts of the amendment are not reversible, they therefore have the potential to result in new or different significant permanent construction effects only. Therefore, there is no temporary construction or operational assessment for cultural heritage.

Existing environmental baseline

- 5.7.13 The baseline cultural heritage information for the Fradley to Colton area is as described in Volume 2, CA1, Section 7 of the main ES.
- 5.7.14 A cropmark complex at Bourne Brook (FRCo20), an asset of moderate value, lies partially within the land required for the amendment.
- 5.7.15 Further information about this asset is provided in the main ES Volume 5: Appendix CH-001-001 and Map Series CH-01 in the main ES Volume 5: Cultural heritage Map Book.

Future environmental baseline

Construction (2020)

- 5.7.16 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 5.7.17 No avoidance or mitigation measures, additional to those reported in the main ES and draft Code of Construction Practice⁹⁰ (CoCP), are identified.

Assessment of impacts and effects

- 5.7.18 The main ES reported a permanent major adverse significant effect on the cropmark complex at Bourne Brook (FRCo20), a non-designated asset of moderate value. The additional land required for works associated with the temporary pylon diversion will impact further upon archaeological features within

⁸⁸ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report (Appendix CT-001-001). Available online at : <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

⁸⁹ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report Addendum (Appendix CT-001-002). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

⁹⁰ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, draft Code of Construction Practice (CT-003-000). Available online at <https://www.gov.uk/government/publications/draft-code-of-construction-practice-for-hs2-phase-2a>

the complex, removing an enclosure and part of a possible prehistoric trackway. This will give rise to a different significant effect, however this will not change the level of significance of the effects reported in the main ES.

- 5.7.19 For further information see Map Series CH-01 in the SES2 and AP2 ES Volume 5: Appendix CH-003-000 and the SES2 and AP2 ES Volume 5: Cultural heritage Map Book.

Mitigation and residual effects

Other mitigation measures

- 5.7.20 No mitigation measures additional to those reported in the main ES and draft CoCP are identified.

Summary of likely residual significant effects

- 5.7.21 The additional land required to relocate an existing pylon will give rise to a different likely residual permanent significant effect on the cropmark complex at Bourne Brook (FRCo20), by removing further archaeological features within the complex. However, this will not change the level of significance of the effects reported in the main ES.

Cumulative effects

- 5.7.22 There are no new or different likely significant cumulative effects for cultural heritage as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Ecology and Biodiversity

Scope, assumptions and limitations

- 5.7.23 The assessment scope, key assumptions and limitations for ecology and biodiversity are as set out in Volume 1, the SMR and SMR Addendum of the main ES and SMR Addendum 2 (see SES2 and AP2 ES Volume 5: Appendix CT-001-000).
- 5.7.24 This amendment has the potential to result in new or different significant construction effects only. Therefore, there is no operational assessment for ecology and biodiversity.
- 5.7.25 Where data are limited, a precautionary baseline has been built up according to the guidance provided in the SMR and SMR Addendum. This constitutes a 'reasonable worst case' basis for the subsequent assessment.
- 5.7.26 The precautionary approach to the assessment that has been adopted identifies the likely significant environmental effects of the amendment.

Existing environmental baseline

- 5.7.27 The ecological baseline of the area subject to the amendment has been based on field data collated for the main ES and SES1, aerial photography, and relevant

information from regional and local sources. In addition, the baseline has been informed by additional Phase 1 habitat survey.

- 5.7.28 A summary of the baseline information relevant to the assessment of the amendment is provided below. Further detail on the relevant new or updated baseline information is provided in BID-EC-019-000, including Map Series EC-02 which accompanies the SES2 and AP2 ES.
- 5.7.29 For those receptors described in the main ES, further details are provided in Volume 2, CA3, Section 8, and Volume 5: Appendix EC-001-000, including Map Series EC-01. Baseline ecology reports that accompanied the main ES are provided in BID-EC-002-000 to BID-EC-014-000, including Map Series EC-02 to EC-12⁹¹.
- 5.7.30 For those receptors described in SES1, further details are provided in Volume 2, CA3, Section 3. The baseline ecology report that accompanied SES1 and AP1 ES is provided in BID EC-004-000, including Map Series EC-02, EC-04, EC-05, EC-10, EC-11 and EC-12⁹².

Designated sites

- 5.7.31 There is one Biodiversity Alert Site (BAS) of relevance to the assessment of the amendment, which is of district/borough value. Riley Hill BAS, covering an area of approximately 5.7 ha, comprises a large pool and a narrow band of broadleaved woodland also known as Shaw Lane Gap Wood. Riley Hill BAS is located off Shaw Lane adjacent to the area subject to the amendment.

Habitats

- 5.7.32 Habitats within or immediately adjacent to the area subject to the amendment include broadleaved woodland, arable, hardstanding, hedgerows, and a watercourse. The habitats of potential relevance to the assessment of the amendment are described below in further detail.
- 5.7.33 Semi-natural broadleaved woodland is present at Shaw Lane Gap Wood, which forms part of Riley Hill BAS. This woodland is assumed to qualify as lowland mixed deciduous woodland, a habitat of principal importance listed under the provisions of Section 41 of the Natural Environment and Rural Communities (NERC) Act (2006)⁹³ and a conservation priority of the Staffordshire Biodiversity Action Plan⁹⁴ (BAP). The woodland at Shaw Lane Gap Wood is located immediately adjacent to the area subject to the amendment. The woodland is of district/borough value.

⁹¹ HS2 Ltd (2017). *High Speed Two (HS2) Phase 2a (West Midlands – Crewe), Background Information and Data*, Available online at: <https://www.gov.uk/government/publications/hs2-phase-2a-background-information-and-data-ecology-and-biodiversity>

⁹² HS2 Ltd (2018). *High Speed Two (HS2) Phase 2a (West Midlands – Crewe), Background Information and Data*, Supplementary ecological baseline data (BID EC-004-000), Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/692664/G33_Ecological_baseline_BID-EC-004-000_WEB.pdf

⁹³ Natural Environment and Rural Communities Act 2006. Available online at: <http://www.legislation.gov.uk/ukpga/2006/16/section/41>

⁹⁴ Staffordshire Biodiversity Partnership. Staffordshire Biodiversity Action Plan. Available online at: <http://www.sbap.org.uk/>

- 5.7.34 Hedgerows within the area subject to the amendment are assumed to be predominantly species-rich. Hedgerow with at least 80% cover of native woody which is a habitat of principal importance and a conservation priority of the Staffordshire BAP. These contribute towards a wider hedgerow network within the Fradley to Colton area that is of county value.
- 5.7.35 An unnamed tributary of the River Trent is present to the north of Alrewas Road directly adjacent to the area subject to the amendment. The unnamed tributary is of up to local/parish value.

Species

- 5.7.36 Protected and/or notable species that are known or assumed to occur within the area subject to the amendment include bats, otter, badger, polecat, harvest mouse, European hedgehog, brown hare and common reptile species.
- 5.7.37 The main ES reported a bat assemblage using habitats south of Kings Bromley Pits (including Rileyhill, woodlands near Shaw Lane, Tomlinson's Spinney, land around Kings Bromley Marina and at Westfield Covert). Field surveys in this area recorded roosting brown long-eared bats and soprano pipistrelle, and foraging and commuting soprano pipistrelle, Myotis species and noctule bats. Particularly high levels of common and soprano pipistrelle activity were recorded at the woodland along Shaw Lane. The area subject to the amendment contains potential bat roosting, foraging and commuting habitats that are likely to be used by this assemblage. The bat assemblage includes several species of principal importance and other species that are conservation priorities of the Staffordshire BAP. The bat assemblage using habitats south of Kings Bromley Pits (including Rileyhill, woodlands near Shaw Lane, Tomlinson's Spinney, land around Kings Bromley Marina and at Westfield Covert) is of county value.
- 5.7.38 The main ES reported assumed otter populations using the major and minor watercourses in the Fradley to Colton area. The area subject to the amendment is directly adjacent to a tributary of the River Trent and this watercourse and associated habitats are likely to offer shelter, foraging and dispersal opportunities for otter. Otter is an Annex 2⁹⁵ species, a species of principal importance and conservation priority of the Staffordshire BAP. The assumed otter population associated with the River Trent (and tributaries) is of district/borough value.
- 5.7.39 The main ES, as amended by SES1, reported at least 10 social groups of badger, identified through field surveys, throughout the Fradley to Colton area. The area subject to the amendment includes suitable sett building and foraging habitats for badgers. The badger populations throughout the Fradley to Colton area are of local/parish value.
- 5.7.40 The main ES reported populations of other mammals including polecat, harvest mouse, European hedgehog and brown hare, identified through desk study records, as being potentially present throughout the Fradley to Colton area. The

⁹⁵ Annex 2 of the EU's Habitats Directive (1992) lists priority species whose conservation requires the designation of Special Areas of Conservation.

area subject to the amendment includes habitats that are suitable for these species. If present, these populations are of local/parish value.

Future environmental baseline

Construction (2020)

- 5.7.41 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 5.7.42 The assessment assumes implementation of the measures set out within the draft CoCP.
- 5.7.43 No avoidance or mitigation measures additional to those reported in the main ES, SES1 and draft CoCP are required.

Assessment of impacts and effects

- 5.7.44 All of the effects within this section are reported in the absence of other mitigation.

Designated sites

- 5.7.45 The main ES reported the potential loss of 0.3ha (5%) of woodland within Riley Hill BAS, which would result in a permanent adverse effect on the structure and function of the BAS that is significant at the district/borough level. The amendment will not result in the loss of additional woodland habitat within Riley Hill BAS. The amendment will not give rise to a different significant effect on Riley Hill BAS and will not change the level of significance of the effects reported in the main ES.

Habitats

- 5.7.46 The main ES reported the loss of 0.3ha of semi-natural broadleaved woodland at Shaw Lane Gap Wood, part of Riley Hill BAS, which would result in a permanent adverse effect at the district/borough level. The amendment will not result in the loss of additional woodland at Shaw Lane Gap Wood. The amendment will not give rise to a new or different significant effect on Shaw Lane Gap Wood and will not change the level of significance of the effects reported in the main ES.
- 5.7.47 On a precautionary basis, the main ES reported the loss of 64.8km of hedgerow habitats within the Fradley to Colton area, which would result in a permanent adverse effect that is significant at the county level. The amendment will result in the loss of an additional 40m of assumed species-rich hedgerow. In the context of the hedgerow network within the Fradley to Colton area, this additional loss does not represent a new or different significant effect.
- 5.7.48 It is not likely that any other effects on habitats of relevance at more than the local/parish level will occur as a result of the amendment. Additional local/parish level effects arising from the AP2 revised scheme are listed in SES2 and AP2 ES Volume 5: Appendix EC-016-000.

Species

- 5.7.49 The main ES reported the direct loss or disturbance of bat roosts and loss and severance of foraging and commuting habitat used by the assemblage of bats using the habitats south of Kings Bromley Pits (including Rileyhill, woodlands near Shaw Lane, Tomlinson’s Spinney, land around Kings Bromley Marina and at Westfield Covert). This was reported as an adverse effect that is significant at the county level. The amendment will result in the loss of 40m of hedgerow that contains semi-mature trees, which on a precautionary basis are assumed to support bat roosts. The hedgerows are also likely to provide foraging and commuting habitats for the bat assemblage. The assumed loss of additional roosts and foraging and commuting habitats will give rise to a different significant effect on the bat assemblage using the habitats south of Kings Bromley Pits (including Rileyhill, woodlands near Shaw Lane, Tomlinson’s Spinney, land around Kings Bromley Marina and at Westfield Covert). However, the amendment will not change the level of significance of the effect as reported in the main ES.
- 5.7.50 It is not likely that any other effects on species of relevance at more than the local/parish level will occur as a result of the amendment. Additional local/parish level effects arising from the AP2 revised scheme are listed in SES2 and AP2 ES Volume 5: Appendix EC-016-000.

Mitigation and residual effects

Other mitigation measures

- 5.7.51 The main ES reported habitat creation measures to compensate for loss of roosting, foraging and commuting habitat for bats, including the provision of woodland habitat creation at Westfield Covert, south of Kings Bromley marina, and south of the A513 Rugeley Road, the provision of wetland habitat creation along the Bourne Brook, and hedgerow habitat creation to improve connectivity to retained areas of woodland at New Plantation and Tomlinson’s Spinney. Once established these habitats will provide suitable foraging and commuting habitats for bats. Artificial roosting provision will be provided within and adjacent to these habitat creation areas to replace bat roosts that will be lost to construction, in accordance with the Ecological Principles of Mitigation within the SMR Addendum. These measures will reduce the different adverse effect resulting from this amendment on the bat assemblage using the habitats south of Kings Bromley Pits (including Rileyhill, woodlands near Shaw Lane, Tomlinson’s Spinney, land around Kings Bromley Marina and at Westfield Covert) to a level that is not significant.

Summary of likely residual significant effects

- 5.7.52 With the implementation of the mitigation proposed, the ecological effects arising from the amendment are reduced to a level where they are not considered to be significant. The significant effects of the amendment in this area are therefore unchanged from those reported in the main ES.

Cumulative effects

- 5.7.53 There are no new or different likely significant cumulative effects for ecology and biodiversity as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments. The combined effect on hedgerows as a result of the AP2 revised scheme is reported at a route-wide level in SES2 and AP2 ES, Volume 3, Route-wide effects.

Water resources and flood risk

Scope, assumptions and limitations

- 5.7.54 The assessment scope, key assumptions and limitations for water resources and flood risk are as set out in Volume 1, the SMR and SMR Addendum of the main ES and SMR Addendum 2 (see SES2 and AP2 ES Volume 5: Appendix CT-001-000).
- 5.7.55 This amendment has the potential to result in new or different significant temporary construction effects only. Therefore, there is no permanent construction or operational assessment for water resources and flood risk.
- 5.7.56 In undertaking the assessment, it was identified that the hydraulic model used to assess flood risk uses Light Detection and Ranging (LiDAR) data and includes several interpolated channel cross-sections. This information will be verified on site prior to detailed design commencing.
- 5.7.57 Where data are limited, a precautionary baseline has been built up. This constitutes a 'reasonable worst case' basis for the subsequent assessment.
- 5.7.58 The precautionary approach to the assessment that has been adopted identifies the likely significant environmental effects of the AP2 revised scheme.

Existing environmental baseline

- 5.7.59 The baseline water resources and flood risk information for the Fradley to Colton area is as described in Volume 2, CA1, Section 15 of the main ES. Further details relating to water resources and flood risk for this area are provided in Volume 5: Appendix WR-002-001 and Appendix WR-003-001, and the Volume 5: Water resources and flood risk Map Book of the main ES. An updated flood risk assessment is provided in SES2 and AP2 ES Volume 5: Appendix WR-003-001.
- 5.7.60 This amendment is in proximity to Bourne Brook, which is a high value receptor. There are licensed abstractions from the brook nearby, all of which are sensitive to the impacts of pollution. The amendment is located within Flood Zone 3 as shown on the Environment Agency's Flood map for planning (rivers and sea).

Future environmental baseline

Construction (2020)

- 5.7.61 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 5.7.62 No avoidance or mitigation measures additional to those reported in the main ES and draft CoCP are required.

Assessment of impacts and effects

- 5.7.63 The main ES reported no significant effects on surface water quality due to site runoff and increased pollution risk in the vicinity of this amendment. This amendment has the potential to give rise to temporary adverse impacts on surface water quality which have the potential to affect the water quality in Bourne Brook and abstractions from this watercourse. However, the amendment will be constructed in accordance with the measures specifically designed to safeguard water resources outlined in the draft CoCP. The impacts of this amendment will therefore be negligible related to water quality.
- 5.7.64 The Lichfield Road utility compound will be within Flood Zone 3 of Bourne Brook, as shown on the Environment Agency's Flood map for planning (rivers and sea). A flood risk assessment and modelling study has therefore been undertaken and is reported in SES2 and AP2 ES Volume 5: Appendix WR-002-001 and WR-003-001. The assessment concludes that the compound will be outside of the 1% (1 in 100) annual probability floodplain, including an allowance for climate change. The impacts of this amendment will therefore be negligible. It will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the main ES.
- 5.7.65 An area of land either side of the A515 Lichfield Road realignment has been included in this amendment that will be used for temporary construction purposes. This land is located within the 1% (1 in 100) annual probability floodplain, including an allowance for climate change. The draft CoCP includes a range of measures that the contractor will need to adopt in order to manage any temporary flood risk issues. Operating in accordance with the CoCP will ensure that these activities do not give rise to new or different significant effects and will not change the level of significance of the effects reported in the main ES.
- 5.7.66 This amendment will not therefore give rise to any new or different likely residual significant effects and will not change the level of significance of the effects reported in the main ES.

Cumulative effects

- 5.7.67 There are no new or different likely significant cumulative effects for water resources and flood risk as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Summary of new or different likely residual significant effects as a result of the amendment

- 5.7.68 The additional land required to relocate an existing pylon will give rise to a different likely residual permanent significant effect on the cropmark complex at

Bourne Brook (FRCo20), by removing further archaeological features within the complex. However, this will not change the level of significance of the effects reported in the main ES.

5.8 Additional land required for new pipework from the Kings Bromley North (Shaw Lane) borrow pit for groundwater recharge to Bourne Brook and the Trent and Mersey Canal (AP2-001-008)

- 5.8.1 The Bill provides for a borrow pit at Kings Bromley North (Shaw Lane) for the extraction of sand and gravel for construction. The borrow pit would be located adjacent to Shaw Lane. See Map CT-05-202, E5 to B1, and Map CT-05-203, J7 to F8, in the main ES Volume 2: CA1 Map Book.
- 5.8.2 Excavation and dewatering of the borrow pits could result in localised and controlled impacts on groundwater flows, which would be minimised through the implementation of the Code of Construction Practice (CoCP)⁹⁶. However, potential would remain for baseflows in nearby watercourses to be impacted while groundwater levels are lowered in the borrow pits during excavation.
- 5.8.3 The main ES assumed that mitigation for the management of groundwater baseflows into the River Trent and Bourne Brook would be provided during excavation and dewatering of the borrow pits; including recirculation of treated water to the River Trent and Bourne Brook at an appropriate rate and location.
- 5.8.4 Since submission of the Bill, additional design development and groundwater modelling has identified suitable discharge points at nearby watercourses for groundwater recharge. Two pipe routes have been identified from the Kings Bromley North (Shaw Lane) borrow pit to pump water into the Trent and Mersey Canal and Bourne Brook, upstream of the borrow pit.
- 5.8.5 All of the pipe routes, which are temporary, will run along the ground surface, largely within a shallow trench (approximately 1m deep), or below ground where required. A temporary access road will be provided alongside the entire length of the recharge pipework, which will be approximately 3m in width. Overall, the pipe route and access tracks will be accommodated within a corridor, approximately 10m in width. Two pipe routes will be provided:
- the first pipe route will convey water from the Kings Bromley North (Shaw Lane) borrow pit, on the western side of the Kings Bromley viaduct, heading south-east within fields alongside existing woodland, adjacent to Shaw Lane. Approximately 0.6ha of additional land will be required for this part of the pipe route. See Map CT-05-202, E8 to B7, in the SES2 and AP2 ES Volume 2: CA1 Map Book. This pipe route will continue in a south-west direction, and then alongside the National Grid 400kV power line, before discharging into a pond

⁹⁶ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, draft Code of Construction Practice (CT-003-000). Available online at <https://www.gov.uk/government/publications/draft-code-of-construction-practice-for-hs2-phase-2a>

which drains into Bourne Brook. See Map CT-05-202-L1, F9, in the SES2 and AP2 ES Volume 2: CA1 Map Book. Part of this pipe route, alongside the National Grid 400kV power line, was identified through design development to serve the Kings Bromley North (A515) borrow pit, and would also be used as part of the recharge of Kings Bromley South borrow pit (AP2-001-003); and

- the second pipe route will convey water from the Kings Bromley North (Shaw Lane) borrow pit, within fields alongside an unnamed water course, before discharging into the Trent and Mersey Canal. Approximately 1.2ha of additional land will be required for this part of the pipe route. See Map CT-05-202-L1, C4 to A1, in the SES2 and AP2 ES Volume 2: CA1 Map Book.

- 5.8.6 Where the pipes join the watercourses, measures will be provided to protect the bed and banks from scour.
- 5.8.7 The pipes will be provided early within the period required for extraction from the Kings Bromley North (Shaw Lane) borrow pit, and will be removed once extraction ceases, and the pipe routes will be reinstated to their current use.
- 5.8.8 The land required to provide groundwater recharge from the Kings Bromley North (Shaw Lane) borrow pit is outside the limits of the Bill and will result in the requirement for an additional 1.8ha of land, some of which will be from the following agricultural holdings: Woodend Farm Farm (CA1/2); and Moreton Farm (CA2/2). See Map CT-05-202, E8 to B7; and Map CT-05-202-L1, C4 to A1, in the SES1 and AP1 ES Volume 2: CA1 Map Book. It is assumed that all of the additional land will be returned to its existing use following construction.

Topics included in the AP2 assessment

- 5.8.9 This amendment is considered to require reassessment of the environmental effects and mitigation in the main ES, as amended by SES1 and SES2, for the following topics: cultural heritage; and ecology and biodiversity.

Cultural heritage

Scope, assumptions and limitations

- 5.8.10 The assessment scope, key assumptions and limitations for cultural heritage are as set out in Volume 1, the Scope and Methodology Report⁹⁷ (SMR) and SMR Addendum⁹⁸ of the main ES and SMR Addendum 2 (see SES2 and AP2 ES Volume 5: Appendix CT-001-000).
- 5.8.11 As the cultural heritage impacts of the amendment are reversible, they therefore have the potential to result in new or different significant temporary construction

⁹⁷ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report (Appendix CT-001-001). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

⁹⁸ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report Addendum (Appendix CT-001-002). Available online at <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

effects only. Therefore, there is no permanent construction or operational assessment for cultural heritage.

Existing environmental baseline

- 5.8.12 The baseline cultural heritage information for the Fradley to Colton area is as described in Volume 2, CA1, Section 7 of the main ES.
- 5.8.13 The Trent and Mersey Canal Conservation Area (FRCo08), a designated asset of moderate value, lies partially within the land required for the amendment.
- 5.8.14 Further information about this asset is provided in the main ES Volume 5: Appendix CH-001-001 and Map Series CH-01 and CH-02 in the main ES Volume 5: Cultural heritage Map Book.

Future environmental baseline

Construction (2020)

- 5.8.15 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 5.8.16 No avoidance or mitigation measures additional to those reported in the main ES and Code of Construction Practice⁹⁹ (CoCP) are identified.

Assessment of impacts and effects

- 5.8.17 The main ES reported a temporary minor adverse effect, which is not significant, on the Trent and Mersey Canal Conservation Area (FRCo08), a designated asset of moderate value. The main ES further reported that in combination with HS2 Phase One there would be a temporary moderate adverse cumulative significant effect on the conservation area. The relationship between the various locks, cottages and bridges along the canal, and between the canal and the surrounding landscape are all important aspects of the historic setting of the conservation area. The amendment will further affect the rural setting of the conservation area. This will give rise to a different significant effect, however this will not change the level of significance of the effects (both the effect from the Phase 2a scheme in isolation and the cumulative effect with the Phase One scheme) reported in the main ES.
- 5.8.18 For further information see Map Series CH-01 and CH-02 in the SES2 and AP2 ES Volume 5: Cultural heritage Map Book and the SES2 and AP2 ES Volume 5: Appendix CH-003-000.

⁹⁹ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, draft Code of Construction Practice (CT-003-000). Available online at <https://www.gov.uk/government/publications/draft-code-of-construction-practice-for-hs2-phase-2a>

Mitigation and residual effects

Other mitigation measures

- 5.8.19 No mitigation measures, additional to those reported in the main ES and draft CoCP, are identified.

Summary of likely residual significant effects

- 5.8.20 The temporary effects of construction activity on the setting of the Trent and Mersey Canal Conservation Area (FRCo08) have been considered. However, they are largely reversible in nature and will be restricted to the duration of the construction works. The amendment will not change the level of significance of the effects reported in the main ES.

Cumulative effects

- 5.8.21 There are no new or different likely significant cumulative effects for cultural heritage as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Ecology and biodiversity

Scope, assumptions and limitations

- 5.8.22 The assessment scope, key assumptions and limitations for ecology and biodiversity are as set out in Volume 1, the SMR and the SMR Addendum of the main ES and the SMR Addendum 2 (see SES2 and AP2 ES Volume 5: Appendix CT-001-000).
- 5.8.23 This amendment has the potential to result in new or different significant construction effects only. Therefore, there is no operational assessment for ecology and biodiversity.
- 5.8.24 To address any limitations in these data, a precautionary baseline has been considered according to the guidance reported within the SMR and SMR Addendum. This constitutes a 'reasonable worst-case' basis for the subsequent assessment.
- 5.8.25 The precautionary approach to the assessment that has been adopted identifies the likely significant ecological effects of the amendment.

Existing environmental baseline

- 5.8.26 The ecological baseline of the area subject to the amendment has been based on field data collated for the main ES as amended by SES1, the baseline information presented in the Phase One SES and AP2 ES¹⁰⁰, aerial photography, and relevant information from regional and local sources. For this amendment, the data that

¹⁰⁰ HS2 Ltd (2015), *High Speed Two (HS2) Phase One (London - West Midlands) Supplementary Environmental Statement and Additional Provision 2 Environmental Statement*, Volume 2 CFA22. Available online at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/442226/SES_and_AP2_ES_Volume_2_CFA22.pdf

are most relevant to the assessment for each receptor from the main ES and SES1 and/or Phase One SES and AP2 ES are reported below. In addition, the baseline has been informed by additional Phase 1 habitat surveys.

- 5.8.27 A summary of the baseline information relevant to the assessment of the amendment is provided below. Further detail on the relevant new or updated baseline information is provided in BID-EC-019-000, including Map Series EC-02 which accompanies the SES2 and AP2 ES.
- 5.8.28 For those receptors described in the Phase One SES and AP2 ES, further details are provided in Volume 2, CFA22, Section 11 and Volume 5 Appendix EC-001-003 and Appendix EC-004-003, including Map Series EC-01; EC-04; EC-05; EC-11 and EC-12.
- 5.8.29 For those receptors described in the main ES, further details are provided in Volume 2, CA1, Section 8, and Volume 5: Appendix EC-001-000, including Map Series EC-01. Baseline ecology reports that accompanied the main ES are provided in BID-EC-002-000 to BID-EC-014-000, including Map Series EC-02 to EC-12¹⁰¹.
- 5.8.30 For those receptors described in SES1, further details are provided in Volume 2, CA1, Section 3. The baseline ecology report that accompanied SES1 and AP1 ES is provided in BID EC-004-000, including Map Series EC-02, EC-04, EC-05, EC-10, EC-11 and EC-12¹⁰².

Designated sites

- 5.8.31 There is one Biodiversity Alert Site (BAS) of relevance to the assessment of the amendment, which is of district/borough value. Riley Hill BAS, covering an area of approximately 5.7 ha, comprises a large pool and a narrow band of broadleaved woodland also known as Shaw Lane Gap Wood. Riley Hill BAS is located off Shaw Lane adjacent to the area subject to the amendment.

Habitats

- 5.8.32 Habitats within or immediately adjacent to the area subject to the amendment include semi-natural broadleaved woodland, arable farmland, hedgerows and watercourses. The habitats of potential relevance to the assessment of the amendment are described below in further detail.
- 5.8.33 Semi-natural broadleaved woodland is present within a narrow belt of woodland that is present alongside the Trent and Mersey Canal. This habitat is assumed to qualify as lowland mixed deciduous woodland, a habitat of principal importance listed under the provisions of Section 41 of the Natural Environment and Rural Communities (NERC) Act (2006)¹⁰³ and a conservation priority of the

HS2 Ltd (2017). *High Speed Two (HS2) Phase 2a (West Midlands - Crewe), Background Information and Data*, Available online at: www.gov.uk/hs2

¹⁰²HS2 Ltd (2018). *High Speed Two (HS2) Phase 2a (West Midlands – Crewe), Background Information and Data*, Supplementary ecological baseline data (BID EC-004-000), Available online at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/692664/G33_Ecological_baseline_BID-EC-004-000_WEB.pdf

¹⁰³ Natural Environment and Rural Communities Act 2006. Available online at: <http://www.legislation.gov.uk/ukpga/2006/16/section/41>

Staffordshire Biodiversity Action Plan¹⁰⁴ (BAP). The woodland belt forms part of a larger belt along the length of the Trent and Mersey Canal and connects to the Kings Bromley Wharf to Fradley Junction, Coventry Canal LWS. The woodland is partially within the area subject to the amendment. This woodland is of up to county value.

- 5.8.34 Semi-natural broadleaved woodland is present at Shaw Lane Gap Wood, which forms part of Riley Hill BAS, and at New Plantation. These woodlands are assumed to qualify as lowland mixed deciduous woodland, a habitat of principal importance and a conservation priority of the Staffordshire BAP. The woodlands at Shaw Lane Gap Wood and New Plantation are located directly adjacent to the area that is subject to the amendment. The woodland habitats are of district/borough value.
- 5.8.35 A narrow belt of semi-natural broadleaved woodland is present on either side of Shaw Lane. This belt includes semi-mature and mature trees and qualifies as lowland mixed deciduous woodland, a habitat of principal importance and a conservation priority of the Staffordshire BAP. The Shaw Lane woodland belt is located partially within the area that is subject to the amendment. The woodland is of district/borough value.
- 5.8.36 Hedgerows within the area subject to the amendment are assumed to be predominantly species-rich. Hedgerow with at least 80% cover of native woody species is a habitat of principal importance and a conservation priority of the Staffordshire BAP. These hedgerows contribute to a wider hedgerow network within the Fradley to Colton area that is of county value.
- 5.8.37 The Trent and Mersey Canal is located partially within the area subject to the amendment, east of Handsacre. The Trent and Mersey Canal in this location is to the north-west of, and connects to, Kings Bromley Wharf to Fradley Junction, Coventry Canal LWS and is a conservation priority of the Staffordshire BAP. The Trent and Mersey Canal is of county value.
- 5.8.38 Bourne Brook is located within the area subject to the amendment. This watercourse is assumed to qualify as a habitat of principal importance and a conservation priority of the Staffordshire BAP. Bourne Brook is of county value. Crawley Brook, a smaller tributary, is also within the area subject to the amendment and is of district/borough value.

Species

- 5.8.39 Protected and/or notable species that are known or assumed to occur within the area subject to the amendment include bats, great crested newt, common amphibian species, otter, badger, polecat, harvest mouse, European hedgehog, brown hare and common reptile species.

¹⁰⁴ Staffordshire Biodiversity Partnership. Staffordshire Biodiversity Action Plan. Available online at <http://sbap.org.uk>

- 5.8.40 The main ES and Phase One AP2 ES reported a bat assemblage using the Trent and Mersey Canal, adjacent woodlands (Ravenshaw Wood, Black Slough, the Slaish and Fradley Wood) and Cranberry Wood. Field surveys in this area recorded roosting common pipistrelle, Daubenton’s bat, Natterer’s bat, Brandt’s bat and noctule and other species foraging and commuting including soprano pipistrelle, Leisler’s bat, brown long-eared bat and whiskered bat. The area subject to the amendment contains potential bat roosting, foraging and commuting habitats that are likely to be used by this assemblage. The bat assemblage includes several species of principal importance and species that are conservation priorities of the Staffordshire BAP. The bat assemblage associated with Trent and Mersey Canal, adjacent woodlands (Ravenshaw Wood, Black Slough, the Slaish and Fradley Wood) and Cranberry Wood is of regional value.
- 5.8.41 The main ES reported a bat assemblage using habitats south of Kings Bromley Pits (including Rileyhill, woodlands near Shaw Lane, Tomlinson’s Spinney, land around Kings Bromley Marina and at Westfield Covert). Field surveys in this area recorded roosting brown long-eared bats and soprano pipistrelle, and foraging and commuting soprano pipistrelle, Myotis species and noctule bats. Particularly high levels of common and soprano pipistrelle activity were recorded at the woodland along Shaw Lane. The area subject to the amendment contains potential bat roosting, foraging and commuting habitats that are likely to be used by this assemblage. The bat assemblage includes several species of principal importance and other species that are conservation priorities of the Staffordshire BAP. The bat assemblage using habitats south of Kings Bromley Pits (including Rileyhill, woodlands near Shaw Lane, Tomlinson’s Spinney, land around Kings Bromley Marina and at Westfield Covert) is of county value.
- 5.8.42 SES1 reported a great crested newt metapopulation¹⁰⁵ north of the Trent and Mersey Canal (AMP¹⁰⁶ 1.5). Field surveys determined the presence of great crested newt in three ponds within a network of six ponds assumed to be used by this metapopulation. None of the ponds within the metapopulation are within the land required for the original scheme. No additional ponds within the metapopulation are within the area subject to the amendment. Terrestrial habitats likely to be used by this metapopulation occur within the area subject to the amendment, in the form of grassland and woodland. Great crested newt is an Annex 2¹⁰⁷ species, a species of principal importance and a conservation priority of the Staffordshire BAP. The great crested newt metapopulation associated with habitats north of the Trent and Mersey Canal is of county value.
- 5.8.43 The main ES reported populations of common amphibian species including palmate newt, smooth newt, common toad and common frog, identified through field surveys, within ponds throughout the Fradley to Colton area. Amphibian species are assumed to be present in ponds that have not yet been surveyed. The

¹⁰⁵ A metapopulation is a group of spatially separated populations which interact. Metapopulations are described in BID-EC-007-000, Ecological baseline data - amphibian and pond surveys.

¹⁰⁶ AMP refers to Amphibian Meta Population.

¹⁰⁷ Annex 2 of the EU’s Habitats Directive (1992) lists priority species whose conservation requires the designation of Special Areas of Conservation.

area subject to the amendment includes woodland habitats within proximity to waterbodies that are likely to be used by these species. Common toad is a species of principal importance. If present, populations of common amphibians are of local/parish value.

- 5.8.44 The main ES reported an assumed otter population on the Trent and Mersey Canal, Bourne Brook and Crawley Brook on a precautionary basis in the absence of complete survey information and based on the presence of nearby records of this species. The area subject to the amendment includes these watercourses and associated habitats that are likely to offer shelter, foraging and dispersal opportunities for otter. Otter is an Annex 2 species, a species of principal importance and conservation priority of the Staffordshire BAP. The assumed otter population associated with the Trent and Mersey Canal, Bourne Brook and Crawley Brook is of district/borough value.
- 5.8.45 The main ES, as amended by SES1, reported at least 10 social groups of badgers, identified through field surveys, throughout the Fradley to Colton area. The area subject to the amendment includes suitable sett building and foraging habitats for badgers. The badger populations throughout the Fradley to Colton area are of local/parish value.
- 5.8.46 The main ES reported populations of other mammals including polecat, harvest mouse, European hedgehog and brown hare, identified through desk study records, as being potentially present throughout the Fradley to Colton area. The area subject to the amendment includes habitats that are suitable for these species. If present, these populations are of local/parish value.
- 5.8.47 The main ES reported populations of common reptile species such as grass snake and slow-worm, identified through desk study records, as being potentially present at low numbers throughout the Fradley to Colton area. Grass snake and slow-worm are both species of principal importance. Grass snake is also a conservation priority of the Staffordshire BAP. The area subject to the amendment includes suitable habitats for these species. If present, these populations are of local/parish value.

Future environmental baseline

Construction (2020)

- 5.8.48 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 5.8.49 The assessment assumes implementation of the measures set out within the draft CoCP.
- 5.8.50 No avoidance or mitigation measures additional to those reported in the main ES, SES1 and draft CoCP are required.

Assessment of impacts and effects

- 5.8.51 All of the effects within this section are reported in the absence of other mitigation.

Designated sites

- 5.8.52 The main ES reported the potential loss of 0.3ha (5%) of woodland within Riley Hill BAS, which would result in a permanent adverse effect on the structure and function of the BAS that is significant at the district/borough level. The amendment will not result in the loss of additional woodland habitat within Riley Hill BAS. The amendment will not give rise to a different significant effect on Riley Hill BAS and will not change the level of significance of the effects reported in the main ES.

Habitats

- 5.8.53 The main ES reported the loss of 0.3ha of semi-natural broadleaved woodland at Shaw Lane Gap Wood (part of Riley Hill BAS), which would result in a permanent adverse effect that is significant at the district/borough level. The main ES did not report an effect on New Plantation. The amendment will not result in the loss of additional woodland at Shaw Lane Gap Wood or New Plantation. The amendment will not give rise to a new or different significant effect on Shaw Lane Gap Wood or New Plantation and will not change the level of significance of the effects reported in the main ES for Shaw Lane Gap Wood.
- 5.8.54 The main ES did not report a significant effect on the woodland belt along Shaw Lane. The amendment will result in the loss of approximately 140m² of semi-natural broadleaved woodland within the woodland belt along Shaw Lane. This limited woodland loss will not result in a new significant effect on semi-natural broadleaved woodland along Shaw Lane.
- 5.8.55 On a precautionary basis, the main ES reported the loss of 64.8km of hedgerow habitats within the Fradley to Colton area, which would result in a permanent adverse effect that is significant at the county level. The amendment will not result in the additional loss of hedgerow. The amendment will not give rise to a new or different significant effect on the hedgerow network within the Fradley to Colton area.
- 5.8.56 The main ES reported the loss of 0.6ha of canal bank and canal habitat on the Trent and Mersey Canal, which would result in a permanent adverse effect on the structure and function of the canal that is significant at the district/borough level. The implementation of measures set out in the draft CoCP, including measures to protect the bed and banks from scour, will avoid significant effects on the watercourse of the canal. The amendment will, however, result in the loss of an additional 200m² of bankside habitat. This limited loss of habitat will not give rise to a new or different significant effect on the Trent and Mersey Canal and will not change the level of significance of the effect reported in the main ES.
- 5.8.57 The main ES reported the culverting and loss of a section of Bourne Brook to construction of the original scheme, which would result in a permanent adverse

effect at the district/borough level. The main ES also reported the culverting and loss of a section of Crawley Brook to construction of the original scheme, which would result in a permanent adverse effect at the local/parish level effect. The implementation of measures set out within the draft CoCP, including measures to protect the bed and banks from scour, will avoid significant effects on watercourses from the amendment. The amendment will not give rise to a new or different significant effect on Bourne Brook or Crawley Brook and will not change the level of significance of the effect reported in the main ES.

- 5.8.58 It is not likely that any other effects on habitats of relevance at more than the local/parish level will occur as a result of the amendment. Additional local/parish level effects arising from the AP2 revised scheme are listed in SES2 and AP2 ES Volume 5: Appendix EC-016-000.

Species

- 5.8.59 The Phase One SES and AP2 ES reported the direct loss of bat roosts and loss and severance of foraging and commuting habitat used by the assemblage of bats using the Trent and Mersey Canal and adjacent woodlands (Ravenshaw Wood, Black Slough, the Slaish and Fradley Wood) and Cranberry Wood, which would result in a permanent adverse effect that is significant at the regional level. The amendment will result in the additional loss of approximately 200m² of woodland belt along the Trent and Mersey Canal. The amendment will also result in the additional loss of mature trees, which on a precautionary basis are assumed to support bat roosts. The assumed loss of additional roosts will give rise to a different significant effect on the bat assemblage using the Trent and Mersey Canal and adjacent woodlands (Ravenshaw Wood, Black Slough, the Slaish and Fradley Wood) and Cranberry Wood. However, the amendment will not change the level of significance of the effect as reported in the Phase One SES and AP2 ES.
- 5.8.60 The main ES reported the direct loss or disturbance to bat roosts and loss and severance of foraging and commuting habitat used by the assemblage of bats using the habitats south of Kings Bromley Pits (including Rileyhill, woodlands near Shaw Lane, Tomlinson's Spinney, land around Kings Bromley Marina and at Westfield Covert). This was reported as a permanent adverse effect that is significant at the county level. The amendment will result in the loss of approximately 140m² woodland within the woodland belt along Shaw Lane. The amendment will result in the additional loss of mature trees, which on a precautionary basis are assumed to support bat roosts. The assumed loss of additional roosts will give rise to a different significant effect on the bat assemblage using the habitats south of Kings Bromley Pits (including Rileyhill, woodlands near Shaw Lane, Tomlinson's Spinney, land around Kings Bromley Marina and at Westfield Covert). However, the amendment will not change the level of significance of the effect as reported in the main ES.
- 5.8.61 The main ES reported no significant effects on the great crested newt metapopulation north of the Trent and Mersey Canal (AMP 1.5). The amendment will result in the loss of approximately 200m² of woodland belt along the Trent and Mersey Canal, within 100m of a pond. In the absence of survey information,

the pond is assumed to support great crested newts, and the woodland is likely to offer terrestrial habitat opportunities for this species. However, given the small area of potential terrestrial habitat lost to the amendment, it will not give rise to a new significant effect on the great crested newt metapopulation north of the Trent and Mersey Canal.

- 5.8.62 It is not likely that any other effects on species of relevance at more than the local/parish level will occur as a result of the amendment. Additional local/parish level effects arising from the AP2 revised scheme are listed in SES2 and AP2 ES Volume 5: Appendix EC-016-000.

Mitigation and residual effects

Other mitigation measures

- 5.8.63 The main ES reported habitat creation measures including the provision of woodland habitat creation along Ashby Sitch and along Pyford Brook and wetland habitat creation along Pyford Brook. Artificial roosting provision will be provided within and adjacent to these habitat creation areas to replace bat roosts that will be lost to construction, in accordance with the Ecological Principles of Mitigation within the SMR Addendum. These measures will reduce the different adverse effect resulting from this amendment on the assemblage of bats using the Trent and Mersey Canal, adjacent woodlands (Ravenshaw Wood, Black Slough, the Slaish and Fradley Wood) and Cranberry Wood to a level that is not significant.
- 5.8.64 The main ES reported habitat creation measures including the provision of woodland habitat creation at Westfield Covert, south of Kings Bromley marina and south of the A513 Rugeley Road, and the provision of wetland habitat creation along Bourne Brook, and hedgerow habitat creation to improve connectivity to retained areas of woodland at New Plantation and Tomlinson's Spinney. Artificial roosting provision will be provided within and adjacent to these habitat creation areas to replace bat roosts that will be lost to construction, in accordance with the Ecological Principles of Mitigation within the SMR Addendum. These measures will reduce the different adverse effect resulting from this amendment on the assemblage of bats using the habitats south of Kings Bromley Pits (including Rileyhill, woodlands near Shaw Lane, Tomlinson's Spinney, land around Kings Bromley Marina and at Westfield Covert) to a level that is not significant.
- 5.8.65 The woodland habitat creation areas reported within the main ES, as described above for bats, will also provide suitable terrestrial habitat for great crested newt. These measures will provide compensation for the non-significant loss of great crested newt terrestrial habitats resulting from this amendment.

Summary of likely residual significant effects

- 5.8.66 With the implementation of the mitigation proposed, the ecological effects arising from the amendment are reduced to a level where they are not considered to be significant. The significant effects of the amendment in this area are

therefore unchanged from those reported in the main ES and Phase One SES and AP2 ES.

Cumulative effects

- 5.8.67 There are no new or different likely significant cumulative effects for ecology and biodiversity as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

5.9 Additional land required for new pipework from the Blithbury borrow pit for groundwater recharge to Luth Burn and River Trent (AP2-001-009)

- 5.9.1 The Bill provides for a borrow pit at Blithbury for the extraction of sand and gravel for construction. The borrow pit would be located adjacent to the north of the River Trent viaduct. See Map CT-05-204, H5 to E1, in the main ES Volume 2: CA1 Map Book.

- 5.9.2 Excavation and dewatering of the borrow pits could result in localised and controlled impacts on groundwater flows, which would be minimised through the implementation of the Code of Construction Practice (CoCP). However, potential would remain for baseflows in nearby watercourses to be impacted while groundwater levels are lowered in the borrow pits during excavation.

- 5.9.3 The main ES assumed that mitigation for the management of groundwater baseflows into the River Trent and Bourne Brook would be provided during excavation and dewatering of the borrow pits; including recirculation of treated water to the River Trent and Bourne Brook at an appropriate rate and location.

- 5.9.4 Since submission of the Bill, additional design development and groundwater modelling has identified suitable discharge points at nearby watercourses for groundwater recharge. Two pipe routes have been identified from Blithbury borrow pit to pump water into Luth Burn and the River Trent, upstream of the borrow pit.

- 5.9.5 All of the pipe routes, which are temporary, will run along the ground surface, largely within a shallow trench (approximately 1m deep), or below ground where required. A temporary access road will be provided alongside the entire length of the recharge pipework, which will be approximately 3m in width. Overall, the pipe route and access tracks will be accommodated within a corridor, approximately 10m in width. Two pipe routes would be provided:

- the first pipe route will convey water from the Blithbury borrow pit, on the north side of the River Trent viaduct near to Pipe Lane (see Map CT-05-204, D5, in the SES2 and AP2 ES Volume 2: CA1 Map Book), heading west within fields alongside Pipe Lane, to discharge to Luth Burn (see Map CT-05-204, C7, in the SES2 and AP2 ES Volume 2: CA1 Map Book). Approximately 0.6ha of additional land will be required for this pipe route; and
- the second pipe route will convey water from the Blithbury borrow pit (see Map CT-05-204, F7, in the SES2 and AP2 ES Volume 2: CA1 Map Book),

adjacent to hedgerow proposed alongside the River Trent, to discharge into the River Trent (see Map CT-05-204, E8, in the SES2 and AP2 ES Volume 2: CA1 Map Book). Approximately 0.5ha of additional land will be required for this pipe route.

- 5.9.6 Where the pipes join the watercourses, measures will be provided to protect the bed and banks from scour.
- 5.9.7 The pipes will be provided early within the period required for extraction from the Blithbury borrow pit, and will be removed once extraction ceases, and the pipe routes will be reinstated to their current use.
- 5.9.8 The land required to provide groundwater recharge from the Blithbury borrow pit is outside the limits of the Bill and will result in the temporary requirement for an additional 1.1ha of land, some of which will be from the following agricultural holdings: Woodhouse Farm (CA1/21); Land at Luthbur (CA1/22); and Pipe Hall Farm (CA1/18). See Map CT-05-204, D5 to C7, and Map CT-05-204, F6 to E8, in the SES1 and AP1 ES Volume 2: CA1 Map Book. It is assumed that all of the additional land will be returned to its existing use following construction.

Topics included in the AP2 assessment

- 5.9.9 This amendment is not considered to require a reassessment of the environmental effects or mitigation as set out in the main ES, as amended by SES1 and SES2, with respect to any environmental topics.

5.10 Additional land required for the diversion of a National Grid Gas Transmission gas pipeline and a new utility compound, north of Pipe Ridware (AP2-001-010)

- 5.10.1 The Bill provides for the permanent diversion of an underground National Grid Gas Transmission 1,050mm diameter high pressure gas pipeline for 350m, 100m south of its existing alignment. The diversion would cross beneath the HS2 route at the River Trent viaduct, 125m south-east of the Pipe Ridware embankment. See Map CT-06-204, D4 to E6, in the SES1 and AP1 ES Volume 2: CA1 Map Book. Works to divert the National Grid Gas Transmission pipeline would take nine months to complete, commencing in 2021, and would be managed from River Trent viaduct satellite compound.
- 5.10.2 Since submission of the Bill, a requirement has been identified through further engagement with the utility provider to provide an additional working area, to enable the connection of the new and existing pipelines, and to provide a new utility compound for the management of the National Grid Gas Transmission 1,050mm diameter high pressure gas pipeline diversion works.
- 5.10.3 The pipeline diversion connects to the existing pipelines at approximately the same locations as in the original scheme. At each end of the pipeline diversion, works to connect the new section of pipeline to the existing pipeline, whilst maintaining gas supply during construction, will result in the temporary requirement for an additional 2.8ha of land. See Map CT-06-204, E4 to B7, in the SES2 and AP2 ES Volume 2: CA1 Map Book.

- 5.10.4 A new utility compound will be provided for the management of the National Grid Transmission 1,050mm diameter high pressure gas pipeline diversion works. Pipe Lane utility compound will be located 40m east of Pipe Ridware embankment, within land required for the original scheme. See Map CT-05-204, B7, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 5.10.5 Pipe Lane utility compound will be operational for nine months, commencing during 2022, and will support an average of 15 workers per day (20 workers at peak times). Access to the new compound will be from the B5014 Uttoxeter Road via Common Lane and site haul routes and Pipe Lane.
- 5.10.6 Some of the works associated with the diversion of the National Grid Gas Transmission pipeline are located within Flood Zone 3, as shown on the Environment Agency's Flood map for planning (rivers and sea).
- 5.10.7 The diversion works will take six months to complete, commencing in 2022.
- 5.10.8 The working area required to enable the connection of the new and existing pipelines, is outside the limits of the Bill and will result in the requirement for an additional 2.8ha of land, some of which will be from Pipe Hall Farm (CA1/18). See Map CT-05-204, E4 to B7, in the SES2 and AP2 ES Volume 2: CA1 Map Book. It is assumed that 0.2ha of the additional land will be returned to its existing use following construction.

Topics included in the AP2 assessment

- 5.10.9 This amendment is considered to require reassessment of the environmental effects and mitigation in the main ES, as amended by SES1 and SES2, for the following topics: cultural heritage; landscape and visual; and water resources and flood risk.
- 5.10.10 The assessment of the changes to construction traffic flows and traffic related effects as a result of this AP2 amendment in combination with all SES2 changes and AP2 amendments, is reported in Section 7.

Cultural heritage

Scope, assumptions and limitations

- 5.10.11 The assessment scope, key assumptions and limitations for cultural heritage are as set out in Volume 1, the Scope and Methodology Report¹⁰⁸ (SMR) and SMR Addendum¹⁰⁹ of the main ES and SMR Addendum 2 (see SES2 and AP2 ES Volume 5: Appendix CT-001-000).

¹⁰⁸ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report (Appendix CT-001-001). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

¹⁰⁹ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report Addendum (Appendix CT-001-002). Available online at <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

- 5.10.12 As the cultural heritage impacts of the amendment are not reversible, they therefore have the potential to result in new or different significant permanent construction effects only. There is no temporary construction or operational assessment for cultural heritage.

Existing environmental baseline

- 5.10.13 The baseline cultural heritage information for the Fradley to Colton area is as described in Volume 2, CA1, Section 7 of the main ES.
- 5.10.14 Buried archaeological remains of pits, linear features and a Bronze Age round barrow of prehistoric or Romano-British round house, north of Pipe Ridware (FRCo84), a non-designated asset of moderate value, are located partially within the land required for the amendment.
- 5.10.15 Further information about this asset is provided in the main ES Volume 5: Appendix CH-001-001 and Map Series CH-01 in the main ES Volume 5: Cultural heritage Map Book.

Future environmental baseline

Construction (2020)

- 5.10.16 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 5.10.17 No avoidance or mitigation measures additional to those reported in the main ES and draft Code of Construction Practice (CoCP)¹¹⁰ are identified.

Assessment of impacts and effects

- 5.10.18 The main ES reported a permanent moderate adverse significant effect on buried archaeological remains of pits, linear features and a Bronze Age round barrow of prehistoric or Romano-British round house, north of Pipe Ridware (FRCo84), a non-designated asset of moderate value. The area required to enable the connection of the new and existing pipelines will increase the extent of the asset to be removed during construction, which will change the impact from medium to high. This amendment will give rise to a different significant effect and will change the level of significance of the effect reported in the main ES from moderate adverse to major adverse.
- 5.10.19 For further information see Map Series CH-01 in the SES2 and AP2 ES Volume 5: Cultural heritage Map Book and the SES2 and AP2 ES Volume 5: Appendix CH-003-000.

¹¹⁰ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, draft Code of Construction Practice (CT-003-000). Available online at <https://www.gov.uk/government/publications/draft-code-of-construction-practice-for-hs2-phase-2a>

Mitigation and residual effects

Other mitigation measures

- 5.10.20 No mitigation measures additional to those reported in the main ES and draft CoCP are identified.

Summary of likely residual significant effects

- 5.10.21 The amendment will give rise to a different likely residual permanent adverse effect on buried archaeological remains of pits, linear features and a Bronze Age round barrow of prehistoric or Romano-British round house, north of Pipe Ridware (FRCo84). The likely residual significant effect, reported in the main ES, will change from moderate adverse to major adverse, due to the increase in extent of the asset to be removed during construction.

Cumulative effects

- 5.10.22 There are no new or different likely significant cumulative effects for cultural heritage as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Landscape and visual

Scope, assumptions and limitations

- 5.10.23 The assessment scope, key assumptions and limitations for landscape and visual are as set out in Volume 1, the SMR and SMR Addendum of the main ES.
- 5.10.24 This amendment has the potential to give rise to new or different temporary significant construction visual effects only. Therefore, there is no permanent construction assessment for landscape and no operational assessment for landscape and visual.

Existing environmental baseline

- 5.10.25 The baseline landscape and visual information for the Fradley to Colton area is as described in Volume 2, CA1, Section 11 of the main ES.

Visual baseline

- 5.10.26 The amendment has the potential to affect one viewpoint, which is described in Volume 5: LV-001-001 of the main ES and summarised below.

View north-east from Pipe Wood Lane (viewpoint 003.03.024)

- 5.10.27 Users of Mavesyn Ridware Footpath 28, currently have filtered views through the roadside hedgerows and trees across the small scale fields around Pipe Ridware. To the north of the road, views are foreshortened by the rising landform.

Future environmental baseline

Construction (2020)

- 5.10.28 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Temporary effects arising during construction

Avoidance and mitigation measures

- 5.10.29 No avoidance or mitigation measures additional to those reported in the main ES and CoCP are identified.

Assessment of impacts and effects

Visual assessment

View north-east from Pipe Wood Lane (viewpoint 003.03.024)

- 5.10.30 The main ES reported a major adverse significant effect due to the open and close distance views towards construction associated with the River Trent viaduct, the Pipe Ridware auto-transformer station and Pipe Ridware embankment. The presence of cranes, Pipe Ridware embankment satellite compound, movement of construction vehicles, Pipe Lane diversion works and a gas pipeline diversion would also affect close distance views.
- 5.10.31 The effect of the amendment will be minimal when seen alongside the extensive construction activities in this location. The amendment will therefore not give rise to a new or different significant effect at viewpoint 003.03.024 and will not change the level of significance of the effect reported in the main ES.
- 5.10.32 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001.

Cumulative effects

- 5.10.33 There are no new or different likely significant cumulative effects for landscape and visual as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Water resources and flood risk

Scope, assumptions and limitations

- 5.10.34 The assessment scope, key assumptions and limitations for water resources and flood risk are as set out in Volume 1, the SMR and SMR Addendum of the main ES and SMR Addendum 2 (see SES2 and AP2 ES Volume 5: Appendix CT-001-000).
- 5.10.35 This amendment has the potential to result in new or different construction effects only. Therefore, there is no operational assessment for water resources and flood risk.
- 5.10.36 In undertaking the assessment it was identified that the hydraulic model used to assess flood risk uses Light Detection and Ranging (LiDAR) data and includes

several interpolated channel cross-sections, which will be verified on site prior to detailed design commencing.

- 5.10.37 Where data are limited, a precautionary baseline has been built up. This constitutes a 'reasonable worst case' basis for the subsequent assessment.
- 5.10.38 The precautionary approach to the assessment that has been adopted identifies the likely significant environmental effects of the AP2 revised scheme.

Existing environmental baseline

- 5.10.39 The baseline water resources and flood risk information for the Fradley to Colton area is as described in Volume 2, CA1, Section 15 of the main ES. Further details relating to water resources and flood risk for this area are provided in Volume 5: Appendix WR-002-001 and Appendix WR-003-001, and the Volume 5: Water resources and flood risk Map Book of the main ES. An updated flood risk assessment is provided in SES and AP2 ES Volume 5: Appendix WR-003-001.

Effects arising during construction

- 5.10.40 The River Trent is a very high value receptor and there are several high value licensed abstractions from the river nearby, all of which are sensitive to the impacts of pollution. Construction works are of a nature and extent that could impact water quality in the River Trent. The amendment will not give rise to a new or different significant effect related to water quality.
- 5.10.41 The amendment includes a temporary compound in Flood Zone 3 as shown on the Environment Agency's Flood map for planning (rivers and sea). A flood risk assessment has been undertaken of the issues and is reported in SES2 and AP2 ES Volume 5: Appendix WR-003-001. This assessment concludes that the amendment will be outside of the 1% (1 in 100) annual probability floodplain, including an allowance for climate change. The impacts of the amendment will therefore be negligible.
- 5.10.42 The amendment will not therefore give rise to any new or different likely residual significant effects and will not change the level of significance of the effects reported in the main ES.

Cumulative effects

- 5.10.43 There are no new or different likely significant cumulative effects for water resources and flood risk as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Summary of new or different likely residual significant effects as a result of the amendment

- 5.10.44 The amendment will give rise to a different likely residual permanent adverse effect on buried archaeological remains of pits, linear features and a Bronze Age round barrow of prehistoric or Romano-British round house, north of Pipe Ridware (FRC084). The significance of the effect will increase from moderate adverse to major adverse, due to the increase in extent of the asset to be removed during construction.

5.11 Additional land and a change to Bill powers for the revised alignment of a site haul route and removal of HS2 maintenance access at Pipe Lane (AP2-001-011)

- 5.11.1 The Bill provides for a temporary construction traffic route along Pipe Lane and through Pipe Ridware, and the permanent widening of Pipe Lane, up to 5.5m wide, from the junction with Common Lane into Pipe Ridware to accommodate two-way heavy goods vehicle (HGV) traffic. Approximately 490m of hedgerow habitat creation would be provided on the south side of Pipe Lane and a further 90m of hedgerow habitat creation would be provided along the road junction into Pipe Ridware. See Map CT-06-204, C10 to D6, in the main ES Volume 2: CA1 Map Book.
- 5.11.2 The AP1 revised scheme (amendment AP1-001-003: Additional land permanently required for a new site haul route and HS2 maintenance access route from Pipe Lane and modifications to existing highways) included the provision of a new site haul route and permanent HS2 maintenance access route, approximately 470m in length and 5.5m wide with 1.5m verges on both sides, crossing agricultural land from Pipe Lane towards the Pipe Ridware embankment.
- 5.11.3 That amendment also provided for the permanent widening to 5.5m in width of approximately 200m of Common Lane and Pipe Lane, located between Pipe Ridware and Quintons Orchard. Approximately 120m of hedgerow habitat creation would be provided along the east side of Common Lane, near the junction with Pipe Lane, to provide replacement hedgerow habitat and help integrate the scheme into the landscape. Due to the localised widening of Pipe Lane, the adjacent grassland habitat creation proposed in the original scheme would be reduced by 180m². See Map CT-06-204, D7 to C6, and Map CT-06-204-L1, D4 to C1, in the SES1 and AP1 ES Volume 2: CA1 Map Book.
- 5.11.4 Since submission of the SES1 and AP1 ES, further engagement with National Grid and the landowner has identified a requirement to remove the permanent HS2 maintenance access route, included in the AP1 revised scheme, due to the location of a National Grid high pressure gas main at this location and to reduce impact on the existing use of the surrounding land during both construction and operation. This amendment will require HS2 maintenance vehicles to access Pipe Ridware via the existing Pipe Lane. Permanent maintenance access will require infrequent HGV access to the balancing pond and Pipe Ridware auto-transformer station, located on the north side of the HS2 route, to the west of Dawson Lane (twice yearly for the balancing pond, once every 30 years for the auto-transformer station). On occasion, a larger maintenance vehicle will be required. In this event, a smaller vehicle could be used as an escort to maintain road safety.
- 5.11.5 Furthermore, engagement with National Grid and the landowner has identified the requirement to realign the temporary site haul route, 500m in length, 160m further east compared to the AP1 revised scheme, connecting into Pipe Lane approximately 50m further north, to the east of Church Farm. This would enable a perpendicular crossing of the National Grid high pressure gas main. Measures to protect the crossing of the temporary site haul route over the National Grid high

pressure gas main will be implemented through the provision of a concrete protection slab. See Map CT-05-204, D9 to B8, in the SES2 and AP2 ES Volume 2: CA1 Map Book.

- 5.11.6 The construction of the new site haul route will take six months to complete, commencing in 2021. Works will be managed from the Pipe Ridware embankment satellite compound.
- 5.11.7 The land required to realign the site haul route is outside the limits of the Bill, and will result in a change to Bill powers, the removal of the requirement for 0.9ha of land, and the requirement for an additional 1.3ha of land. See Map CT-05-204, D9 to B8, in the SES2 and AP2 ES Volume 2: CA1 Map Book. It is assumed that all of the additional land will be returned to its existing use following construction.

Topics included in the AP2 assessment

- 5.11.8 This amendment is considered to require reassessment of the environmental effects and mitigation in the main ES, as amended by SES1 and SES2, for: agriculture, forestry and soils; community; and traffic and transport.
- 5.11.9 The assessment of the changes to construction traffic flows and traffic related effects as a result of this AP2 amendment in combination with all SES2 changes and AP2 amendments, is reported in Section 7.

Agriculture, forestry and soils

Scope, assumptions and limitations

- 5.11.10 The assessment scope, key assumptions and limitations for agriculture, forestry and soils are as set out in Volume 1, the Scope and Methodology Report¹¹¹ (SMR) and SMR Addendum¹¹² of the main ES.
- 5.11.11 This amendment has the potential to result in new or different temporary or permanent significant construction effects only. Therefore, there is no operational assessment for agriculture, forestry and soils.

Existing environmental baseline

- 5.11.12 The baseline agriculture, forestry and soils information for the Fradley to Colton area is as described in Volume 2, CA1, Section 4 of the main ES.
- 5.11.13 The area of land required for the amendment has soil in the Wick 1 association, as described in Volume 2, CA1, Section 4 of the main ES. Wick 1 association

¹¹¹ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report (Appendix CT-001-001). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

¹¹² HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report Addendum (Appendix CT-001-002). Available online at <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

comprises of deep well drained coarse loamy and sandy soils, locally over gravel. This land is classified as very good quality agricultural land in Grade 2¹¹³.

- 5.11.14 Two farm holdings, already affected by the original scheme, will be further affected by this amendment. These are:
- Land at Luthbar (CA1/22), a 1ha non-commercial equestrian holding of low sensitivity to change; and
 - Quintons Orchard Farm (CA1/25), a 316ha mixed arable, beef cattle and sheep unit, with equestrian and fishery enterprises, of medium sensitivity to change.

Future environmental baseline

Construction (2020)

- 5.11.15 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 5.11.16 No avoidance or mitigation measures, additional to those reported in the main ES and draft Code of Construction Practice (CoCP)¹¹⁴, are required.

Assessment of impacts and effects

- 5.11.17 The amendment will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the main ES on best and most versatile (BMV) agricultural land or forestry land within the Fradley to Colton area as it is not of a scale to change the magnitude of impact. The route-wide effects on BMV land and forestry land are reported in Volume 3 of the SES2 and AP2 ES.
- 5.11.18 The main ES reported a temporary negligible effect on Land at Luthbar (CA1/22), which is not significant. Approximately 0.1ha (10% of the total area of the land holding) would be required temporarily, resulting in a low impact. The AP1 amendment AP1-001-003 required an additional 0.2ha of land temporarily which would result in a high impact and a moderate adverse significant effect. This amendment will remove the additional 0.2ha of land required temporarily for the AP1 amendment (AP1-001-003). The AP2 amendment will change the impact of the temporary land required from high, as reported in the SES1 and AP1 ES, to low, and the level of the significance of the effects from moderate adverse, as reported in the SES1 and AP1 ES, to negligible, which is not significant.

¹¹³ The quality of agricultural land in England and Wales is assessed according to the Agricultural Land Classification (ALC) system, which classifies agricultural land into five grades from excellent quality Grade 1 land to very poor quality Grade 5 land. Grade 3 is subdivided into Subgrades 3a and 3b. Grades 1, 2 and 3a are defined as the best and most versatile (BMV) land. The ALC methodology is contained in: Ministry of Agriculture, Fisheries and Food (1988), Agricultural Land Classification of England and Wales – Revised guidelines and criteria for grading the quality of agricultural land.

¹¹⁴ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, draft Code of Construction Practice (CT-003-000). Available online at <https://www.gov.uk/government/publications/draft-code-of-construction-practice-for-hs2-phase-2a>

The amendment will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the main ES.

The amendment will remove the moderate adverse significant effect reported in the AP1 ES. There is no change to the permanent land required for the original scheme from this land holding.

- 5.11.19 The main ES reported a temporary moderate adverse effect on Quintons Orchard Farm (CA1/25), which is significant. Approximately 14.6ha (5% of the total area of the land holding) would be required temporarily, resulting in a negligible impact. The AP1 amendment AP1-001-003 required an additional 1.1ha of land temporarily. This amendment will remove the additional 1.1ha of land required temporarily for the AP1 amendment (AP1-001-003). The amendment will, however, require an additional 1.1ha of land temporarily from the land holding (in a different part of the land holding than that required for AP1-001-003), resulting in a total area of land required temporarily of 15.7ha (5% of the total area of the land holding). The amendment will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the main ES.
- 5.11.20 The main ES reported a permanent minor adverse effect on Quintons Orchard Farm, which is not significant. Approximately 8.8ha (3% of the total area of the land holding) would be required permanently, resulting in a negligible impact. The AP1 amendment AP1-001-003 required an additional 0.3ha of land permanently. The amendment will remove the additional 0.3ha of land required permanently for the AP1 amendment (AP1-001-003). The amendment will, however, require an additional 0.2ha of land permanently from the holding (in a different part of the land holding than that required for AP1-001-003), resulting in a total area of land required permanently of 9ha (3% of the total area of the land holding). The amendment will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the main ES.
- 5.11.21 For further information see SES2 and AP2 ES Volume 5: Appendix AG-001-000 and SES2 and AP2 ES Volume 5: Agriculture, forestry and soils Map Book.

Mitigation and residual effects

Other mitigation measures

- 5.11.22 The land required temporarily for construction will be restored to its former agricultural condition once the works are completed, following good practice techniques in handling, storing and reinstating soils on that land, as set out in the draft CoCP. No other mitigation has been identified.

Summary of likely residual significant effects

- 5.11.23 There are no changes to the likely residual significant effects identified in the main ES as a result of the amendment. The amendment will remove the likely residual significant effect reported on Land at Luthbar (CA1/22) as a result of AP1 amendment (AP1-001-003) reported in the SES1 and AP1 ES.

Cumulative effects

- 5.11.24 There are no new or different likely significant cumulative effects for agriculture, forestry and soils as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Community

Scope, assumptions and limitations

- 5.11.25 The assessment scope, key assumptions and limitations for community are as set out in Volume 1, the SMR and SMR Addendum of the main ES.
- 5.11.26 This amendment has the potential to result in new or different significant temporary construction effects only. Therefore, there is no permanent construction or operational assessment for community.

Existing environmental baseline

- 5.11.27 The baseline community information for the Fradley to Colton area is as described in Volume 2, CA1, Section 6 of the main ES and Section 3 and 5 of the SES1 and AP1 ES.
- 5.11.28 Pipe Ridware is a small settlement of eight residential properties with a village church, which was until recently used as a community theatre. Pipe Ridware is located approximately 1.5km north of Handsacre.

Future environmental baseline

Construction (2020)

- 5.11.29 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 5.11.30 No avoidance or mitigation measures additional to those reported in the main ES and draft CoCP are required.

Assessment of impacts and effects

- 5.11.31 The main ES reported significant in-combination effects at five residential properties in Pipe Ridware for up to one year and two months in total due to a combination of noise and visual effects. The AP1 revised scheme did not result in any new or different significant community effects in this area. This amendment has been assessed for potential HGV traffic effects to determine if these give rise to a new or different significant in-combination effect on community resources in this area. The assessment has concluded that this amendment will not give rise to any new or different likely residual significant effects and will not change the level of significance of the effects reported in the main ES.

Cumulative effects

- 5.11.32 There are no new or different likely significant cumulative effects for community as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Traffic and transport

Scope, assumptions and limitations

- 5.11.33 The assessment scope, key assumptions and limitations for traffic and transport are as set out in Volume 1, the SMR and SMR Addendum of the main ES.
- 5.11.34 This amendment has the potential to result in new or different operational effects only. Therefore, there is no temporary or permanent construction assessment for traffic and transport.
- 5.11.35 The assessment of the changes to construction traffic flows as a result of this amendment in combination with all SES2 changes and AP2 amendments is reported in Section 7.

Existing environmental baseline

- 5.11.36 The baseline traffic and transport information for the Fradley to Colton area is as described in Volume 2, CA1, Section 14 of the main ES.
- 5.11.37 The B5014 Uttoxeter Road is a main traffic route within the Fradley to Colton area, and is a north-south link connecting the settlements of Blithbury, Abbots Bromley, Handsacre and Hill Ridware to Uttoxeter in the north and Lichfield in the south. Common Lane and School Road are local roads that connect Pipe Ridware to the B5014 Uttoxeter Road. There are no accesses on to Common Lane and limited accesses on School Road between Common Lane and Pipe Ridware.

Future environmental baseline

Operation (2027 and 2041)

- 5.11.38 The future baseline for operation in 2027 and 2041 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during operation

Avoidance and mitigation measures

- 5.11.39 No avoidance or mitigation measures additional to those reported in the main ES are identified.

Assessment of impacts and effects

- 5.11.40 The main ES reported that the operation and maintenance of the original scheme in the Fradley to Colton area would generate a limited number of vehicular trips and the effects would not be significant.
- 5.11.41 The AP1 amendment (AP1-001-003) provided for a site haul route from Pipe Lane towards the Pipe Ridware embankment to be used as a construction route to

remove construction HGV traffic through Pipe Ridware and on completion of the construction of the construction works, the site haul route would provide a permanent maintenance access route from Pipe Lane towards the Pipe Ridware auto-transformer feeder station for occasional use by maintenance vehicles. The SES1 and AP1 ES stated that as use of the permanent maintenance access would be infrequent, this would not result in any new significant traffic effects.

- 5.11.42 The AP2 amendment removes the site haul route on completion of the construction works such that maintenance vehicles associated with the permanent maintenance of the scheme would require occasional access through Pipe Ridware. In comparison to the main ES, the amendment will not result in any new or different significant effects. In comparison to the AP1 amendment in this area, the AP2 amendment will result in occasional operational traffic using local roads through Pipe Ridware, but these will not result in any significant effects.
- 5.11.43 For further information see SES2 and AP2 ES Volume 5: Appendix TR-001-000.

Cumulative effects

- 5.11.44 There are no new or different likely significant cumulative effects for traffic and transport as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Summary of new or different likely residual significant effects as a result of the amendment

- 5.11.45 The amendment will remove the likely residual significant effect on Land at Luthbar (CA1/22) as the additional land required temporarily for the AP1 amendment (AP1-001-003) is removed.

5.12 Additional land required for agricultural access off Stonyford Lane (AP2-001-012)

- 5.12.1 The Bill provides for the realignment of the B5014 Uttoxeter Road to cross over the Blithbury Central cutting. Stonyford Lane would be realigned to the east of its existing alignment to join the realigned B5014 Uttoxeter Road. Existing farm accesses off the highway network would be retained, where possible.
- 5.12.2 Since the submission of the Bill, a requirement has been identified to provide two accesses off Stonyford Lane to agricultural land associated with Manor Farm (CA1/27), Blithbury. The accesses will be located 220m north-west of the junction of the realigned Stonyford Lane and the realigned B5014 Uttoxeter Road. See Map CT-06-206, G9, in the SES2 and AP2 ES Volume 2: CA1 Map Book. The grass verges at the location of the two accesses will be widened to provide visibility splays. Approximately 260m of existing hedgerow will be moved further back from the highway to comply with highway access junction visibility requirements. See Map CT-06-206, G9, in the SES2 and AP2 ES Volume 2: CA1 Map Book.

- 5.12.3 The additional accesses will take up to one month to construct, commencing in 2022, in advance of the Stonyford Lane diversion. Works will be managed from the Blithbury Central cutting satellite compound.
- 5.12.4 The land required to provide the two agricultural accesses is outside the limits of the Bill and will result in the requirement for an additional 0.2ha of land, some of which will be from the following agricultural holdings: Black Flatts Farm (CA1/34); and Manor Farm (CA1/27), Blithbury. See Map CT-05-206, D6, in the SES2 and AP2 ES Volume 2: CA1 Map Book.

Topics included in the AP2 assessment

- 5.12.5 The assessment of the changes to construction traffic flows and traffic related effects as a result of this AP2 amendment in combination with all SES2 changes and AP2 amendments, is reported in Section 7.
- 5.12.6 This amendment is not considered to require a reassessment of the environmental effects or mitigation as set out in the main ES, as amended by SES1 and SES2, with respect to any environmental topics.

5.13 Additional land and a change to Bill powers required for HS2 maintenance access along an agricultural access track from Blithbury Road (AP2-001-013)

- 5.13.1 The Bill provides for Manor Farm overbridge, which would provide access to agricultural land over the HS2 route at Blithbury Central cutting. Approximately 300m of agricultural track would be provided, to the south-west of the HS2 route, to maintain access to all of the fields south of the HS2 route associated with Manor Farm (CA1/27). See Map CT-05-206, F4 to E2, in the main ES Volume 2: CA1 Map Book.
- 5.13.2 Since submission of the Bill, further design development has identified a need to provide a HS2 maintenance access to Manor Farm overbridge. The HS2 maintenance access will follow the alignment of an existing agricultural track from Blithbury Road to the north-east of the HS2 route. The access track will be upgraded to 3m in width to accommodate HS2 maintenance vehicles. See Map CT-05-206, F3 to E2, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 5.13.3 This amendment will be constructed after the main works are complete, in 2024, and will take up to one month to complete. Works will be managed from Blithbury Central cutting satellite compound.
- 5.13.4 The upgrade of the agricultural access track for its use as a permanent HS2 maintenance access is outside the limits of the Bill and will require a change to Bill powers and the requirement for an additional 0.6ha of land from Manor Farm (CA1/27). See Map CT-05-206, F3 to E2, in the SES2 and AP2 ES Volume 2: CA1 Map Book.

Topics included in the AP2 assessment

- 5.13.5 The assessment of the changes to construction traffic flows and traffic related effects as a result of this AP2 amendment in combination with all SES2 changes and AP2 amendments, is reported in Section 7.
- 5.13.6 This amendment is not considered to require a reassessment of the environmental effects or mitigation as set out in the main ES, as amended by SES1 and SES2, with respect to any other environmental topics.

5.14 Additional land required for agricultural access off Blithbury Road (AP2-001-014)

- 5.14.1 The Bill provides for the realignment of a section of Blithbury Road to cross over the Blithbury Central cutting. See Map CT-06-206, I10 to F2 in the main ES Volume 2: CA1 Map Book. Existing farm accesses off the highway network would be retained, where possible.
- 5.14.2 Since the submission of the Bill, a requirement has been identified to provide an additional access off Blithbury Road to agricultural land associated with Manor Farm, Blithbury (CA1/27). The access will be located 400m east of Blithbury Road overbridge. See Map CT-06-206, E2 to D3, in the SES2 and AP2 ES Volume 2: CA1 Map Book. The grass verges at the location of the access will be widened to provide a visibility splay. Approximately 150m of existing hedgerow will be moved further back from the highway to comply with highway access junction visibility requirements. See Map CT-06-206, E2 to D3, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 5.14.3 The additional access will take up to one month to construct, commencing in 2021, in conjunction with the Blithbury Road realignment. Works will be managed from Blithbury Central cutting satellite compound.
- 5.14.4 The land required to provide the agricultural access is outside the limits of the Bill and will result in the requirement for an additional 560m² of land, some of which will be from Manor Farm (CA1/27). See Map CT-05-206, G9, in the SES2 and AP2 ES Volume 2: CA1 Map Book.

Topics included in the AP2 assessment

- 5.14.5 The assessment of the changes to construction traffic flows and traffic related effects as a result of this AP2 amendment in combination with all SES2 changes and AP2 amendments, is reported in Section 7.
- 5.14.6 This amendment is not considered to require a reassessment of the environmental effects or mitigation as set out in the main ES, as amended by SES1 and SES2, with respect to any other environmental topics.

5.15 Additional land and a change to Bill powers required for a grid supply point connection to National Grid Parkgate substation (AP2-001-015)

- 5.15.1 The Bill provides for a connection from the grid supply point at the former Rugeley Power Station to provide traction power supply for HS2 Phase 2a. A power connection, 4km in length, would run between the National Grid Rugeley substation and Newlands Lane auto-transformer feeder station. The Newlands Lane auto-transformer feeder station would provide power to the overhead line equipment and to a number of auto-transformer stations along the Phase 2a route.
- 5.15.2 A connection to the grid supply point at the National Grid Rugeley substation would be created, which would transform an existing 400kV power supply down to 132kV. See Map CT-06-207-L3, G2 in the main ES Volume 2: CA1 Map Book. The 132kV power line would be ducted underground, using horizontal directional drilling for 670m under the River Trent and the West Coast Main Line (WCML). See Map CT-06-207-L3, F2 to E1 and Map CT-06-207 L2, H10 to F7 in the main ES Volume 2: CA1 Map Book. A cable sealing end compound¹¹⁵, 80m by 40m, would be located adjacent to Cawarden Springs Local Wildlife Site (LWS) to allow the transition of ducted cables to overhead power line. See Map CT-06-207-L2, F7 to E7 in the main ES Volume 2: CA1 Map Book. Access to the cable sealing end compound would be via a new access from the existing access track to Cawarden Springs Farm, which connects to Blithbury Road to the north. The existing access track would be upgraded.
- 5.15.3 Three sets of wooden poles 15m in height with 100m spans between the poles would carry the power line overhead for 2.3km north to the second cable sealing end compound. There would be an offset of 18m between each of the three parallel pole lines. See Map CT-06-207-L2, F7 to C1 and Map CT-06-207-L1, H10 to D3, in the main ES Volume 2: CA1 Map Book. A cable sealing end compound, 80m by 40m, would be located 100m south-west of Hollow Lane, and accessed from Hollow Lane. This compound would allow the transition of the overhead power line to buried cables. See Map CT-06-207-L1, D2 and D3 in the main ES Volume 2: CA1 Map Book. The buried power lines would continue for 1km to the north-east towards the HS2 route where they would be ducted beneath the route. The ducted lines would then pass around the perimeter of the Newlands Lane auto-transformer feeder station and connect into transformers on the north side of the auto-transformer feeder station. See Map CT-06-207-L1, D2 and D1 and Map CT-06-207, E10 to E4 in the main ES Volume 2: CA1 Map Book.
- 5.15.4 Landscape and ecological mitigation would be provided for the Rugeley connection in the form of:
- two ecological mitigation ponds, within an area of grassland habitat creation, two areas of woodland habitat creation to provide replacement habitat, and an

¹¹⁵ A cable sealing end compound is required at the interface between overhead line and buried cables.

area of grassland habitat creation, to the east of the overhead power lines, extending from 270m north-east of the WCML. See Map CT-06-207- L2, F6 to E3 in the main ES Volume 2: CA1 Map Book;

- four ecological mitigation ponds, within an area of grassland habitat creation, and areas of woodland habitat creation to provide replacement habitat and provide habitat connectivity around an existing pond, extending from 300m south-west of Hollow Lane. See Map CT-06-207-L1, D4 to C6 in the main ES Volume 2: CA1 Map Book;
- landscape mitigation planting to provide visual screening at the sealing end compound for views from Hollow Lane and adjacent properties, and grassland habitat creation. See Map CT-06-207-L1, D2 and D3, in the main ES Volume 2: CA1 Map Book; and
- an area of grassland habitat creation around Newlands Lane auto-transformer feeder station. See Map CT-06-207, E2 to E3 in the main ES Volume 2: CA1 Map Book.

- 5.15.5 Construction of the Rugeley grid supply point connection would be managed from Blithbury North cutting satellite compound. Construction of the connection would take two years to complete. Blithbury North cutting satellite compound would also manage construction of the foundations and building for the Newlands Lane auto-transformer feeder station, which would take one year to complete.
- 5.15.6 The installation of railway systems and equipment at the Newlands Lane auto-transformer feeder station would be managed from Newlands Lane auto-transformer feeder station satellite compound, and would take two years to complete.
- 5.15.7 Since submission of the Bill, the development of the traction power design has identified that in order to enable National Grid to meet HS2's power supply requirements for Phase 2a whilst maintaining resilience in National Grid's overall supply to the local area, additional physical power supply infrastructure would have been needed from the south to the substation on the site of the decommissioned Rugeley Power Station. It is now understood that meeting both HS2 and National Grid requirements would not be achievable under the original scheme.
- 5.15.8 Further studies have accordingly been undertaken to identify and appraise an appropriate solution to this problem. The principal purpose of these studies was to select a suitable National Grid supply point which would provide National Grid and HS2 Ltd with resilience of supply.
- 5.15.9 The selected option will provide a new grid connection between Parkgate, on the B5234 Bromley Lane, and the Newlands Lane auto-transformer feeder station. The local alternatives considered and the reason for selecting this option is detailed below.
- 5.15.10 The connection to Rugeley Power Station, provided in the original scheme, will be removed from the AP2 revised scheme. All of the works and land required for the Rugeley grid supply point connection will be removed from the powers in the Bill,

including the overhead and underground power lines, cable sealing end compounds and associated environmental mitigation.

- 5.15.11 A connection to the grid supply point will be created at a new permanent National Grid substation (National Grid Parkgate substation). The National Grid Parkgate substation will be located immediately to the south of the existing 400kV National Grid overhead power line. See Map CT-05-207-R6, J5 to I6 in the SES2 and AP2 ES Volume 2: CA1 Map Book. Power will be transformed from 400kV to 132kV at this substation. The works will also require one of the existing 400kV pylons to be removed and replaced by two new 400kV pylons, up to approximately 55.5m in height, located along the line of existing pylons, approximately 70m to the north and south of the removed pylon. In order to construct the new pylons, a temporary pylon and diversion of the 400kV line will be required. Land will also be required along the 400kV line for overhead line replacement works and earthing purposes, related to the new pylons for the new substation. See Map CT-05-207-R7, J9 to Map CT-05-207-R6, B3 in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 5.15.12 The 132kV connection from the new National Grid Parkgate substation to the Newlands Lane 132kV substation will consist of three circuits, carried on two parallel lines of steel pylons, one carrying two circuits and the other carrying a single circuit, for a length of approximately 7.7km. The proposed power lines will run in a generally south-west direction from the National Grid Parkgate substation towards the Newlands Lane auto-transformer feeder station.
- 5.15.13 The pylons carrying two circuits will vary in height from 23m at Map CT-05-207-R6, G8, to 38m at Map CT-05-207-R3, F6 in the SES2 and AP2 ES Volume 2: CA1 Map Book. The pylons carrying a single circuit will vary in height from 23m at Map CT-05-207-R6, H8 to 35m at Map CT-05-207-R5, G4 and Map CT-05-207-R3, F6 in the SES2 and AP2 ES Volume 2: CA1 Map Book. The majority of pylons on both lines will be 29m in height. The height of the pylons will vary to take account of the topography, to maintain the required clearance beneath the 132kV overhead lines.
- 5.15.14 The distance between the two overhead lines is determined by the falling distance of the adjacent pylons, the geometry of the overhead line and the topography of the land and will vary between 29m and 38m.
- 5.15.15 The size of pylon bases will vary with the height of the pylon ranging from 36m² for a 23m high pylon, to 81m², for a 38m high pylon.
- 5.15.16 The amendment provides for a corridor within which the pylons will be located. In developing the current level of design, the power lines have been routed to minimise tree loss, particularly of protected trees and large mature trees, where reasonably practicable, however some tree loss will be unavoidable. Where possible, pylons have been placed at the edge of field boundaries, avoiding roads and crossings over watercourses to minimise impacts on agriculture, connectivity and water resources.
- 5.15.17 During detailed design, localised constraints such as ground conditions may require the pylons to be repositioned. A sensitivity assessment for each topic has

considered the following potential variations, including any combination of these: repositioning the pylons by up to 50m in either direction along the power line route; and/or laterally within the pylon construction corridor; and/or up to 3m higher. Where this may result in new or different significant environmental effects these are reported within the topic assessment. Where this movement does not result in any new or different significant effects, this is not reported.

- 5.15.18 A new permanent substation (National Grid Newlands Lane substation) will be located immediately to the north of the Newlands Lane auto-transformer feeder station to provide for the connection of the overhead lines. The new substation will be 90m by 120m and will be level with the Newlands Lane auto-transformer feeder station. The Newlands Lane auto-transformer feeder station will be unchanged from the original scheme, however the access road will be amended to accommodate and provide access to the National Grid Newlands Lane substation. See Map CT-06-207, E3 to D5 in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 5.15.19 Along the grid supply route, three Western Power Distribution 11kV overhead lines and five British Telecom Openreach overhead telecommunications lines will be diverted underground to provide sufficient clearance to the proposed overhead 132kV power lines.
- 5.15.20 An additional 233.4ha of land beyond the land required in the original scheme has been identified to allow for the construction of the Parkgate grid supply point connection. This pylon construction corridor width allows for the design to be further refined, including adjusting pylon locations, as well as safe and efficient pylon erection, overhead line stringing and associated works and access for future maintenance. As the design is further refined, it is expected that the corridor will reduce considerably, and therefore not all of the land will be required. The typical width of the pylon construction corridor in the detailed design could reduce to approximately 65m.
- 5.15.21 Removal of existing vegetation and tree cover will only occur where essential for construction purposes. However, on a precautionary basis and in the absence of survey information, mitigation has been provided to replace all ecological habitats within the land required for construction, in line with the mitigation principles applied, generally, to the original scheme. This mitigation will only be implemented to compensate the habitat that is removed, and therefore may not need to be implemented in full. This comprises:
- three ecological mitigation ponds within an area of grassland habitat creation, two areas of woodland habitat creation, and an area of grassland habitat creation, to the east and beneath the overhead power lines, extending from Newlands Lane. See Map CT-06-207-R1, D8 to C5, in the SES2 and AP2 ES Volume 2: CA1 Map Book;
 - three ecological mitigation ponds, within an area of grassland habitat creation, two ecological mitigation ponds within an area of woodland habitat creation, and an area of woodland mitigation planting to the south of the power lines.

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See Map CT-06-207-R1, E4 to C6, in the SES2 and AP2 ES Volume 2: CA1 Map Book;

- two ecological mitigation ponds, within an area of grassland habitat creation. See Map CT-06-207-R1, G3 in the SES2 and AP2 ES Volume 2: CA1 Map Book;
- an area of wetland habitat creation, including six ecological mitigation ponds adjacent to Little Blithe, north of the B5014 Lichfield Road. See Map CT-06-207-R2, C5 to A7, in the SES2 and AP2 ES Volume 2: CA1 Map Book;
- eight ecological mitigation ponds, within an area of grassland habitat creation. See Map CT-06-207-R2, B2 to B5, in the SES2 and AP2 ES Volume 2: CA1 Map Book;
- two ecological mitigation ponds, within an area of grassland habitat creation and wetland habitat creation. See Map CT-06-207-R2, F7 to E6, in the SES2 and AP2 ES Volume 2: CA1 Map Book;
- grassland and woodland habitat creation. See Map CT-06-207-R3, G9 to F8, in the SES2 and AP2 ES Volume 2: CA1 Map Book;
- fourteen ecological mitigation ponds, within an areas of grassland habitat creation, wetland habitat creation, and woodland habitat creation. See Map CT-06-207-R3, H5 to E1, in the SES2 and AP2 ES Volume 2: CA1 Map Book;
- two ecological mitigation ponds within an area of grassland habitat creation adjacent to an existing pond. See Map CT-06-207-R3, G1 to F2, in the SES2 and AP2 ES Volume 2: CA1 Map Book;
- two ecological mitigation ponds, within an areas of grassland habitat creation. See Map CT-06-207-R3, I4 to I3, in the SES2 and AP2 ES Volume 2: CA1 Map Book;
- an area of grassland habitat creation. See Map CT-06-207-R6, C3, in the SES2 and AP2 ES Volume 2: CA1 Map Book;
- two ecological mitigation ponds, within an areas of grassland habitat creation and woodland habitat creation around the National Grid Parkgate substation. See Map CT-06-207-R6, H7 to Map CT-06-207-R7, C7, in the SES2 and AP2 ES Volume 2: CA1 Map Book;
- an areas of grassland habitat creation. See Map CT-06-207-R7, G6 to G7, in the SES2 and AP2 ES Volume 2: CA1 Map Book; and
- two ecological mitigation ponds, within an areas of grassland habitat creation and woodland habitat creation. See Map CT-06-207-R7, H9 to G9, in the SES2 and AP2 ES Volume 2: CA1 Map Book.

5.15.22 In addition, landscape mitigation planting is proposed around the National Grid Parkgate substation, the Newlands Lane auto-transformer feeder station and the National Grid Newlands Lane substation to provide visual screening.

- 5.15.23 Construction of the National Grid Newlands Lane substation will be managed from Blithbury North cutting satellite compound. Blithbury North cutting satellite compound will also manage construction of the foundations and building for the Newlands Lane auto-transformer feeder station, which will take one year to complete.
- 5.15.24 Construction of the National Grid Parkgate substation and pylon route will be managed from a new compound, the Parkgate grid supply point utility compound, located to the east of the National Grid Parkgate substation. A material storage area will also be provided to the west of the National Grid Parkgate substation during construction. This compound and material storage area will be in place for four years, commencing in 2021, throughout the construction of the National Grid Parkgate substation. Construction of the pylon route will take two years to complete. The compound will be accessed from the B5234 Bromley Lane, and will support an average of 30 workers per day (45 workers at peak times).
- 5.15.25 The programme and activities associated with the installation of railway systems for Newlands Lane auto-transformer feeder station will be unchanged, however the location of the Newlands Lane auto-transformer feeder station satellite compound will be amended slightly to accommodate the amended access road into the auto-transformer feeder station.
- 5.15.26 For the purpose of the assessment, it has been assumed that during construction, temporary diversions or realignments of Colton Footpath 79 and Abbots Bromley Footpaths 26, 29, 30, 38, 39, 46 and 49 will be required for up to three months each to ensure the safety of non-motorised users. Colton Footpath 79 and Abbots Bromley Footpath 26 will be diverted parallel to their existing routes for one year during construction, to separate non-motorised users from construction vehicles accessing the pylon route.
- 5.15.27 A number of localised temporary crossings of watercourses will be required for construction transport, and to avoid or reduce impacts on local roads.
- 5.15.28 The land required to provide the grid supply point connection to National Grid Parkgate substation is outside the limits of the Bill and will result in the requirement for an additional 233.4ha of land. The amendment will also require a change to Bill powers. See Map CT-05-206-R1, Map CT-05-207, Map CT-05-207-R1, Map CT-05-207-R2, Map CT-05-207-R3, Map CT-05-207-R4, Map CT-05-207-R5, Map CT-05-207-R6, Map CT-05-207-R7, Map CT-06-206-R1, Map CT-06-207, Map CT-06-207-R1, Map CT-06-207-R2, Map CT-06-207-R3, Map CT-06-207-R4, Map CT-06-207-R5, Map CT-06-207-R6, and Map CT-06-207-R7, in the SES2 and AP2 ES Volume 2: CA1 Map Book. It is assumed that 196.5ha of the additional land will be returned to its existing use following construction.
- 5.15.29 The land for the Rugeley grid supply point connection will be removed from the limits of the Bill, removing the requirement for 83ha of land. See Map CT-05-207-L1, Map CT-05-207-L2, Map CT-05-207-L3, Map CT-06-207-L1, Map CT-06-207-L2 and Map CT-06-207-L3 in the AP2 and SES2 Volume 2: CA1 Map Book.

Local alternatives

5.15.30 Since submission of the Bill, a preliminary options appraisal was undertaken of five options put forward by National Grid to provide traction power for the scheme. Three of these options were not taken forward for further consideration as they were not considered to be reasonable alternatives:

- Option 1: the original scheme. Further information on power supplies into the existing substation meant that this option could not meet both HS2's power supply requirements and National Grid's requirements. Further information about the redundant Rugeley Power Station site also indicated a higher risk of contaminated land around the substation than originally anticipated, and identification of other constraints on site such as buried cables or coal pits.
- Option 3: a combination of using the original scheme Rugeley substation, and a new substation at Kings Bromley. This was the highest cost option and was considered not to meet HS2's power supply requirements. This option had the same contaminated land constraints as Option 1, combined with the need for further land at Kings Bromley;
- Option 4: all power to come from a new substation at Kings Bromley. This option would require the construction of a new substation at Kings Bromley, with underground cables running along the line of the HS2 route. This would introduce an unacceptable level of interaction between the HS2 infrastructure and a National Grid asset, which would introduce risk during construction and operation. A variation of this option was then considered with the aim of minimising interaction with the HS2 infrastructure. This would increase the length of the connection, but not completely remove the interaction with the HS2 route. This variation would increase the costs and the duration of the works. This option would be on land currently not required by HS2 and would not offer any significant benefits compared with Option 5, and so was not taken forward for further consideration.

5.15.31 The two options taken forward for further consideration were:

- Option 2: this option would be a modification to the original scheme. In addition to a three-circuit 132kV power line from National Grid Rugeley substation to Newlands Lane auto-transformer feeder station, described in the main ES, a single circuit 275kV overhead power line would also be provided. This additional circuit, 7.7km in length, would run from an existing 400kV pylon, near Hanch Reservoir, to the National Grid Rugeley substation. Pylons, 31m in height, would support the additional overhead power line. Every fifth pylon would be taller, with a height of 43m; and
- Option 5 (the AP2 revised scheme): a connection would be provided from an existing 400kV pylon, on a double circuit, located approximately 200m south-east of the B5234 Bromley Lane and approximately 1.5km south-west of Newborough, to a new substation (National Grid Parkgate substation), measuring 36.1ha in area, located adjacent to the existing pylon. The National Grid Parkgate substation would reduce the voltage from 400kV to 132kV. Two 132kV overhead power lines, 7.7km in length, would run between the

National Grid Parkgate substation and a new substation (National Grid Newlands Lane substation). At the time it was considered, these were one line, 27m in height carrying two circuits, and the other 23m in height carrying a single circuit.

- 5.15.32 High level consideration has also been given to the principle of undergrounding a variation of Option 5. This was not considered to be a reasonable alternative due to the more disruptive nature of the construction works, the likely longer duration of works, and the likely increased cost.
- 5.15.33 A variation of Option 5 utilising three lines of 'Trident'¹¹⁶ wooden poles was also considered. Due to the rating¹¹⁷ of a wooden pole-type route, with a standard conductor arrangement, being insufficient to support the required traction power loading, this was not feasible and therefore not considered to be a reasonable alternative.
- 5.15.34 Of the reasonable alternatives, Option 5 was identified as the preferred option, as on balance it presented the most favourable environmental outcome and best met HS2 and National Grid's power supply requirement. Option 2 would retain the ground contamination risks of Option 1 and would result in a greater impact on community receptors and businesses and impact a number of heritage assets through their removal or change in setting. Option 2 would also result in additional cost when compared to Option 5, due to the partial undergrounding of the power line as well as the greater length of overhead power line. Option 2 would have a lower risk from flooding, as it would not be downstream of a raised reservoir. Option 5 would remove the need to undertake works within a potentially contaminated site (Rugeley Power Station) but would have an additional risk of opening up pathways for contamination due to the presence of historic landfill sites in the area of additional land required for the connection.
- 5.15.35 The analysis of engineering, cost and potential environmental impacts associated with both options is set out below.

Option 5

- 5.15.36 Option 5 would remove the construction works from the site of the former Rugeley Power Station, which would be required in the original scheme and in Option 2. Rugeley Power Station represents a potential source of contamination (historic landfill, power station, fuel storage and coal mining activities) and there would be potential for construction works to create pathways for contamination/gas migration. Option 5 would remove this potential contamination risk at Rugeley Power Station.
- 5.15.37 The length of power line in Option 5 would be almost double the length of the Option 2 connection between the National Grid Rugeley substation and the Newlands Lane auto-transformer feeder station. However, with Option 2, there

¹¹⁶ 'Trident' refers to the appearance and configuration of the wooden poles used to support the electrical conductors.

¹¹⁷ Rating refers to the capacity of an electrical conductor to carry electrical current load.

would be a requirement for an additional line between Hanch Reservoir, and National Grid Rugeley substation which would be of similar length to Option 5. Therefore, the total length of Option 2 is longer than Option 5, resulting in construction activity over a larger area, which would give rise to visual intrusion to residential properties and recreational receptors. During operation, for Option 5, there would be views of the overhead power lines from residential receptors at Buthfold Farm, Ashbrook Farm, Barn Farm and Bentilee Farm. While the undulating landscape and existing woodland would help to screen the overhead power line and the new substation, the new infrastructure would introduce uncharacteristic features into the rural and secluded landscape.

- 5.15.38 The overhead line for Option 5 would be within the relevant Natural England Impact Risk Zone for Blithfield Reservoir Site of Special Scientific Interest (SSSI), Braken Hurst SSSI and Forest Banks SSSI, and would increase the risk of incidental mortality of individual birds through collisions with the power line. This option would impact fewer known built heritage assets than Option 2, and the impact on those assets would be small, compared to the scale of impact with Option 2. Option 5 would, however, be downstream of Blithfield Reservoir dam, a large raised reservoir, which could impact the pylons in the event of reservoir dam failure. Subsequent investigations have identified that the risk of reservoir dam failure is negligible.
- 5.15.39 Option 5 is less complex in terms of construction as it would not require horizontal directional drilling from National Grid Rugeley substation beneath the WCML and River Trent, and it would have a reduced cost compared to Option 2. The construction of the additional National Grid Parkgate substation would increase the overall duration of construction of the connection, compared to Option 2, but this could be accommodated within the overall HS2 Phase 2a construction programme.

Option 2

- 5.15.40 Option 2 would require construction works within the site of the former Rugeley Power Station. Directional drilling, required to underground the power line from National Grid Rugeley substation beneath the WCML and the River Trent, has the potential to create pathways for contamination or gas migration, particularly where the drilling reaches the surface.
- 5.15.41 The single circuit overhead power line associated with this option would be in proximity to Lichfield Golf and Country Club, Lower Lodge Mobile Home Park and Plum Pudding Inn, and may result in localised indirect impacts on these businesses. Impacts on the local community would be greater due to an increased number of residential receptors and community resources in the vicinity of this option. This option would also increase the number and scale of loss of known potential buried archaeological remains compared to Option 5 due to the larger area of land required for Option 2 and would have the potential to impact the setting of built heritage assets.
- 5.15.42 Option 2 would have a substantial impact on the landscape character, introducing man-made structures into the landscape adding to the urbanising effects of the

existing pylon lines and the former Rugeley Power Station, and would reduce the scenic quality. The single circuit overhead power line associated with this option would be in views from the A513 Rugeley Road, smaller local roads, a number of public rights of way (PRoW) and the Trent and Mersey Canal, which together with proximity to Armitage, Hill Top historic village and the Lower Lodge residential mobile park would have substantial visual impacts. While the visual impacts in Option 5 would also be substantial, the undulating landscape and plentiful tree cover would help to screen the overhead power line, whereas the views are more open in the landscape around Option 2.

- 5.15.43 Option 2 would have a lower risk to birds than Option 5, as it is outside the Impact Risk Zone for Blithfield Reservoir SSSI, which is designated for its bird interest. Option 2 would also impact fewer sensitive agricultural holdings than Option 5, however the wooden poles would be closer together than pylons and are likely to have more disruptive effects on the holdings affected.
- 5.15.44 Option 2 would require works within the floodplains of the River Trent, Shropshire Brook and Bilson Brook and the overhead power line would cross over several watercourses. However, the option is not anticipated to have an impact on the Water Framework Directive (WFD) quality elements of surface water and groundwater bodies. In comparison to Option 5, which would be downstream of a large raised reservoir, this option would have a reduced risk from flooding.
- 5.15.45 Option 2 would be more complex to construct than Option 5 as it would require horizontal directional drilling from the National Grid Rugeley substation, beneath the WCML and the River Trent. This option would result in an increased cost compared to the Option 5, due to the partial undergrounding of the power line as well as the increased length of overhead power line.

Topics included in the AP2 assessment

- 5.15.46 This amendment is considered to require reassessment of the environmental effects and mitigation in the main ES, as amended by SES1 and SES2, for the following topics: agriculture, forestry and soils; cultural heritage; ecology and biodiversity; landscape and visual; traffic and transport; and water resources and flood risk.
- 5.15.47 The assessment of the changes to construction traffic flows and traffic related effects as a result of this AP2 amendment in combination with all SES2 changes and AP2 amendments, is reported in Section 7.

Agriculture, forestry and soils

Scope, assumptions and limitations

- 5.15.48 The assessment scope, key assumptions and limitations for agriculture, forestry and soils are as set out in Volume 1, the Scope and Methodology Report¹¹⁸ (SMR) and SMR Addendum¹¹⁹ of the main ES.
- 5.15.49 The amendment has the potential to result in new or different temporary or permanent significant construction effects only. Therefore, there is no operational assessment for agriculture, forestry and soils.

Existing environmental baseline

- 5.15.50 The baseline agriculture, forestry and soils information for the additional land required within the Parkgate grid supply point connection has been established through desk study and site surveys, drawing on a number of data sources, including geology and soil mapping, climatic data and provisional Agricultural Land Classification (ALC)¹²⁰ data. Farm Impact Assessments have been undertaken where possible for the additional land required for the amendment. Baseline information relating to the additional land required within the Parkgate grid supply point connection is described in SES2 and AP2 ES Volume 5: Appendix AG-001-000.
- 5.15.51 The baseline agriculture, forestry and soils information for the land to be removed within the Rugeley grid supply point connection and the land within the original scheme which will be still required as part of the amendment is described in Volume 2, CA1, Section 4 and Volume 5: AG-001-001 of the main ES.

Soil and land resources

Geology and soil parent materials

- 5.15.52 The bedrock geology mapped by the British Geological Survey (BGS)¹²¹ across the land required for the amendment mostly comprises the Mercia Mudstone Group which includes red mudstones with subordinate siltstones. The Helsby Formation of the Sherwood Sandstone Group is present to the north-east of Rugeley and comprises pebbly sandstone interbedded with siltstone and mudstone.
- 5.15.53 Superficial deposits include alluvium, which is associated with all of the watercourses, and which typically comprises compressible silty clay. A number of deposits of glacial till are mapped across gently sloping land and can include clay,

¹¹⁸HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report (Appendix CT-001-001). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

¹¹⁹HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report (Appendix CT-001-001). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

¹²⁰ Ministry of Agriculture, Fisheries and Food (1988), Agricultural Land Classification of England and Wales – Revised guidelines and criteria for grading the quality of agricultural land.

¹²¹ British Geological Survey (2018). Geology of Britain viewer. Available online at: <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

sand, gravel and boulders. Glaciofluvial sand and gravels overlie the mudstone to the east of B5014 Lichfield Road.

Topography and drainage

- 5.15.54 The topography of the area is characterised by a series of valleys containing watercourses including the River Blithe, Little Blithe, Ash Brook and Pur Brook, which all generally flow from north to south.
- 5.15.55 Slopes are mostly shallow to moderate although some are steeper in the east of the area. The altitude across the area ranges from 80m above Ordnance Datum (AOD) in the valley of the River Blithe, to 135m AOD north of the B5234 Bromley Lane and west of Parkgate.
- 5.15.56 Between Colton and Rugeley, the landform is characterised by moderate gradients falling to the River Trent valley to the west.
- 5.15.57 Within the area, the land at greatest risk of flooding is within the valleys and floodplains of the River Trent, River Blithe, Little Blithe, Ash Brook and Pur Brook. Most of the land at risk of flooding from these watercourses is classified as Flood Zone 3, in which there is a 1 in 100 or greater annual probability of flooding.

Description and distribution of soil types

- 5.15.58 The characteristics of the soils are described by the Soil Survey of England and Wales and shown on the National Soil Map. There are 11 soil associations mapped within the land required for the amendment. The associations are described in more detail in the main ES Volume 5: Appendix AG-001-001 and shown on Map AG-02-101 in the main ES Volume 5: Agriculture, forestry and soils Map Book; and in SES2 and AP2 ES Volume 5: Appendix AG-001-000 and shown on Map AG-02-101-R1 in the SES and AP2 ES Volume 5: Agriculture, forestry and soils Map Book. They broadly comprise:
- well drained coarse-textured soils derived from River Terrace Deposits of the Wick 1 association;
 - poorly drained (Wetness Class¹²² (WC IV)) clay loam over clay of the Salop, Brockhurst 1 and Brockhurst 2 associations;
 - poorly drained (WC IV) clays of the Denchworth and Crewe associations;
 - poorly or imperfectly drained (WC III or IV) clay loam or sandy clay loam over clay of the Oak 1 and Flint associations, developed in reddish till;
 - imperfectly drained (WC III) clay loam or silty clay loam over silty clay or clay of the Whimple 3 and Worcester associations; and
 - poorly drained (WC IV) clays of the Fladbury 2 association, developed in alluvium.

¹²² The Wetness Class of a soil is classified according to the depth and duration of waterlogging in the soil profile and has six categories from WCI which is well drained to WCVI which is very poorly drained.

Soil and land use interactions

Agricultural land quality

- 5.15.59 Provisional ALC mapping shows the land required for the amendment to be mostly Grade 3, with Grade 4 associated with the watercourses and Grade 2 to the east of Rugeley. Detailed ALC data is available for the land at the south end of the Rugeley grid supply point connection, which is classified as a mix of Grades 2, 3a and 3b.
- 5.15.60 Climate within this area does not in itself place any limitation on agricultural land quality. However, the interactions of climate with soil characteristics are important in determining the wetness and droughtiness¹²³ limitations of the land.
- 5.15.61 The local agro-climatic data have been interpolated from the Meteorological Office's standard 5km grid point dataset¹²⁴ for three points within the additional land required within the Parkgate grid supply point connection and are set out in SES2 and AP2 ES Volume 5: Appendix AG-001-000. The local climate data for the land to be removed within the Rugeley grid supply point connection and the land within the original scheme which will be still required as part of the amendment is set out in the main ES Volume 5: Appendix AG-001-001. The climate for both areas is moderately cool and moist. The number of Field Capacity Days (FCDs) ranges from 169 to 172 days which is slightly unfavourable for providing opportunities for agricultural field work.
- 5.15.62 Site factors include gradient and microrelief, which limit agricultural land quality in the east of the additional land required within the Parkgate grid supply point connection where moderately steeply sloping valley sides in excess of 7 degrees limit the land to Subgrade 3b.
- 5.15.63 Flooding of low-lying land is a limitation to agricultural land quality in the vicinity of the watercourses where flood risk is likely to be limiting to Subgrade 3b. The main physical limitation that results from interactions between soil, climate and site factors in this area is soil wetness. Each soil can be allocated a Wetness Class based on soil structure, evidence of waterlogging and the number of FCDs. The topsoil texture then determines its ALC grade.
- 5.15.64 In this area, subject to an average of 170 FCDs, poorly drained profiles of WC IV with clay loam or clay topsoils are limited by wetness and workability to Subgrade 3b.
- 5.15.65 Imperfectly drained profiles (WC III) of the Oak 1, Flint, Whimple 3 and Worcester associations are also classified as Subgrade 3b where the topsoils are of heavy clay loam or heavy silty clay loam. Where the topsoils are of medium clay loam, medium silty clay loam or sandy clay loam, the wetness and workability limitation is less severe, to Subgrade 3a.

¹²³ A measure of the likely moisture stress in a crop arising from the crop's requirement for water exceeding the available water capacity in the soil.
¹²⁴ Meteorological Office (1989), *Gridpoint Meteorological data for Agricultural Land Classification of England and Wales and other Climatological Investigations*.

- 5.15.66 Land at the south end of the land to be removed within the Rugeley grid supply point connection is limited mostly by soil droughtiness, with the river terrace soils classified as mostly Grades 2 and 3a, with those soils with higher sand and stone contents classified as Subgrade 3b.
- 5.15.67 The distribution of agricultural land quality in the land required for the amendment is described in more detail in the main ES Volume 5: Appendix AG-001-001 and shown on Map AG-04 in the main ES Volume 5: Agriculture, forestry and soils Map Book; and in SES2 and AP2 ES, Volume 5: Appendix AG-001-000 and shown on Map AG-04 in the SES2 and AP2 ES Volume 5: Agriculture, forestry and soils Map Book.

Other soil interactions

- 5.15.68 Soil fulfils a number of functions and services for society in addition to those of food and biomass production, which are central to social, economic and environmental sustainability.
- 5.15.69 Forestry resources represent a potentially multifunctional source of productive timber, landscape amenity, biodiversity and carbon storage capacity. An assessment of the value and sensitivity of woodland resources is reported in the ecology and biodiversity section of this amendment.
- 5.15.70 The floodplains of watercourses occupy land where water has to flow or be stored in times of flood. The soils and floodplains in these areas function as water stores for flood attenuation, as well as providing ecological habitat.

Land use

Land use description

- 5.15.71 Agricultural land in the land required for the amendment is divided between large blocks of arable cropping and permanent pasture. Most of the fields are large, reflecting the larger scale arable and mixed agriculture. The woodlands are described in the ecology and biodiversity section of this amendment, but no information is currently available on the management of these woodlands, and whether any comprise commercial forestry.
- 5.15.72 A number of environmental designations potentially influence land use, including nitrate vulnerable zone regulations. In addition to statutory environmental designations, some agricultural land affected is subject to agri-environment schemes.

Number, type and size of holdings

- 5.15.73 Table 11 sets out the main farm holdings within the land required for the amendment. This includes farm holdings within the additional land required for the Parkgate grid supply point connection, farm holdings within the land for the original scheme which will be still required as part of the amendment, and farm holdings within the land to be removed for the Rugeley grid supply point connection. Table 11 also sets out the sensitivity of individual holdings to change. The holding reference provides a unique identifier and relates to either Maps

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AG-01-104 to AG-01-104-L1 in the main ES Volume 5 Agriculture, forestry and soils Map Book and main ES Volume 5: Appendix AG-001-000; or Maps AG-01-103 to AG-01-103-R3 and AG-01-104-R1 to AG-01-104-R3 in the SES2 and AP2 ES Volume 5 Agriculture, forestry and soils Map Book and SES2 and AP2 ES Volume 5: Appendix AG-001-000.

Table 11: Summary characteristics of holdings within the land required for the amendment

Holding reference/name	Holding type	Holding size (ha)	Diversification	Agri-environment scheme ¹²⁵	Sensitivity to change
Farm holdings within the additional land required for the Parkgate grid supply point connection					
CA1/64* Park Farm, Abbots Bromley	Dairy	44	Not known	None	High
CA1/65* Land at Fieldhouse Coppice	Grassland	5	Not known	None	Low
CA1/66* Bromley Park Farm	Dairy, arable and commercial equestrian	93	Not known	None	High
CA1/67 Fieldhouse Farm	Dairy, beef cattle and miscanthus (land cropped with miscanthus affected)	76	On-farm shoot, holiday cottages and commercial lets	None	Medium
CA1/68 Daisy Bank Farm	Dairy, beef cattle and arable	385	On-farm shoot	None	High
CA1/69 Thorntree Hall Farm	Beef cattle	41	On-farm shoot and light industrial lets	Countryside Stewardship Scheme (CSS)	Medium
CA1/70 Three Lanes End Farm	Dairy	43	None	Mid-tier CSS	Medium
CA1/71* Land west of Yoxall Road	Grassland	5	Not known	None	Low
CA1/72* Land at Newborough End	Grassland	9	Not known	None	Low
CA1/73* Newborough End Farm	Beef cattle and commercial equestrian	16	Not known	None	Medium
CA1/74* Land at Hoar Cross	Grassland	24	Not known	None	Low

¹²⁵ Agri-environment schemes seek to retain and enhance the landscape and biodiversity qualities and features of farmland. The main scheme is now the Countryside Stewardship Scheme (CSS), which from 2015 replaced the Environmental Stewardship Scheme (the Entry Level Scheme (ELS) or Higher Level Scheme (HLS)), although existing Environmental Stewardship agreements will run their course.

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Holding reference/name	Holding type	Holding size (ha)	Diversification	Agri-environment scheme ¹²⁵	Sensitivity to change
CA1/75* Forge Farm	Dairy and arable	285	Not known	None	High
CA1/76 Bromley Wood Farm	Dairy, beef cattle and sheep	55	None	None	High
CA1/77* Land north of Blunts' Hollow	Arable and grassland	9	Not known	None	Low
CA1/78* Slate House Farm	Livestock	25	Not known	None	Medium
CA1/79* Land south of Blunts' Hollow (west)	Grassland	6	Not known	None	Low
CA1/80* Land south of Blunts' Hollow (east)	Grassland	4	Not known	None	Low
CA1/81* Bentilee Park	Arable	128	Not known	None	Medium
CA1/82* Bentilee	Livestock	49	Not known	None	Medium
CA1/83* Land west of Glass Lane	Grassland	8	Not known	None	Low
CA1/84* Ash Farm	Grassland	13	Not known	None	Low
CA1/85* South Hill Farm	Grassland	3	Not known	None	Low
CA1/86 Gilleon's Hall Farm	Beef cattle	15	None	None	Medium
CA1/87 Hart's Farm	Sheep	7	None	None	Medium
CA1/88 Ashbrook Farm	Arable and beef cattle	170	None	South Staffordshire water scheme - wildflower mix	Medium
CA1/89 Rookery Farm	Arable, dairy and beef cattle	164	Holiday lets and on-farm shoot	South Staffordshire water scheme - wildflower mix	High
CA1/90* Land east of Newlands Lane	Grassland	63	Not known	None	Medium
CA1/91* St Stephens Hill Farm	Dairy	180	Not known	None	High
CA1/92* Land east of Newlands Lane	Grassland	7	Not known	None	Low

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Holding reference/name	Holding type	Holding size (ha)	Diversification	Agri-environment scheme ¹²⁵	Sensitivity to change
Beacon Bank Farm					
CA1/93* Tollgate House Farm	Arable	210	Wind turbine	None	Medium
Farm holdings within the land required for the original scheme which will be still required as part of the amendment					
CA1/18 Pipe Hall Farm	Dairy, arable, beef cattle	405	None	Entry Level Scheme (ELS)	High
CA1/25 Quintons Orchard Farm	Arable, beef cattle, sheep, equestrian and fishery	316	On-farm shoot and forestry plantation	ELS and Higher Level Scheme (HLS)	Medium
CA1/27 Manor Farm, Blithbury	Dairy, arable and beef cattle (organic)	225	Non-commercial shoot	Organic Countryside Stewardship	High
CA1/34 Blackflatts Farm	Dairy and arable	84	None	ELS	High
CA1/37 Hurstwood Farm	Dairy and sheep	27	None	None	High
CA1/38 Town End Farm	Dairy, beef cattle and sheep (accommodation land only)	324	On-farm shoot	ELS	Medium
CA1/39* Holding No.8 - Old Wood Farm	Dairy (accommodation land only)	21	Not known	ELS	Medium
Farm holdings within the land to be removed for the Rugeley grid supply point connection					
CA1/40* Land north of Hollow Lane	Grassland	2.3	Not known	None	Low
CA1/41* Land at Bank Top Farm	Grassland	1	Not known	None	Low
CA1/42* Hurst Wood Meadow	Equestrian (non-commercial)	0.3	Not known	None	Low
CA1/43* Holding No.2 - Old Wood Farm	Dairy	38	Not known	ELS	High
CA1/44* Land at New Barn	Grassland and equestrian (non-commercial)	6	Fishery	None	Low
CA1/45 Cawarden Springs Farm	Arable	121	Reclaimed building materials suppliers and industrial lets	HLS	Medium

* No Farm Impact Assessment interview conducted; data estimated.

Future environmental baseline

Construction (2020)

- 5.15.74 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 5.15.75 No avoidance or mitigation measures additional to those reported in the main ES and draft Code of Construction Practice¹²⁶ (CoCP) are identified.

Temporary effects during construction

Impacts on agricultural land

- 5.15.76 Approximately 54ha of best and most versatile (BMV) land in Subgrade 3a will be required temporarily during construction for the Parkgate grid supply point connection, and 21ha of BMV land in Grades 2 and 3a will no longer be required for the Rugeley grid supply point connection. There will be a net increase of 33ha of BMV land required for the amendment during construction, which will not change the temporary moderate adverse effect on BMV land reported in the main ES. The route-wide effects on BMV land and forestry land are reported in Volume 3 of the SES2 and AP2 ES.

Impacts on holdings

- 5.15.77 The effects on new individual agricultural and related interests within the additional land required within the Parkgate grid supply point connection are summarised in Table 12.

Table 12: Summary of temporary effects on new holdings during construction within the additional land required for the Parkgate grid supply point connection

Holding reference/name/ sensitivity	Total area required from holding	Construction severance	Disruptive effects	Scale of construction effect	Area to be restored
CA1/64 Park Farm, Abbots Bromley High sensitivity	3.8ha (9%) Low	Negligible	Negligible	Moderate adverse	3.8ha
CA1/65 Land at Fieldhouse Coppice Low sensitivity	0.6ha (12%) Medium	Negligible	Negligible	Minor adverse	0.2ha
CA1/66 Bromley Park Farm High sensitivity	5.2ha (6%) Low	Negligible	Negligible	Moderate adverse	5.2ha
CA1/67	14.3ha (19%)	Negligible	Negligible	Moderate adverse	13.5ha

¹²⁶ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, draft Code of Construction Practice (CT-003-000). Available online at <https://www.gov.uk/government/publications/draft-code-of-construction-practice-for-hs2-phase-2a>

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Holding reference/name/ sensitivity	Total area required from holding	Construction severance	Disruptive effects	Scale of construction effect	Area to be restored
Fieldhouse Farm Medium sensitivity	Medium				
CA1/68 Daisy Bank Farm High sensitivity	2.1ha (5%) Low	Negligible	Negligible	Moderate adverse	11.6ha
CA1/69 Thorntree Hall Farm Medium sensitivity	0.6ha (1%) Negligible	Negligible	Negligible	Negligible	0.6ha
CA1/70 Three Lanes End Farm Medium sensitivity	2.5ha (6%) Low	Negligible	Negligible	Minor adverse	2.5ha
CA1/71 Land west of Yoxall Road Low sensitivity	0.4ha (8%) Low	Negligible	Negligible	Negligible	0.1ha
CA1/72 Land at Newborough End Low sensitivity	3.3ha (37%) High	Negligible	Negligible	Moderate adverse	3.3ha
CA1/73 Newborough End Farm Medium sensitivity	1.9ha (12%) Medium	Negligible	Negligible	Moderate adverse	1.9ha
CA1/74 Land at Hoar Cross Low sensitivity	2.6ha (11%) Medium	Negligible	Negligible	Minor adverse	2.2ha
CA1/75 Forge Farm High sensitivity	33.7ha (12%) Medium	Negligible	Negligible	Major/moderate adverse	26.6ha
CA1/76 Bromley Wood Farm High sensitivity	5.7ha (10%) Medium	Negligible	Negligible	Major/moderate adverse	5.6ha
CA1/77 Land north of Blunts' Hollow Low sensitivity	8.6ha (100%) High	Negligible	Negligible	Moderate adverse	8.5ha
CA1/78 Slate House Farm Medium sensitivity	0.2ha (1%) Negligible	Negligible	Negligible	Negligible	0.2ha
CA1/79 Land south of Blunts' Hollow (west) Low sensitivity	4.6ha (77%) High	Negligible	Negligible	Moderate adverse	4.5ha
CA1/80 Land south of Blunts' Hollow (east) Low sensitivity	0.8ha (20%) Medium	Negligible	Negligible	Minor adverse	0.8ha
CA1/81	15ha (12%)	Negligible	Negligible	Moderate adverse	14.9ha

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Holding reference/name/ sensitivity	Total area required from holding	Construction severance	Disruptive effects	Scale of construction effect	Area to be restored
Bentilee Park Medium sensitivity	Medium				
CA1/82 Bentilee Medium sensitivity	2.3ha (5%) Negligible	Negligible	Negligible	Negligible	2.2ha
CA1/83 Land west of Glass Lane Low sensitivity	4.8ha (60%) High	Negligible	Negligible	Moderate adverse	4.7ha
CA1/84 Ash Farm Low sensitivity	2.4ha (18%) Medium	Negligible	Negligible	Minor adverse	1.7ha
CA1/85 South Hill Farm Low sensitivity	2.4ha (80%) High	Negligible	Negligible	Moderate adverse	2.4ha
CA1/86 Gilleon's Hall Farm Medium sensitivity	0.4ha (3%) Negligible	Negligible	Negligible	Negligible	oha
CA1/87 Hart's Farm Medium sensitivity	0.3ha (4%) Negligible	Negligible	Negligible	Negligible	oha
CA1/88 Ashbrook Farm Medium sensitivity	4.1ha (24%) High	Negligible	Negligible	Major/moderate adverse	33.1ha
CA1/89 Rookery Farm High sensitivity	9.9ha (6%) Low	Low	Negligible	Moderate adverse	8.9ha
CA1/90 Land east of Newlands Lane Medium sensitivity	20.8ha (33%) High	Negligible	Negligible	Major/moderate adverse	17.2ha
CA1/91 St Stephens Hill Farm High sensitivity	1.6ha (1%) Negligible	Negligible	Negligible	Minor adverse	oha
CA1/92 Beacon Bank Farm Low sensitivity	4.1ha (59%) High	Negligible	Negligible	Moderate adverse	4ha
CA1/93 Tollgate House Farm Medium sensitivity	0.5ha (<1%) Negligible	Negligible	Negligible	Negligible	oha

5.15.78 The effects on individual agricultural and related interests within the land required for the original scheme which will be still required as part of the amendment are summarised in Table 13.

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Table 13: Summary of temporary effects during construction on holdings within the land required for the original scheme which will be still required as part of the amendment

Holding reference/name/ sensitivity	Total area required from holding from original scheme <i>(Total area required for amendment)</i>	Construction severance	Disruptive effects	Scale of construction effect from original scheme <i>(Scale of effect with amendment)</i>	Area to be restored in original scheme <i>(Area to be restored with amendment)</i>
CA1/25 Quintons Orchard Farm Medium sensitivity	14.6ha (5%) Negligible 14.9ha (5%) Negligible Additional 2.3ha for Parkgate connection; removed 2ha from Rugeley connection	Low	Medium	Moderate adverse Moderate adverse	5.8ha 6.1ha
CA1/27 Manor Farm, Blithbury High sensitivity	44.1ha (20%) Medium 43.4ha (19%) Medium Additional 0.4ha for Parkgate connection; removed 1.1ha from Rugeley connection	High	Medium	Major adverse Major adverse	16.3ha 14.7ha
CA1/38 Town End Farm Medium sensitivity	28ha (9%) Low 28.9ha (9%) Low Additional 0.9ha for Parkgate connection	High	Low	Major/moderate adverse Major/moderate adverse	14ha 13.2ha
CA1/39 Holding No.8 - Old Wood Farm Medium sensitivity	4.4ha (21%) High 3.7ha (18%) Medium Removed 0.7ha from Rugeley connection	Negligible	Negligible	Major/moderate adverse Moderate adverse	2.8ha 2.1ha
CA1/37 Hurstwood Farm High sensitivity	9.7ha (36%) High 6.3ha (23%) High Removed 3.4ha from Rugeley connection	Negligible	Negligible	Major adverse Major adverse	6.7ha 4.6ha
CA1/34 Blackflatts Farm High sensitivity	7.3ha (9%) Low 1ha (1%) Negligible Removed 6.3ha from Rugeley connection	Negligible	Negligible	Moderate adverse Minor adverse	6.4ha 0.1ha
CA1/18 Pipe Hall Farm High sensitivity	57.3ha (14%) Medium 44.2ha (11%) Medium	Low	Medium	Major/moderate adverse Major/moderate adverse	50.3ha 37.2ha

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Holding reference/name/ sensitivity	Total area required from holding from original scheme (Total area required for amendment)	Construction severance	Disruptive effects	Scale of construction effect from original scheme (Scale of effect with amendment)	Area to be restored in original scheme (Area to be restored with amendment)
	Removed 13.1ha from Rugeley connection				

5.15.79 Table 14 summarises the farm holdings that are unaffected by the HS2 route but are within the land to be removed for the Rugeley grid supply point connection.

Table 14: Summary of temporary effects during construction on holdings within the land to be removed for the Rugeley grid supply point connection

Holding reference/name/sensitivity	Total area required from holding reported in main ES	Scale of construction effect reported in main ES	Total area required from holding as a result of the amendment	Scale of construction effect as a result of the amendment
CA1/40 Land north of Hollow Lane Low sensitivity	2.3ha (100%) High	Moderate adverse	0ha (0%) Negligible	No effect
CA1/41 Land at Bank Top Farm Low sensitivity	0.3ha (30%) High	Moderate adverse	0ha (0%) Negligible	No effect
CA1/42 Hurst Wood Meadow Low sensitivity	0.3ha (100%) High	Moderate adverse	0ha (0%) Negligible	No effect
CA1/43 Holding No.2 - Old Wood Farm High sensitivity	12.3ha (32%) High	Major adverse	0ha (0%) Negligible	No effect
CA1/44 Land at New Barn Low sensitivity	0.7ha (10%) Low	Negligible	0ha (0%) Negligible	No effect
CA1/45 Cawarden Springs Farm Medium sensitivity	21ha (17%) Medium	Moderate adverse	0ha (0%) Negligible	No effect

5.15.80 Overall, 30 holdings within the additional land required for the Parkgate grid supply point connection will experience new temporary construction effects, of which 17 will experience moderate or major/moderate adverse effects, which are significant for each land holding.

5.15.81 Two holdings within the land required for the original scheme, which will be still required as part of the amendment, will experience different effects. The effect on Holding No. 8, Old Wood Farm (CA1/39) will be reduced from major/moderate adverse to moderate adverse, which remains significant for the holding. The effect on Blackflatts Farm (CA1/34) will be reduced from moderate adverse to

minor adverse, which will remove the significant effect on the holding, as reported in the main ES.

- 5.15.82 The amendment will remove significant temporary adverse effects, as reported in the main ES, from five holdings within the land to be removed for the Rugeley grid supply point connection. The effect on the sixth holding will be removed, however the original scheme effect was negligible, which is not significant.

Permanent effects arising during construction

Impacts on agricultural land

- 5.15.83 Approximately 1.5ha of BMV land in Subgrade 3a will be required permanently for the Parkgate grid supply point connection amendment, and 0.4ha of BMV land in Grades 2 and 3a will no longer be required for the Rugeley grid supply point connection. There will be a net increase of 1.1ha of BMV land required permanently for the amendment, which will not give rise to a new or different significant effect and will not change the permanent moderate adverse effect on BMV land reported in the main ES. The route-wide effects on BMV land and forestry land are reported in Volume 3 of the SES2 and AP2 ES.

Impacts on holdings

- 5.15.84 The permanent effects on new individual agricultural and related interests within the additional land required for the Parkgate grid supply point connection are summarised in Table 15.

Table 15: Summary of permanent effects on holdings during construction within the additional land required for the Parkgate grid supply point connection

Holding reference/name/ sensitivity	Land required from holding	Severance	Infrastructure	Scale of effect
CA1/64 Park Farm, Abbots Bromley High sensitivity	0ha (0%) Negligible	Negligible	Negligible	No effect
CA1/65 Land at Fieldhouse Coppice Low sensitivity	0.4ha (8%) Low	Negligible	Negligible	Negligible
CA1/66 Bromley Park Farm High sensitivity	0ha (0%) Negligible	Negligible	Negligible	No effect
CA1/67 Fieldhouse Farm Medium sensitivity	0.8ha (1%) Negligible	Negligible	Negligible	Negligible
CA1/68 Daisy Bank Farm High sensitivity	9.4ha (2%) Negligible	Negligible	Negligible	Minor adverse
CA1/69 Thorntree Hall Farm	0ha (0%) Negligible	Negligible	Negligible	No effect

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Holding reference/name/ sensitivity	Land required from holding	Severance	Infrastructure	Scale of effect
Medium sensitivity				
CA1/70 Three Lanes End Farm Medium sensitivity	0ha (0%) Negligible	Negligible	Negligible	No effect
CA1/71 Land west of Yoxall Road Low sensitivity	0.3ha (6%) Low	Negligible	Negligible	Negligible
CA1/72 Land at Newborough End Low sensitivity	0ha (0%) Negligible	Negligible	Negligible	No effect
CA1/73 Newborough End Farm Medium sensitivity	0ha (0%) Negligible	Negligible	Negligible	No effect
CA1/74 Land at Hoar Cross Low sensitivity	0.4ha (2%) Negligible	Negligible	Negligible	Negligible
CA1/75 Forge Farm High sensitivity	7.1ha (2%) Negligible	Negligible	Negligible	Minor adverse
CA1/76 Bromley Wood Farm High sensitivity	<0.1ha (0%) Negligible	Negligible	Negligible	Negligible
CA1/77 Land north of Blunts' Hollow Low sensitivity	<0.1ha (0%) Negligible	Negligible	Negligible	Negligible
CA1/78 Slate House Farm Medium sensitivity	0ha (0%) Negligible	Negligible	Negligible	No effect
CA1/79 Land south of Blunts' Hollow (west) Low sensitivity	<0.1ha (0%) Negligible	Negligible	Negligible	Negligible
CA1/80 Land south of Blunts' Hollow (east) Low sensitivity	0ha (0%) Negligible	Negligible	Negligible	No effect
CA1/81 Bentilee Park Medium sensitivity	<0.1ha (0%) Negligible	Negligible	Negligible	Negligible
CA1/82 Bentilee Medium sensitivity	<0.1ha (0%) Negligible	Negligible	Negligible	Negligible

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Holding reference/name/ sensitivity	Land required from holding	Severance	Infrastructure	Scale of effect
CA1/83 Land west of Glass Lane Low sensitivity	<0.1ha (0%) Negligible	Negligible	Negligible	Negligible
CA1/84 Ash Farm Low sensitivity	0.7ha (5%) Low	Negligible	Negligible	Negligible
CA1/85 South Hill Farm Low sensitivity	0ha (0%) Negligible	Negligible	Negligible	No effect
CA1/86 Gilleon's Hall Farm Medium sensitivity	0.4ha (3%) Negligible	Negligible	Negligible	Negligible
CA1/87 Hart's Farm Medium sensitivity	0.3ha (4%) Negligible	Negligible	Negligible	Negligible
CA1/88 Ashbrook Farm Medium sensitivity	7.9ha (5%) Negligible	Negligible	Negligible	Negligible
CA1/89 Rookery Farm High sensitivity	1ha (1%) Negligible	Negligible	Negligible	Minor adverse
CA1/90 Land east of Newlands Lane Medium sensitivity	3.6ha (6%) Low	Negligible	Negligible	Minor adverse
CA1/91 St Stephens Hill Farm High sensitivity	1.7ha (1%) Negligible	Negligible	Negligible	Minor adverse
CA1/92 Beacon Bank Farm Low sensitivity	<0.1ha (0%) Negligible	Negligible	Negligible	Negligible
CA1/93 Tollgate House Farm Medium sensitivity	0.4ha (<1%) Negligible	Negligible	Negligible	Negligible

5.15.85 The permanent effects on individual agricultural and related interests within the land required for the original scheme which will be still required as part of the amendment are summarised in Table 16.

SES2 and AP2 ES Volume 2 – Community area 1, Fradley to Colton

Table 16: Summary of permanent effects on holdings within the land required for the original scheme which will be still required as part of the amendment

Holding reference/name/ sensitivity	Total area required from holding from original scheme <i>(Total area required for amendment)</i>	Severance	Infrastructure	Scale of effect from original scheme <i>(Scale of effect with amendment)</i>
CA1/25 Quintons Orchard Farm Medium sensitivity	8.8ha (3%) Negligible 8.8ha (3%) Negligible Additional <0.1ha for Parkgate connection	Low	Negligible	Minor adverse Minor adverse
CA1/27 Manor Farm, Blithbury High sensitivity	27.8ha (12%) Medium 28.7ha (13%) Medium Additional 0.9ha for Parkgate connection	Medium	Negligible	Major/moderate adverse Major/moderate adverse
CA1/38 Town End Farm Medium sensitivity	14ha (4%) Negligible 15.7ha (5%) Negligible Additional 1.7ha for Parkgate connection	Low	Negligible	Minor adverse Minor adverse
CA1/39* Holding No.8 - Old Wood Farm Medium sensitivity	1.6ha (8%) Low 1.6ha (8%) Low No change from amendment	Negligible	Negligible	Minor adverse Minor adverse
CA1/37 Hurstwood Farm High sensitivity	3ha (11%) Medium 1.7ha (6%) Low Removed 1.3ha from Rugeley connection	Negligible	Negligible	Major/moderate adverse Moderate adverse
CA1/34 Blackflatts Farm High sensitivity	0.9ha (1%) Negligible 0.9ha (1%) Negligible No change from amendment	Negligible	Negligible	Minor adverse Minor adverse
CA1/18 Pipe Hall Farm High sensitivity	7ha (2%) Negligible 7ha (2%) Negligible No change from amendment	Negligible	Negligible	Minor adverse Minor adverse

5.15.86 Overall, 21 holdings within the additional land required for the Parkgate grid supply point connection will experience new permanent construction effects. All of these effects are negligible or minor adverse and are therefore not significant for any of the land holdings.

- 5.15.87 The level of significance of permanent construction effects for six holdings within the land required for the original scheme, which will be still required as part of the amendment, will remain as reported for the original scheme in the main ES. The removal of land required permanently from the Rugeley grid supply point connection at Hurstwood Farm (CA1/37) will reduce the level of effect from major/moderate adverse to moderate adverse. This remains a significant effect on the holding.
- 5.15.88 The amendment will remove all permanent construction effects reported in the main ES for the six holdings affected by the Rugeley grid supply point connection. None of these effects were reported as significant in the main ES.

Mitigation and residual effects

Other mitigation measures

- 5.15.89 The land required temporarily for construction will be restored to its former agricultural condition once the works are completed, following good practice techniques in handling, storing and reinstating soils on that land, as reported in the main ES and draft CoCP. No other mitigation has been identified.

Summary of likely residual significant effects

- 5.15.90 The additional area of BMV agricultural land required temporarily during construction for the amendment is approximately 33ha. The amendment will not change the temporary moderate adverse effect reported in the main ES. The additional area of BMV land required permanently is approximately 1.1ha which will not change the permanent moderate adverse effect on BMV land reported in the main ES.
- 5.15.91 Seventeen farm holdings within the additional land required for the Parkgate grid supply point connection will experience new likely residual moderate or major/moderate temporary effects during construction, which will be significant for each farm holding. Two holdings within the land required for the original scheme, which will still be required as part of the amendment, will experience different temporary effects. The effect on Holding No. 8, Old Wood Farm (CA1/39) will be reduced from major/moderate adverse to moderate adverse, which remains significant for the holding. The effect on Blackflatts Farm (CA1/34) will be reduced from moderate adverse to minor adverse, which will remove the significant temporary effect on the holding, as reported in the main ES.
- 5.15.92 One holding within the land required for the original scheme which will still be required as part of the amendment, will experience a different permanent effect. The effect on Hurstwood Farm (CA1/37) will be reduced from major/moderate adverse to moderate adverse, which remains significant for the holding.
- 5.15.93 The amendment will remove likely residual significant temporary effects reported in the main ES on five other farm holdings associated with the Rugeley grid supply point connection.

Cumulative effects

- 5.15.94 There are no new or different likely significant cumulative effects for agriculture, forestry and soils as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Cultural heritage

Scope, assumptions and limitations

- 5.15.95 The assessment scope, key assumptions and limitations for cultural heritage are as set out in Volume 1, the SMR and SMR Addendum of the main ES and SMR Addendum 2 (see SES2 and AP2 ES Volume 5: Appendix CT-001-000).
- 5.15.96 As the cultural heritage impacts of the amendment are not reversible, they therefore have the potential to result in new or different significant permanent construction effects only. There is no temporary construction or operational assessment for cultural heritage.
- 5.15.97 Heritage assets within the land required for the amendment are assumed to require complete removal and the assessment has been undertaken on that basis. However, it is likely that the majority of the heritage assets can in fact be retained, as the majority of the land is only required for the construction of pylons, stringing of cables, or to provide an access route to the works.
- 5.15.98 The Bridge over the Little Blithe river (FRC277) will not be physically impacted by the scheme and has been assessed on the basis of this assumption.

Existing environmental baseline

- 5.15.99 The baseline cultural heritage information for the land to be removed within the Rugeley grid supply point connection and the land within the original scheme which will still be required as part of the amendment is described in Volume 2, CA1, Section 7 and in Volume 5: Appendix CH-002-002 and Appendix CH-003-002 of the main ES.
- 5.15.100 New baseline information for the additional land required for the Parkgate grid supply connection point (including assets which were not reported in the main ES as they were outside the study area of the original scheme) is provided in Background Information Data (BID) CH-004-000 which accompanies the SES2 and AP2 ES, and in SES2 and AP2 ES Volume 5: Appendix CH-002-000.
- 5.15.101 Further information about these assets is provided in Map Series CH-01 and CH-02 in the SES2 and AP2 ES Volume 5: Cultural heritage Map Book.

Rugeley grid supply point connection

- 5.15.102 A cropmark enclosure at Cawarden Springs (FRC178), a non-designated asset of moderate value, lies partially within the land that was required for the Rugeley grid supply point connection.
- 5.15.103 The following non-designated assets of low value lie wholly or partially within the land required that was required for the Rugeley grid supply point connection:

- Colton Hall Farm (FRC173);
- a group of linear, curvilinear and rectangular cropmarks at Colton Hall Farm (FRC174);
- water meadows north of Brereton and south of Cawarden Springs Wood (FRC180); and
- the possible site of a medieval deer park, Colton Hall Farm (FRC153).

5.15.104 Analysis has been undertaken of the historic landscape character within and around the land that was required for the Rugeley grid supply point connection. For the purpose of the assessment, the amendment has been divided into a number of Historic Landscape Character Areas (HLCAs). For further information see Volume 5: Appendix CH-005-000 of the main ES and SES2 and AP2 ES Volume 5: Appendix CH-001-000.

5.15.105 The Rugeley grid supply point connection crosses HLCA 3 Rugeley, Armitage and Handsacre. This HLCA includes the section of the Trent Valley to the west of the Kings Bromley floodplain. It incorporates the medieval settlements at Rugeley and Armitage and Handsacre, which have been largely obscured by industrial and modern development, including Rugeley power station and major linear infrastructure. The heritage value of this HLCA is considered to be low.

Parkgate grid supply point connection

5.15.106 Hoar Cross Conservation Area (FRC342), a designated asset of moderate value, is located partially within the land required for the Parkgate grid supply point connection. This asset was not reported in the main ES as it was outside the study area of the original scheme.

5.15.107 The Parkgate grid supply point connection will be constructed in proximity to the following six designated assets of moderate value. These assets were not reported in the main ES as they were either not affected or outside the study area of the original scheme:

- Bentilee Park Farmhouse (FRC332) and stables and former cartsheds (FRC333), both Grade II listed buildings;
- Grade II listed buildings at Newlands Farmhouse, including an associated barn and stables (FRC131);
- Mount Pleasant Farmhouse (FRC316), a Grade II listed building; and
- Guilleon's Hall (FRC322) and a wall incorporating bee boles and fowl pens (FRC324), both Grade II listed buildings.

5.15.108 The following non-designated assets of moderate value lie wholly or partially within the land required for the Parkgate grid supply point connection. These assets were not reported in the main ES as they were outside the study area of the original scheme:

- Abbots Bromley Parish Boundary (FRC336); and
- a late eighteenth or early nineteenth century bridge over the Little Blithe river (FRC277).

5.15.109 The following non-designated assets of low value lie wholly or partially within the land required for the Parkgate grid supply point connection. These assets were not reported in the main ES as they were outside the study area of the original scheme:

- a cropmark indicating a circular enclosure (FRC366);
- a sub-circular cropmark (FRC364); and
- an area of ridge and furrow (FRC326).

5.15.110 Analysis has been undertaken of the historic landscape character within and around the land required for the Parkgate grid supply point connection. For the purpose of the assessment, the amendment has been divided into a number of HLCAs. For further information, see Volume 5: Appendix CH-005-000 of the main ES and SES2 and AP2 ES Volume 5: Appendix CH-001-000.

5.15.111 The Parkgate grid supply point connection crosses the following HLCAs:

- HLCA 2 Kings Bromley, the Trent Valley and the Ridwares: this HLCA extends across the Trent floodplain either side of Kings Bromley. It contains a regionally significant concentration of important prehistoric remains, indicated by an extensive network of cropmarks. This is a reflection of extensive arable cultivation on free-draining Pleistocene gravels. The fields retain many of their early enclosure boundaries. The area also contains the historic villages of Mavesyn Ridware, Pipe Ridware and Orgreave. The heritage value of this HLCA is considered to be moderate; and
- HLCA 20 Parkgate: this HLCA includes the Blithe Valley to the east of the Blithfield Reservoir and the rural landscape to the east of Abbots Bromley village. It incorporates extensive areas of parkland or former parkland, and remnants of extensive medieval forests that formerly existed in this area. The heritage value of this HLCA is considered to be moderate. This HLCA was not reported in the main ES as it was outside the study area of the original scheme.

5.15.112 Further information about these assets is provided in the main ES Volume 5: Appendix CH-001-001 and Map Series CH-01, CH-02 and CH-03 in the main ES Volume 5: Cultural heritage Map Book and the SES2 and AP2 ES Volume 5: Appendix CH-001-000.

Future environmental baseline

Construction (2020)

5.15.113 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 5.15.114 No avoidance or mitigation measures, additional to those reported in the main ES and draft CoCP, are identified.

Assessment of impacts and effects

Rugeley grid supply point connection

- 5.15.115 The main ES reported a permanent moderate adverse significant effect on the buried archaeological remains associated with a rectangular enclosure of prehistoric date at Cawarden Springs (FRC178), a non-designated asset of moderate value. The Rugeley grid supply point connection will no longer be implemented and therefore the asset will not be removed. The amendment will remove the permanent moderate adverse significant effect on the asset reported in the main ES.
- 5.15.116 The main ES reported a permanent moderate adverse significant effect on the buried archaeological remains associated with cropmarks at Colton Hall Farm (FRC174), a non-designated asset of low value. The Rugeley grid supply point connection will no longer be implemented and therefore the asset will not be removed. The amendment will remove the permanent moderate adverse significant effect on the asset reported in the main ES.
- 5.15.117 For further information see the SES2 and AP2 ES Volume 5: Cultural heritage Map Book and the SES2 and AP2 ES Volume 5: Appendix CH-003-000.

Parkgate grid supply point connection

- 5.15.118 The main ES did not report any effects on HLCA 20 as it was outside the study area of the original scheme. This area contains relatively little modern infrastructure and retains many elements of historic forest and parkland. Construction of the Parkgate grid supply point connection will involve construction of access tracks, movement of construction vehicles and erection of pylons and power lines, which will introduce noise and visual impacts in the rural setting. Construction activity for the overhead power line will take place over approximately two years. This will give rise to a new temporary medium impact and a new temporary moderate adverse effect, which is significant.
- 5.15.119 The main ES did not report any effects on the Grade II listed Newlands Farmhouse and associated barn and stables (FRC131), a designated asset of moderate value, as it was not affected by the original scheme. The buildings derive some of their significance from their historic rural setting. The presence of the Parkgate grid supply point connection will introduce modern industrial structures into the landscape. This will give rise to a new permanent medium adverse impact and a new permanent moderate adverse effect, which is significant.
- 5.15.120 The main ES did not report any effects on the Grade II listed buildings Bentilee Park Farmhouse (FRC332) and stables and former cartsheds (FRC333), both

designated assets of moderate value, as these were outside the study area of the original scheme. The buildings derive some of their significance from their historic rural setting. The presence of the Parkgate grid supply point connection will introduce modern industrial structures into the landscape. This will give rise to a new permanent medium adverse impact and a new permanent moderate adverse effect, which is significant.

- 5.15.121 The main ES did not report any effects on a cropmark indicating a circular enclosure (FRC366), a non-designated asset of low value, as it was outside the study area of the original scheme. The asset will be partially removed by the construction of the amendment. This will give rise to a new permanent high adverse impact and a new permanent moderate adverse effect, which is significant.
- 5.15.122 The main ES did not report any effects on a sub-circular cropmark (FRC364), a non-designated asset of low value, as it was outside the study area of the original scheme. The asset will be partially removed by the construction of the amendment. This will give rise to a new permanent high adverse impact and a new permanent moderate adverse effect, which is significant.
- 5.15.123 The main ES did not report any effects on an area of ridge and furrow (FRC326), a designated asset of low value, as it was outside the study area of the original scheme. The asset will be partially removed by the construction of the amendment. This will give rise to a new permanent high adverse impact and a new permanent moderate adverse effect, which is significant.
- 5.15.124 For further information see the SES2 and AP2 ES Volume 5: Cultural heritage Map Book and the SES2 and AP2 ES Volume 5: Appendix CH-003-000.

Mitigation and residual effects

Other mitigation measures

- 5.15.125 No mitigation measures additional to those reported in the main ES and draft CoCP are identified.

Summary of likely residual significant effects

- 5.15.126 The amendment will remove the likely residual permanent moderate adverse significant effects from buried archaeological remains associated with a rectangular enclosure of prehistoric date (FRC178) and buried archaeological remains associated with cropmarks at Colton Hall Farm (FRC174), as the Rugeley grid supply point connection will no longer be implemented.
- 5.15.127 The amendment will give rise to a new likely residual temporary moderate adverse significant effect on HLCA 20 Parkgate as the construction of the Parkgate grid supply point connection will introduce noise and visual impacts into the rural setting of the landscape.
- 5.15.128 The amendment will give rise to new likely residual permanent moderate adverse significant effects on Grade II listed buildings at Newlands Farmhouse and associated barn and stables (FRC131), Bentilee Park Farmhouse (FRC332) and

stables and former cartsheds (FRC333) as a result of changes to the historic rural settings of these buildings.

- 5.15.129 The amendment will give rise to new likely residual permanent moderate adverse significant effects on a cropmark indicating a circular enclosure (FRC366), a sub-circular cropmark (FRC364), and an area of ridge and furrow (FRC326), as these assets will be partially removed during construction.

Cumulative effects

- 5.15.130 There are no new or different likely significant cumulative effects for cultural heritage as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Ecology and biodiversity

Scope, assumptions and limitations

- 5.15.131 The assessment scope, key assumptions and limitations for ecology and biodiversity are as set out in Volume 1, the SMR and SMR Addendum of the main ES and SMR Addendum2 (see SES2 and AP2 ES Volume 5: Appendix CT-001-002).
- 5.15.132 This amendment has the potential to result in new or different significant construction effects only. Therefore, there is no operational assessment for ecology and biodiversity.
- 5.15.133 Where data are limited, a precautionary baseline has been built up according to the guidance provided in the SMR and SMR Addendum. This constitutes a 'reasonable worst case' basis for the subsequent assessment.
- 5.15.134 On a precautionary basis, construction works within the area subject to the amendment are assumed to require removal of the majority of habitats present, unless specific avoidance measures are identified within the assessment. However, the impacts upon ecologically valuable habitats arising from the final detailed design for construction of the power line will be much reduced from those reported within this precautionary assessment, as follows:
- the detailed design process will aim to avoid or minimise the loss of ecologically valuable habitat features, including woodland, floodplain grazing marsh, species-rich hedgerows, watercourses and ponds;
 - the amendment includes a typical width for the pylon construction corridor of over 200m, to allow flexibility for further design development. The typical width of the pylon construction corridor within the detailed design could reduce to approximately 65m; and
 - within the refined pylon construction corridor, the loss of habitats will be concentrated around the pylon locations and access routes. The methods for stringing power cables will not require the complete removal of all habitats in between the pylons, which will be spaced approximately 250-300m apart. Habitat features, such as ponds that are located in between pylons, but outside of pylon construction areas, will not be routinely removed.

Existing environmental baseline

- 5.15.135 The ecological baseline of the area subject to the amendment has been based on field data collated for the main ES and SES1, aerial photography, and relevant information from regional and local sources.
- 5.15.136 A summary of the baseline information relevant to the assessment of the amendment is provided below. Further detail on the relevant new or updated baseline information is provided in BID-EC-019-000, including Map Series EC-02 which accompanies the SES2 and AP2 ES, and SES2 and AP2 ES Volume 5: Appendix EC-001-000, including Map Series EC-01.
- 5.15.137 For those receptors described in the main ES, further details are provided in Volume 2, CA1, Section 8, and Volume 5: Appendix EC-001-000, including Map Series EC-01. Baseline ecology reports that accompanied the main ES are provided in BID-EC-002-000 to BID-EC-014-000, including Map Series EC-02 to EC-12¹²⁷.
- 5.15.138 For those receptors described in SES1, further details are provided in Volume 2, CA1, Section 3. The baseline ecology report that accompanied SES1 and AP1 ES is provided in BID EC-004-000, including Map Series EC-02, EC-04, EC-05, EC-10, EC-11 and EC-12¹²⁸.

Designated sites

- 5.15.139 The area subject to the amendment is located within Natural England Impact Risk Zone (IRZ) for the following nationally important Sites of Special Scientific Interest (SSSIs):
- Blithfield Reservoir SSSI, covering an area of approximately 463.9ha, is Staffordshire's largest area of standing water and is nationally important for the bird species goosander, regularly supporting more than 1% of the total British wintering population. The reservoir and its woodland and farmland surroundings are described in the SSSI citation as 'an important wintering locality for an outstanding variety of birds'. A number of the grassland fields adjoining the reservoir are grazed by regionally significant numbers of wigeon. The concentration of wintering and passage birds attracts predatory species such as peregrine and merlin, whilst ospreys are regular visitors on migration. Blithfield Reservoir SSSI is located north of Stockwell Heath, approximately 1.1km west of the area subject to the amendment;
 - Braken Hurst SSSI, covering an area of approximately 25.3ha, is one of the largest, least-altered remnants of the once extensive plateau woodlands¹²⁹ and wood pastures of the former Crown Forest of Needwood. The full range of types of semi-natural woodland occurring in the locality is represented in a

¹²⁷ HS2 Ltd (2017). *High Speed Two (HS2) Phase 2a (West Midlands - Crewe), Background Information and Data*, Available online at: <https://www.gov.uk/government/publications/hs2-phase-2a-background-information-and-data-ecology-and-biodiversity>

¹²⁸ HS2 Ltd (2018). *High Speed Two (HS2) Phase 2a (West Midlands - Crewe), Background Information and Data*, Supplementary ecological baseline data (BID EC-004-000), Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/692664/G33_Ecological_baseline_BID-EC-004-000_WEB.pdf

¹²⁹ Woodlands on flat or gently sloping land, in this case associated with the floodplains of the River Trent and River Dove.

variety of stands including former coppice, wood pasture relics and broadleaved high forest. The site sustains a characteristic and diverse flora and fauna which includes several rare plants and a notable assemblage of moths and butterflies. The major woodland type is hazel-pedunculate oakwood on acid boulder clay. The mixed scrub and glades of the 'pylon ride'¹³⁰ within the SSSI attract birds and invertebrates. Braken Hurst SSSI is located south-east of Hoar Cross, approximately 1km south-east of the area subject to the amendment. This SSSI was not reported in the main ES as it was not relevant to the assessment of the original scheme; and

- Forest Banks SSSI, covering an area of approximately 45.4ha, consists of three of the least modified and most diverse sections of what remains of the scarp woodlands of the former Royal Forest of Needwood. Varied topography and soils give rise to a number of types of semi-natural woodland, some of which are very uncommon in Staffordshire. The site supports an outstanding assemblage of moths and butterflies. Forest Banks SSSI is located to the south-west of Marchington, approximately 1.7km north-east of the area subject to the amendment. This SSSI was not reported in the main ES as it was not relevant to the assessment of the original scheme.

5.15.140 There are five LWS of relevance to the assessment of the amendment, which are of county value. With the exception of Cawarden Springs Wood LWS and Newlands Lane (Hedge 6), these LWS were not reported in the main ES as they were not relevant to the assessment of the original scheme. The LWS of relevance to the assessment of the amendment are:

- Cawarden Springs Wood LWS, covering an area of approximately 3.7ha, comprises ancient semi-natural woodland, which was subject to extensive felling approximately 100 years ago. This LWS is located west of Cawarden Springs Farm, east of Rugeley, adjacent to the land no longer required as a result of the amendment;
- Newlands Lane (Hedge 6) LWS¹³¹, is a hedgerow approximately 1.3km in length, which is designated for its high connectivity and good hedgerow structure. The LWS is located north-west of Stockwell Heath, south of Newlands and partially within the area subject to the amendment;
- Newlands Lane (Hedge 7) LWS is a hedgerow approximately 870m in length, which includes standard trees and is valued for its high connectivity and large number of species in the hedge canopy. The LWS is located east of Newlands, partially within the area subject to the amendment;
- Hart's Farm (south of) LWS, covering an area of approximately 2.3ha, is designated for unimproved diverse neutral grassland with a small area of marshy grassland. This LWS is located to the south-east of Abbots Bromley.

¹³⁰ This is an existing feature which does not relate to the pylons that will be constructed as part of the grid supply point connection to National Grid Parkgate substation.

¹³¹ The designated site is referred to as Newlands Lane LWS within the main ES.

The LWS is partially within the area subject to the amendment for the purposes of mitigation planting and to provide access to the mitigation planting; and

- Ash Brook LWS, covering an area of approximately 2.6ha, is designated for alder woodland with an ancient woodland ground flora on the eastern side of Ash Brook and a wooded pit to the east of the southern block of woodland surrounded by species-rich grassland. Ash Brook LWS is located to the north of Hart's Farm LWS, south-east of Abbots Bromley. The LWS is partially within the area subject to the amendment for the purposes of mitigation planting only.

5.15.141 There are two Biodiversity Alert Sites (BAS) of relevance to the assessment of the amendment, which are of district/borough value:

- Long Mets Lane (Hedge 1) BAS is a hedgerow that is approximately 260m in length, which includes standard trees and is valued for its connectivity and structure. The BAS is located to the east of Newlands Lane, south of Stockwell Heath, partially within the area subject to the amendment; and
- Newlands Lane Track (Hedge 1) BAS is a hedgerow that is approximately 310m in length, which includes standard trees and is valued for its connectivity, height and structure. The BAS is located to the south of Newlands Lane, south of Stockwell Heath, within the area subject to the amendment.

5.15.142 There are two Ancient Woodland Inventory (AWI) sites of relevance to the assessment of the amendment, which are of county value:

- Cawarden Springs Wood AWI site, covering an area of approximately 2.2ha, forms part of Cawarden Springs Wood LWS. This AWI site is located west of Springs Cawarden Farm, east of Rugeley, adjacent to the land no longer required as a result of the amendment; and
- Birch and Roosthill Woods AWI site, covering an area of approximately 48.9ha, is located to the east of Bromley Wood, located adjacent to the area subject to the amendment. This AWI site was not reported in the main ES as it was not relevant to the assessment of the original scheme.

5.15.143 On the basis of the heritage review undertaken by HS2 Ltd, there is an additional woodland of relevance to this amendment, which does not appear on the AWI but is considered to be potentially ancient. Lower Birches Plantation/Titler's Plantation, covering an area of approximately 3.7ha, comprises potential ancient woodland along Pur Brook, which provides connectivity to the adjacent Birch and Roosthill Woods AWI site. The woodland is located to the west of Newhall Farm, south-west of Newborough, partially within the area subject to the amendment. This potential ancient woodland is of up to county value.

Habitats

5.15.144 Habitats within the area subject to the amendment include semi-natural broadleaved woodland, traditional orchard, improved and semi-improved grassland, arable,

hedgerows, watercourses and ponds. The habitats of relevance to the assessment of the amendment are described in further detail below.

5.15.145 There are 12 areas of broadleaved woodland that are of relevance to the assessment and are likely to qualify as lowland mixed deciduous woodland, a habitat of principal importance listed under the provisions of Section 41 of the Natural Environment and Rural Communities (NERC) Act (2006)¹³² and a conservation priority of the Staffordshire Biodiversity Action Plan¹³³ (BAP). With the exception of Cawarden Springs Wood, these areas of woodland habitat were not reported in the main ES as they were not relevant to the assessment of the original scheme. The woodlands of relevance to the amendment are:

- Cawarden Springs Wood, covering an area of approximately 3.7ha, which is a remnant ancient semi-natural woodland. This woodland is located west of Springs Cawarden Farm, east of Rugeley, adjacent to the land no longer required as a result of the amendment. The woodland habitat is of county value;
- Ash Brook, covering an area of approximately 2.6ha, which comprises three areas of woodland. The two blocks adjacent to Ash Brook comprise alder woodland, with a smaller block to the east comprising a wooded pit. These woodlands are located to the south-east of Abbots Bromley. Two of the woodland blocks are partially within the area subject to the amendment for the purposes of mitigation planting only. The woodland habitat is of up to county value;
- Birch and Roosthill Woods, covering an area of approximately 48.9ha, includes ancient semi-natural woodland and plantation on ancient woodland, located between Abbots Bromley and Newborough, adjacent to the area subject to the amendment. The woodland habitat is of county value;
- Lower Birches Plantation/Titler's Plantation, covering an area of approximately 3.7ha, comprises potential ancient semi-natural woodland along Pur Brook, which provides connectivity to the adjacent Birch and Roosthill Woods. The woodland is located to the west of Newhall Farm, south-west of Newborough, partially within the area subject to the amendment. The woodland habitat is of up to county value;
- Woodland to the east of Bromley Hurst, covering an area of approximately 0.6ha, is located along Ash Brook to the south-east of Hurst Farm, within the area subject to the amendment. Due to its small size this woodland habitat is of local/parish value;
- Woodland to the south of Newlands Lane, covering an area of approximately 0.3ha, surrounds a pond adjacent to a small unnamed watercourse. The woodland is south of Newlands, within the area subject to the amendment. Due to its small size this woodland habitat is of local/parish value;

¹³² Natural Environment and Rural Communities Act 2006. Available at: <http://www.legislation.gov.uk/ukpga/2006/16/section/41>

¹³³ Staffordshire Biodiversity Partnership. Staffordshire Biodiversity Action Plan. Available online at <http://sbap.org.uk>

- three small woodlands east of Bromley Hurst, each covering an area of less than 0.3ha, are located between Hart’s Farm (south of) LWS and Ashbrook farm. The woodlands are within the area subject to the amendment. Due to their small size the woodland habitat in each case is of local/parish value; and
 - a narrow tract of broadleaved woodland, covering an area of approximately 0.4ha, located to the west of Titler’s plantation, south-east of Parkgate, partially within the area subject to the amendment. Due to its small size this woodland habitat is of local/parish value.
- 5.15.146 A traditional orchard, covering an area of approximately 0.7ha, is located to the east of Bromley Hurst at Ashbrook farm. Traditional orchard is a habitat of principal importance. The traditional orchard is located within the area subject to the amendment and is of up to district/ borough value. This area of orchard habitat was not reported in the main ES as it was not relevant to the assessment of the original scheme.
- 5.15.147 Improved and semi-improved grassland and arable land within the floodplain of the River Blithe, covering an area of approximately 119.7ha, qualifies as floodplain grazing marsh, which is a habitat of principal importance. The floodplain grazing marsh occurs to the east of Blithfield Reservoir. This habitat is partially within the area subject to the amendment. The floodplain grazing marsh is of up to district/borough value. This area of floodplain grazing marsh was not reported in the main ES as it was not relevant to the assessment of the original scheme.
- 5.15.148 Unimproved and marshy grassland, covering an area of approximately 2.3ha, occurs within Hart’s Farm (south of) LWS. This grassland is likely to qualify as lowland meadow, which is a habitat of principal importance and a conservation priority of the Staffordshire BAP. This habitat is located to the south-east of Abbots Bromley and partially within the area subject to the amendment for the purposes of mitigation planting and to provide access to the mitigation planting. This area of lowland meadow habitat is of county value. This area of lowland meadow was not reported in the main ES as it was not relevant to the assessment of the original scheme.
- 5.15.149 Approximately 2ha of species-poor semi-improved grassland occurs within land no longer required as a result of the amendment. Areas of species-poor semi-improved grassland are of local/parish value.
- 5.15.150 Hedgerows within the area subject to the amendment are assumed to be predominantly species-rich. Hedgerow with at least 80% cover of native woody species is a habitat of principal importance and a conservation priority of the Staffordshire BAP. These contribute towards a wider hedgerow network across the Fradley to Colton area that is of county value.
- 5.15.151 The River Blithe and its tributaries Little Blithe, Ash Brook and Pur Brook will be crossed by the area subject to the amendment. These watercourses are assumed to qualify as habitats of principal importance and a conservation priority of the Staffordshire BAP, and they are each of up to county value. Several smaller unnamed tributaries associated with these watercourses are also located within the area subject to the amendment. These small unnamed watercourses are of local/parish value. None of these watercourses were reported in the main ES as they were not relevant to the assessment of the original scheme.

- 5.15.152 The area subject to the amendment includes 34 ponds. The land no longer required as a result of the amendment includes 11 ponds. On a precautionary basis it is assumed that these qualify as habitats of principal importance and a conservation priority of the Staffordshire BAP. Each of these ponds is of up to district/borough value.

Species

- 5.15.153 Protected and/or notable species that are known or assumed to occur within the area subject to the amendment include breeding and wintering bird species, fish, bats, amphibian species, otter, badger, polecat, harvest mouse, European hedgehog, brown hare and common reptile species. One great crested newt metapopulation¹³⁴ (AMP¹³⁵ 1.7) and the otter population within the Fradley to Colton area were reported in the main ES. The remaining species assemblages and populations reported within this section were not reported in the main ES as they were not relevant to the assessment of the original scheme.
- 5.15.154 The area subject to the amendment includes a section of the River Blithe and associated floodplain grazing marsh habitat. On a precautionary basis it is assumed that the watercourse and floodplain grazing marsh habitat within the area subject to the amendment provide foraging habitats for a notable assemblage of wintering bird species. This corridor of floodplain grazing marsh along the River Blithe connects to Blithfield Reservoir SSSI, approximately 1.1km to the west of the area subject to the amendment. The SSSI is designated for its nationally important wintering bird population of goosander and regionally important assemblage of other wintering bird species including wigeon, Bewick's swan and white-fronted goose. It is therefore assumed that the assemblage of wintering birds using the land subject to the amendment includes the populations of species for which the SSSI is designated. The wintering bird assemblage associated with the River Blithe corridor is therefore of up to national value.
- 5.15.155 The majority of the area subject to the amendment comprises agricultural land that is likely to support a range of breeding farmland bird species. Field surveys of comparable habitats across the Fradley to Colton area, as reported in the main ES, identified breeding bird assemblages of up to local/parish value. On this basis it is considered that the area subject to the amendment supports breeding bird assemblages of up to local/parish value.
- 5.15.156 The main ES reported that the River Trent supports a population of spined loach and a notable assemblage of other fish species, including bullhead and European eel. The River Blithe is a primary tributary of the River Trent. On a precautionary basis it is assumed that sections of the River Blithe and its tributaries within the area subject to the amendment (including Little Blithe, Ash Brook and Pur Brook) support the same notable fish species that are present within the River Trent. Spined loach is an Annex 2¹³⁶ species and a species of principal importance. Bullhead is an Annex 2 species and European eel is a species of principal importance. The assumed spined loach

¹³⁴ A metapopulation is a group of spatially separated populations which interact.

¹³⁵ AMP refers to Amphibian Meta Population.

¹³⁶ Annex 2 of the EU's Habitats Directive (1992) lists priority species whose conservation requires the designation of Special Areas of Conservation.

population within the River Blithe and tributaries is of up to national value. The fish assemblage within the River Blithe and tributaries is of up to district/borough value.

- 5.15.157 Desk study records indicate the presence of foraging/commuting soprano pipistrelle, common pipistrelle, noctule and a Myotis bat species along Ash Brook, to the south-east of Bromley Hurst. The tree-lined watercourse corridors of the River Blithe, Little Blithe and Ash Brook, and adjacent woodlands, orchard and grassland within the area subject to the amendment are likely to provide valuable foraging, commuting and roosting resources for bat species. Within the area subject to the amendment, the landscape between these habitat features is dominated by agricultural fields bounded by mature hedgerows which provide potential bat commuting routes and foraging habitat and may also be used for roosting where trees occur. The habitats are comparable to areas used by other bat assemblages within the Fradley to Colton area that are reported as being of up to regional value within the main ES. On a precautionary basis, it is assumed that a bat assemblage occurs associated with the River Blithe, its tributaries and adjacent habitats that is of up to regional value.
- 5.15.158 Areas of broadleaved woodland at Birch and Roosthill Woods AWI site, Lower Birches Plantation/Titler's plantation and the tree-lined watercourse of Pur Brook, within and adjacent to the area subject to the amendment, are likely to provide valuable foraging, commuting and roosting resources for bat species. The habitats are comparable to areas used by other bat assemblages within the Fradley to Colton area that are reported as being of up to regional value within the main ES. On a precautionary basis, it is assumed that a bat assemblage occurs associated with habitats at and adjacent to Birch and Roosthill Woods AWI that is of up to regional value.
- 5.15.159 The main ES, as amended by SES1, reported a great crested newt metapopulation between Rugeley and Hill Ridware (AMP 1.7). Field surveys confirmed the presence of great crested newt in 15 ponds and populations are assumed in 30 further ponds that are considered to form part of AMP 1.7. Eight of the ponds associated with the metapopulation are within the land required for the original scheme, of which two ponds are also within the area subject to the amendment and five ponds are within the land no longer required as a result of the amendment. One additional pond associated with the metapopulation is within the area subject to the amendment. Terrestrial habitats likely to be used by this metapopulation occur within the area subject to the amendment. Great crested newt is an Annex 2 species, a species of principal importance, and a conservation priority of the Staffordshire BAP. The great crested newt metapopulation associated with habitats between Rugeley and Hill Ridware is of county value.
- 5.15.160 There are a further 31 ponds within the area subject to the amendment that do not form part of any previously reported great crested newt population or metapopulation. The absence of great crested newt has been confirmed in two of these ponds through field survey. The remaining 29 ponds have not been subject to great crested newt survey and on a precautionary basis it is assumed that they support breeding populations of great crested newt of medium size class. The area subject to the amendment contains terrestrial habitats with potential to be used for foraging and shelter by any great crested newt populations that occur within these ponds.

The assumed populations within the area subject to the amendment are of up to county value.

- 5.15.161 The main ES reported populations of amphibian species including palmate newt, smooth newt, common toad and common frog, identified through field surveys, within ponds throughout the Fradley to Colton area. Amphibian species are assumed to be present in ponds that have not yet been surveyed. The area subject to the amendment includes floodplain grazing marsh, hedgerow, woodland and ponds that are likely to be used by these species. Common toad is a species of principal importance. Populations of common amphibians within the area subject to the amendment are of up to local/parish value.
- 5.15.162 The main ES reported an otter population using watercourses throughout the Fradley to Colton area. Desk records indicate the presence of field signs of otter from the River Blithe both immediately upstream and downstream of the location at which this watercourse is crossed by the area subject to the amendment. The River Blithe and its tributaries within the area subject to the amendment include habitats that are likely to offer shelter, foraging, breeding and dispersal opportunities for otter. Otter is an Annex 2 species and a species of principal importance. The population of otter using watercourses within the Fradley to Colton area, including the River Blithe, is of district/borough value.
- 5.15.163 The main ES, as amended by SES1, reported at least 10 social groups of badger throughout the Fradley to Colton area, identified through field surveys. The area subject to the amendment includes suitable sett building and foraging habitats for badgers. The badger populations throughout the Fradley to Colton area are of local/parish value.
- 5.15.164 The main ES reported populations of other mammals including polecat, harvest mouse, European hedgehog, and brown hare, identified through desk study records, as being potentially present throughout the Fradley to Colton area. The area subject to the amendment includes habitats that are suitable for these species. If present, these populations are of local/parish value.
- 5.15.165 The main ES reported populations of common reptile species such as grass snake and slow-worm, identified through desk study records, as being potentially present in low numbers throughout the Fradley to Colton area. Grass snake and slow-worm are both species of principal importance. Grass snake is also a conservation priority of the Staffordshire BAP. The area subject to the amendment includes suitable habitats for these species. If present, these populations are of local/parish value.

Construction (2020)

- 5.15.166 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 5.15.167 The design of the amendment has avoided any direct loss of Birch and Roosthill Woods AWI site.

- 5.15.168 Adverse impacts upon potential ancient woodland at Lower Birches Plantation/Titler's Plantation will be restricted to those which are unavoidable. Such impacts arise as a result of the temporary diversion of the 400kV power line, which will run through the potential ancient woodland and will connect to the temporary pylon to the north of the new substation. The temporary diversion will occur immediately to the north of the existing 400kV power line through the woodland. A managed vegetation corridor of approximately 50m in width occurs beneath the existing power line through the woodland where the height of trees is reduced in order to maintain statutory minimum clearances from the power line. The temporary diversion of the power line will require the widening of this corridor of managed vegetation by up to 20m to the north, which would impact approximately 0.2ha of potential ancient woodland. The works within this area would comprise lowering the height of any trees that would otherwise infringe on the statutory minimum clearances from the temporary power line; the wholesale clearance of vegetation and removal of ancient woodland soils would be avoided. No works within the remainder of the potential ancient woodland will be required, therefore approximately 1.6ha of potential ancient woodland within the additional land required for the amendment will be retained and protected following measures within the draft CoCP.
- 5.15.169 The amendment includes an access route from the B5014 Lichfield Road at Blithford Farm. The access route will be constructed within agricultural fields to the south of Newlands Lane (Hedge 7) LWS to avoid impacting the narrow lane and its associated hedgerows that form the LWS. Furthermore, the working methods for construction of the power line over Newlands Lane will ensure that there is no loss of hedgerow within the LWS.
- 5.15.170 The working methods for construction of the power line over hedgerows will not routinely require removal of hedgerow. Some hedgerow removal will be required for construction and maintenance access routes (as reported within the assessment), however the majority of hedgerow within the additional land required for the amendment will not be impacted. This includes avoidance of loss of any of the Newlands Lane Track (Hedge 1) BAS, which is within the land required for the amendment.
- 5.15.171 The design of the amendment will avoid loss of the traditional orchard at Ashbrook Farm that occurs within the additional land required for the amendment. The orchard habitat will be retained and protected following implementation of measures within the draft CoCP.
- 5.15.172 The design of the amendment will include the positioning of pylons to avoid direct impacts to watercourses including the River Blithe, Little Blithe, Ash Brook and Pur Brook. The watercourses within the area subject to the amendment will not be permanently diverted or culverted as a result of the amendment. The amendment will include temporary watercourse crossings to provide construction access routes. The effects of any such construction works on watercourses will be reduced through implementation of the measures included within the draft CoCP.
- 5.15.173 Osprey are regular visitors on migration to Blithfield Reservoir SSSI. Large raptor species such as osprey are vulnerable to electrocution from certain designs of power line, when the separation distance between the energised and grounded components is sufficiently small to allow the birds to bridge this distance. In Europe, a minimum

distance of 1.4m between power lines and separation greater than 0.6m between a likely perch site and the energised parts is required in order to reduce the risk of bird electrocution to a low level¹³⁷. The standard design of the pylons and length of insulators to be used as part of the Parkgate grid supply point connection will exceed these minimum separation distances, and significant effects upon osprey will therefore be avoided.

Assessment of impacts and effects

- 5.15.174 All of the effects within this section are reported in the absence of other mitigation, which are detailed after the assessment.

Designated sites

- 5.15.175 Blithfield Reservoir SSSI was unaffected by the original scheme. The land required for the Parkgate grid supply point connection falls within a Natural England Impact Risk Zone¹³⁸ for Blithfield Reservoir SSSI. The Risk Zone identifies 'pipelines, pylons and overhead cables' as a development category which could potentially have adverse impacts upon the SSSI. This is relevant to the amendment because pylons and overhead power lines can create a collision risk for birds, resulting in increased mortality rates within the wintering waterfowl populations for which the SSSI is designated. The Parkgate grid supply point connection, a 132kV power line, carried on two parallel lines of steel pylons that will vary in height from 23m to 38m, will cross approximately 3km of the Impact Risk Zone for this development category. The location with the greatest risk of waterfowl collision with the power line is at the crossing of the River Blithe and associated floodplain grazing marsh habitat, which are likely to be used for foraging and dispersal by the wintering waterfowl species for which the SSSI is designated. The construction of the power line will also result in direct loss of areas of this habitat, as described within the assessment of impacts to habitats below.
- 5.15.176 On a precautionary basis, it is considered that the amendment will result in increased mortality of the waterfowl populations for which the SSSI is designated, as a result of collision with power lines. The amendment will also result in the loss of floodplain grazing marsh that is assumed to be used for foraging by the wintering bird species for which the SSSI is designated. Without mitigation, these impacts would give rise to a new permanent adverse effect on the designated features of Blithfield Reservoir SSSI that is significant at up to the national level.
- 5.15.177 Braken Hurst SSSI was unaffected by the original scheme. Part of the area subject to the amendment falls within a Natural England IRZ for Braken Hurst SSSI. The Risk Zone identifies 'pipelines, pylons and overhead cables' as a development category which could potentially have adverse impacts upon the SSSI. The Parkgate grid supply point connection will cross approximately 0.9km of the IRZ for this development category. The SSSI is designated for its range of semi-natural woodland types that

¹³⁷ Prinsen, H.A.M., Smallie, J.J., Boere, G.C. & Pires, N. (Compilers), 2012. Guidelines on How to Avoid or Mitigate Impact of Electricity Power Grids on Migratory Birds in the African-Eurasian Region. AEWAs Conservation Guidelines No. 14, CMS Technical Series No. 29, AEWAs Technical Series No. 50, CMS Raptors MOU Technical Series No. 3, Bonn, Germany.

¹³⁸ The Impact Risk Zones are a GIS tool developed by Natural England to make a rapid initial assessment of the potential risks to SSSIs posed by development proposals and indicate relevant development categories which could potentially have adverse impacts.

support a characteristic and diverse flora and fauna. The works associated with the amendment will not impact the designated features of the SSSI. The amendment will not give rise to a significant effect upon the designated features of Braken Hurst SSSI.

- 5.15.178 Forest Banks SSSI was unaffected by the original scheme. Part of the area subject to the amendment falls within a Natural England IRZ for Forest Banks SSSI. The Risk Zone identifies 'pipelines, pylons and overhead cables' as a development category which could potentially have adverse impacts upon the SSSI. The Parkgate grid supply point connection will cross approximately 0.3km of the Impact Risk Zone for this development category. The SSSI is designated for its range of semi-natural woodland types that support an outstanding assemblage of moths and butterflies. The works associated with the amendment will not impact the designated features of the SSSI. The amendment will not give rise to a significant effect upon the designated features of Forest Banks SSSI.
- 5.15.179 The main ES reported the permanent loss of 25m (2%) of hedgerow at Newlands Lane (Hedge 6) LWS¹³⁹, which would result in a permanent adverse effect on the structure and function of the site that is significant at the county level. The Parkgate grid supply point connection will result in the additional loss of approximately 50m (approximately 4%) of hedgerow at Newlands Lane (Hedge 6) LWS. This will result in a different permanent adverse effect on the structure and function of the LWS that is significant at the county level.
- 5.15.180 The main ES reported the permanent loss of 30m (12%) of hedgerow at Long Mets Lane (Hedge 1) BAS, which would result in a permanent adverse effect on the structure and function of the site that is significant at the district/borough level. The Parkgate grid supply point connection will result in the additional loss of approximately 170m (65%) of hedgerow at Long Mets Lane (Hedge 1) BAS. This will result in a different permanent adverse effect on the structure and function of the BAS that is significant at the district/borough level.
- 5.15.181 The area of potential ancient woodland at Lower Birches Plantation/Titler's Plantation was unaffected by the original scheme. The Parkgate grid supply point connection will include the temporary diversion of the power line through the potential ancient woodland, immediately to the north of the existing power line. A corridor of managed vegetation occurs beneath the existing line and the temporary diversion may require the widening of this corridor by up to 20m to the north to provide statutory minimum clearances between trees and the temporary power line. This woodland has not been subject to survey and on a precautionary basis it is assumed that these trees are mature and support deadwood features that contribute to the biodiversity of the ancient woodland. The reduction in height of trees within this area could therefore result in damage of up to 0.2ha (5%) of potential ancient woodland at Lower Birches Plantation/Titler's Plantation. This would result in a new permanent adverse effect upon potential ancient woodland at Lower Birches Plantation/Titler's Plantation that is significant at up to the county level.

¹³⁹ The designated site is referred to as Newlands Lane LWS within the main ES.

Habitats

Woodland

- 5.15.182 Other than the new significant effect on potential ancient woodland described in the designated sites section, there are no other new or different significant effects upon woodland habitats as a result of the amendment.

Grassland

- 5.15.183 Floodplain grazing marsh alongside the River Blithe, east of Blithfield Reservoir, was unaffected by the original scheme. The amendment will result in the loss of up to 13.7ha (11%) of floodplain grazing marsh alongside the River Blithe, east of Blithfield Reservoir. The amendment will result in a new permanent adverse effect on floodplain grazing marsh that is significant at up to the district/borough level.

Hedgerow

- 5.15.184 On a precautionary basis the main ES reported the permanent loss of 64.8km of hedgerow habitat within the land required for construction of the original scheme within the Fradley to Colton area, which would result in a permanent adverse effect that is significant at the county level. The amendment will result in the additional loss of up to 2.2km of hedgerow within the additional land required for the Parkgate grid supply point connection. The amendment will also result in the avoidance of 2.5km of hedgerow within land that is no longer required as a result of the removal of the Rugeley grid supply point connection. In the absence of mitigation, the net change in hedgerow length within the area subject to the amendment will be an increase in retained hedgerow by approximately 300m, in comparison to the original scheme. In the context of the hedgerow network within the Fradley to Colton area, this change does not represent a different significant effect on the existing hedgerow network.

Water bodies

- 5.15.185 On a precautionary basis, the assessment reported in the main ES assumed that all ponds that have not been subject to survey are habitats of principal importance, a conservation priority of the Staffordshire BAP and are each up to district/borough value. There are 34 ponds located within the area subject to the amendment, three of which are within the land required for the original scheme and their loss is reported in the main ES. On a precautionary basis, up to 31 additional ponds will be lost as a result of construction of the Parkgate grid supply point connection. The amendment will give rise to a new permanent adverse effect on each of these ponds that is significant at up to the district/borough level in each case.
- 5.15.186 The amendment will avoid the loss of 11 ponds that are located within the land no longer required as a result of the removal of the Rugeley grid supply point connection. The amendment will remove the adverse effect on each of these ponds that was reported as being significant at up to the district/borough level in each case within the main ES.
- 5.15.187 It is not likely that any other effects on habitats of relevance at more than the local/parish level will occur as a result of the amendment. Additional local/parish level effects arising from the AP2 revised scheme are listed in SES2 and AP2 ES Volume 5: Appendix EC-016-000.

Species

- 5.15.188 The Parkgate grid supply point connection will cross the River Blithe and associated floodplain grazing marsh habitat that is likely to be used for foraging and dispersal by a notable assemblage of wintering waterfowl. The assemblage is assumed to include species that are vulnerable to collision risk from power lines. On a precautionary basis, it is considered that the amendment will result in increased bird mortality as a result of collisions. In addition, the amendment will result in direct loss of floodplain grazing marsh habitat that is likely to provide a foraging resource for wintering waterfowl. These impacts will give rise to a new permanent adverse effect on the wintering bird assemblage associated with the River Blithe corridor that is significant at up to the national level.
- 5.15.189 The nationally important assumed spined loach population within the River Blithe and tributaries and the assemblage of other fish species within the River Blithe and tributaries will not be directly affected by the amendment. Any indirect effects will be controlled through implementation of measures in the draft CoCP and therefore any effects will not be significant.
- 5.15.190 The Parkgate grid supply point connection will result in the loss of floodplain grazing marsh along the River Blithe, and the loss of connected hedgerows, small woodlands and ponds that are likely to provide foraging and commuting habitats for the bat assemblage assumed to be associated with the River Blithe, its tributaries and adjacent habitats. The hedgerows and woodland areas are likely to contain trees with moderate or high bat roosting potential, which on a precautionary basis are assumed to support bat roosts. The assumed loss of roosts and foraging and commuting habitats will give rise to a new permanent adverse effect on the bat assemblage assumed to be associated with the River Blithe, its tributaries and adjacent habitats that is significant at up to the regional level.
- 5.15.191 The Parkgate grid supply point connection will result in the loss of broadleaved woodland at Lower Birches Plantation/Plantation and the loss of connected hedgerows, small woodlands and ponds that are likely to provide foraging and commuting habitats for the bat assemblage assumed to be associated with habitats at and adjacent to Birch and Roosthill Woods AWI site. The hedgerows and woodland areas are likely to contain trees with moderate or high bat roosting potential, which on a precautionary basis are assumed to support bat roosts. The assumed loss of roosts and foraging and commuting habitats will give rise to a new permanent adverse effect on the bat assemblage assumed to be associated with habitats at and adjacent to Birch and Roosthill Woods AWI site that is significant at up to the regional level.
- 5.15.192 The main ES, as amended by SES₁, reported the loss of eight ponds and terrestrial habitats associated with a great crested newt metapopulation situated between Rugeley and Hill Ridware (AMP 1.7), which would result in a permanent adverse effect that is significant at a county level. The Parkgate grid supply point connection will result in the additional loss of one pond and adjacent terrestrial habitats associated with the metapopulation. The removal of the Rugeley grid supply point connection will avoid the loss of five ponds and adjacent terrestrial habitats associated with the metapopulation that are located within the land no longer required as a result of the amendment. The amendment will give rise to a different significant effect on the great crested newt metapopulation situated between Rugeley and Hill Ridware.

However, this will not change the level of significance of the effect reported in the main ES.

- 5.15.193 Assumed great crested newt populations occur within a further 29 additional ponds that will be lost as result of the Parkgate grid supply point connection, which do not form part of any great crested newt population or metapopulation reported in the main ES, as amended by SES1. The amendment will also result in the additional loss of terrestrial habitats likely to be used by the assumed great crested newt populations, including hedgerow, woodland and grassland. The amendment will give rise to a new permanent adverse effect upon 29 assumed great crested newt populations that is significant at up to the county level in each case.
- 5.15.194 It is not likely that any other effects on species of relevance at more than the local/parish level will occur as a result of the amendment. Additional local/parish level effects arising from the AP2 revised scheme are listed in SES2 and AP2 ES Volume 5: Appendix EC-016-000.

Mitigation and residual effects

- 5.15.195 On a precautionary basis for the purposes of the assessment, construction works within the land required for the amendment are assumed to require complete removal of the majority of the habitats present, except where otherwise specified within the assessment. The mitigation design has been developed on the same precautionary basis to include measures to remove or reduce new and different significant effects, wherever possible. The impacts upon potential ancient woodland, ecologically valuable habitats and species arising from the final detailed design for construction of the power line are likely to be reduced from those reported within this precautionary assessment. Where development of the detailed design results in the avoidance or reduction of a new or different significant effect that is reported within this assessment, the design of the related mitigation will be revised to ensure that it remains proportionate to the significant effects that will occur.
- 5.15.196 The baseline for the amendment has also been built up on a precautionary basis, with the presence of several protected and notable species being assumed in the absence of survey data. HS2 Ltd will continue to survey for habitats and species and where it is confirmed that species receptors that form part of the assumed baseline are absent, and related significant effects will not occur, then the requirement for the related mitigation measures will be re-assessed.

Other mitigation measures

- 5.15.197 Mitigation measures will be provided to reduce the potential for bird collision with the new power line. A large body of published literature provides evidence that marking power lines to increase their visibility to birds is an effective measure to significantly reduce bird mortality from collisions^{140,141}. Where required, the installation of such

¹⁴⁰ Williams, D.R., Child, M.F., Dicks, L.V., Ockendon, N., Pople, R.G., Showler, D.A., Walsh, J.C., zu Ermgassen, E.K.H.J. & Sutherland, W.J. (2018) Bird Conservation. Pages 95-244 in: W.J. Sutherland, L.V. Dicks, N. Ockendon, S.O. Petrovan & R.K. Smith (eds) What Works in Conservation 2018. Open Book Publishers, Cambridge, UK.

¹⁴¹ Prinsen, H.A.M., Smallic, J.J., Boere, G.C. & Pires, N. (Compilers), 2012, *Guidelines on How to Avoid or Mitigate Impact of Electricity Power Grids on Migratory Birds in the African-Eurasian Region*. AEWa Conservation Guidelines No. 14, CMS Technical Series No. 29, AEWa Technical Series No. 50, CMS Raptors MOU Technical Series No. 3, Bonn, Germany.

marking devices (known as bird diverters) will be implemented as part of the Parkgate grid supply point connection in accordance with National Grid Policy Statement EN-5¹⁴² and National Grid's Protocol on Bird Diverters.

- 5.15.198 The mitigation approach will include detailed field surveys within the area subject to the amendment to identify any important bird flight lines and foraging areas. The survey data will inform a species-specific assessment of bird collision risk, to include consideration of all bird species that are relevant to the designation of Blithfield Reservoir SSSI. The type and location of bird diverters will be determined by the outcome of the collision risk assessment. In addition, habitat creation and reinstatement measures will be provided in response to the loss of floodplain grazing marsh habitat, as described below, which will mitigate the loss of foraging habitat for the wintering bird assemblage. The implementation of these mitigation measures will reduce the effects of the amendment on the designated features of Blithfield Reservoir SSSI and the wintering bird assemblage associated with the River Blithe corridor to a level that is not significant.
- 5.15.199 On a precautionary basis, the amendment will result in the damage to approximately 0.2ha of potential ancient woodland, which is irreplaceable, from Lower Birches Plantation/Titler's Plantation.
- 5.15.200 The amendment will result in a combined loss of woodland habitat from several small woodlands of up to local/parish value within the additional land required for the amendment as reported within the register of local/parish effects (SES2 and AP2 ES, Volume 5: Appendix EC-016-000).
- 5.15.201 In accordance with the Ecological Principles of Mitigation in the SMR Addendum, a route-wide, integrated strategic approach has been developed to compensate for loss of woodland. The planting in this area is required to partly compensate for woodland losses in the local area as well as to ensure that the populations of protected and notable species, including bats, are maintained. With these objectives in mind, where reasonably practicable, the locations of woodland planting have been located so as to increase the size of existing higher quality woodland habitat and to increase connectivity.
- 5.15.202 The impact to potential ancient woodland will be partly compensated through the planting of approximately 0.9ha of native broadleaved woodland. This occurs between Lower Birches Plantation/Titler's Plantation and Birch and Roosthill Woods AWI site (0.4ha); and in two locations that increase existing small woodlands to the south of Newborough End Farm (0.3ha) and to the east of Chantry Farm (0.2ha).
- 5.15.203 The loss of non-ancient woodland and significant effects upon notable species, including bats, will be mitigated through additional woodland planting of 7.2ha with native broadleaved trees and shrubs. The target habitat type for woodland planting is lowland mixed deciduous woodland habitat of principal importance. The new areas of woodland habitat will connect and help maintain the integrity of remaining areas of woodland. Woodland habitat creation areas are provided in combination with

¹⁴² https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/37050/1942-national-policy-statement-electricity-networks.pdf

grassland, hedgerow and pond habitat creation in areas between Newlands Lane and Ashill Lane, in areas adjacent to Ash Brook and adjacent to the northern boundary of Birch and Roosthill Woods AWI site. The function of these combined habitat creation areas as mitigation for faunal species is described further below.

- 5.15.204 To compensate for the loss of approximately 13.7ha of floodplain grazing marsh alongside the River Blithe, approximately 10.44ha of wet grassland habitat will be created in other areas adjacent to the River Blithe and Ash Brook. Furthermore, it is assumed that the 13.7ha of floodplain grazing marsh to be lost during construction of the amendment will be returned to existing agricultural use after construction, allowing it to still function as floodplain grazing marsh. Following restoration of the habitat and creation of wet grassland habitat, the adverse effect on floodplain grazing marsh will be reduced to a level that is not significant.
- 5.15.205 New hedgerows will be planted as replacement for those lost as a result of the amendment. Where practicable the hedgerows along Newlands Lane (Hedge 6) LWS and Long Mets Lane (Hedge 1) BAS will be translocated to the nearest suitable habitat creation areas. In addition, approximately 1.3km of new hedgerows will be planted and the species composition will be characteristic of the surrounding area. However, approximately 5.3km of hedgerow planting that was provided within the original scheme will no longer be provided as a result of the removal of the Rugeley grid supply point connection.
- 5.15.206 There will be a net reduction in hedgerow planting of approximately 4km in comparison to that provided within the original scheme. There will also be an increase in retained hedgerow of approximately 300m in comparison to the original scheme (as reported in the assessment of impacts and effects section). Therefore, after the implementation of mitigation there will be a net reduction of approximately 3.7km of hedgerow within the area subject to the amendment, in comparison to the original scheme. In the context of the hedgerow network within the Fradley to Colton area, the net reduction in hedgerow after mitigation represents a different residual adverse effect upon the hedgerow network. However, this will not change the level of significance of the effect as reported in the main ES.
- 5.15.207 At least one pond will be created for every pond lost to the amendment. New ponds will be established in accordance with the Ecological Principles of Mitigation in the SMR Addendum. Once established, it is anticipated that any adverse effect on pond habitats will be reduced to a level that is not significant.
- 5.15.208 To replace bat roosts that will be lost to construction, artificial roosting provision will be provided across the area subject to the amendment in accordance with the Ecological Principles of Mitigation within the SMR Addendum. The habitat creation measures detailed above for mitigation of habitat loss, including creation of areas of grassland, hedgerows, new ponds, and semi-natural woodland, will compensate for those bat foraging habitats lost within the land required for the amendment as detailed below.
- 5.15.209 The loss of roosting, foraging and commuting habitat near the River Blithe and its tributaries will be addressed through new areas of habitat creation. These include several areas of grassland, woodland and hedgerow planting between Newlands Lane and Ashill Lane, a linear strip of grassland and hedgerow planting to the west of

Lichfield Road, grassland and hedgerow planting adjacent to the Little Blithe, and woodland and grassland habitat creation areas adjacent to Ash Brook. Following establishment of these habitats, the adverse effect on the bat assemblage assumed to be associated with the River Blithe, its tributaries and adjacent habitats will be reduced to a level that is not significant.

- 5.15.210 The loss of roosting, foraging and commuting habitat within and adjacent to Lower Birches Plantation/Titler's Plantation will be addressed through new areas of habitat creation. These include several extensive areas of woodland habitat creation adjacent to the northern boundary of Birch and Roosthill Woods AWI site. Following establishment of this habitat, the adverse effect on the bat assemblage assumed to be associated with habitats at and adjacent to Birch and Roosthill Woods AWI site will be reduced to a level that is not significant.
- 5.15.211 Provision of ponds, wet grassland and broadleaved woodland will be designed to compensate for the loss of breeding sites, foraging habitat and places of shelter used by great crested newts and other amphibian species. Compensation will be provided within three ecological habitat creation areas between Newlands Lane and Ashill Lane, an area to the west of Lichfield Road, two areas adjacent to the Little Blithe, a connected corridor of habitat creation areas along Ash Brook, an area to the south of Fieldhouse Farm and areas to the north and east of Birch and Roosthill Woods AWI site. Ponds, grassland and woodland will be established in accordance with the Ecological Principles of Mitigation within the SMR Addendum. Following implementation, the adverse effects on the great crested newt metapopulation situated between Rugeley and Hill Ridware (AMP 1.7) and the assumed amphibian populations within the additional land required for the amendment, will be reduced to a level that is not significant.

Summary of likely residual significant effects

- 5.15.212 On a precautionary basis, the amendment will result in damage of approximately 0.2ha of potential ancient woodland at Lower Birches Plantation/Titler's Plantation which will give rise to a new permanent adverse residual effect that is significant at the county level.
- 5.15.213 The amendment will result in a different significant adverse residual effect upon the hedgerow network in the Fradley to Colton area in comparison to that reported in the main ES, as amended by SES1. This is the result of the net reduction of approximately 3.7km of hedgerow within the area subject to the amendment after implementation of mitigation, in comparison to the original scheme. A permanent adverse residual effect upon the hedgerow network in the Fradley to Colton area will still occur, which remains significant at county level. As reported in the main ES, the reinstatement of existing hedgerow within land required only for construction provides an opportunity to reduce this residual effect to a level that is not significant.

Cumulative effects

- 5.15.214 There are no new or different likely significant cumulative effects for ecology and biodiversity as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments. The combined effect on hedgerows as a result of the AP2 revised scheme is reported at a route-wide level in SES2 and AP2 ES, Volume 3, Route-wide effects.

Landscape and visual

Scope, assumptions and limitations

- 5.15.215 The assessment scope, key assumptions and limitations for landscape and visual are as set out in Volume 1, the SMR and SMR Addendum of the main ES and SMR Addendum 2 (see SES2 and AP2 ES Volume 5: Appendix CT-001-000).
- 5.15.216 This amendment has the potential to give rise to new or different temporary or permanent significant construction and operational effects for landscape and visual. Therefore, both construction and operational phases are considered in this assessment.
- 5.15.217 Assumptions have been made with regards to vegetation clearance required for the construction and operation of the proposed pylon lines. It is assumed that permanent vegetation clearance will only comprise those trees which require removal to maintain safety clearances from conductors along the pylon lines. Vegetation required to be removed for construction, for example hedgerows and trees affected by access tracks, will be reinstated after works are completed but will take time to mature.
- 5.15.218 Three additional scenarios or sensitivity tests for each identified visual receptor have been applied to this assessment as follows:
- an increase in pylon height of 3m above that in the design;
 - lateral movement of a pylon within the land required for the amendment; and
 - longitudinal movement along the pylon alignment of up to 50m.
- 5.15.219 Each scenario has been considered individually and in combination. Where the effects of these scenarios change the assessed level of effects of the amendment, this has been reported. Where the effects of these scenarios do not change the assessed level of effects of the amendment, this has not been reported.
- 5.15.220 There are a number of non-significant effects reported in the main ES which have been removed or altered as a result of this amendment. There are also a number of new landscape character areas (LCA) and viewpoints which are subject to non-significant effects. These are reported in Volume 5: LV-001-001 of the SES2 and AP2 ES.

Existing environmental baseline

- 5.15.221 The baseline landscape and visual information for the Fradley to Colton area is reported in Volume 2, CA1, Section 11 of the main ES. The amendment extends into an area which was not affected by the original scheme and therefore additional LCAs and viewpoints have been identified.
- 5.15.222 A summary of the baseline relevant to the assessment of the amendment is provided below.

Landscape baseline

- 5.15.223 The amendment to provide the Parkgate grid supply point connection and remove the Rugeley grid supply point connection, has the potential to affect the following LCA, which is described in Volume 5: Appendix LV-001-001 of the main ES and summarised below.

Colton and Stockwell Heath Settled Farmlands LCA

- 5.15.224 The Colton and Stockwell Heath Settled Farmlands LCA lies between Hill Ridware, Colton and Admaston. It is an undulating and rural landscape characterised by an historic small-scale field pattern defined by hedgerows with hedgerow trees and occasional woodlands. Settlement within the LCA comprises mainly dispersed individual properties and farmsteads as well as the historic settlement of Colton, which dates back to the Anglo Saxon period, and the nearby hamlet of Stockwell Heath. Settlements are linked by a traditional rural road and lane network. Long distance views to the wooded ridges of the Cannock Chase Area of Outstanding Natural Beauty (AONB) are frequently afforded from the PRoW and road network.
- 5.15.225 The amendment to provide the Parkgate grid supply point connection will give rise to likely significant effects at the following three new LCAs:
- Blithe Alluvial Farmland LCA;
 - Bromley Settled Farmland LCA; and
 - Bromley Park Plateau Farmland LCA.
- 5.15.226 The baseline for these three new LCAs is provided in the SES2 and AP2 ES Volume 5: Appendix LV-001-000, and is summarised below.

Blithe Alluvial Farmland LCA

- 5.15.227 The Blithe Alluvial Farmland LCA includes the low lying farmland to the south-east of the reservoir and either side of the River Blithe. It is typified by irregular pastures and arable fields interspersed with riparian vegetation along the meandering course of the river. Occasional hedgerows provide some enclosure but many fields have open boundaries. Two farmsteads are located within the river valley, which is mostly tranquil with few human influences. To the north-west, the end of the reservoir forms an abrupt feature when seen in proximity, but from a distance the artificial grassed slope blends into the wider landscape and is not noticeable. A number of footpaths cross the LCA including the Staffordshire Way.

Bromley Settled Farmland LCA

- 5.15.228 The Bromley Settled Farmland LCA comprises the settlement of Abbots Bromley and surrounding farmland. The village is located on elevated ground, which falls away to the south and east and affords long distance views across the wider landscape. The settlement is recorded in the Domesday Book and has an historic character focused on its conservation area and listed buildings. The field pattern surrounding Abbots Bromley is quite irregular and of a small to medium scale,

reflecting the rolling landform and minor watercourses, including Dunstall Brook and Ash Brook, which flow through the LCA and are defined by linear tree belts. Fields are bounded by hedgerows with hedgerow trees. The roads which radiate from the settlement, and include the B5234 Ashbrook Lane and B5014 Lichfield Road, locally disrupt the sense of tranquillity experienced elsewhere.

Bromley Park Plateau Farmland LCA

- 5.15.229 The Bromley Park Plateau Farmland is defined as an elevated rolling agricultural landscape with a medium to large scale regular field pattern. The few mature trees and open outlook afford long views across the area. The area is lightly settled with a scattering of large farmsteads. The B5234 Ashbrook Lane and Blunts Hollow provide access through the LCA and locally disrupt the sense of tranquillity. To the east of the LCA, an existing pylon line is a prominent feature.

Visual baseline

- 5.15.230 The amendment to provide the Parkgate grid supply point connection and remove the Rugeley grid supply point connection has the potential to affect the following four viewpoints, which are described in Volume 5: LV-001-001 of the main ES and summarised below:

View south-east from Hollow Lane (viewpoint 006.02.034)

- 5.15.231 This viewpoint represents the views experienced by residents of Bank Top Farm. It is located in an area of small to medium scale rolling arable farmland bounded by mature hedgerows and hedgerow trees. In the foreground, Hollow Lane is bounded by a grass verge with hedgerows and mature hedgerow trees. Bank Top Farm and a wood pole overhead line are visible through and above the hedgerows. There are long distance views along the road and across the rolling farmland as it rises up to a distant wooded skyline.

View west from Colton Footpath 12 (viewpoint 005.02.017)

- 5.15.232 This viewpoint represents the views experienced by residents of Old Wood Farm and users of Colton Footpath 12. It is located in an area of large hedged pastures, with occasional trees and woodland blocks, which slope down towards the River Trent valley. Old Wood Farm is visible beyond the large field and a wood pole overhead line. Much of the middle distance view is obscured by a low ridgeline but there are views of hedged pastures with woodland blocks to the north-west. Long distance views comprise a wooded ridgeline.

View north from Colton Footpath 4 (viewpoint 005.02.018)

- 5.15.233 This viewpoint represents the views experienced by residents at Old Wood Farm No. 2 and users of Colton Footpath 4. It is located in an area of medium-scale rolling pastoral farmland with hedgerows and mature field boundary trees. In the foreground, an undulating pasture is bounded by mature hedgerows with hedgerow trees to the north and a woodland block to the east. The hedged pastures with woodland continue into the middle distance, where they become more rolling and are crossed by wood pole overhead lines. The view is contained in the middle distance by the rolling landform.

View north-east from Blithbury Road (viewpoint 005.02.019)

5.15.234 This viewpoint represents the views experienced by residents of Croft House and is located in an area of large, open and undulating pastures, bounded by patchy hedgerows with occasional hedgerow trees. Blithbury Road in the immediate foreground is bounded by a mix of hedgerows and post and rail fences. A wood pole overhead line follows the road. Beyond the road, is a small pasture which lies adjacent to Croft House. To the east of the view, a wooded drive leads to Colton Wood Farm, where views are contained by woodland. To the north-east, there are views along Blithbury Road, which rises to a low ridgeline on the middle distance horizon.

5.15.235 The amendment to provide the Parkgate grid supply point connection is assessed by the following 11 new viewpoints:

- view north from Colton Footpath 12 (viewpoint 005.02.036);
- view south-east from the Staffordshire Way near Park Barn Farm (viewpoint 005.03.023);
- view south-east from Newlands Lane (viewpoint 005.03.024);
- view east from the roadside near Lower Newlands Farm (viewpoint 005.02.025);
- view west from farmland near Poplar Farm (viewpoint 005.02.026);
- view south-east from farmland near Hurd's Farm (viewpoint 005.02.028);
- view south-east from Pinfold Lane near Hart's Farm (viewpoint 005.02.030);
- view south-east from the B5234 at Bromley Wood (viewpoint 005.02.031);
- view south-west from Blunts Hollow Road near Barn Farm (viewpoint 005.02.032);
- view south-west from Thorney Lanes near Noah's Ark Farm (viewpoint 005.02.034); and
- view south-west from B5234 near Parkgate (viewpoint 005.02.035).

5.15.236 The baseline for these 11 new viewpoints is provided in the SES2 and AP2 ES Volume 5: Appendix LV-001-001 and summarised below.

View north from Colton Footpath 12 (viewpoint 005.02.017 in the main ES which has been rotated and renumbered to viewpoint 005.02.036)

5.15.237 This viewpoint represents the views experienced by users of Colton Footpath 12 and residents of properties along Blithbury Road. It is located in an area of large-scale pastures, bounded by hedgerows with occasional hedgerow trees and woodland blocks, which slope down towards Hollow Lane in the middle distance. To the north-west, a ridgeline in the middle distance partially obstructs more distant views across well-wooded pastoral farmland towards distant hills with intermittent copses on the skyline.

View south-east from the Staffordshire Way near Park Barn Farm (viewpoint 005.03.023)

- 5.15.238 This viewpoint is located on a low, gently-rolling ridgeline comprising of medium sized pastures which fall gently away towards the south-east towards the River Blithe and Blithfield Reservoir. A wood pole overhead line extends across the foreground and is a skyline feature. The middle distance comprises rolling fields with hedgerows and hedgerow trees. There are long distance views towards the wooded skyline of Hoar Cross and Abbots Bromley to the north-west. A single wind turbine is visible to the south-east. To the south-west of the view, Rugeley Power Station can be seen through gaps in the vegetation but does not break the distant horizon formed by the wooded hills of Cannock Chase.

View south-east from Newlands Lane (viewpoint 005.03.024)

- 5.15.239 This viewpoint is located on the junction of two lanes, one of which forms part of Colton Footpath 79. It represents the views experienced by users of the footpath and Newlands Lane. The foreground comprises Newlands Lane which is bounded by tall hedgerows and occasional hedgerow trees. These largely filter views across rolling farmland to either side. The hedgerows channel views along the lane towards a rolling pasture in the middle distance with trees on the horizon. Rising landform screens more distant views.

View east from the roadside near Lower Newlands Farm (viewpoint 005.02.025)

- 5.15.240 This viewpoint is located on Newlands Lane and represents the view experienced by residents of Newlands Farm and users of Colton Footpath 78 and Newlands Lane. The foreground comprises gently rolling arable fields which slope down to the undulating farmland in the valley of the River Blithe. Fields within the valley have few hedgerows but there are many mature field boundary trees. The gently rolling arable fields and pastures in the middle distance merge into the long distance views, where scattered individual properties and farmsteads can be seen amongst the trees. Housing at Abbots Bromley is visible to the north. An existing pylon line can be seen on the distant horizon which is formed by the woodlands near Hoar Cross.

View west from farmland near Poplar Farm (viewpoint 005.02.026)

- 5.15.241 This viewpoint is located on Abbots Bromley Footpath 32 within a large arable field which is bounded by a hedgerow with hedgerow trees. It represents the views experienced by users of the footpath and residents of nearby Poplar Farm. In the middle distance to the west of the view the shallow, well-treed valley of the River Blithe and a wood pole overhead line are just visible through the vegetation. Beyond this, the landform starts to rise to form a low wooded ridgeline which screens longer distance views. To the west, beyond the arable field, a low wooded horizon is just perceptible in the distance.

View south-east from farmland near Hurd's Farm (viewpoint 005.02.028)

- 5.15.242 This viewpoint is located within a large gently rising pasture on Abbots Bromley Footpath 38. It represents the views experienced by users of the footpath and

residents of Hurd's Farm. Close distance views comprise the open pasture which is bounded by hedgerows with mature individual hedgerow trees. The farm buildings of Sunnyside are a noticeable feature as are wood pole overhead lines to the south. To the south-east, longer views are mostly screened by the landform, mature trees around the perimeter of the field and by the farm building, although to the north of Sunnyside Farm, there are some middle distance views of scattered properties within well-treed rolling farmland. A low wooded ridgeline forms the distant horizon. A single wind turbine is visible. To the south-east of the view the distant horizon is formed by the low wooded hills of Cannock Chase.

View south-east from Pinfold Lane near Hart's Farm (viewpoint 005.02.030)

- 5.15.243 This viewpoint represents the views experienced by residents of Hart's Farm and users of Pinfold Lane. It is located in an area of medium sized, gently undulating and well-treed arable and pastoral farmland. The foreground comprises an open pasture bounded by a mature but intermittent hedgerow with a mixture of post and rail and post and wire fencing. In close distance views to the east, vegetation and the buildings of Harts Farm screen longer views. The mature trees foreshorten many middle and long distance views across the farmland, although there are some glimpses of the low wooded hills of Cannock Chase on the horizon to the south. Wind turbines are also just visible through the trees, one in the middle distance and one on the distant skyline.

View south-east from the B5234 Bromley Lane at Bromley Wood (viewpoint 005.02.031)

- 5.15.244 This viewpoint represents the elevated views experienced by residents of properties in the hamlet of Bromley Wood and users of Bromley Lane. It affords a wide panoramic view across the surrounding gently rolling farmland. The foreground comprises a large pasture bounded by patchy hedgerows infilled with post and wire fencing, beyond which are some groups of trees, including a small woodland and mature individual trees. Occasional scattered properties can just be seen amongst the trees, as can a distant wind turbine. To the south, Rugeley Power Station can be seen against the low wooded hills of Cannock Chase which form the distant horizon. A radio mast, distant pylon line and telecommunications tower are also visible on the distant horizon.

View south-west from Blunts Hollow Road near Barn Farm (viewpoint 005.02.032)

- 5.15.245 This viewpoint is located on Blunts Hollow Road in an area of gently undulating pastoral farmland. It represents the view experienced by users of the road and residents of nearby Barn Farm. The foreground comprises the road, beyond which lies a large field bounded by hedgerows with some individual mature trees. The landform gently slopes away from the viewpoint, foreshortening middle distance views of scattered properties nestled amongst the well-wooded farmland. A single wind turbine is visible between the trees in the middle distance. To the south are the wooded slopes of Hoar Cross. Distant views comprise the low wooded hills of Cannock Chase. A distant pylon line and telecommunications tower are also visible on the distant horizon.

View south-west from Thorney Lanes near Noah's Ark Farm (viewpoint 005.02.034)

- 5.15.246 The viewpoint is located in an area of small to medium sized fields with tree lined lanes. It represents the views experienced by users of the lanes and residents of nearby Noah's Ark Farm. The foreground comprises pasture with overgrown hedgerows and some individual mature trees. To the south of the view is a post and rail fence and outbuildings associated with Noah's Ark Farm. Views to the north are restricted by vegetation. An existing pylon line is visible in the middle distance, located on lower ground as the landform falls towards Pur Brook. The pylons are mostly seen against a background of landform and vegetation which lessens their prominence. Rolling pastures bounded by hedgerows continue into the middle distance as the landform rises and screens longer distance views. To the south, Birch Wood forms the skyline.

View south-west from B5234 near Parkgate (viewpoint 005.02.035)

- 5.15.247 The viewpoint is located in an area of small to medium sized fields with tree lined lanes. It represents the views experienced by users of the lane and residents of nearby Noah's Ark Farm. The foreground comprises rough pasture with overgrown hedgerows and some individual mature trees. To the south of the view is a post and rail fence and outbuildings associated with the farm. Views to the north are restricted by vegetation. An existing pylon line is visible but not prominent in the middle distance, where it is located on lower lying land within the valley of Pur Brook. The pylons are mostly seen against a background of landform and vegetation which makes them less noticeable. Rolling pastures bounded by hedgerows continue into the middle distance as the landform rises and screens longer distance views. To the south, Birch Wood is visible on the horizon.

Future environmental baseline

Construction (2020) and operation (2027)

- 5.15.248 The future baseline for construction in 2020 and operation in 2027 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising from construction

Avoidance and mitigation measures

- 5.15.249 No avoidance or mitigation measures additional to those reported in the main ES and draft CoCP are required.

Assessment of impacts and effects

Landscape assessment: existing LCAs

- 5.15.250 The amendment to provide the Parkgate grid supply point connection and remove the Rugeley grid supply point connection will affect the following LCA, which was assessed in the main ES and was affected by the original scheme.

Colton and Stockwell Heath Farmlands LCA

- 5.15.251 The main ES reported a major adverse significant effect due to construction activity associated with Pipe Ridware embankment, Blithbury cutting, Stockwell Heath embankment, Stockwell Heath cutting and construction of three wood pole overhead lines.
- 5.15.252 The amendment will give rise to very localised effects on the LCA, and the overall construction effects on the character of the wider LCA will be very similar. Construction activity will include vegetation removal, construction of access tracks and the presence of cranes to erect the pylons. The effects of the HS2 route remain as described in the main ES. The amendment will therefore not give rise to any new or different significant effects on the landscape character of the Colton and Stockwell Heath Farmlands LCA and will not change the level of significance of the effect reported in the main ES.
- 5.15.253 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

Landscape assessment: new LCAs

- 5.15.254 The amendment to provide the Parkgate grid supply point connection will affect the following LCA, which was not assessed in the main ES and was unaffected by the original scheme.

Bromley Park Plateau Farmland LCA

- 5.15.255 The two pylon lines will cross the Bromley Park Plateau Farmland LCA between Blunts Hollow and Parkgate. Construction activity will require localised removal of trees and hedgerows along the alignment of the two pylon lines and access tracks. There will be temporary loss of agricultural land for laydown areas and crane pads. As the two pylon lines will be broadly parallel, and pylon locations close to each other, the direct effects will be localised. Due to the open and elevated nature of the landscape, the presence of construction activity, including cranes to erect the pylons, will reduce scenic quality over much of the south side of this LCA. The eastern edge of the LCA will also be affected by large-scale construction activity associated with the new substation which is located adjacent to the existing pylon line. This will include a temporary overhead line diversion for the existing pylon line during construction of the substation. As this area is slightly lower in elevation and surrounded by mature vegetation, including Birch Wood, the effects on the landscape from construction of the substation will be relatively contained.
- 5.15.256 Construction of the amendment will therefore give rise to a high magnitude of change on the landscape character of the Bromley Park Plateau Farmland LCA and a new major adverse significant effect.
- 5.15.257 For further information see SES2 and AP2 ES Volume 2: Appendix LV-001-001 and the SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

Visual assessment: existing viewpoints

- 5.15.258 The amendment to provide the Parkgate grid supply point connection and remove the Rugeley grid supply point connection will affect the following viewpoints, which were assessed in the main ES and were affected by the original scheme.

View south-east from Hollow Lane (viewpoint 006.02.034)

- 5.15.259 The main ES reported a major adverse significant effect from construction. This was due to the construction activities associated with the Rugeley grid supply point connection and cable sealing end compound in close distance views.

- 5.15.260 Removal of the Rugeley grid supply point connection will remove all the construction effects reported in the main ES. This will remove a major adverse significant effect at viewpoint 006.02.034.

View west from Colton Footpath 12 (viewpoint 005.02.017)

- 5.15.261 The main ES reported a moderate adverse significant effect from construction. This was due to the middle distance views of construction activities associated with the Rugeley grid supply point connection and cable sealing end compound.

- 5.15.262 Removal of the Rugeley grid supply point connection will remove all the construction effects reported in the main ES. This will remove a moderate adverse significant effect at viewpoint 005.02.017.

View north from Colton Footpath 4 (viewpoint 005.02.018)

- 5.15.263 The main ES reported a moderate adverse significant effect from construction. This was due to the middle distance views of construction activities associated with the Rugeley grid supply point connection and cable sealing end compound.

- 5.15.264 Removal of the Rugeley grid supply point connection will remove all the construction effects reported in the main ES. This will remove a moderate adverse significant effect at viewpoint 005.02.018.

View north-east from Blithbury Road (viewpoint 005.02.019)

- 5.15.265 The main ES reported a moderate adverse significant effect from construction. This was due to the middle distance views of construction activities associated with the Rugeley grid supply point connection.

- 5.15.266 Removal of the Rugeley grid supply point connection will remove all the construction effects reported in the main ES. This will remove a moderate adverse significant effect at viewpoint 005.02.019.

Visual assessment: new viewpoints

- 5.15.267 The amendment to provide the Parkgate grid supply point connection will affect the following viewpoints, which were not assessed in the main ES and were unaffected by the original scheme.

View south-east from Newlands Lane (viewpoint 005.03.024)

- 5.15.268 Construction of the two pylon lines will require the removal of vegetation along Newlands Lane to enable vehicular access to the crane pads. Laydown areas, access tracks and the presence of construction equipment and movement of construction vehicles will be visible on the elevated landform to the south where it will appear uncharacteristic within the rural landscape. Construction of the amendment will give rise to a medium magnitude of change and a new moderate adverse significant effect at viewpoint 005.03.024.
- 5.15.269 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View south-west from Blunts Hollow Road near Barn Farm (viewpoint 005.02.032)

- 5.15.270 Construction activity associated with the two pylon lines will be prominent in close and middle distance views and will comprise laydown areas, access tracks and the presence of construction equipment and movement of construction vehicles. Cranes used for erecting the pylons will be prominent on the skyline. The angle of the view in relation to the pylon lines means that construction activity will be concentrated in one location which will increase the overall visual effect. Vegetation removal will also be apparent. Construction of the amendment will give rise to a medium magnitude of change and a new moderate adverse significant effect at viewpoint 005.02.032.
- 5.15.271 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View south-west from Thorney Lanes near Noah's Ark Farm (viewpoint 005.02.034)

- 5.15.272 The angle of the view in relation to the two pylon lines means that construction activity will be concentrated in one location which will increase the overall visual effect, particularly since it is on the more open and higher ground. Here ground level activities will be visible and will include laydown areas, access tracks and movement of construction vehicles. Construction of National Grid Parkgate substation will also affect this view, although its location in an area of lower lying landform means that ground level activities and construction vehicles will be mostly obscured from view. Cranes used for erecting the pylons will be prominent skyline features. Construction of the amendment will give rise to a medium magnitude of change and a new moderate adverse significant effect at viewpoint 005.02.034.
- 5.15.273 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View south-west from B5234 near Parkgate (viewpoint 005.02.035)

- 5.15.274 Construction activity associated with the two pylon lines, including laydown areas, access tracks, stockpiling of material and the presence of construction equipment and movement of construction vehicles will be prominent in close distance views. Much of the view will be affected due to the proximity and scale

of the works. Construction of the amendment will give rise to a high magnitude of change and a new major adverse significant effect at viewpoint 005.02.035.

- 5.15.275 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

Mitigation and residual effects

Other mitigation measures

- 5.15.276 No mitigation measures additional to those reported in the main ES and draft CoCP, are identified.

Summary of likely residual significant effects

- 5.15.277 The temporary residual significant effects during construction remain as described above. These effects will be temporary and reversible in nature lasting only for the duration of the construction works. These residual effects will generally arise from the localised presence of construction activity and construction plant within the landscape and viewed by surrounding residents, and users of PRoW and main roads within the study area.

- 5.15.278 The significant effects that will remain after implementation of construction phase mitigation are summarised below.

Summary of likely residual significant effects: new LCAs

- 5.15.279 The amendment to provide the Parkgate grid supply point connection will give rise to a new likely residual major adverse significant construction effect on the landscape character of Bromley Park Plateau Farmland LCA. This LCA was not assessed in the main ES and was unaffected by the original scheme.

Summary of likely residual significant effects: existing viewpoints

- 5.15.280 The amendment to provide the Parkgate grid supply point connection and remove the Rugeley grid supply point connection will remove the following likely residual significant construction effects, which were reported in the main ES:

- view south-east from Hollow Lane (viewpoint 006.02.034) – major adverse significant visual effect will be removed;
- view west from Colton Footpath 12 (viewpoint 005.02.017) – moderate adverse significant visual effect will be removed;
- view north from Colton Footpath 4 (viewpoint 005.02.018) – moderate adverse significant visual effect will be removed; and
- view north-east from Blithbury Road (viewpoint 005.02.019) – moderate adverse significant visual effect will be removed.

Summary of likely residual significant effects: new viewpoints

- 5.15.281 The amendment to provide the Parkgate grid supply point connection will give rise to new likely residual significant construction effects at the following

viewpoints. These viewpoints were not assessed in the main ES and were unaffected by the original scheme:

- view south-east from Newlands Lane (viewpoint 005.03.024) – moderate adverse significant effect;
- view south-west from Blunts Hollow Road near Barn Farm (viewpoint 005.02.032) – moderate adverse significant effect;
- view south-west from Thorney Lanes near Noah’s Ark Farm (viewpoint 005.02.034) - moderate adverse significant effect; and
- view south-west from B5234 near Parkgate (viewpoint 005.02.035) – major adverse significant effect.

Cumulative effects

- 5.15.282 There are no new or different likely significant cumulative effects for landscape and visual as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Permanent effects arising during operation

Avoidance and mitigation measures

- 5.15.283 A process of iterative routing and design has been the key mitigation factor in avoiding or reducing likely significant landscape or visual effects. Where practicable, designated and other sensitive landscapes have been avoided; distances between pylons, residential areas and occupied properties have been positioned to reduce visual impacts. In addition, wherever practicable, the pylon lines have been routed around areas of high tree cover to reduce the requirement for tree and hedgerow removal, while skyline locations have been avoided to limit the visibility of the pylons.

Assessment of impacts and effects

Landscape assessment: existing LCAs

- 5.15.284 The amendment to provide the Parkgate grid supply point connection and remove the Rugeley grid supply point connection will affect the following LCA, which was assessed in the main ES and was affected by the original scheme.

Colton and Stockwell Heath Settled Farmlands LCA

- 5.15.285 The main ES reported a major adverse significant effect at year 1, year 15 and year 60. This was due to the presence of Pipe Ridware embankment, Blithbury cutting, Stockwell Heath embankment, Stockwell Heath cutting and the Rugeley grid supply point connection on three wood pole overhead lines running south-west from Newlands Lane auto-transformer feeder station. Introduction of these uncharacteristic features into the rural and historic landscape would lead to substantial landscape change, with loss of woodland and field boundary vegetation. The embankments and cuttings would locally alter the existing

undulating landform character and sever historic field patterns and the villages of Stockwell Heath and Colton.

- 5.15.286 At year 1, year 15 and year 60, the presence of the two pylon lines, associated with the Parkgate grid supply point connection, will slightly increase the effect on landscape character compared to the original scheme. This is because the taller pylons will be prominent skyline features and will extend the influence of the scheme across a wider area. The amendment will therefore give rise to a different significant effect on the landscape character of the Colton and Stockwell Heath Settled Farmlands LCA. However, the level of significance of the effect will remain major adverse as reported in the main ES.
- 5.15.287 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

Landscape assessment: new LCAs

- 5.15.288 The amendment to provide the Parkgate grid supply point connection will affect the landscape character of the following LCAs, which were not assessed in the main ES and were unaffected by the original scheme.

Blithe Alluvial Farmland LCA

- 5.15.289 The two pylon lines, associated with the Parkgate grid supply point connection, will cross the relatively small Blithe Alluvial Farmland LCA to the north of Blithford Farm. Landscape effects will arise from the presence of two broadly parallel pylon lines, which will be uncharacteristic and large-scale features within the rural landscape. Although the presence of mature trees will partially integrate them into the wider landscape, they will be visible across much of the LCA and will noticeably reduce scenic quality. Most of the vegetation lost during construction will be replaced, with the exception of those trees directly under the new conductors. The amendment will therefore give rise to a medium magnitude of change and a new moderate adverse significant effect on the landscape character of the Blithe Alluvial Farmland LCA.
- 5.15.290 At year 15, the replacement planting will be maturing and will provide some integration of the pylons into the wider landscape, although due to their size the pylons will continue to reduce scenic quality across the LCA. The amendment will therefore give rise to a medium magnitude of change and a new moderate adverse significant effect on the landscape character of the Blithe Alluvial Farmland LCA.
- 5.15.291 At year 60, the replacement planting will be mature and will provide further integration of the pylons into the wider landscape, although due to their size the pylons will continue to reduce scenic quality in the southern part of the LCA. Much of the landscape within the LCA will however remain unaffected. The amendment will therefore give rise to a medium magnitude of change and a new moderate adverse significant effect on the landscape character of the Blithe Alluvial Farmland LCA.

- 5.15.292 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

Bromley Settled Farmland LCA

- 5.15.293 The two pylon lines, associated with the Parkgate grid supply point connection, will cross the southern corner of the large Bromley Settled Farmland LCA between Sunnyside and Ashbrook Farm. Landscape effects will arise from the presence of two broadly parallel pylon lines, which will be uncharacteristic and large-scale features within the rural landscape and will noticeably reduce scenic quality. The presence of mature trees will partially integrate them into the wider landscape and the effect will be limited to the southern part of the LCA. The settlement of Abbots Bromley will be unaffected. Most of the vegetation lost during construction will be replaced, with the exception of those trees directly under the new conductors. The amendment will therefore give rise to a medium magnitude of change and a new moderate adverse significant effect on the landscape character of the Bromley Settled Farmland LCA.

- 5.15.294 At year 15, the replacement planting will be maturing and will provide some integration of the pylons into the wider landscape, although due to their size the pylons will continue to reduce scenic quality across the southern part of the LCA. The amendment will therefore give rise to a medium magnitude of change and a new moderate adverse significant effect on the landscape character of the Bromley Settled Farmland LCA.

- 5.15.295 At year 60, the replacement planting will be mature and will provide further integration of the pylons into the wider landscape, although due to their size the pylons will continue to reduce scenic quality in the south part of the LCA. The amendment will therefore give rise to a medium magnitude of change and a new moderate adverse significant effect on the landscape character of the Bromley Settled Farmland LCA.

- 5.15.296 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

Bromley Park Plateau Farmland LCA

- 5.15.297 The two pylon lines, associated with the Parkgate grid supply point connection, will cross the Bromley Park Plateau Farmland LCA between Blunts Hollow and Parkgate. Landscape effects will arise from the presence of two broadly parallel pylon lines and a new substation within the elevated and open farmland. Most of the vegetation lost during construction will be replaced, with the exception of those trees directly under the new conductors. The pylons will be uncharacteristic and prominent landscape features, which will reduce rural character and sense of remoteness. The pylons will also interrupt the long distance views which are a characteristic feature of this LCA. National Grid Parkgate substation, although visually more contained by landform and vegetation, will introduce large-scale infrastructure into the rural landscape. The amendment will therefore give rise to a high magnitude of change on the landscape character of the Bromley Park Plateau Farmland LCA and a new major adverse significant effect.

- 5.15.298 At year 15, the replacement planting and substation mitigation planting will be maturing and will provide some integration of the pylons and substation into the wider landscape, although due to their size the pylons will continue to reduce scenic quality across the LCA. The amendment will therefore give rise to a medium magnitude of change on the landscape character of the Bromley Park Plateau Farmland LCA and a new moderate adverse significant effect.
- 5.15.299 At year 60, the replacement planting and substation mitigation planting will be mature and will provide further integration of the pylons and substation into the wider landscape, although due to their size the pylons will continue to reduce scenic quality across the LCA. The amendment will therefore give rise to a medium magnitude of change on the landscape character of the Bromley Park Plateau Farmland LCA and a new moderate adverse significant effect.
- 5.15.300 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

Visual assessment: existing viewpoints

- 5.15.301 The amendment to provide the Parkgate grid supply point connection and remove the Rugeley grid supply point connection will affect the following viewpoints, which were assessed in the main ES and were affected by the original scheme.

View south-east from Hollow Lane (viewpoint 006.02.034)

- 5.15.302 The main ES reported a moderate adverse significant effect at year 1 due to the close distance views of the cable sealing end compound which would affect much of the view. This would reduce to minor adverse non-significant in year 15 due to the screening afforded by the maturing mitigation planting, before reducing to negligible non-significant in year 60.
- 5.15.303 The removal of the Rugeley grid supply point connection, will remove these effects as two new pylons lines will either be too distant from the viewpoints or will be screened from view.

View west from Colton Footpath 12 (viewpoint 005.02.017)

- 5.15.304 The main ES reported a moderate adverse significant effect at year 1 due to the middle distance views of the cable sealing end compound and Rugeley grid supply point connection. This would reduce to minor adverse non-significant at year 15 and year 60 due to the screening afforded by the maturing mitigation planting.
- 5.15.305 The removal of the Rugeley grid supply point connection, will remove these effects as two new pylons lines will either be too distant from the viewpoints or will be screened from view.

View north from Colton Footpath 4 (viewpoint 005.02.018)

- 5.15.306 The main ES reported a moderate adverse significant effect at year 1, year 15 and year 60 due to the middle distance views of the cable sealing end and Rugeley grid supply point connection.

- 5.15.307 The removal of the Rugeley grid supply point connection, will remove these effects as two new pylons lines will either be too distant from the viewpoints or will be screened from view.
- 5.15.308 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

Visual assessment: new viewpoints

- 5.15.309 The amendment to provide the Parkgate grid supply point connection will affect the following viewpoints, which were not assessed in the main ES and were unaffected by the original scheme.

View south-east from the Staffordshire Way near Park Barn Farm (viewpoint 005.03.023)

- 5.15.310 The two pylon lines, associated with the Parkgate grid supply point connection, will be visible in middle distance views from viewpoint 005.03.023, which represents the view from the Staffordshire Way and Blithfield Footpath 2.
- 5.15.311 At year 1, there will be middle distance views of the upper sections of the pylons which will be seen on the skyline as they cross the low ridgeline between the Newlands auto-transformer station and the River Blithe. The lower sections of the pylons will be screened by landform and the intervening field boundary vegetation. The pylons will be uncharacteristic features within the rural landscape and lead to a reduction in scenic quality. Operation of the amendment will therefore give rise to a medium magnitude of change and a new moderate adverse significant effect.
- 5.15.312 At year 15 and year 60, trees and hedgerows which have been replaced will be maturing but will not be visible due to the intervening landform and existing field boundary vegetation. The upper sections of the pylons will however still be prominent skyline features. Operation of the amendment will therefore give rise to a medium magnitude of change and a new moderate adverse significant effect.
- 5.15.313 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View south-east from Newlands Lane (viewpoint 005.03.024)

- 5.15.314 The two pylon lines, associated with the Parkgate grid supply point connection, will be visible in middle distance views from viewpoint 005.03.024, which represents the view from Colton Footpath 79 and Newlands Lane.
- 5.15.315 At year 1, the pylons and their associated conductors will be prominent skyline features as they cross the elevated landform to the south. Individual mature trees will screen and filter views and reduce the perceived height of the pylons, but the full height of some pylons will be visible. The pylons will be uncharacteristic features within the rural landscape and will reduce scenic quality. Operation of the amendment will therefore give rise to a medium magnitude of change and a new moderate adverse significant effect.

- 5.15.316 At year 15 and year 60, the hedgerows which have been replaced will be maturing and will screen the lower sections of the pylons, although the upper sections of the pylons and associated conductors will still be prominent skyline features. Operation of the amendment will therefore give rise to a medium magnitude of change and new moderate adverse significant effects.
- 5.15.317 The view of the amendment from viewpoint 005.03.024 during operation Year 15 is illustrated on the photomontage shown in Figure LV- 01-681 of the SES2 and AP2 ES Volume 5: Appendix LV-001-001.
- 5.15.318 Considering the scenarios for the sensitivity test, the effects for this viewpoint would increase if the pylons moved closer to the viewpoint. As the viewpoint is located at the edge of the land required for the amendment, pylons could potentially move very close to this viewpoint. Operation of the amendment in this scenario would therefore give rise to a new major adverse significant effect at year 1, year 15 and year 60.
- 5.15.319 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View east from the roadside near Lower Newlands Farm (viewpoint 005.02.025)

- 5.15.320 The two pylon lines, associated with the Parkgate grid supply point connection, will be visible in long distance views from viewpoint 005.02.025, which represents the view from Colton Footpath 78, Newlands Lane and Lower Newlands Farm.
- 5.15.321 At year 1, year 15 and year 60, there will be long distance views towards the pylon lines to the east where they will be partially visible against the sky, but will form a small element in a panoramic view. The irregular horizon formed by the existing pylon line, the undulating landform with mature woodland blocks and individual trees will help reduce its perceptibility. Operation of the amendment will therefore give rise to a low magnitude of change and a new minor adverse, non-significant effect.
- 5.15.322 The view of the amendment from viewpoint 005.02.025 during operation Year 15 is illustrated on the photomontage shown in Figure LV-01-682 of the SES2 and AP2 ES Volume 5: Appendix LV-001-001.
- 5.15.323 Considering the scenarios for the sensitivity test, the visual effects at this location would increase if the pylons were to increase in height (by up to 3m). This is because more of them would be seen against the sky, thereby increasing their prominence. Operation of the amendment in this scenario would therefore give rise to a medium magnitude of change and new moderate adverse significant effects at year 1, year 15 and year 60.
- 5.15.324 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View west from farmland near Poplar Farm (viewpoint 005.02.026)

- 5.15.325 The two pylon lines, associated with the Parkgate grid supply point connection, will be visible in close to middle distance views from viewpoint 005.02.026, which represents the view from Abbots Bromley Footpath 32 and nearby Poplar Farm.
- 5.15.326 At year 1, there will be close to middle distance views along the two broadly parallel pylons lines. Several pylons and their associated conductors will be seen against the sky as they pass to the east and north of the viewpoint. The pylons will be uncharacteristic features within the rural landscape and, due to their size and proximity, will substantially reduce scenic quality. Operation of the amendment will therefore give rise to a high magnitude of change and a new major adverse significant effect.
- 5.15.327 At year 15 and year 60, trees and hedgerows which have been replaced will be maturing and will screen the lower sections of the pylons. The upper sections of the pylons and associated conductors will however still be prominent skyline features. Operation of the amendment will therefore give rise to a high magnitude of change and new major adverse significant effects.
- 5.15.328 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View south-east from farmland near Hurd's Farm (viewpoint 005.02.028)

- 5.15.329 The two pylon lines, associated with the Parkgate grid supply point connection, will be visible in middle distance views from viewpoint 005.02.028, which represents the view from Abbots Bromley Footpath 38 and Hurd's Farm.
- 5.15.330 At year 1, there will be middle distance views of the pylons and their associated conductors which will be prominent on the skyline as they pass behind the existing Sunnyside farm buildings. The pylons will be uncharacteristic features within the rural landscape and will reduce scenic quality. To the north-east the land drops in elevation and the pylons will become more screened by landform and intervening field boundary vegetation. Operation of the amendment will therefore give rise to a medium magnitude of change and a new moderate adverse significant effect.
- 5.15.331 At year 15 and year 60, the effects of the two pylon lines will remain due to the prominence of the pylons on the skyline. Operation of the amendment will therefore give rise to a medium magnitude of change and new moderate adverse significant effects.
- 5.15.332 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View south-east from Pinfold Lane near Hart's Farm (viewpoint 005.02.030)

- 5.15.333 The amendment to provide a grid supply point connection to National Grid Parkgate substation on two broadly parallel pylon lines will be visible in middle distance views from viewpoint 005.02.030, which represents the view from Pinfold Lane and nearby Hart's Farm.

- 5.15.334 At year 1, there will be middle distance views of the pylons. The upper sections of the pylons will be seen on the skyline although the lower sections will be substantially screened by intervening vegetation including individual mature trees. The pylons will be uncharacteristic features within the rural landscape and will reduce scenic quality. Operation of the amendment will therefore give rise to a medium magnitude of change and a new moderate adverse significant effect.
- 5.15.335 At year 15 and year 60, the effects of the two pylon lines will remain due to the prominence of the pylons on the skyline. Operation of the amendment will therefore give rise to a medium magnitude of change and new moderate adverse significant effect.
- 5.15.336 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.
- View south-east from the B5234 Bromley Lane at Bromley Wood (viewpoint 005.02.031)*
- 5.15.337 The two pylon lines, associated with the Parkgate grid supply point connection, will be visible in middle distance views from viewpoint 005.02.031, which represents the view residential properties at Bromley Wood (including Slate Farm) and the B5234 Bromley Lane.
- 5.15.338 At year 1, there will be middle distance views of the pylons which will be partially seen on the skyline, although the lower sections will be screened by the intervening vegetation including individual mature trees. The pylons will be visible across much of the view, although to the south-west they will be seen against a backdrop of landform which will reduce their perceptibility. The pylons will be uncharacteristic features within the rural landscape and will reduce scenic quality. Operation of the amendment will therefore give rise to a medium magnitude of change and a new moderate adverse significant effect.
- 5.15.339 At year 15 and year 60, the two pylon lines will remain prominent skyline features. Operation of the amendment will therefore give rise to a medium magnitude of change and new moderate adverse significant effects.
- 5.15.340 The view of the grid supply point connection to National Grid Parkgate substation from viewpoint 005.02.031 during operation Year 15 is illustrated on the photomontage shown in Figure LV-01-683 of the SES2 and AP2 ES Volume 5: Appendix LV-001-001.
- 5.15.341 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.
- View south-west from Blunts Hollow Road near Barn Farm (viewpoint 005.02.032)*
- 5.15.342 The two pylon lines, associated with the Parkgate grid supply point connection, will be visible in close to middle distance views from viewpoint 005.02.032, which represents the view from Blunts Hollow Road and nearby Barn Farm.
- 5.15.343 At year 1, a cluster of pylons will be visible in the middle distance with further pylons visible in close distance views. More distant pylons will be less noticeable

as they will blend into the background of landform and vegetation. The pylons will be uncharacteristic features within the rural landscape and due to their size and proximity will substantially reduce scenic quality. Operation of the amendment will therefore give rise to a high magnitude of change and a new major adverse significant effect.

5.15.344 At year 15 and year 60, trees and hedgerows which have been replaced will be maturing, but due to the proximity of the pylons this will have little screening or filtering effect. The upper sections of the pylons will be prominent skyline features. Operation of the amendment will therefore give rise to a high magnitude of change and new major adverse significant effects.

5.15.345 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View south-west from Thorney Lanes near Noah's Ark Farm (viewpoint 005.02.034)

5.15.346 The two pylon lines and National Grid Parkgate substation, associated with the Parkgate grid supply point connection will be visible in middle distance views from viewpoint 005.02.034, which represents the view from Blunts Hollow Road and nearby Noah's Ark Farm.

5.15.347 At year 1, users of the lane and farm will have middle distance views of a cluster of pylons which will be prominent on the skyline as they cross the higher landform to the north of Birch Wood. A single pylon in the centre of the view will be less noticeable as it will blend into the background of vegetation. The National Grid Parkgate substation will also be visible although it will be mostly screened by existing vegetation. Taller equipment such as gantries within the substation will be seen against a backdrop of vegetation which will reduce their perceptibility. Replacement pylons on the existing overhead line adjacent to the substation will be taller than the existing and will be more visible above the backdrop of woodland. Both the pylons and the National Grid Parkgate substation will be uncharacteristic features within the rural landscape and will reduce scenic quality. Operation of the amendment will therefore give rise to a medium magnitude of change and a new moderate adverse significant effect.

5.15.348 At year 15 and year 60, the trees and hedgerows which have been replaced will be maturing, but this will have little screening or filtering effect and the upper parts of the cluster of pylons will still be seen on the skyline. Operation of the amendment will therefore give rise to a medium magnitude of change and new moderate adverse significant effect.

5.15.349 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

View south-west from B5234 near Parkgate (viewpoint 005.02.035)

5.15.350 The two pylon lines and National Grid Parkgate substation, associated with the Parkgate grid supply point connection, will be visible in close to medium range

views from viewpoint 005.02.035, which represents the view from the B5234 Abbots Bromley to Burton upon Trent Road.

- 5.15.351 At year 1, the introduction of large-scale infrastructure into the view will permanently alter the rural agricultural landscape. Taller equipment, including the pylons, will break the wooded skyline. Both the pylons and the National Grid Parkgate substation will be uncharacteristic features within the rural landscape and will substantially reduce scenic quality. Operation of the amendment will therefore give rise to a high magnitude of change and a new major adverse significant effect.
- 5.15.352 At year 15 and year 60, the maturing mitigation planting around the substation will help integrate the pylons and substation into the wider landscape, but effects of the Parkgate grid supply point connection will remain, mostly due to the prominence of pylons on the skyline. Operation of the amendment will therefore give rise to a medium magnitude of change and new moderate adverse significant effect.
- 5.15.353 The view of the amendment from viewpoint 005.02.035 during operation Year 15 is illustrated on the photomontage shown in Figure LV-01-684 of the SES2 and AP2 ES Volume 5: Appendix LV-001-001.
- 5.15.354 For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001 and SES2 and AP2 ES Volume 5: Landscape and visual Map Book.

Mitigation and residual effects

Other mitigation measures

- 5.15.355 No mitigation measures, additional to those reported in the main ES, are identified.

Summary of likely residual significant effects: existing LCAs

- 5.15.356 The amendment to provide the Parkgate grid supply point connection and remove the Rugeley grid supply point connection will give rise to a different likely residual significant operational effect on the landscape character of Colton and Stockwell Heath Settled Farmlands LCA. The effect will reduce but will remain major adverse significant. This will not change the level of significance of the effect reported in the main ES.

Summary of likely residual significant effects: new LCAs

- 5.15.357 The amendment to provide the Parkgate grid supply point connection will give rise to new likely residual significant operational effects on the landscape character of the following LCAs:
- Blithe Alluvial Farmland LCA – moderate adverse significant at year 15 and year 60;
 - Bromley Settled Farmland LCA – moderate adverse significant at year 15 and year 60; and

- Bromley Park Plateau Farmland – moderate adverse significant at year 15 and year 60.

Summary of likely residual significant effects: existing viewpoints

- 5.15.358 The amendment to provide the Parkgate grid supply point connection and remove the Rugeley grid supply point connection will remove the likely residual significant operational visual effect at the view north from Colton Footpath 4 (viewpoint 005.02.018). The level of significance of the effect reported in the main ES will reduce from moderate adverse significant to negligible and therefore non-significant at year 15 and year 60.

Summary of likely residual significant effects: new viewpoints

- 5.15.359 The amendment to provide the Parkgate grid supply point connection will give rise to new likely residual significant operational effects at the following viewpoints:
- view south-east from the Staffordshire Way near Park Barn Farm (viewpoint 005.03.023) – moderate adverse significant effect at year 15 and year 60;
 - view south-east from Newlands Lane (viewpoint 005.03.024) – moderate adverse significant effect at year 15 and year 60, but could increase to major adverse when considering the sensitivity tests;
 - view east from the roadside near Lower Newlands Farm (viewpoint 005.03.025) - minor adverse significant effects at year 15 and year 60, but could increase to moderate adverse when considering the sensitivity tests;
 - view west from farmland near Poplar Farm (viewpoint 005.02.026) – major adverse significant effect at year 15 and year 60;
 - view south-east from farmland near Hurd’s Farm (viewpoint 005.02.028) – moderate adverse significant effect at year 15 and year 60;
 - view south-east from Pinfold Lane near Hart’s Farm (viewpoint 005.02.030) – moderate adverse significant effect at year 15 and year 60;
 - view south-east from the B5234 at Bromley Wood (viewpoint 005.02.031) – moderate adverse significant effect at year 15 and year 60;
 - view south-west from Blunts Hollow Road near Barn Farm (viewpoint 005.02.032) – major adverse significant effect at year 15 and year 60;
 - view south-west from Thorney Lanes near Noah’s Ark Farm (viewpoint 005.02.034) – moderate adverse significant effect at year 15 and year 60; and
 - view south-west from B5234 near Parkgate (viewpoint 005.02.035) – moderate adverse significant effect at year 15 and year 60.

Cumulative effects

- 5.15.360 There are no new or different likely significant cumulative effects for landscape or visual as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Monitoring

- 5.15.361 Volume 1 of the main ES sets out the general approach to environmental monitoring during operation of the original scheme.
- 5.15.362 There are no changes to the monitoring requirements identified in the main ES for landscape and visual as a result of the amendment.

Traffic and transport

Scope, assumptions and limitations

- 5.15.363 The assessment scope, key assumptions and limitations for traffic and transport are as set out in Volume 1, the SMR and SMR Addendum of the main ES.
- 5.15.364 This amendment has the potential to result in new or different significant temporary construction effects only. Therefore, there is no permanent construction or operational assessment for traffic and transport.
- 5.15.365 The assessment of the changes to construction traffic flows as a result of this amendment in combination with all SES2 changes and AP amendments is reported in Section 7.

Existing environmental baseline

- 5.15.366 The baseline traffic and transport information for the Fradley to Colton area is as described in Volume 2 CA1, Section 14 of the main ES.
- 5.15.367 There are a number of PRoW in the Fradley to Colton area, which are all considered to be lightly used. These include:
- Colton Footpath 19 which travels in an east-west direction and connects Colton Footpath 17 to Newlands Lane;
 - Colton Footpath 79 which travels in a north-south direction and connects Newlands Lane to Colton Footpath 19;
 - Abbots Bromley Footpath 30 which travels in a north-east to south-west direction and connects two parts of Orange Lane;
 - Abbots Bromley Footpath 49 which travels in an east-west direction and connects Abbots Bromley Footpath 32 to B5014 Lichfield Road;
 - Abbots Bromley Footpath 29 which travels in an east-west direction and connects Orange Lane to Abbots Bromley Footpath 26;
 - Abbots Bromley Footpath 26 which travels in an east-west direction and connects Glass Lane to Pinfold Lane;

- Abbots Bromley Footpath 38 which travels in an east-west direction and connects Glass Lane to Pinfold Lane; and
- Abbots Bromley Footpath 39 which travels in an east-west direction and connects Glass Lane to Abbots Bromley Footpath 38.

Future environmental baseline

Construction (2023)

- 5.15.368 The future baseline for construction in 2023 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 5.15.369 No avoidance or mitigation measures additional to those reported in the main ES and draft CoCP are required.

Assessment of impacts and effects

- 5.15.370 The main ES reported that power would be provided from an existing substation at the Rugeley Power Station located to the west of the HS2 route. The main ES did not identify any significant traffic and transport effects as a direct consequence of the design.
- 5.15.371 The amendment removes the proposed route to the Rugeley Power Station and provides a new alternative overhead route to the east of the HS2 route to a new substation at Parkgate. The amendment will give rise to new temporary minor adverse severance effect for non-motorised users due to the temporary diversion of Abbots Bromley Footpath 39 which will increase the travel distance for users of this footpath by up to 350m, which is significant.
- 5.15.372 For the purpose of the assessment, it is assumed that the amendment will require the temporary closure or diversion/realignment of Colton Footpath 19, Colton Footpath 79, Abbots Bromley Footpath 30, Abbots Bromley Footpath 29, Abbots Bromley Footpath 26, Abbots Bromley Footpath 38, Abbots Bromley Footpath 46, and Abbots Bromley Footpath 49. These will be of a short duration and/or distance and therefore will not give rise to any new or different likely significant severance effect on users of these footpaths.

Mitigation and residual effects

Other mitigation measures

- 5.15.373 No mitigation measures additional to those reported in the main ES and draft CoCP are required.

Summary of likely residual significant effects

- 5.15.374 The amendment will give rise to a new likely residual significant temporary minor severance effect for non-motorised users, due to the temporary diversion of

Abbots Bromley Footpath 39 which will increase the distance for users by up to 350m.

Cumulative effects

- 5.15.375 There are no new or different likely significant cumulative effects for traffic and transport as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Water resources and flood risk

Scope, assumptions and limitations

- 5.15.376 The assessment scope, key assumptions and limitations for water resources and flood risk are as set out in Volume 1, the SMR and SMR Addendum of the main ES and SMR Addendum 2 (see SES2 and AP2 ES Volume 5: Appendix CT-001-002).
- 5.15.377 This amendment has the potential to result in new or different significant temporary and permanent construction effects only. Therefore, there is no operational assessment for water resources and flood risk.

Existing environmental baseline

- 5.15.378 The baseline water resources information for the Fradley to Colton area is as described in Volume 2, CA1, Section 15 of the main ES. Further details relating to water resources for this area are provided in Volume 5: Appendix WR-002-001 and Appendix WR-003-001, and the Volume 5: Water resources and flood risk Map Book in the main ES.
- 5.15.379 The land required for the Parkgate grid supply point connection extends north eastwards outside the study area outlined in the main ES, therefore additional surface and groundwater water receptors have to be considered as part of the assessment of this amendment. The additional surface water receptors are outlined in Table 17.

SES2 and AP2 ES Volume 2 – Community area 1, Fradley to Colton

Table 17: Surface water body receptors

Water body name and identification number ¹⁴³	Current WFD Status ¹⁴⁴	WFD Status objective	Watercourse classification	Crossing location description (National Grid Reference ¹⁴⁵)	Receptor value
Blithe – Tad Bk to River Trent GB104028046491	Moderate	Good by 2027	Ordinary watercourse	Tributary of River Blithe SK07699 21633	Moderate
			Main river	River Blithe SK08298 21812	High
			Main river	Little Blithe SK08542 21927	High
			Main river	Ash Brook SK09601 22467	High
			Minor ditch	Catch drain SK09668 22506	Low
			Ordinary watercourse	Tributary of Pur Brook 1 SK10418 23006	Low
			Ordinary watercourse	Tributary of Pur Brook 2 SK11066 24643	Low
			Main river	Pur Brook SK12302 24642	High
			Ordinary watercourse	Tributary of Pur Brook 3 SK12302 24642	Low
			Main river	River Swarbourne SK15006 25632	High

5.15.380 The additional groundwater receptors are outlined in Table 18.

¹⁴³ The Environment Agency has attributed each surface water and groundwater body a unique identification (ID) number.

¹⁴⁴ See WFD compliance assessment (Volume 5: WR-001-000 as part of the SES2 and AP2 ES) for definitions of WFD status.

¹⁴⁵ This location is where the proposed amendment intersects the watercourse or the location of closest proximity

SES2 and AP2 ES Volume 2 – Community area 1, Fradley to Colton

Table 18: Summary of geology and hydrogeology in the study area

Geology ¹⁴⁶	Distribution	Formation description	Aquifer classification	WFD body (ID) and current overall status ¹⁴⁷	WFD status objective ¹⁴⁸	Receptor value
Superficial deposits						
Alluvium	Along the river valleys	Clay, silt, sand and gravel	Secondary A	Not assessed by Environment Agency	Not assessed by Environment Agency	Moderate
Glacial Till	Patchy, extending northwards between Ashbrook and Pur Beck	Sandy silty clay	Secondary (Undifferentiated)	Not assessed by Environment Agency	Not assessed by Environment Agency	Low
Bedrock						
Mercia Mudstone	Across the whole additional area.	Mudstone and siltstone with some halite bearing units and presence of sandstone.	Secondary B	Staffordshire Trent Valley – Mercia Mudstone East and Coal Measures (GB40402G300300) Good	Good by 2015	Moderate

5.15.381 The land required for the Parkgate grid supply point connection is located near to two potential springs.

5.15.382 The amendment will involve construction activities of a nature and scale that have potential water quality implications.

5.15.383 This amendment will involve construction work in floodplain areas associated with the above watercourses and is also in the inundation zone associated with Blithfield Reservoir.

Future environmental baseline

Construction (2020)

5.15.384 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

5.15.385 The main ES reported no significant effects on surface water quality due to site runoff and increased pollution risk in the vicinity of this amendment. This amendment has the potential to give rise to temporary adverse impacts on surface water quality which have the potential to affect the water quality in the

¹⁴⁶ In recent years the British Geological Survey (BGS) has revised the nomenclature used to describe the geological materials present in Great Britain, with the publication of a series of lithostratigraphic framework reports. Some of these reports cover an entire geological period e.g. The Carboniferous and others cover a single group e.g. the Triassic Mercia Mudstone. The nomenclature used in these reports supersedes the nomenclature introduced in the 1980s. While some traditional names have been retained by this process, many new names have also been generated, and many geological maps have not yet been updated. Some stratigraphic units have been renamed twice in the last 35 years. To reflect this, the previous name used for geological units (if different) is shown in brackets.

¹⁴⁷ These objectives are as stated in the 2015 Environment Agency River basin management plan.

¹⁴⁸ These objectives are as stated in the 2015 Environment Agency River basin management plan.

River Blythe, Little Blithe, Ash Brook, Pur Brook and River Swarbourne. However, this amendment will be constructed in accordance with the measures specifically designed to safeguard water resources outlined in the draft CoCP. The impacts of this amendment will therefore be negligible related to water quality.

- 5.15.386 This amendment involves installation of a high voltage power supply across the inundation zone of Blithfield Reservoir on pylons. This increases the potential severity of the consequences should the Blithfield Reservoir embankment dam ever fail. Blithfield Reservoir is however already in the highest risk category (Category A) of dam structures, as defined within reservoir safety legislation. Safety measures associated with this category of dam means that the chances of a dam breach occurring are negligible.
- 5.15.387 This amendment will not therefore give rise to any new or different likely residual significant effects and will not change the level of significance of the effects reported in the main ES.

Cumulative effects

- 5.15.388 There are no new or different likely significant cumulative effects for water resources and flood risk as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Summary of new or different likely residual significant effects as a result of the amendment

Rugeley grid supply point connection

- 5.15.389 The removal of the Rugeley grid supply connection will remove the following likely residual significant effects reported in the main ES.
- 5.15.390 The amendment will remove the temporary major to moderate adverse significant effects on five farm holdings.
- 5.15.391 The amendment will remove the permanent moderate adverse significant effects from buried archaeological remains associated with a rectangular enclosure of prehistoric date (FRC178) and buried archaeological remains associated with cropmarks at Colton Hall Farm (FRC174).
- 5.15.392 The amendment will remove the major to moderate adverse significant construction effects at viewpoints 006.02.034, 005.02.017, 005.02.018 and 005.02.019, and the moderate adverse significant operational effect at viewpoint 005.02.018.

Parkgate grid supply point connection

- 5.15.393 The introduction of the Parkgate grid supply connection will give rise to the following new and different likely residual significant effects.
- 5.15.394 The amendment will give rise to new moderate or major/moderate temporary adverse significant effects on 17 farm holdings. There will be a different temporary adverse significant effect on two farm holdings. The temporary adverse significant effect on Holding No. 8, Old Wood Farm (CA1/39) will be

reduced from major/moderate to moderate and the temporary adverse significant effect on Blackflatts Farm (CA1/34) will be reduced from moderate to minor, which will remove the significant effect. There will be a different permanent adverse significant effect on Hurstwood Farm (CA1/37) which will be reduced from major/moderate to moderate.

- 5.15.395 The amendment will give rise to a new temporary moderate adverse significant effect on HLCA 20 Parkgate as construction will introduce noise and visual impacts into the rural setting of the landscape. There will be new permanent moderate adverse significant effects on Grade II listed buildings at Newlands Farmhouse and associated barn and stables (FRC131), Bentilee Park Farmhouse (FRC332) and stables and former cartsheds (FRC333), as a result of changes to the historic rural settings of these buildings. There will also be new permanent moderate adverse significant effects on a cropmark indicating a circular enclosure (FRC366), a sub-circular cropmark (FRC364), and an area of ridge and furrow (FRC326), as these assets will be partially removed during construction.
- 5.15.396 On a precautionary basis, the amendment will result in damage of approximately 0.2ha of potential ancient woodland at Lower Birches Plantation/Titler's Plantation which will give rise to a new permanent adverse significant effect. The amendment will give rise to a different permanent adverse significant effect upon the hedgerow network in the Fradley to Colton area, as a result of the net reduction of approximately 3.7km of hedgerow within the area subject to the amendment. However, this will not change the level of significance of the effect as reported in the main ES.
- 5.15.397 The amendment will give rise to a new major adverse significant construction effect on the landscape character of Bromley Park Plateau Farmland LCA. The amendment will give rise to a different adverse operational significant effect on the landscape character of Colton Stockwell Heath Settled Farmlands LCA. However, this will not change the level of significance of the effect reported in the main ES. The amendment will also give rise to new major adverse significant operational effects on Blithe Alluvial Farmland LCA, Bromley Settled Farmland LCA and Bromley Park Plateau Farmland.
- 5.15.398 The amendment will give rise to new major to moderate adverse significant construction effects at viewpoints 005.03.024, 005.02.032, 005.02.034 and 005.02.035. The amendment will also give rise to new moderate to major adverse significant operational effects at viewpoints 005.03.023, 005.03.024, 005.02.026, 005.02.028, 005.02.030, 005.02.031, 005.02.032, 005.02.034 and 005.02.035.
- 5.15.399 The amendment will give rise to a new significant temporary minor adverse severance effect for non-motorised users, due to the temporary diversion of Abbots Bromley Footpath 39 which will increase the distance for users by up to 350m.

5.16 Additional land required for the provision of a replacement facility for Mayfield Children's Home (AP2-002-001)

- 5.16.1 This amendment relates to the Mayfield Children's Home which is located in the Colwich to Yarlet area. The description of this amendment and assessment of

effects arising as a result of this amendment is relevant to both the Colwich and Yarlet area (CA2) and the Fradley to Colton area. A description of the amendment and assessment of effects within the Colwich to Yarlet area is reported in SES2 and AP2 ES Volume 2, Community area 2, Colwich to Yarlet. A description of the amendment and assessment of effects within the Fradley to Colton area are described below.

- 5.16.2 The Bill provides for the HS2 route to pass to the south of Moreton House in a section of Moreton cutting, within the Colwich to Yarlet area. Moreton retaining wall would be located to the north of the HS2 route to reduce the amount of land required in proximity to Moreton House. See Map CT-06-210, D5 to D4, in the main ES Volume 2: CA2 Map Book. Mayfield Children's Home is located in Moreton and occupies the Grade II listed Moreton House. It is a specialist residential home for students at Rugeley School located in the Fradley to Colton area. The home has facilities for up to 23 children aged between five and 19 years old, with approximately 100 staff. All of the children are severely autistic, with many also having special behavioural, learning or communication needs.
- 5.16.3 Mayfield Children's Home would be in proximity to the construction and operation of the original scheme. Residents of the children's home would experience significant adverse noise effects during construction of the original scheme, and activity disturbance and sleep disturbance due to the running of the trains during operation. Residents would also experience significant adverse visual effects due to close range views during construction and operation. The noise and visual effects would result in an in-combination community effect, which would be significant, on residents of Mayfield Children's Home for up to three years during construction, and permanent in-combination effects, which also would be significant, on the amenity of the residents of Mayfield Children's Home.
- 5.16.4 Since the submission of the Bill, a requirement has been identified to provide a replacement facility for the Mayfield Children's Home at the site of the former Westwood School, adjacent to Rugeley School, on the outskirts of Blithbury in Lichfield in the Fradley to Colton area. See Map CT-06-206-R1, J8 to J7, in the SES2 and AP2 ES Volume 2: CA1 Map Book. The requirement for the replacement facility for Mayfield Children's Home has been agreed with the operator (the Priory Group) of both Mayfield Children's Home and Rugeley School, in order to reduce the significant adverse environmental effects that would arise during construction and operation of the scheme on the existing Mayfield Children's Home, identified in the main ES.
- 5.16.5 The new residential facility on the former Westwood School site is intended to be a replacement for Mayfield Children's Home in a modern building and grounds with appropriate facilities, to be operated in conjunction with the educational and other facilities of the adjacent Rugeley School.
- 5.16.6 The new residential facility at the former Westwood School site is assumed to comprise up to four, two-storey residential buildings and a communal building, with a total floorspace of approximately 1,600m², with pitched roofs and an

assumed height of 12m. The details of the size and layout of the facility will be confirmed through discussion with the operator and the local planning authority.

- 5.16.7 The existing former site of Westwood School occupies an area of 2.3ha and has 18 vacant buildings within its boundary, all of which will be demolished. The vacant buildings are predominantly single storey timber clad structures. Existing hedgerows and mature trees on site will be retained where possible. The residential facility will be accessed via the existing vehicular and pedestrian access for the former Westwood School site off Blithbury Road, on the north-east boundary of the site. All vehicular traffic for the replacement residential facility, both during construction and operation, will use this existing access. Pedestrian links will be provided with Rugeley School to the south. Rugeley School is currently accessed from Blithbury Road with a secondary access from Pipe Wood Lane. See Map CT-06-206-R1, I10 to H8, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 5.16.8 The new residential facility at the former Westwood School site will provide appropriate facilities for the residents. Up to 50 staff parking spaces, five visitor spaces and five minibus spaces are assumed to be provided, including loading/turning for service vehicles.
- 5.16.9 HS2 Ltd is working with the Priory Group in providing the replacement facility. The Priory Group is seeking separate planning permission that would allow construction of the replacement facility to be completed in advance of construction works in the vicinity of Mayfield Children's Home. This process has the potential to allow the facility to be built sooner than assessed, therefore removing the significant effects reported in the main ES Volume 2, Community area 2, Colwich to Yarlet.
- 5.16.10 For the purpose of assessment, it has been assumed that if the Priory Group are unable to achieve their own consent for a replacement facility and the nominated undertaker is required to provide the new residential facility, construction of the new residential facility will commence in 2021, over a period of one year and six months, enabling the phased transfer of residents and staff from Moreton House to the new residential facility by June 2022. Construction of the new residential facility will be managed from a compound within the land acquired for the replacement Mayfield Children's Home and will be accessed via an existing access off Blithbury Road. See Map CT-06-206-R1, I10 to H8, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 5.16.11 The land required for the provision of a replacement facility for Mayfield Children's Home is outside of the limits of the Bill. This amendment will result in a requirement for an additional 2.3ha of land. See Map CT-06-206-R1, J8 to I7, in the SES2 and AP2 ES Volume 2: CA1 Map Book.

Topics included in the AP2 assessment

- 5.16.12 Within the Fradley to Colton area, this amendment is considered to require reassessment of the environmental effects and mitigation in the main ES, as amended by SES1 and SES2, for: cultural heritage; ecology and biodiversity; health; landscape and visual; sound, noise and vibration; and traffic and transport.

- 5.16.13 The assessment of the changes to construction traffic flows and traffic related effects as a result of this AP2 amendment in combination with all SES2 changes and AP2 amendments, is reported in Section 7.

Cultural heritage

Scope, assumptions and limitations

- 5.16.14 The assessment scope, key assumptions and limitations for cultural heritage are as set out in Volume 1, the Scope and Methodology Report¹⁴⁹ (SMR) and SMR Addendum¹⁵⁰ of the main ES and SMR Addendum 2 (see SES2 and AP2 ES Volume 5: Appendix CT-001-002).
- 5.16.15 As the cultural heritage impacts of the amendment are not reversible, they therefore have the potential to result in new or different significant permanent construction effects only. There is no temporary construction or operational assessment for cultural heritage.

Existing environmental baseline

- 5.16.16 The baseline cultural heritage information for this amendment is described in SES2 and AP2 ES Volume 5: Appendix CH-002-000.
- 5.16.17 Mayfield Children's Home will be relocated to the site of the former Westwood School. Westwood School, formerly known as Pipewood Camp School in Blithbury (FRC381), a non-designated asset of low value, is located wholly within the land required for the amendment. This asset was not reported in the main ES as it was outside of the study area for the original scheme.
- 5.16.18 Further information about this asset is provided in the SES2 and AP2 ES Volume 5: Appendix CH-002-000 and Map Series CH-01 in the SES2 and AP2 ES Volume 5: Cultural heritage Map Book.

Future environmental baseline

Construction (2020)

- 5.16.19 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

¹⁴⁹ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report (Appendix CT-001-001). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

¹⁵⁰ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report Addendum (Appendix CT-001-002). Available online at <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

Effects arising during construction

Avoidance and mitigation measures

- 5.16.20 No avoidance or mitigation measures additional to those reported in the main ES and draft Code of Construction Practice¹⁵¹ (CoCP) are identified.

Assessment of impacts and effects

- 5.16.21 Westwood School, formerly known as Pipewood Camp School in Blithbury (FRC381), a non-designated asset of low value, will be completely removed by the construction of the replacement residential facility. This will give rise to a new permanent high adverse impact and a new permanent moderate adverse effect, which is significant.
- 5.16.22 For further information see Map Series CH-01 in the SES2 and AP2 ES Volume 5: Cultural heritage Map Book and the SES2 and AP2 ES Volume 5: Appendix CH-003-000.

Mitigation and residual effects

Other mitigation measures

- 5.16.23 No mitigation measures additional to those reported in the main ES and draft CoCP are identified.

Summary of likely residual significant effects

- 5.16.24 The amendment will give rise to a new likely residual significant permanent moderate adverse effect on Westwood School, formerly known as Pipewood Camp School in Blithbury (FRC381) by removing the full extent of the asset during construction.

Cumulative effects

- 5.16.25 There are no new or different likely significant cumulative effects for cultural heritage as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Ecology and biodiversity

Scope, assumptions and limitations

- 5.16.26 The assessment scope, key assumptions and limitations for ecology and biodiversity are as set out in Volume 1, the SMR and SMR Addendum of the main ES and SMR Addendum 2 (see SES2 and AP2 ES Volume 5: Appendix CT-001-002).

¹⁵¹ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, draft Code of Construction Practice (CT-003-000). Available online at <https://www.gov.uk/government/publications/draft-code-of-construction-practice-for-hs2-phase-2a>

- 5.16.27 This amendment has the potential to result in new or different significant construction effects only. Therefore, there is no operational assessment for ecology and biodiversity.
- 5.16.28 Where data are limited, a precautionary baseline has been built up according to the guidance provided in the SMR and SMR Addendum. This constitutes a 'reasonable worst case' basis for the subsequent assessment.
- 5.16.29 The precautionary approach to the assessment that has been adopted identifies the likely significant environmental effects of the amendment.

Existing environmental baseline

- 5.16.30 The ecological baseline of the area subject to the amendment has been based on field data collated for the main ES and SES₁, aerial photography, and relevant information from regional and local sources.
- 5.16.31 A summary of the baseline information relevant to the assessment of the amendment is provided below. Further detail on the relevant new or updated baseline information is provided in BID-EC-019-000, including Map Series EC-02 which accompanies the SES₂.
- 5.16.32 For those receptors described in the main ES, further details are provided in Volume 2, CA₁, Section 8, and Volume 5: Appendix EC-001-000, including Map Series EC-01. Baseline ecology reports that accompanied the main ES are provided in BID-EC-002-000 to BID-EC-014-000, including Map Series EC-02 to EC-12¹⁵².
- 5.16.33 For those receptors described in SES₁, further details are provided in Volume 2, CA₁, Section 3. The baseline ecology report that accompanied SES₁ and AP₁ ES is provided in BID EC-004-000, including Map Series EC-02, EC-04, EC-05, EC-10, EC-11 and EC-12¹⁵³.

Designated sites

- 5.16.34 The area subject to the amendment is located within a Natural England Impact Risk Zone¹⁵⁴ for Blithfield Reservoir Site of Special Scientific Interest (SSSI), which is of national value. Blithfield Reservoir SSSI, covering an area of approximately 436.9ha, is designated because it regularly supports >1% of the national wintering population of goosander. Blithfield Reservoir SSSI is located north of Colton, approximately 3.1km north-west of the area subject to the amendment.
- 5.16.35 There is one Local Wildlife Site (LWS) of relevance to the assessment of the amendment, which is of county value. Pipe Wood LWS, covering an area of

¹⁵² HS2 Ltd (2017). *High Speed Two (HS2) Phase 2a (West Midlands - Crewe), Background Information and Data*, Available online at: <https://www.gov.uk/government/publications/hs2-phase-2a-background-information-and-data-ecology-and-biodiversity>

¹⁵³ HS2 Ltd (2018). *High Speed Two (HS2) Phase 2a (West Midlands – Crewe), Background Information and Data*, Supplementary ecological baseline data (BID EC-004-000), Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/692664/G33_Ecological_baseline_BID-EC-004-000_WEB.pdf

¹⁵⁴ The Impact Risk Zones are a GIS tool developed by Natural England to make a rapid initial assessment of the potential risks to SSSIs posed by development proposals and indicate the types of development proposal which could potentially have adverse impacts.

approximately 5.2ha, is designated for its semi-natural broadleaved woodland. Pipe Wood LWS is located south-east of Blithbury, directly adjacent to the area subject to the amendment.

- 5.16.36 There is one Ancient Woodland Inventory (AWI) site of relevance to the assessment of the amendment, which is of county value. Pipe Wood AWI site, covering an area of approximately 5.2ha, is located south-east of Blithbury, directly adjacent to the area subject to the amendment.

Habitats

- 5.16.37 Habitats within the area subject to the amendment include semi-natural broadleaved woodland, scrub, species-rich hedgerows, amenity grassland and derelict school buildings. The habitats of relevance to the assessment of the amendment are described in further detail below.

- 5.16.38 There are two woodlands that qualify as lowland mixed deciduous woodland, a habitat of principal importance in Section 41 of the Natural Environment and Rural Communities (NERC) Act (2006)¹⁵⁵ and a conservation priority of the Staffordshire Biodiversity Action Plan (BAP)¹⁵⁶, these are:

- Pipe Wood, covering an area of 5.2ha, is located south-east of Blithbury, directly adjacent to the area subject to the amendment. Pipe Wood is of county value; and
- an un-named woodland, covering an area of 0.4ha, which is likely to be a fragment of Pipe Wood and is located south-east of Blithbury, within the area subject to the amendment. This woodland complex is of local / parish value.

- 5.16.39 Hedgerows within the area subject to the amendment are predominantly species-rich. Hedgerow with at least 80% cover of native woody species is a habitat of principal importance and a conservation priority of the Staffordshire BAP. These contribute towards a wider hedgerow network within the Fradley to Colton area that is of district / borough value.

Species

- 5.16.40 Protected and / or notable species that are known or assumed to occur within the area subject to the amendment include bats, reptiles, badger, polecat and European hedgehog.

- 5.16.41 The main ES reported a bat assemblage associated with habitats near Pipe Wood and other land south-east of Blithbury. Field surveys in this area recorded maternity roosts of noctule and brown long-eared bats and other species foraging and commuting including Nathusius' pipistrelle, common pipistrelle and brown long-eared bat. The area subject to the amendment contains potential bat roosting, foraging and commuting habitats that are likely to be used by this bat assemblage. The bat assemblage includes several species of principal importance

¹⁵⁵ Natural Environment and Rural Communities Act 2006 (2006 CHAPTER 16). Her Majesty's Stationery Office, London

¹⁵⁶ Staffordshire Biodiversity Partnership. Staffordshire Biodiversity Action Plan. Available online at: <http://www.sbap.org.uk/>

and other species that are conservation priorities of the Staffordshire BAP. The bat assemblage is of regional value.

- 5.16.42 The main ES reported populations of common reptile species which include common lizard, slow-worm and grass snake, identified through desk study records, as being potentially present at low numbers throughout the Fradley to Colton area. Common lizard, slow-worm and grass snake are species of principal importance. Grass snake is also a conservation priority of the Staffordshire BAP. The area subject to the amendment includes suitable habitats for these species. If present, these populations are of local/parish value.
- 5.16.43 The main ES, as amended by SES1, reported at least 10 social groups of badgers, identified through field surveys, throughout the Fradley to Colton area. The area subject to the amendment includes suitable sett building and foraging habitats for badgers. The badger populations throughout the Fradley to Colton area are of local/parish value.
- 5.16.44 The main ES reported populations of other mammals including polecat and European hedgehog, identified through desk study records, as being potentially present throughout the Fradley to Colton area. The area subject to the amendment includes suitable habitats for these species. If present, these populations are of local/parish value.

Future environmental baseline

Construction (2020)

- 5.16.45 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 5.16.46 The assessment assumes implementation of the measures set out within the draft CoCP (see the main ES Volume 5: Appendix CT-003-000).
- 5.16.47 No avoidance or mitigation measures additional to those reported in the main ES and draft CoCP are required.

Assessment of impacts and effects

- 5.16.48 All of the effects within this section are reported in the absence of other mitigation.

Designated sites

- 5.16.49 No effects on Blithfield Reservoir SSSI were reported within the main ES. Blithfield Reservoir SSSI will not be directly impacted by construction of the amendment. The closest point of construction of the facility will be approximately 3km south-east of the SSSI. The SSSI is designated because it regularly supports >1% of the national wintering population of goosander.

The amendment will not give rise to new or different significant effects upon the designated features of this SSSI.

- 5.16.50 Pipe Wood LWS and AWI site will not be directly impacted by construction of the amendment. The closest point of construction of the facility is directly adjacent to Pipe Wood LWS and AWI site. Pipe Wood LWS is designated because it supports ancient woodland. The amendment will not give rise to new or different significant effects upon the designated feature of this LWS and AWI site.

Habitats

- 5.16.51 It is not likely that any effect on habitats of relevance at more than the local/parish level will occur as a result of the amendment. Additional local/parish level effects arising from the AP2 revised scheme are listed in SES2 and AP2 ES Volume 5: Appendix EC-016-000.

Species

- 5.16.52 The main ES reported a direct loss of bat roosts and loss and fragmentation of foraging and commuting habitat used by the assemblage of bats associated with habitats near Pipe Wood to the south-east of Blithbury, which would result in a permanent adverse effect that is significant at regional level. The amendment will result in the demolition of derelict buildings, which on a precautionary basis are assumed to support bat roosts. The assumed loss of additional roosts will give rise to a different significant effect on the bat assemblage associated with habitats near Pipe Wood to the south-east of Blithbury. However, this will not change the level of significance of the effect as reported in the main ES.
- 5.16.53 It is not likely that any other effects on species of relevance at more than the local/parish level will occur as a result of the amendment. Additional local/parish level effects arising from the AP2 revised scheme are listed in SES2 and AP2 ES Volume 5: Appendix EC-016-000.

Mitigation and residual effects

Other mitigation measures

- 5.16.54 The main ES reported habitat creation measures to the west of Pipe Lane, which includes the creation of ponds, species-rich grassland, hedgerows and broadleaved woodland, to compensate for the loss of bat foraging habitats. Once established, these habitat creation measures will provide suitable bat foraging and commuting habitat. Artificial roosting provision will be provided across the woodland habitat creation areas to replace bat roosts that will be lost to construction, in accordance with the Ecological Principles of Mitigation within the SMR Addendum. These measures will reduce the different adverse effect resulting from this amendment on the bat assemblage associated with habitats near Pipe Wood to the south-east of Blithbury to a level that is not significant.

Summary of likely residual significant effects

- 5.16.55 With the implementation of the mitigation proposed, the ecological effects arising from the amendment are reduced to a level where they are not considered

to be significant. The significant effects of the amendment in this area are therefore unchanged from those reported in the main ES as amended by SES1.

Cumulative effects

- 5.16.56 There are no new or different likely significant cumulative effects for ecology and biodiversity as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Health

Scope, assumptions and limitations

- 5.16.57 The assessment scope, key assumptions and limitations for health are as set out in Volume 1 and the SMR of the main ES.
- 5.16.58 This amendment has the potential to result in new or different significant temporary and permanent construction effects for health in the Fradley to Colton area. Therefore, only the construction phase is considered in this assessment.

Existing environmental baseline

- 5.16.59 The baseline health information for the Fradley to Colton and Colwich to Yarlet (CA2) areas are as described in Volume 2, CA1 Section 9 and Volume 2, CA2 Section 9 of the main ES.
- 5.16.60 Mayfield Children's Home occupies Moreton House, within the hamlet of Moreton located within the Colwich to Yarlet area. The children's home, operated by the Priory Group, provides residential accommodation for up to 23 children who attend Rugeley School. The children travel by minibus daily from Moreton House to Rugeley School.
- 5.16.61 Rugeley School is an independent specialist residential school owned and operated by the Priory Group, serving up to 52 residential and day pupils between the ages of five and 19. The school is located on the outskirts of Blithbury in Staffordshire.
- 5.16.62 All of the pupils at Rugeley School have severe autism with complex needs. Many have communication, learning and behavioural needs and all require one to one care. Rugeley School accepts residential pupils from across the UK, as well as day pupils who commute daily to and from the school. The school provides a 40-week education programme, which is supplemented for some students with a care programme that can be up to 52 weeks a year.

Future environmental baseline

Construction (2020) and operation (2027)

- 5.16.63 The future baseline for construction in 2020 and operation in 2027 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 5.16.64 The main ES reported measures in the draft CoCP would be the means of controlling the construction works associated with the scheme to ensure that the effects of the works upon people and the natural environment are reduced or avoided insofar as reasonably practicable. It has been assumed in this assessment that this mitigation will be extended to include any worksites associated with the construction of the new accommodation close to Rugeley School.

Assessment of impacts and effects

- 5.16.65 The main ES did not report any health effects at Rugeley School. The amendment will give rise to a new adverse health effect in the Fradley to Colton area, due to the construction of the replacement residential facility for Mayfield Children's Home, at the former Westwood School site adjacent to Rugeley School. The replacement site has been selected by the Priory Group. The construction of the replacement residential facility will introduce health effects not reported in the main ES. The effects on children residing in Mayfield Children's home are reported in the SES2 and AP2 ES, Volume 2 Community area report for the Colwich to Yarlet area (CA2).
- 5.16.66 Construction of the replacement facility will take place over a period of approximately one year and three months, commencing in 2021. During this period, pupils at Rugeley School will experience periodic construction noise, traffic, and visual impacts, resulting in a change to the existing environmental conditions within the school. The impacts of construction will be noticeable on the approach to the school, and in parts of the school buildings and grounds.
- 5.16.67 Changes in the environmental conditions at the school and on-site residential facilities are likely to affect pupils' wellbeing adversely, given the sensitivity of children with autistic spectrum disorder (ASD). In particular, people with ASD can be hypersensitive to noise, and sometimes to specific frequencies of sound. Sounds can become magnified, distorted or muddled, and affected individuals may struggle to cut-out background noises, which can lead to difficulties in concentrating¹⁵⁷.
- 5.16.68 The pupils at Rugeley School have individual plans and routines, which may be changed as a result of the construction activity, since it may be necessary to alter the way in which internal and external spaces are used. Although each child is different, children with autism are generally very sensitive to change, and are therefore likely to experience adverse effects on their wellbeing as a result of impacts on their daily routines.
- 5.16.69 The amendment will introduce a new permanent beneficial effect on health and wellbeing through the provision of a purpose-built accommodation adjacent to

¹⁵⁷ The National Autism Society; www.autism.co.uk

Rugeley School, removing the need for children to travel to school by bus from Mayfield Children's Home.

Mitigation and residual effects

Other mitigation measures

- 5.16.70 HS2 Ltd will engage with Rugeley School to develop mitigation measures that will reduce or avoid impacts on vulnerable pupils resulting from the construction of the new residential facility adjacent to the school, if this is undertaken by HS2 Ltd. Issues to be considered will include altering the way in which the Rugeley School facilities are used, construction techniques, working hours, and engaging pupils in the design and construction process. This is additional to those mitigation measures reported in the main ES.

Summary of likely residual effects

- 5.16.71 The amendment is likely to give rise to the following new likely residual health effects, which are additional to those reported in the main ES, comprising:
- a new temporary adverse effect on the wellbeing of pupils at Rugeley School, associated with impacts from construction activities on the former Westwood School site for a period of one year and three months; and
 - a new permanent beneficial effect on the health and wellbeing of residents of the new, purpose built residential facility, adjacent to Rugeley School.

Cumulative effects

- 5.16.72 There are no new or different likely cumulative effects for health as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments. The AP2 amendment which will remove Moreton retaining wall (AP2-002-002¹⁵⁸) brings these construction works closer to Moreton House. However, the effect of this will be negligible in comparison to the effect from works adjacent to Moreton House.

Landscape and visual

Scope, assumptions and limitations

- 5.16.73 The assessment scope, key assumptions and limitations for landscape and visual are as set out in Volume 1, the SMR and SMR Addendum of the main ES.
- 5.16.74 The amendment has the potential to give rise to new or different significant construction visual effects only. Therefore, there is no construction assessment (landscape) or operational assessment for landscape and visual.

¹⁵⁸ Reported in the CA2: Colwich to Yarlet area Volume 2 report.

Existing environmental baseline

Visual baseline

- 5.16.75 The amendment requires land outside of the study area for the original scheme, therefore the following new viewpoint has been identified to represent the view from Blithbury Road and Mavesyn Ridware Footpath 5.

View south-east from Blithbury Road and Mavesyn Ridware Footpath 5 (viewpoint 005.02.037)

- 5.16.76 This viewpoint is located on the edge of Blithbury in an area of large flat pastures bounded by hedgerows with occasional hedgerow trees and woodlands. The foreground comprises Blithbury Road which is bounded by a grass verges and hedgerows. To the west of the road, fencing and garden vegetation to the rear of the property on the corner of Pipe Lane foreshortens longer views. To the east of the road views are more open and comprise pastures with hedgerow boundaries and individual mature trees. A wood pole overhead line crosses the fields. Further along the road the horizon is formed by the mature belt of trees associated with the derelict Westwood School site. These trees screen most of the former school buildings.

Future environmental baseline

Construction (2020)

- 5.16.77 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Temporary effects arising during construction

Avoidance and mitigation measures

- 5.16.78 No avoidance or mitigation measures additional to those reported in the main ES and CoCP are identified.

Assessment of impacts and effects

View south-east from Blithbury Road and Mavesyn Ridware Footpath 5 (viewpoint 005.02.037)

- 5.16.79 Construction of the replacement facility for Mayfield Children's Home will be visible to residents of properties along Blithbury Road, users of Mavesyn Footpath 5 and users of Blithbury Road. Vegetation along the site boundary will screen and filter many views of the construction activity, but taller equipment used to construct the two-storey buildings will be noticeable above the tree line. Occupants of properties along Pipe Lane will have upper storey views although these will be substantially filtered by existing vegetation. The amendment will therefore give rise to a localised non-significant effect on this viewpoint, which was not assessed in the main ES and was unaffected by the original scheme. For further information see SES2 and AP2 ES Volume 5: Appendix LV-001-001.

Cumulative effects

- 5.16.80 There are no new or different likely significant cumulative effects for landscape and visual as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Sound, noise and vibration

Scope, assumptions and limitations

- 5.16.81 The assessment scope, key assumptions and limitations for sound, noise and vibration are as set out in Volume 1 and the SMR of the main ES.
- 5.16.82 This amendment has the potential to result in new or different significant construction effects only for sound, noise and vibration in the Fradley to Colton area. Therefore, only the construction phase is considered in this assessment.

Existing environmental baseline

- 5.16.83 The baseline sound, noise and vibration information for the Fradley to Colton area is as described in Volume 2, CA1, Section 13 of the main ES. Baseline sound levels representative of the assessment locations affected by the amendment have been used in the construction assessment.
- 5.16.84 In the vicinity of the amendment at Rugeley, the existing environmental baseline is dominated by noise from road traffic on Blithbury Road, Pipe Wood Lane and Uttoxeter Road. The existing baseline noise is contributed to by overflying aircraft and natural and agricultural sounds. Rugeley School, close to the village of Blithbury, represented by assessment location ref.: 11107(N), is an independent specialist residential school, operated by the Priory Group, serving up to 52 residential and day pupils between the ages of five and 19. The school is located on the outskirts of Blithbury in Staffordshire to the north-east of the HS2 route. All of the pupils at Rugeley School have severe autism with complex needs. Many have communication, learning and behavioural needs and all require one to one care. Rugeley School accepts residential pupils from across the UK, as well as day pupils who commute daily to and from the school. The school provides a 40-week education programme, which is supplemented for some students with a care programme that can be up to 52 weeks a year.

Future environmental baseline

Construction (2020)

- 5.16.85 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 5.16.86 The main ES reported that screening, as described in the draft CoCP, has been assumed at worksites in the vicinity of Rugeley School to avoid or reduce likely significant effects. It has been assumed in this assessment that this mitigation

would be extended to include any worksites associated with the construction of the replacement facility for Mayfield Children's Home, close to Rugeley School. On this basis, no additional avoidance or mitigation measures to those reported in the main ES and draft CoCP, are identified.

Assessment of impacts and effects

- 5.16.87 The main ES reported no likely significant construction noise effects at Rugeley School. The amendment will result in, on a precautionary basis, likely significant adverse effects on Rugeley School during construction of the new facility. The highest predicted daytime monthly construction noise levels at the closest school buildings are 13dB(A) above the impact screening criteria defined in the SMR for this use for a period of up to two months during the foundation construction of the replacement facility. For further information, see SES2 and AP2 ES Volume 5: Appendix SV-002-000.

Mitigation and residual effects

Other mitigation measures

- 5.16.88 No mitigation measures additional to those reported in the main ES and draft CoCP are identified.

Summary of likely residual significant effects

- 5.16.89 The amendment will give rise to a new likely residual significant construction noise effect at Rugeley School for a period of up to two months.
- 5.16.90 HS2 Ltd will engage with Rugeley School to develop mitigation measures that will reduce or avoid impacts on vulnerable pupils resulting from the construction of the new residential facility adjacent to the school, if this is undertaken by HS2 Ltd.

Cumulative effects

- 5.16.91 There are no new or different likely significant cumulative effects for sound, noise and vibration as a result of the amendment acting in combination with any other AP2 amendments or AP1 amendments.

Traffic and transport

Scope, assumptions and limitations

- 5.16.92 The assessment scope, key assumptions and limitations for traffic and transport are as set out in Volume 1, the SMR and SMR Addendum of the main ES.
- 5.16.93 The amendment has the potential to result in new or different significant operation effects only. Therefore, there is no construction assessment for traffic and transport. The assessment of the changes to construction traffic flows as a result of this amendment in combination with all SES2 changes and AP2 amendments is reported in Section 7.

Existing environmental baseline

- 5.16.94 The baseline traffic and transport information for the Fradley to Colton area is as described in Volume 2, CA1, Section 14 of the main ES.
- 5.16.95 Blithbury Road is a local road in the Fradley to Colton area which provides access to residential properties in the area and Rugeley School which is located on Blithbury Road itself. The main road in the area is the B5014 Uttoxeter Road, which is a north-south link connecting the settlements of Blithbury, Abbots Bromley, Handsacre and Hill Ridware to Uttoxeter in the north and Lichfield in the south. The local road network in this area generally operates well.

Future environmental baseline

Operation (2027 and 2041)

- 5.16.96 The future baseline for operation in 2027 and 2041 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising from operation

Avoidance and mitigation measures

- 5.16.97 No avoidance or mitigation measures, additional to those reported in the main ES are required.

Assessment of impacts and effects

- 5.16.98 The main ES did not report any traffic effects in and around the Blithbury area during operation.
- 5.16.99 The amendment will introduce additional traffic movements on to the B5014 Uttoxeter Road and Blithbury Road for vehicles accessing the replacement facility for Mayfield Children's Home however this will in part be offset by existing movements which occur between the Mayfield Children's Home and Rugeley School. In the future 2027 and 2041 assessment years, the B5014 Uttoxeter Road and Blithbury Road junction is forecast to operate within capacity. The changes in traffic associated with the replacement facility will not substantially increase queues or delays at the junction and will not give rise to an adverse significant traffic congestion and delay effect on users of the junction. The amendment will not substantially change traffic flows for existing users of Blithbury Road and will not give rise to an adverse significant traffic severance effect.

Cumulative effects

- 5.16.100 There are no new or different likely significant cumulative effects for traffic and transport as a result of the amendment acting in combination with any other AP2 amendments, AP1 amendments or any relevant committed development.

Summary of new or different likely residual significant effects as a result of the amendment

- 5.16.101 The amendment will give rise to a new likely residual significant permanent moderate adverse effect on Westwood School, formerly known as Pipewood

Camp School in Blithbury (FRC381) by removing the full extent of the asset during construction.

- 5.16.102 The amendment will give rise to new likely residual temporary adverse effect on the wellbeing of pupils at Rugeley School, associated with impacts from construction activities on the former. Once constructed there will be a new likely residual permanent beneficial effect on the health and wellbeing of residents of the new, purpose built residential facility.
- 5.16.103 The amendment will give rise to a new likely residual significant construction noise effect at Rugeley School for a period of up to two months.

6 Assessment of minor utility amendments in the Fradley to Colton area

6.1 Additional land for the underground diversion of a Western Power Distribution 11kV underground cable north-west of Echills Farm (AP2-001-101)

- 6.1.1 The Bill provides for the permanent underground diversion of a Western Power Distribution 11kV underground cable, 200m in length, from a Western Power Distribution pole 50m south-east of the Bourne embankment satellite compound, crossing under the HS2 route 50m east of Echills Farm. See Map CT-06-203, H4 to E5, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 6.1.2 The AP1 revised scheme (AP1-001-104: Additional land for the permanent diversion of BT Openreach overhead telecommunications line along the A513 Rugeley Road and access road to Echills Farm), provides for an underground diversion of a section of an existing overhead telecommunications line. The diversion of the utility would be 650m in length, running parallel to the A513 Rugeley Road and then within an access road serving Echills Farm. The additional land required for AP1-001-104 overlaps with the land required for this amendment. See Map CT-06-203, H4 to E7, in the SES1 and AP1 ES Volume 2: CA1 Map Book.
- 6.1.3 Since submission of the Bill and the SES1 and AP1 ES, further engagement with the utility provider has identified a need to change the alignment of the diversion. The diversion of the utility will be 590m in length, along the A513 Rugeley Road and an access road under the River Trent viaduct to Echills Farm. See Map CT-06-203, H4 to E5 in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 6.1.4 The activities will require the removal of any surface material from the area of the diversion route (this may include vegetation, soil, and road surfacing), the removal of existing utility infrastructure (where necessary) and installation of the utility. As required and where suitable, topsoil will be temporarily stored adjacent to the working area and will be used to reinstate the area once the works are complete. Activities to divert the utility will take six months to complete, commencing in 2021.
- 6.1.5 The additional land required for this utility diversion is outside of the limits of the Bill and will result in a requirement for 75m² of additional land within the access to Echills Farm (CA1/15). See Map CT-06-203, H4 to E5 in the SES2 and AP2 ES Volume 2: CA1 Map Book. It is assumed that all of the additional land will be returned to its existing use following construction.
- 6.1.6 This amendment is dependent on the AP1-001-104 (Additional land for the permanent diversion of BT Openreach overhead telecommunications line along the A513 Rugeley Road and access road to Echills Farm) being approved, as part of the additional land included within the AP1 revised scheme is also required for the utility works described in the AP2 amendment.

- 6.1.7 This amendment is considered to require reassessment of the environmental effects and mitigation in the main ES, as amended by SES1 and SES2, for community.

Community

- 6.1.8 The land required for the amendment will be within the boundary of a residential property at Echills Farm. The impact of the utility diversion at this property will be small in scale and of short duration (approximately three months), resulting in a temporary minor adverse effect, which is not significant. For further information see SES2 and AP2 ES Volume 5: Appendix CM-001-001.

6.2 Additional land to extend an underground Openreach telecommunications cable to Pipe Ridware embankment satellite compound (AP2-001-102)

- 6.2.1 The Bill provides for a new temporary underground Openreach telecommunications cable, 90m in length, running along Pipe Lane diversion to the Pipe Ridware embankment satellite compound. See Map CT-06-204, E4 to D4 in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 6.2.2 Since submission of the Bill, further engagement with the utility provider has identified a need for additional land to extend the temporary underground Openreach telecommunications cable to the Pipe Ridware embankment satellite compound. The temporary connection will be a total of 300m in length, extending from a point 200m east of the River Trent viaduct, along Pipe Lane and east of the junction with Pipe Lane diversion, to the Pipe Ridware embankment satellite compound. See Map CT-06-204, E4 to D4 in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 6.2.3 The activities will require the removal of any surface material from the area of the new utility (this may include vegetation, soil, and road surfacing) and installation of the utility. As required and where suitable, topsoil will be temporarily stored adjacent to the working area and will be used to reinstate the area once the works are complete. Activities to construct the utility will take six months to complete, commencing in 2021.
- 6.2.4 The additional land required for this utility diversion is outside of the limits of the Bill and will result in a requirement for 435m² of additional land, all of which will be from Pipe Hall Farm (CA1/18). See Map CT-06-204, E4 to D4 in the SES2 and AP2 ES Volume 2: CA1 Map Book. It is assumed that all of the additional land will be returned to its existing use following construction.
- 6.2.5 This amendment is not considered to require a reassessment of the environmental effects or mitigation as set out in the main ES, as amended by SES1 and SES2, with respect to any environmental topics.

6.3 Additional land for the diversion of an existing South Staffordshire Water water mains supply along Pipe Lane diversion (AP2-001-103)

- 6.3.1 Since submission of the Bill, further engagement with the utility provider has identified a need for additional land to permanently divert a South Staffordshire Water water mains supply. The new permanent diversion will be 1.3km in length, running from the junction with Pipe Lane to Woodhouse Farm, along the Pipe Lane diversion. See Map CT-06-205, I7 to F7, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 6.3.2 The activities will require the removal of any surface material from the area of the diversion route (this may include vegetation, soil, and road surfacing), the removal of existing utility infrastructure (where necessary) and installation of the utility. As required and where suitable, topsoil will be temporarily stored adjacent to the working area and will be used to reinstate the area once the works are complete. Activities to divert the utility will take six months to complete, commencing in 2021.
- 6.3.3 The additional land required for this utility diversion is outside of the limits of the Bill and will result in a requirement for 0.1ha of additional land, all of which will be from Woodhouse Farm (CA1/21). See Map CT-06-205, I7 to F7, in the SES2 and AP2 ES Volume 2: CA1 Map Book. It is assumed that all of the additional land will be returned to its existing use following construction.
- 6.3.4 This amendment is not considered to require a reassessment of the environmental effects or mitigation as set out in the main ES, as amended by SES1 and SES2, with respect to any environmental topics.

6.4 Additional land for the diversion of a South Staffordshire Water water mains supply to Quintons Orchard (AP2-001-104)

- 6.4.1 The AP1 revised scheme (AP1-001-105: Additional land for the permanent diversion of BT Openreach overhead telecommunications line at Quintons Orchard Farm) provides for the underground diversion of a section of an existing telecommunications cable. The diversion of the utility would be 620m in length and follow the route of an access road to Quintons Orchard Farm. A section of the existing utility, where it crosses the HS2 route to Quintons Orchard Farm, would be removed. The additional land required for AP1-001-105 overlaps with the land required for this amendment. See Map CT-06-204, B7, and Map CT-06-205, I7 to D3, in the SES1 and AP1 ES Volume 2: CA1 Map Book.
- 6.4.2 Since submission of the Bill, further engagement with the utility provider has identified a need for additional land to permanently divert an existing South Staffordshire Water water mains supply along a new alignment. The diversion will be 650m in length, running from Pipe Lane along the access road to Quintons Orchard. See Map CT-06-204, B7, and Map CT-06-205, I7 to D3, in the SES2 and AP2 ES Volume 2: CA1 Map Book.

- 6.4.3 The activities will require the removal of any surface material from the area of the diversion route (this may include vegetation, soil, and road surfacing), the removal of existing utility infrastructure (where necessary) and installation of the utility. As required and where suitable, topsoil will be temporarily stored adjacent to the working area and will be used to reinstate the area once the works are complete. Activities to divert the utility will take six months to complete, commencing in 2021.
- 6.4.4 The additional land required for this utility diversion is outside of the limits of the Bill and will result in a requirement for 150m² of additional land, all of which will be from Quintons Orchard Farm (CA1/25). See Map CT-06-204, B7, and Map CT-06-205, I7 to D3, in the SES2 and AP2 ES Volume 2: CA1 Map Book. It is assumed that all of the additional land will be returned to its existing use following construction.
- 6.4.5 This amendment is dependent on the AP1-001-105 (Additional land for the permanent diversion of BT Openreach overhead telecommunications line at Quintons Orchard Farm) being approved, as part of the additional land included within the AP1 revised scheme is also required for the utility works described in the AP2 amendment.
- 6.4.6 This amendment is not considered to require a reassessment of the environmental effects or mitigation as set out in the main ES, as amended by SES1 and SES2, with respect to any environmental topics.

6.5 Additional land for the diversion of an Openreach telecommunications cable to Bentley Hall Farm (AP2-001-105)

- 6.5.1 The AP1 revised scheme (AP1-001-004: Additional land permanently required to improve the visibility at the junction of Pipe Lane and an accommodation track), provides for additional land for the underground diversion of a section of an existing telecommunications cable and relocation of hedgerow. The additional land required for AP1-001-004 overlaps with the land required for this amendment. See Map CT-06-204, B7, and Map CT-06-205, I7 to D3, in the SES1 and AP1 ES Volume 2: CA1 Map Book.
- 6.5.2 Since submission of the Bill and the SES1 and AP1 ES, further engagement with the utility provider has identified a need for additional land to permanently divert an existing Openreach telecommunications cable. The diversion of the utility will be 770m in length, crossing the new Mavesyn Ridware Footpath 38 accommodation overbridge and farmland going to Bentley Hall Farm. See Map CT-06-205, I7 to D3, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 6.5.3 The activities will require the removal of any surface material from the area of the diversion route (this may include vegetation, soil, and road surfacing), the removal of existing utility infrastructure (where necessary) and installation of the utility. As required and where suitable, topsoil will be temporarily stored adjacent to the working area and will be used to reinstate the area once the works are

complete. Activities to divert the utility are currently planned to be carried out in 2021-2022 and are expected to take approximately six months to complete.

- 6.5.4 The additional land required for this utility diversion is outside of the limits of the Bill and will result in a requirement for 0.2ha of additional land, some of which will be from the following agricultural holdings: Pipe Hall Farm (CA1/18) and Quintons Orchard Farm (CA1/25). See Map CT-06-205, I7 to D3, in the SES2 and AP2 ES Volume 2: CA2 Map Book. It is assumed that all of the additional land will be returned to its existing use following construction.
- 6.5.5 This amendment is dependent on the AP1-001-004 (Additional land permanently required to improve the visibility at the junction of Pipe Lane and an accommodation track) being approved, as part of the additional land included within the AP1 revised scheme is also required for the utility works described in the AP2 amendment.
- 6.5.6 This amendment is not considered to require a reassessment of the environmental effects or mitigation as set out in the main ES, as amended by SES1 and SES2, with respect to any environmental topics.

6.6 Additional land for the underground diversion of a Western Power Distribution 11kV overhead line near Pipe Lane Farm (AP2-001-106)

- 6.6.1 The Bill provides for the permanent underground diversion of a Western Power Distribution 11kV overhead line, 310m in length, from a pole 150m west of Pipe Lane Farm, crossing the HS2 route, to a pole 230m north-west of Bentley Hall Farm. See Map CT-06-204, E5, to CT-06-205, F4, in the main ES Volume 2: CA1 Map Book.
- 6.6.2 Since submission of the Bill, further engagement with the utility provider has identified a need to change the alignment of the diversion. The underground diversion of the utility will be 700m in length, from a pole 150m west of Pipe Lane Farm, crossing the HS2 route 250m further north-west, to a pole 230m north-west of Bentley Hall Farm. See Map CT-06-204, E5, to CT-06-205, F4, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 6.6.3 The activities will require the removal of any surface material from the area of the diversion route (this may include vegetation, soil, and road surfacing), the removal of existing utility infrastructure (where necessary) and installation of the utility. As required and where suitable, topsoil will be temporarily stored adjacent to the working area and will be used to reinstate the area once the works are complete. Activities to divert the utility will take six months to complete, commencing in 2021.
- 6.6.4 The additional land required for this utility diversion is outside of the limits of the Bill and will result in a requirement for 1.3ha of additional land, some of which will be from the following agricultural holdings: Bentley Hall Farm (CA1/26) and Pipe Hall Farm (CA1/18). See Map CT-06-204, E5, to CT-06-205, F4, in the SES2 and AP2 ES Volume 2: CA1 Map Book. It is assumed that all of the additional land will be returned to its existing use following construction.

- 6.6.5 This amendment is considered to require reassessment of the environmental effects and mitigation in the main ES, as amended by SES1 and SES2, for the following topics: community, cultural heritage and landscape and visual.

Community

- 6.6.6 The land required for the amendment will be within the boundary of a residential property at Pipe Lane Farm. The impact of the utility diversion at this property will be small in scale and of short duration (approximately three months), resulting in a temporary minor adverse effect, which is not significant. For further information see SES2 and AP2 ES Volume 5: Appendix CM-001-001.

Cultural heritage

- 6.6.7 The main ES reported a permanent major adverse significant effect on buried archaeological remains of a rectilinear enclosure of probable Iron Age or Roman date, to the west of Pipe Wood Lane, Mavesyn Ridware (FRC095), a non-designated asset of moderate value. The amendment will increase the extent of the asset that will be removed during construction. This will result in a different significant effect, however this will not change the level of the significance of the effect reported in the main ES. For further information see the SES2 and AP2 ES Volume 5: Cultural heritage Map Book and the SES2 and AP2 ES Volume 5: Appendix CH-003-000.

Landscape and visual

- 6.6.8 This amendment will involve construction activity which will be visible in views experienced by residents of properties along Pipewood Lane. The activities will require the removal of surface material, including vegetation, soil, road surfacing, removal of existing utility infrastructure (where necessary) and installation of the 11kV underground cable. As required and where suitable, topsoil will be temporarily stored adjacent to the working area and will be used to reinstate the area once the works are complete. These small scale construction works will take approximately six months to complete and will be seen in the context of much wider construction activity in this location. The amendment will therefore not give rise to a new or different significant effect.

6.7 Additional land for the underground diversion of Western Power Distribution 11kV overhead line from Hadley Gate Farm to near Stoneyford House (AP2-001-107)

- 6.7.1 The Bill provides for the underground diversion of a Western Power Distribution 11kV overhead line, 300m in length, crossing the HS2 route, 220m west of Blithbury Road overbridge, running from Hadley Gate Farm to near Stoneyford House. See Map CT-06-206 C3 to A7, in the main ES Volume 2: CA1 Map Book.
- 6.7.2 Since submission of the Bill, further engagement with the utility provider has identified a need to change the alignment of the diversion. The diversion of the utility will be 1.3km in length from Hadley Gate Farm along the Hadley Gate Lane diversion, Blithbury Road realignment, crossing the HS2 route at the Blithbury Road overbridge and continuing parallel to the south of the HS2 route near

Stoneyford House. See Map CT-06-206 C3 to A7, in the SES2 and AP2 ES Volume 2: CA1 Map Book.

- 6.7.3 The activities will require the removal of any surface material from the area of the diversion route (this may include vegetation, soil, and road surfacing), the removal of existing utility infrastructure (where necessary) and installation of the utility. As required and where suitable, topsoil will be temporarily stored adjacent to the working area and will be used to reinstate the area once the works are complete. Activities to divert the utility will take six months to complete, commencing in 2021.
- 6.7.4 The additional land required for this utility diversion is outside of the limits of the Bill and will result in a requirement for 400m² of additional land, all of which will be required from Stoneyford (CA1/32). See Map CT-06-206 C3 to A7, in the SES2 and AP2 ES Volume 2: CA1 Map Book. It is assumed that all of the additional land will be returned to its existing use following construction.
- 6.7.5 This amendment is considered to require reassessment of the environmental effects and mitigation in the main ES, as amended by SES1 and SES2, for community.

Community

- 6.7.6 The land required for the amendment will be within the boundary of the residential property Stoneyford House. The impact of the utility diversion at this property will be small in scale and of short duration (approximately three months), resulting in a temporary minor adverse effect, which is not significant. For further information see SES2 and AP2 ES Volume 5: Appendix CM-001-001.

6.8 Additional land for the provision of a new underground Openreach telecommunications cable to Newlands Lane auto-transformer feeder station railway systems satellite compound (AP2-001-108)

- 6.8.1 Since submission of the Bill, further engagement with the utility provider has identified a need for additional land to provide a new temporary underground Openreach telecommunication cable to Newlands Lane auto-transformer feeder station railway systems satellite compound. The new temporary telecommunications cable will be 1.5km in length, running along Newlands Lane from Croft Cottage to Newlands Lane auto-transformer feeder station railway systems satellite compound. See Map CT-06-207, F5, to CT-06-207-R1, B8, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 6.8.2 The activities will require the removal of any surface material from the area of the new utility (this may include vegetation, soil, and road surfacing), the removal of existing utility infrastructure (where necessary) and installation of the utility. As required and where suitable, topsoil will be temporarily stored adjacent to the working area and will be used to reinstate the area once the works are complete. Activities to construct the utility will take six months to complete, commencing in 2021.

- 6.8.3 The additional land required for this utility diversion is outside of the limits of the Bill and will result in a requirement for 0.4ha of additional land. See Map CT-06-207, F5, to CT-06-207-R1, B8, in the SES2 and AP2 ES Volume 2: CA1 Map Book. It is assumed that all of the additional land will be returned to its existing use following construction.
- 6.8.4 This amendment is not considered to require a reassessment of the environmental effects or mitigation as set out in the main ES, as amended by SES1 and SES2, with respect to any environmental topics.

6.9 Additional land for the underground diversion of a Western Power Distribution 11kV overhead line east of Newlands Lane underbridge (AP2-001-109)

- 6.9.1 The Bill provides for the underground diversion of a Western Power Distribution 11kV overhead line, 230m in length, running from an existing Western Power Distribution pole and crossing the HS2 route, 270m west of Newlands Lane overbridge. See Map CT-06-207, B6 to A5, in the main ES Volume 2, CA1 Map Book.
- 6.9.2 Since submission of the Bill, further engagement with the utility provider has identified a need to change the alignment of the diversion. The diversion of the utility will be 680m in length, from an existing Western Power Distribution pole, crossing the HS2 route 510m west of Newlands Lane overbridge and reconnecting to an existing pole. See Map CT-06-207, B6 to A5, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 6.9.3 The activities will require the removal of any surface material from the area of the diversion route (this may include vegetation, soil, and road surfacing) the removal of existing utility infrastructure (where necessary) and installation of the utility. As required and where suitable, topsoil will be temporarily stored adjacent to the working area and will be used to reinstate the area once the works are complete. Activities to divert the utility will take six months to complete, commencing in 2021.
- 6.9.4 The additional land required for this utility diversion is outside of the limits of the Bill and will result in a requirement for 0.5ha of additional land, some of which will be from the following agricultural holdings: Town End Farm (CA1/38) and Manor Farm (CA1/27). See Map CT-06-207, B6 to A5, in the SES2 and AP2 ES Volume 2: CA1 Map Book. It is assumed that all of the additional land will be returned to its existing use following construction.
- 6.9.5 This amendment is considered to require reassessment of the environmental effects and mitigation in the main ES, as amended by SES1 and SES2, for cultural heritage.

Cultural heritage

- 6.9.6 The main ES reported a permanent moderate adverse significant effect on earthwork remains of narrow ridge and furrow, a non-designated asset of low value, immediately to the east of Stockwell Heath (FRC117). The amendment will

increase the extent of the asset that will be removed during construction. This will result in a different significant effect, however this will not change the level of the significance of the effect reported in the main ES. For further information see the SES2 and AP2 ES Volume 5: Cultural heritage Map Book and the SES2 and AP2 ES Volume 5: Appendix CH-003-000.

6.10 Additional land and a change to Bill powers for the underground diversion of Western Power Distribution 11kV overhead lines near Stockwell Heath (AP2-001-110)

- 6.10.1 The Bill provides for the underground diversion of two existing Western Power Distribution 11kV overhead lines. The first underground diversion would be 270m in length, crossing the HS2 route 160m west of Newlands Lane underbridge from Bleak Cottage to Tinkerlow Farm. The second underground diversion would be 330m in length, crossing the HS2 route 350m west of Newlands Lane underbridge from Bleak Cottage to a Western Power Distribution pole, 100m north-west of Hamley House Farm See Map CT-06-208, G6 to E5, in the main ES Volume 2: CA1 Map Book.
- 6.10.2 Since submission of the Bill, further engagement with the utility provider has identified a need to change the alignment of the diversion. The diversion will be 700m in length, from an existing Western Power Distribution pole, crossing the HS2 route 430m west of Newlands Lane underbridge to another existing pole 5m north of the Moor Lane diversion. See Map CT-06-208, G6 to E5, in the SES2 and AP2 ES Volume 2: CA1 Map Book.
- 6.10.3 The activities will require the removal of any surface material from the area of the diversion route (this may include vegetation, soil, and road surfacing), the removal of existing utility infrastructure (where necessary) and installation of the utility. As required and where suitable, topsoil will be temporarily stored adjacent to the working area and will be used to reinstate the area once the works are complete. Activities to divert the utilities will take six months to complete, commencing in 2021.
- 6.10.4 The additional land required for this utility diversion is outside of the limits of the Bill and will result in a change to Bill powers and a requirement for 0.1ha of additional land, some of which will be from the following agricultural holdings: Hamley House Farm (CA1/54) and Lea Hall Farm (CA1/53). See Map CT-06-208, G6 to E5, in the SES2 and AP2 ES Volume 2: CA1 Map Book. It is assumed that all of the additional land will be returned to its existing use following construction.
- 6.10.5 This amendment is not considered to require a reassessment of the environmental effects or mitigation as set out in the main ES, as amended by SES1 and SES2, with respect to any environmental topics.

7 Combined effects of changes and amendments in the Fradley to Colton area due to changes in construction traffic flows

7.1 Introduction

7.1.1 This section reports the combined assessment of new or different significant construction traffic effects, as a result of changes in construction traffic flows. These relate to changes associated with SES2 changes and AP2 amendments, where the change in traffic flows cannot be directly attributed to an SES2 change or an AP2 amendment.

7.1.2 The assessment has also considered any impacts in the Fradley to Colton area associated with SES2 changes and AP2 amendments in the adjoining community area.

7.1.3 Traffic and transport effects are reported first, since the effects arise from changes in construction traffic flows. Other topics where a significant effect has been identified, are then reported in the following sequence:

- air quality;
- sound, noise and vibration;
- community; and
- socio-economics.

7.2 SES2 changes and AP2 amendments of relevance to this assessment

7.2.1 The assessment includes all changes to construction traffic. The primary contributors to the changes in construction traffic are the changes to the movement of excavated material, construction programme and construction assumptions. The assessment takes into account measures to reduce the need to move material by the road network and use of site haul routes to limit construction traffic on the road network.

7.2.2 Of the design changes and amendments, the following make a particular contribution to the changes in traffic flows in the Fradley to Colton area:

- A new construction traffic route along Wood End Lane (SES2-001-001);
- Additional land required for modifications to A515 Lichfield Road and Wood End Lane junction and widening of Wood End Lane (AP2-001-002);
- Lowering of Kings Bromley viaduct, Bourne embankment and River Trent viaduct (SES2-001-003);

- Additional land and a change to Bill powers required to make alterations to the Handsacre Junction connection into the West Coast Main Line (WCML) (AP2-001-001);
- Additional land required for the provision of a replacement facility for Mayfield Children’s Home (AP2-002-001);
- local placement of surplus excavated material south of Pipe Ridware embankment (SES2-001-004), south-east of Newlands Lane auto-transformer feeder station (SES2-001-007) and south of Moreton South embankment (SES2-001-008); and
- compounds to support utilities works.

7.3 Traffic and transport

Scope, assumptions and limitations

- 7.3.1 The assessment scope, key assumptions and limitations for traffic and transport are as set out in Volume 1, the Scope and Methodology Report¹⁵⁹ (SMR) and SMR Addendum¹⁶⁰ of the main ES.

Environmental baseline

Existing baseline

- 7.3.2 The baseline traffic and transport information for the Fradley to Colton area is as described in Volume 2, CA1, Section 14 of the main ES. Further baseline information is presented in Volume 2, CFA22, Section 16 of the HS2 Phase One SES and AP2 ES¹⁶¹.
- 7.3.3 Since the production of SES1, additional information on traffic flows on six roads and/or junctions in the Fradley to Colton area has been collected. This is set out in Background Information and Data (BID) document BID-TR-001-000, which accompanies the SES2 and AP2 ES.
- 7.3.4 There are no strategic routes in the Fradley to Colton area. However, the A38 Rykneld Street, which is part of the strategic road network, passes approximately 2.5km to the east of the HS2 route and will cross the HS2 Phase One route to the south-east. The A38 Rykneld Street runs in a north-south direction and is the main route into Birmingham in the south and Burton upon Trent and Derby in the north, and has connections to Lichfield, Alrewas and Fradley.
- 7.3.5 There are two primary ‘A’ roads in the Fradley to Colton area, these are: the A515 Lichfield Road, which connects Kings Bromley with Lichfield; and the A51

¹⁵⁹ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report (Appendix CT-001-001). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

¹⁶⁰ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report (Appendix CT-001-001). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

¹⁶¹ HS2 Ltd Phase One ES available: <https://www.gov.uk/transport/hs2-phase-one>

Stafford Road, which connects Lichfield with Stone via Rugeley. The strategic and primary road network, particularly around Lichfield, can get busy at peak times and delays can be experienced.

7.3.6 The main local roads that are of relevance to the assessment are:

- the A513 Rugeley Road, which is an east-west link connecting Rugeley with Alrewas; the B5014 Uttoxeter Road, which is a north-south link connecting the settlements of Blithbury, Abbots Bromley, Handsacre and Hill Ridware to Uttoxeter in the north and Lichfield in the south;
- the B5013 Uttoxeter Road, which is a north-south link connecting Uttoxeter with Rugeley via Admaston; the A5192 Eastern Avenue, which connects the A38 Rykneld Street with the A51 Stafford Road;
- Wood End Lane, which connects the A38 Rykneld Street with the A515 Lichfield Road; and
- the B5234 Duffield Lane and B5017 Henhurst Hill, which provide access to the surrounding residential areas including Newborough, Needwood, Callingwood and Anslow Leys. The B5017 Henhurst Hill continues to become the B5017 Forest Road in the Burton-on-Trent area providing onward access to the strategic network via the A5121 Wellington Road, which passes through a largely commercial area to the junction with the A38 Lichfield Road.

7.3.7 The local road network in this area generally operates well although some localised delays can be experienced, particularly at peak times.

7.3.8 There are pedestrian footways adjacent to many of the roads in the built up areas of Kings Bromley, Handsacre, Armitage, Colton and Stockwell Heath. Footways vary in width and condition within these areas. Where there is no formal footway provision adjacent to a road, non-motorised user numbers are generally low.

7.3.9 In the Fradley to Colton area, National Route 54 (part of the National Cycle Network) passes through the area including along part of Wood End Lane as well as crossing A5192 Eastern Avenue. There are a number of advisory cycle routes, including the B5014 Uttoxeter Road between Handsacre and Blithbury. In the areas of Colton and Stockwell Heath there are networks of advisory cycle routes, including the High Street between Colton and Stockwell Heath.

Future baseline

Construction (2023)

7.3.10 SES2 and AP2 ES Volume 5: Appendix CT-004-000 provides details of the developments which are assumed to have been implemented by 2023 for construction, additional to those identified in the main ES Volume 5: Appendix CT-004-000.

7.3.11 Land North East of Watery Lane, Curborough, Lichfield, Staffordshire (planning reference 14/00057/OUTMEI) is relevant to the assessment of traffic and transport.

Effects arising during construction

Avoidance and mitigation measures

- 7.3.12 No avoidance or mitigation measures, additional to those reported in the main ES and draft Code of Construction Practice¹⁶² (CoCP), are required.

Assessment of impacts and effects

Temporary effects

Construction compounds

- 7.3.13 Volume 2, CA1, Section 14 of the main ES provides details of construction compounds in the Fradley to Colton area. Volume 2, CFA22, Section 16 of the HS2 Phase One SES and AP2 ES provides details of construction compounds in the Whittington to Handsacre area.
- 7.3.14 This information has been updated to reflect the provision of new compounds and changes to existing compounds resulting from the SES2 changes and AP2 amendments. This information is provided in Table 19.

Table 19: Typical vehicle trip generation for construction sites in the Fradley to Colton area

Compound type	Location	Access to/from compound to main road network	Indicative start/set up date	Estimated duration of use (years) ¹⁶³	Estimated duration of busy period (months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity ¹⁶⁴	
						Cars/LGV	HGV
Satellite	Pyford Brook viaduct satellite compound	A515 Lichfield Road	Civil engineering - January 2021	Three years and six months	7	22-22	51-62
			Site reinstatement – January 2026	Three months	3		59-59
Satellite	Pyford Brook utility compound	A515 Lichfield Road	September 2021	One year and six months	1	26-26	16-16
Satellite	Common Lane utility compound	A515 Lichfield Road	March 2023	Six months	1	30-30	51-51

¹⁶² HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, Volume 5: Technical appendices, draft Code of Construction Practice (CT-003-000). Available online at <https://www.gov.uk/government/publications/draft-code-of-construction-practice-for-hs2-phase-2a>

¹⁶³ The Volume 2 scheme description of the construction phase represents the duration of works in a different way to the Volume 5: Transport Assessment addendum (SES2 and AP2 ES Volume 5: Appendix TR-001-000). The Volume 2 scheme description is based on quarters (each representing three months), e.g. December (Quarter 4) to February (Quarter 1) is rounded to six months, whereas the Volume 5: Transport Assessment addendum counts the absolute duration and is then rounded e.g. three months.

¹⁶⁴ For each compound the peak month of activity is the month within which HGV traffic is at its highest for that compound. The busy period is the period during which HGV traffic serving that compound will be greater than 50% of the HGV traffic in the peak month. The average daily combined two-way vehicle trips for the busy period is the lower end of the range shown in the table below. Two-way trips refer to the total number of vehicle movements in both directions (i.e. with 200 westbound vehicles and 100 eastbound vehicles, there would be 300 two-way trips).

SES2 and AP2 ES Volume 2 – Community area 1, Fradley to Colton

Compound type	Location	Access to/from compound to main road network	Indicative start/set up date	Estimated duration of use (years) ¹⁶³	Estimated duration of busy period (months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity ¹⁶⁴	
						Cars/LGV	HGV
Satellite	Pyford North embankment satellite compound	A515 Lichfield Road	Civil engineering - July 2020	Four years and three months	4	55-55	71-103
			Site reinstatement – January 2026	Three months	2		94-94
			Railway systems – December 2024	One year and three months	4	46-65	160-162
Satellite	Lichfield Road utility compound	Crawley Lane to A515 Lichfield Road for site set up and servicing, followed by site haul route to A515 Lichfield Road	June 2021	Nine months	1	67-67	19-19
Transfer node	Transfer node associated with Pyford North embankment satellite compound	A515 Lichfield Road	January 2022	Two years and six months	6	N/A	249-499
Satellite	Bourne embankment satellite compound	A513 Rugeley Road and on to the A515 Lichfield Road	Civil engineering - January 2021	Four years and six months	14	88-88	59-82
			Site reinstatement - January 2026	Three months	1		74-74
Transfer node	Transfer node associated with Bourne embankment satellite compound	A513 Rugeley Road and on to the A515 Lichfield Road	January 2022	Two years	4	N/A	439-498
Satellite	River Trent viaduct satellite compound	A513 Rugeley Road and on to the A515 Lichfield Road	Civil engineering - January 2021	Four years six months	50	121-121	45-68
			Site reinstatement – January 2026	Three months	2		45-45
Satellite	Pipe Ridware embankment satellite	Site haul route to Common Lane, B5014	Civil engineering – July 2020	Three years and nine months	2	65-66	80-105

SES2 and AP2 ES Volume 2 – Community area 1, Fradley to Colton

Compound type	Location	Access to/from compound to main road network	Indicative start/set up date	Estimated duration of use (years) ¹⁶³	Estimated duration of busy period (months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity ¹⁶⁴	
						Cars/LGV	HGV
	compound	Uttoxeter Road, A513 Rugeley Road and onto A515 Lichfield Road	Site reinstatement – January 2026	Three months	2		51-54
			Railway systems – December 2024	One year and three months	4	69-86	159-162
Satellite	Pipe Lane utility compound	Site haul route to Common Lane, B5014 Uttoxeter Road, A513 Rugeley Road and onto A515 Lichfield Road	March 2022	Six months	1	29-30	36-36
Satellite	Blithbury crossovers satellite compound	Site haul route to Common Lane, B5014 Uttoxeter Road, A513 Rugeley Road and onto A515 Lichfield Road	January 2026	Three months	2	up to 10	up to 10
Satellite	Parkgate grid supply point utility compound	B5234 Duffield Lane, B5017 Henhurst Hill, B5017 Forest Road and onto A5121 Wellington Road	January 2021	Four years	3	29-30	35-38
Satellite	Blithbury Central cutting satellite compound	Blithbury Road, B5013 Colton Road and onto A51 Rugeley Eastern Bypass for set up, servicing followed by site haul route to Common Lane, B5014 Uttoxeter Road, A513 Rugeley Road and onto A515 Lichfield Road	Civil engineering – October 2020	Four years and six months	30	84-119	41-55
			Site reinstatement – February 2026	Three months	1		111-111
Satellite	Blithbury North cutting satellite compound	Hollow Lane maintenance access, Hollow Lane, Blithbury Road, B5013 Colton Road and onto A51 Rugeley Eastern	Civil engineering – January 2021	Four years and three months	23	154-154	45-58
			Site reinstatement – January	Six months	1		48-48

SES2 and AP2 ES Volume 2 – Community area 1, Fradley to Colton

Compound type	Location	Access to/from compound to main road network	Indicative start/set up date	Estimated duration of use (years) ¹⁶³	Estimated duration of busy period (months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity ¹⁶⁴	
						Cars/LGV	HGV
		Bypass for set up and servicing, followed by site haul route to Common Lane, B5014 Uttoxeter Road, A513 Rugeley Road and onto A515 Lichfield Road	2026				
Satellite	Newlands Lane auto-transformer feeder station satellite compound	Newlands Lane, Hollow Lane maintenance access, Hollow Lane, Blithbury Road, B5013 Colton Road and onto A51 Rugeley Eastern Bypass	December 2024	One year and three months	8	50-74	up to 10
Satellite	Stockwell Heath cutting satellite compound	B5013 Uttoxeter Road and on to the A51 Rugeley Eastern Bypass	Civil engineering - January 2021	Four years and three months	1	55-55	100-100
			Site reinstatement – January 2026	Six months	1		37-37
			Railway systems – April 2025	Nine months	4	38-52	158-160
Satellite	Jonghams Lane utility compound	Jonghams Lane, B5013 Uttoxeter Road and on to the A51 Rugeley Eastern Bypass	April 2021	Six months	5	30-30	11-11
Satellite	Moreton Brook viaduct satellite compound	Site haul route, B5013 Uttoxeter Road, Colton Road and onto A51 Rugeley Eastern Bypass	Civil engineering – February 2021	Three years and six months	7	11-11	27-37
			Site reinstatement – July 2026	Three months	1		Up to 10

7.3.15 The amendment for Handsacre Junction (AP2-001-001) requires changes to a small number of HS2 Phase One compounds, and additional compounds, as a consequence of the amendments to the design. Table 20 contains information on the additional traffic use of these compounds over and above that identified for HS2 Phase One.

SES2 and AP2 ES Volume 2 – Community area 1, Fradley to Colton

Table 20: Typical additional vehicle trip generation for construction sites associated with the Handsacre amendment

Compound type	Location	Access to/from compound to main road network	Indicative start/set up date	Estimated duration of use (years) ¹⁶⁵	Estimated duration of busy period (months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity ¹⁶⁶	
						Cars/LGV	HGV
Main	A515 Lichfield Road underbridge main compound	A515 Lichfield Road	Civil engineering - April 2020	Three years and nine months	3	81-81	42-59
			Site reinstatement – July 2025	Six months	2		73-73
Satellite	A515 Lichfield Road underbridge satellite compound	A515 Lichfield Road	Civil engineering - January 2021	Two years	16	A515 main compound	Up to 10
			Site reinstatement – January 2023	Three months	3		12-12
Satellite	Harvey's Rough viaduct satellite compound and Shaw Lane satellite compound	Shaw Lane to B5014 Lichfield Road and onto A515 Lichfield Road	Civil engineering – April 2020	Three years and nine months	11	A515 main compound	18-22
			Site reinstatement – November 2023	Six months	2		40-50
			Rail Systems – November 2021	Three years and three months	8		62-62
Main	Spode Avenue main compound	Site haul route to Shaw Lane, B5014 Lichfield Road and onto A515 Lichfield Road	Rail Systems – November 2021	Three years and three months	8	62-62	Up to 10
Transfer Node	Wood End Lane Eastbound road head ¹⁶⁷	Wood End Lane and onto A38 Rykneld Street	April 2022	One year and six months	6	N/A	144-154

¹⁶⁵ The Volume 2 scheme description of the construction phase represents the duration of works in a different way to the Volume 5 Transport Assessment addendum (SES2 and AP2 ES Volume 5: Appendix TR-001-000). The Volume 2 scheme description is based on quarters (each representing three months), e.g. December (Quarter 4) to February (Quarter 1) is rounded to six months, whereas the Volume 5 Transport Assessment assessment counts the absolute duration and is then rounded e.g. three months

¹⁶⁶ For each compound the peak month of activity is the month within which HGV traffic is at its highest for that compound. The busy period is the period during which HGV traffic serving that compound will be greater than 50% of the HGV traffic in the peak month. The average daily combined two-way vehicle trips for the busy period is the lower end of the range shown in the table below. Two-way trips refer to the total number of vehicle movements in both directions (i.e. with 200 westbound vehicles and 100 eastbound vehicles, there would be 300 two-way trips).

¹⁶⁷ Road heads are sites where excavated materials from the HS2 Phase One scheme leave or enter the construction worksites from the public roads and are the equivalent to HS2 Phase 2a transfer nodes.

7.3.16 Information on the indicative construction programme is provided in Section 2 of the SES2 and the construction methodology is summarised in Volume 1, Section 6 of the main ES. This illustrates how the phasing of activities at different compounds will generally be staggered and that construction activities at individual compounds may not occur over the whole duration presented in Table 19 and Table 20.

7.3.17 Where construction routes serve more than one construction compound, the combined vehicle movements during the busiest period for each section of each route have been assessed. The effects resulting from changes to construction compounds have been considered and are reported in the highway network section.

Highway network

7.3.18 The main ES reported effects related to increases in congestion and delay including the combined effects associated with the construction of HS2 Phase One, which were significant, at the following locations:

- A5192 Eastern Avenue/A5127 Trent Valley Road roundabout – major adverse effect;
- B5014 Lichfield Road/A515 Tewnals Lane – major adverse effect;
- A515 Lichfield Road/Wood End Lane – minor adverse effect;
- A51 Stafford Road/A513 Rugeley Road/Armitage Road roundabout – minor adverse effect;
- A51 Stafford Road/Borough Lane – major adverse effect;
- A51 Stafford Road/Breretonhill Lane – major adverse effect; and
- A5192 Eastern Avenue/A51 Stafford Road signals – moderate adverse effect.

7.3.19 In addition to the combined effects reported in the main ES, the HS2 Phase One SES and AP2 ES reported that changes in traffic flows during construction would result in a substantial increase in congestion and delay for vehicle users at the western part of the junction between A38 Rykneld Street and Wood End Lane (Hilliards Cross), considered to be a major significant effect.

7.3.20 The HS2 Phase One SES3 scheme¹⁶⁸ identified mitigation to the Hilliards Cross junction (SES3-002-001), including an upgrade to the carriageway and signalisation of the junction. This mitigation removed the major adverse congestion and delay significant effect to vehicle users of the Wood End Lane/A38(T) Rykneld Street junction identified in the HS2 Phase One SES and AP2 ES.

¹⁶⁸ Described in the HS2 Ltd Phase One, SES2 and AP4 ES Volume 2, CFA22 available: <https://www.gov.uk/transport/hs2-phase-one>

- 7.3.21 The SES2 scheme in this area includes SES2 changes to reduce construction traffic flows. These included changes to the use of construction traffic routes (the addition of a construction traffic route along Wood End Lane (SES2-001-001)), improved use of site haul routes, and changes to the movement and use of surplus excavated material.
- 7.3.22 The AP2 revised scheme includes an AP2 amendment to modify the network to mitigate the impact of construction traffic at the A515 Lichfield Road and Wood End Lane junction and widening of Wood End Lane (AP2-001-002). This amendment will reduce the impact of construction traffic around the Lichfield area and in particular will substantially reduce construction traffic on the A5192 Eastern Avenue in the peak month.
- 7.3.23 The SES2 changes and AP2 amendments will result in changes to the congestion and delay effects for vehicle occupants in the area, as reported in the main ES, at the following locations:
- A5192 Eastern Avenue/A5127 Trent Valley Road roundabout – the addition of a new construction traffic route along Wood End Lane (SES2-001-001), combined with changes to the movement and use of surplus excavated material, will reduce the level of significance of the effect at the A5192 Eastern Avenue/A5127 Trent Valley Road roundabout from a temporary major adverse significant effect to a temporary minor adverse effect, which is significant;
 - A5192 Eastern Avenue/A51 Stafford Road signals – the addition of a new construction traffic route along Wood End Lane (SES2-001-001), combined with changes to the movement and use of surplus excavated material (SES2-001-004, SES2-001-007 and SES2-001-008), will reduce the level of significance of the effect at the A5192 Eastern Avenue/A51 Stafford Road signals from a temporary moderate adverse significant effect to a temporary minor adverse effect, which is significant;
 - A515 Lichfield Road/Wood End Lane – the modifications to the A515 Lichfield Road and Wood End Lane junction and widening of Wood End Lane (AP2-001-002) will remove the temporary minor adverse significant effect at the A515 Lichfield Road/Wood End Lane junction; and
 - A51 Stafford Road/Breretonhill Lane – the changes to the movement and use of surplus excavated material (SES2-001-004, SES2-001-007 and SES2-001-008) will reduce the level of significance of the effect at the A51 Stafford Road/Breretonhill Lane junction from a temporary major adverse significant effect to a temporary minor adverse effect, which is significant.
- 7.3.24 The SES2 changes and AP2 amendments (and in particular the addition of a construction traffic route along Wood End Lane (SES-001-001)) will increase construction traffic flows on Wood End Lane and at the Wood End Lane/A38(T) Rykneld Street (Hilliards Cross) junction. In the absence of any mitigation measures, this would give rise to a new major adverse congestion and delay effect, which is significant, on the vehicle users of the Wood End Lane/A38(T) Rykneld Street junction.

- 7.3.25 However, the HS2 Phase One scheme also uses part of this route for construction access to the HS2 Phase One construction compounds, and the HS2 Phase One SES3 and AP4 ES identified measures at the Wood End Lane/A38(T) Rykneld Street junction which mitigated the construction traffic impacts of the Phase One scheme. The HS2 Phase One construction traffic peak occurs before the peak of the HS2 Phase 2a construction traffic, although there is some overlap in the construction traffic between HS2 Phase One and HS2 Phase 2a which provides a combined peak.
- 7.3.26 The HS2 Phase One mitigation will also mitigate the major adverse congestion and delay significant effect to vehicle users of the Wood End Lane/A38(T) Rykneld Street junction that would otherwise arise as a result of the SES2 changes and AP2 amendments alone or in combination with HS2 Phase One construction traffic.
- 7.3.27 There are other changes to traffic congestion and delay arising from the combination of SES2 changes and AP2 amendments. However, these do not result in new or different significant traffic effects. Changes to traffic are reported in SES2 and AP2 ES Volume 5: Appendix TR-001-000.
- 7.3.28 The main ES reported traffic severance effects for non-motorised users from increases in either all traffic (including worker trips, light goods vehicles (LGV) and heavy goods vehicles (HGV) traffic) or HGV traffic, which were significant, at the following locations:
- A51 Stafford Road between the A5192 Eastern Avenue, the A515 Featherbed Lane and the boundary with the Colwich to Yarlet area (CA2), close to the A460 Wolseley Road – major adverse effect as a result of an increase in HGV traffic;
 - A515 Lichfield Road between the A51 Stafford Road and the HS2 route – major adverse effect as a result of an increase in HGV traffic;
 - A513 Rugeley Road/Kings Bromley Lane between Shaw Lane and the B5014 Uttoxeter Road – major adverse effect as a result of an increase in HGV traffic;
 - B5014 Uttoxeter Road between Stonyford Lane and the HS2 route – moderate adverse effect as a result of an increase in HGV traffic;
 - B5014 Uttoxeter Road between Stonyford Lane and Common Lane – major adverse effect as a result of an increase in HGV traffic;
 - B5014 Uttoxeter Road between the A513 Rugeley Road and Common Lane – moderate adverse effect as a result of an increase in HGV traffic;
 - B5013 Uttoxeter Road between the HS2 route and Bellamour Lane – minor adverse effect as a result of an increase in HGV traffic;
 - Blithbury Road between the B5014 Uttoxeter Road and Hollow Lane – moderate adverse effect as a result of an increase in all traffic;
 - Newlands Lane between the B5014 Uttoxeter Road and the HS2 route – moderate adverse effect as a result of an increase in all traffic;

- Dawson Lane between Pipe Lane and the HS2 route – moderate adverse effect as a result of an increase in all traffic;
- Pipe Lane between School Lane and Pipe Wood Lane – moderate adverse effect as a result of an increase in all traffic;
- Common Lane between the A515 Lichfield Road and the HS2 route – moderate adverse effect as a result of an increase in HGV traffic; and
- Hollow Lane between Blithbury Road and Colton Bridleway 33 – major adverse effect as a result of an increase in all traffic.

7.3.29 The AP1 revised scheme included an AP1 amendment relating to the permanent widening of Common Lane and a section of Pipe Lane, and the provision of a new site haul route from Pipe Lane towards the Pipe Ridware embankment (AP1-001-003). The SES1 and AP1 ES reported changes to the traffic severance effects for non-motorised users at the following locations:

- B5014 Uttoxeter Road between Stonyford Lane and the HS2 route – removal of the moderate adverse effect on traffic severance for non-motorised users;
- B5014 Uttoxeter Road between Stonyford Lane and Common Lane – removal of the major adverse effect on traffic severance for non-motorised users; and
- Pipe Lane between School Lane and Pipe Wood Lane – removal of the moderate adverse effect on traffic severance for non-motorised users.

7.3.30 At Common Lane, between the B5014 Uttoxeter Road and Pipe Lane the SES1 and AP1 ES reported a new moderate adverse traffic severance effect for non-motorised users as a result of an increase in HGV traffic on this section of the road.

7.3.31 The SES2 changes and AP2 amendments to the construction routes and the movement and use of surplus excavated material, will result in changes to the traffic severance effects for non-motorised users, as reported in the main ES, at the following locations:

- A51 Stafford Road between the A515 Featherbed Lane and the boundary with the Colwich to Yarlet area (CA2), close to the A460 Wolseley Road – a reduction in construction traffic flows, particularly as a result of the addition of a new construction traffic route along Wood End Lane (SES-001-001), will reduce the level of significance of the effect from a temporary major adverse significant effect to a temporary moderate adverse effect, which is significant;
- A51 Stafford Road between the A5192 Eastern Avenue and A515 Featherbed Lane - a reduction in construction traffic flows, particularly as a result of the addition of a new construction traffic route along Wood End Lane (SES-001-001), will remove the temporary major adverse significant effect;
- A513 Rugeley Road/Kings Bromley Lane between Shaw Lane and the B5014 Uttoxeter Road – a reduction in construction traffic flows on this section will reduce the level of significance of the effect from a temporary major adverse significant effect to a temporary moderate adverse effect, which is significant;

- Newlands Lane between the B5014 Uttoxeter Road and the HS2 route – a reduction in construction traffic flows on this section will remove the temporary moderate adverse significant effect;
- Dawson Lane between Pipe Lane and the HS2 route – a reduction in construction traffic flows on this section will remove the temporary moderate adverse significant effect; and
- Hollow Lane between Blithbury Road and Colton Bridleway 33 – a reduction in construction traffic flows on this section will reduce the level of significance of the effect from a temporary major adverse significant effect to a temporary moderate adverse effect, which is significant.

7.3.32

Changes to the construction routes and the movement and use of surplus excavated material, will give rise to new traffic severance effects for non-motorised users, at the following locations:

- Blithbury Road between the B5013 Colton Road and Hollow Lane – an increase in HGV traffic will introduce a new temporary minor adverse effect, which is significant;
- Blithbury Road between the B5014 Uttoxeter Road and construction access to the replacement facility for Mayfield Children’s Home (AP2-002-001) – an increase in HGV traffic will introduce a new temporary moderate adverse effect, which is significant;
- Wood End Lane between the A38 Rykneld Street and the A515 Lichfield Road – an increase in HGV traffic, particularly as a result of the addition of a new construction traffic route along Wood End Lane (SES-001-001), will introduce a new major adverse effect, which is significant. The HS2 Phase One SES and AP2 ES already reported a temporary major adverse significant effect for non-motorised users between the A38 Rykneld Street and Wood End Lane roadhead west of Gorse Lane. This new temporary effect will be of the same level of significance as the Phase One effect, but will occur at a different time over this section;
- B5014 Lichfield Road between A515 Lichfield Road and Shaw Lane – an increase in HGV traffic, particularly as a result of the Handsacre Junction (AP2-001-001), will introduce a new temporary moderate adverse effect, which is significant;
- Jonghams Lane – an increase in HGV traffic, particularly as a result of a new utility compound to facilitate a Western Power Distribution power line diversion, west of Jonghams Cottage (SES2-001-009), will introduce a new temporary minor adverse effect, which is significant;
- B5234 Duffield Lane between the compound access and Rangemore Hill in Needwood – an increase in HGV traffic, particularly as a result of the additional land required for an amendment to a National Grid Electricity Transmission 400kV overhead power line and a new utility compound, near Kings Bromley

viaduct (AP2-001-007) will introduce a new temporary minor adverse effect, which is significant; and

- B5017 Henhurst Hill between Rangemore Hill in Needwood and Postern Road – an increase in HGV traffic, particularly as a result of the additional land required for an amendment to a National Grid Electricity Transmission 400kV overhead power line and a new utility compound, near Kings Bromley viaduct (AP2-001-007) will introduce a new temporary minor adverse effect, which is significant.

7.3.33 The SES2 changes and AP2 amendments will have the same effect as reported in the SES and AP1 ES relating to the permanent widening of Common Lane and a section of Pipe Lane, and the provision of a new site haul route from Pipe Lane towards the Pipe Ridware embankment (AP1-001-003) and remove the traffic severance adverse significant effects for non-motorised users at the following locations:

- B5014 Uttoxeter Road between Stonyford Lane and the HS2 route – removal of the temporary moderate adverse significant effect;
- B5014 Uttoxeter Road between Stonyford Lane and Common Lane – removal of the temporary major adverse significant effect; and
- Pipe Lane between School Lane and Pipe Wood Lane – removal of the temporary moderate significant adverse.

7.3.34 The SES2 changes and AP2 amendments will give rise to a new temporary moderate adverse traffic severance effect for non-motorised users as a result of an increase in HGV traffic on Common Lane, between the B5014 Uttoxeter Road and Pipe Lane. This is the same as the temporary effect reported in the SES1 and AP1 ES relating to the permanent widening of Common Lane and a section of Pipe Lane, and the provision of a new site haul route from Pipe Lane towards the Pipe Ridware embankment (AP1-001-003).

7.3.35 There are other changes to construction traffic flows arising from the combination of SES2 changes and AP2 amendments. However, these do not result in new or different significant traffic effects. Changes to traffic flows are reported in SES2 and AP2 ES Volume 5: Appendix TR-001-000.

Permanent effects

7.3.36 There are no permanent traffic and transport effects resulting from changes in construction traffic flows in the Fradley to Colton area.

Other mitigation measures

7.3.37 No mitigation measures additional to those reported in the main ES and draft CoCP are required.

Summary of likely residual significant effects

- 7.3.38 The SES2 changes and AP2 amendments remove the minor adverse significant effect on congestion and delay to vehicle users of the A515 Lichfield Road/Wood End Lane junction.
- 7.3.39 The SES2 changes and AP2 amendments will result in changes to the congestion and delay effects on vehicle occupants, as reported in the main ES, at the following locations:
- A5192 Eastern Avenue/A5127 Trent Valley Road roundabout – will reduce from a temporary major adverse significant effect to a likely residual temporary minor adverse significant effect;
 - A5192 Eastern Avenue/A51 Stafford Road signals – will reduce from a temporary moderate adverse significant effect to a likely residual temporary minor adverse significant effect; and
 - A51 Stafford Road/Breretonhill Lane junction – will reduce from a temporary major adverse significant effect to a likely residual temporary minor adverse significant effect.
- 7.3.40 The SES2 changes and AP2 amendments will remove the traffic severance significant effects for non-motorised users, as reported in the main ES, at the following locations:
- A51 Stafford Road, between the A5192 Eastern Avenue and the A515 Featherbed Lane;
 - Newlands Lane between the B5014 Uttoxeter Road and the HS2 route; and
 - Dawson Lane between Pipe Lane and the HS2 route.
- 7.3.41 The SES2 changes and AP2 amendments will result in changes to the traffic severance effects for non-motorised users, as reported in the main ES, at the following locations:
- A51 Stafford Road between A515 Featherbed Lane and the boundary with the Colwich to Yarlet area (CA2) close to the A460 Wolseley Road – will reduce from a temporary major adverse significant effect to a likely residual temporary moderate adverse significant effect;
 - A513 Rugeley Road/Kings Bromley Lane between Shaw Lane and the B5014 Uttoxeter Road – will reduce from a temporary major adverse significant effect to a likely residual temporary moderate adverse significant effect; and
 - Hollow Lane between Blithbury Road and Colton Bridleway 33 – will reduce from a temporary major adverse significant effect to a likely residual temporary moderate adverse significant effect.
- 7.3.42 The SES2 changes and AP2 amendments will give rise to a new traffic severance effects for non-motorised users at the following locations:

- Blithbury Road between the B5103 Colton Road and Hollow Lane - a new likely residual temporary minor adverse significant effect;
- Blithbury Road between the B5014 Uttoxeter Road and construction access to the replacement facility for Mayfield Children's Home - a new likely residual temporary moderate adverse significant effect;
- Wood End Lane between the A38 Rykneld Street and the A515 Lichfield Road - a new likely residual temporary major adverse significant effect;
- B5014 Lichfield Road between A515 Lichfield Road and Shaw Lane - a new likely residual temporary moderate adverse significant effect;
- Jonghams Lane - a new likely residual temporary minor adverse significant effect;
- B5234 Duffield Lane between the compound access and Rangemore Hill in Needwood - a new likely residual temporary minor adverse significant effect; and
- B5017 Henhurst Hill between Rangemore Hill in Needwood and Postern Road - a new likely residual temporary minor adverse significant effect.

7.3.43 The SES2 changes and AP2 amendments will also have the same effect as reported in the SES1 and AP1 ES relating to the permanent widening of Common Lane and a section of Pipe Lane, and the provision of a new site haul route from Pipe Lane towards the Pipe Ridware embankment (AP1-001-003) and remove the traffic severance adverse significant effects for non-motorised users at the following locations:

- B5014 Uttoxeter Road between Stonyford Lane and the HS2 route;
- B5014 Uttoxeter Road between Stonyford Lane and Common Lane; and
- Pipe Lane between School Lane and Pipe Wood Lane.

7.3.44 The SES2 changes and AP2 amendments will give rise to a new temporary moderate adverse traffic severance effect for non-motorised users on Common Lane, between the B5014 Uttoxeter Road and Pipe Lane. This is the same as the effect reported in the SES and AP1 ES.

Cumulative effects

7.3.45 This combined assessment has taken into account cumulative effects from background traffic growth, committed developments and traffic and transport impacts arising from the SES2 changes and AP2 amendments in this area and other community areas.

7.4 Air quality

Scope, assumptions and limitations

7.4.1 The assessment scope, key assumptions and limitations for air quality are as set out in Volume 1, the SMR and SMR Addendum of the main ES.

- 7.4.2 As set out in Volume 1, since the production of the main ES, updated background pollutant concentrations and road vehicle emission factors have become available from the Department for Environment, Food and Rural Affairs (Defra). These have been used in this assessment. The updated road vehicle emission factors are higher for NO_x than those used in the main ES, especially along motorways. Therefore, higher concentrations have been predicted for the future baseline scenario (without the HS2 scheme). At locations where NO₂ concentrations are predicted to exceed the annual mean air quality standard of 40µg/m³ without the scheme, it is more likely that a small increase in concentrations due to the scheme will result in a significant effect.

Environmental baseline

Existing baseline

- 7.4.3 The baseline air quality information for the Fradley to Colton area is as described in Volume 2, CA1, Section 5 of the main ES.
- 7.4.4 Since the production of the main ES, air quality measurements for the baseline year of 2016 have become available. There are currently five relevant diffusion tube sites located within the Fradley to Colton area for monitoring NO₂ concentrations. These are located along the A38 Lichfield Road, within Lichfield and Rugeley. Measured NO₂ concentrations in 2016 were above the air quality standard at two of these sites, both located along the A38 Lichfield Road. Details of their location and data measurements are provided in the SES2 and AP2 ES Volume 5: Appendix AQ-001-001 and Map Series AQ-01, which accompany the SES2 and AP2 ES.
- 7.4.5 The updated background concentrations from Defra are within the air quality standards for all pollutants in the baseline year of 2016 within the Fradley to Colton area. Details are provided in BID-AQ-002-000, which accompanies the SES2 and AP2 ES.

Future baseline

Construction (2020)

- 7.4.6 The updated background concentrations from Defra for the first year of construction in 2020 predict NO₂, PM₁₀ and PM_{2.5} levels in 2020 to be lower than in the 2016 baseline and within the relevant air quality standards.
- 7.4.7 Volume 5: Appendix CT-004-000 of the SES2 and AP2 ES provides details of the developments which are assumed to have been implemented by 2020 for construction, additional to those identified in the main ES. These have been included as future receptors in the assessment of air quality impacts and are detailed in Volume 5: Appendix AQ-001-001 of the SES2 and AP2 ES.
- 7.4.8 None of the identified developments affect the assessment of the SES2 scheme and AP2 revised scheme's likely construction impacts on air quality.

Effects arising during construction

Avoidance and mitigation measures

- 7.4.9 No avoidance or mitigation measures additional to those reported in the main ES and draft CoCP are required.

Assessment of impacts and effects

Temporary effects

- 7.4.10 Construction activity could affect local air quality through the additional traffic generated on local roads as a result of construction vehicles and through changes to traffic patterns arising from temporary road diversions and realignments.
- 7.4.11 The assessment of construction traffic emissions has been undertaken for a 'without scheme' and a 'with scheme' scenarios. The traffic data for each scenario includes the additional traffic from future committed developments.
- 7.4.12 Construction traffic data in the area has been screened to identify roads that required further assessment and to confirm the likely effect of the change in emissions from vehicles using those roads in the construction period. These were primarily the main roads within the study area, namely the A38 Rykneld Street, Cappers Lane, Wood End Lane, the A51 Stafford Road, the A515 Lichfield Road, the A5192 Eastern Avenue, the A513 King's Bromley Lane and the B5014 Ridware Road.
- 7.4.13 Concentrations of NO₂, PM₁₀ and PM_{2.5} are predicted to be within the relevant air quality standards during construction of the scheme. No new or different significant effects are predicted at any receptor during construction of the SES2 and AP2 revised scheme. Details are provided in the SES2 and AP2 ES Volume 5: Appendix AQ-001-001.

Permanent effects

- 7.4.14 No permanent effects on local air quality are likely to arise from changes in construction traffic flows in the Fradley to Colton area.

Other mitigation measures

- 7.4.15 No mitigation measures additional to those reported in the main ES and draft CoCP are required.

Summary of likely residual significant effects

- 7.4.16 No new or different residual significant effects are likely in the Fradley to Colton area as a result of changes to construction traffic flows from the SES2 design changes and AP2 amendments.

Cumulative effects

- 7.4.17 This combined assessment has taken into account cumulative effects from background traffic growth, committed developments and impacts related to

traffic emissions arising from the SES2 changes and AP2 amendments in this area and other community areas.

7.5 Sound, noise and vibration

Scope, assumptions and limitations

- 7.5.1 The assessment scope, key assumptions and limitations for sound, noise and vibration are as set out in Volume 1 and the SMR of the main ES.

Environmental baseline

Existing baseline

- 7.5.2 The baseline sound, noise and vibration information for the Fradley to Colton area is as described in Volume 2, CA1, Section 13 of the main ES.

Future baseline

Construction (2020)

- 7.5.3 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 7.5.4 No avoidance or mitigation measures additional to those reported in the main ES and draft CoCP are required.

Assessment of impacts and effects

- 7.5.5 The main ES identified an indirect likely construction significant effect on a community basis at approximately 10 residential properties on or adjacent to Blithbury Road/Hollow Lane between Blithbury and Colton. This was denoted as CSV01-Co5 in the main ES Volume 5: Appendix SV-002-001.

- 7.5.6 The SES2 changes and AP2 amendments reduce both the average and peak monthly construction road traffic movements on Blithbury Road/Hollow Lane, and thus reduces the associated construction traffic noise levels. For further information see SES2 and AP2 ES Volume 5: Appendix SV-002-000. The reduction in construction traffic noise levels will remove the likely indirect residual significant effect reported in the main ES on properties on Blithbury Road/Hollow Lane between Blithbury and Colton.

Other mitigation measures

- 7.5.7 No mitigation measures additional to those reported in the main ES and draft CoCP are required.

Summary of likely residual significant effects

- 7.5.8 The construction traffic changes will remove the indirect likely residual significant effect reported in the main ES at properties on or adjacent to Blithbury Road/Hollow Lane between Blithbury and Colton.

Cumulative effects

- 7.5.9 This combined assessment has taken into account cumulative effects from changes in traffic flows as a result of the all SES2 changes and AP2 amendments in this area and other community areas.

7.6 Community

Scope, assumptions and limitations

- 7.6.1 The assessment scope, key assumptions and limitations for community are as set out in Volume 1, the SMR and SMR Addendum of the main ES.

Environmental baseline

Existing baseline

- 7.6.2 The baseline community information for the Fradley to Colton area is as described in Volume 2, CA1, Section 6 of the main ES.
- 7.6.3 Kings Bromley is a village of approximately 420 residential properties. The village includes a primary school, places of worship, a public house and Kings Bromley Care Home. South of the main village there are also smaller clusters of residential properties, including Rileyhill.
- 7.6.4 Blithbury is a small village of approximately 25 residential properties, approximately 3.5km north-west of Rugeley. Approximately 1.1km west of Blithbury there is a small settlement of five residential properties related to Hadley Gate Farm. Approximately 200m south-west of these are a further three residential properties, located along Blithbury Road, which are associated with Rosewood Farm.
- 7.6.5 Stockwell Heath is a small, rural hamlet located north of Colton with approximately 10 residential properties. Colton includes approximately 220 residential properties. Stockwell Heath is closely linked with Colton, as the majority of local services for residents are located in Colton, including a church, a primary school and a pub. Moor Lane and Newlands Lane link the two villages. There is a duck pond located in the centre of Stockwell Heath between Newlands Lane and Moor Lane. Hamley Heath is located to the west of these settlements and includes a small number of residential properties based around Hamley Heath Farm.
- 7.6.6 The Four Seasons Nature Study Centre is owned and managed by Conservation, Horticulture, Agriculture for the Disabled Society (CHADS). The whole site is fully wheelchair accessible with the visitor centre acting as the focal point for many of the activities undertaken by the charity. The facilities are used on at least a weekly basis for activities such as surveying, planting, crafting, gardening or

farming. Yoga and meditation classes are also held regularly on site, and other specialist groups hire the site on a less regular basis. The centre is used by a high proportion of people who have limited ability to cope with change.

- 7.6.7 Trentside Meadows, a Local Wildlife Site (LWS) is also owned and managed by CHADS. The site is an area of approximately 27.7ha, located between the River Trent and the A513 Rugeley Road, west of Kings Bromley. The ecological value of the site is intrinsically linked to the reason why people visit Trentside Meadows. Visits to Trentside Meadows are by appointment only, and generally only take place on average about once a month. Trentside Meadows is predominantly used as grazing land.

Future baseline

Construction (2020)

- 7.6.8 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 7.6.9 No avoidance or mitigation measures, additional to those reported in the main ES and draft CoCP, are provided.

Assessment of impacts and effects

Temporary effects

- 7.6.10 The main ES reported that approximately eight properties around Rileyhill, east and west of the A515 Lichfield Road, would experience significant temporary adverse visual and HGV effects. The in-combination effect would result in a temporary major adverse significant effect at the eight properties for up to three years in total.
- 7.6.11 The changes in traffic flows will give rise to a different significant effect by changing the duration of the HGV effect on these properties to between one year one month and four years four months. The changes in traffic flows are primarily due to changes to the construction programme, movement of excavated materials and utility works. This will change the overall duration of the in-combination effect on these properties from up to three years, as reported in the main ES, to up to four years and four months. However, this will not change the level of significance of the effect reported in the main ES. For further information see SES2 and AP2 ES Volume 5: Appendix CM-001-001 and SES2 and AP2 ES Volume 5: Community Map Book.
- 7.6.12 The main ES reported that approximately five properties along Shaw Lane and A513 Rugeley Road, south-west of Kings Bromley would experience significant temporary adverse visual and noise effects. The in-combination effect would result in a temporary major adverse significant effect at the five properties for up to three years in total.

- 7.6.13 The changes in traffic flows will give rise to a different significant effect by introducing a new significant HGV effect on these properties for between nine months and four years four months. The changes in traffic flows are primarily due to changes to the construction programme, movement of excavated materials and utility works. This will change the overall duration of the in-combination effect on these properties from up to three years, as reported in the main ES, to up to four years and four months. However, this will not change the level of significance of the effect reported in the main ES. For further information see SES2 and AP2 ES Volume 5: Appendix CM-001-001 and SES2 and AP2 ES Volume 5: Community Map Book.
- 7.6.14 The main ES reported that Trentside Meadows would experience significant temporary adverse visual effects and HGV effects. The in-combination effect would result in a temporary major adverse significant effect at the facility for up to two years and five months in total.
- 7.6.15 The changes in traffic flows will give rise to a different significant effect by changing the duration of the HGV effect on the facility to two years and six months. This will change the overall duration of the in-combination effect on Trentside Meadows from up to two years and five months, as reported in the main ES, to up to two years and six months. However, this will not change the level of significance of the effect reported in the main ES. For further information see SES2 and AP2 ES Volume 5: Appendix CM-001-001 and SES2 and AP2 ES Volume 5: Community Map Book.
- 7.6.16 The main ES as amended by SES2, reported that approximately eight properties north and south of Blithbury Road would experience significant temporary adverse visual noise and HGV effects. The in-combination effect would result in a temporary major adverse significant effect at the eight properties for up to two years and 10 months in total.
- 7.6.17 The changes in traffic flows will give rise to a different significant effect by changing the duration of the HGV effect on these properties to two years and eight months. This will change the overall duration of the in-combination effect on these properties from up to two years and 10 months, as reported in the main ES as amended by SES2, to two years and eight months. However, this will not change the level of significance of the effect reported in the main ES as amended by SES2. For further information see SES2 and AP2 ES Volume 5: Appendix CM-001-001 and SES2 and AP2 ES Volume 5: Community Map Book.
- 7.6.18 The main ES reported that the duck pond in Stockwell Heath would experience significant temporary adverse visual and HGV effects. The in-combination effect would result in a temporary major adverse significant effect at the duck pond for up to two years and seven months in total.
- 7.6.19 The change in traffic flows will give rise to a different significant effect by changing the duration of the HGV effect to two years and five months. This will change the overall duration of the in-combination effect on the duck pond from up to two years and seven months, as reported in the main ES, to two years and five months. However, this will not change the level of significance of the effect

reported in the main ES. For further information see SES2 and AP2 ES Volume 5: Appendix CM-001-001 and SES2 and AP2 ES Volume 5: Community Map Book.

Permanent effects

- 7.6.20 The changes in traffic flows will not give rise to a new or different significant permanent effect and will not change the level of significance of the permanent effects, as reported in the main ES.

Other mitigation measures

- 7.6.21 No mitigation measures, additional to those reported in the main ES and draft CoCP, are provided.

Summary of likely residual significant effects

- 7.6.22 The changes to traffic flows will give rise to different likely residual temporary significant in-combination effect on the following community resources. However, this will not change the level of significance of the effects reported in the main ES:

- eight properties around Rileyhill, due to an increase in the duration of the significant temporary in-combination effect;
- five properties south-west of Kings Bromley, due to an increase in the duration of the significant temporary in-combination effect;
- Trentside Meadows, due to an increase in the duration of the significant temporary in-combination effect;
- seven properties north and south of Blithbury Road, due to a decrease in the duration of the significant temporary in-combination effect; and
- the duck pond in Stockwell Heath, due to a decrease in the duration of the significant temporary in-combination effect.

Cumulative effects

- 7.6.23 This combined assessment has taken into account cumulative effects from changes in traffic flows as a result of the all SES2 changes and AP2 amendments in this area and other community areas.

7.7 Socio-economics

Scope, assumptions and limitations

- 7.7.1 The assessment scope, key assumptions and limitations for socio-economics are as set out in Volume 1 and the SMR of the main ES.

Environmental baseline

Existing baseline

- 7.7.2 The existing baseline information for socio-economics in the Fradley to Colton area is as described in Volume 2, CA1, Section 12 of the main ES.

Future baseline

Construction (2020)

- 7.7.3 The future baseline for construction in 2020 remains unchanged from that reported in the main ES Volume 5: Appendix CT-004-000.

Effects arising during construction

Avoidance and mitigation measures

- 7.7.4 No avoidance or mitigation measures, additional to those reported in the main ES and draft CoCP, are required.

Assessment of impacts and effects

Temporary effects

- 7.7.5 Construction activity could affect businesses as a result of the environmental effects associated with the additional traffic generated on local roads by construction vehicles and changes to traffic patterns arising from temporary road diversions and realignments. These environmental effects include road congestion, increased noise and air pollution.
- 7.7.6 A combination of these effects on businesses may lead users to divert trade to other locations which do not experience these effects. Only certain types of businesses will be particularly sensitive to their surroundings and these will be drawn from sectors like hospitality, catering, recreational/cultural and retail (depending on circumstances).
- 7.7.7 Businesses identified as sensitive to environmental effects with two or more significant adverse effects drawn from other environmental topics are considered to be affected by in-combination effects, as set out in the SMR and SMR Addendum of the main ES.
- 7.7.8 Based on a review of the environmental effects, no new or different significant in-combination effects are predicted at any business receptors as a result of the changes to construction traffic flows.

Permanent effects

- 7.7.9 The changes in traffic flows will not give rise to a new or different significant permanent effect and will not change the level of significance of the permanent effects, as reported in the main ES.

Other mitigation measures

- 7.7.10 No mitigation measures additional to those reported in the main ES and the draft CoCP are required.

Summary of likely residual significant effects

- 7.7.11 No new or different residual significant effects are likely in the Fradley to Colton area as a result of construction traffic flows from the SES2 design changes and AP2 amendments.

Cumulative effects

- 7.7.12 This combined assessment has taken into account cumulative effects from changes in traffic flows as a result of the all SES2 changes and AP2 amendments in this area and other community areas.

7.8 Summary of new or different likely residual significant effects as a result of combined effects due to changes in traffic flows

- 7.8.1 The SES2 changes and AP2 amendments will remove the minor adverse likely residual significant effect on congestion and delay to vehicle users of the A515 Lichfield Road/Wood End Lane junction.
- 7.8.2 The SES2 changes and AP2 amendments will reduce the level of significance from temporary major adverse significant to likely residual temporary minor adverse significant for congestion and delay to vehicle occupants at A5192 Eastern Avenue/A5127 Trent Valley Road roundabout and A51 Stafford Road/Breretonhill Lane junction. At A5192 Eastern Avenue/A51 Stafford Road signals the level of significance will reduce from temporary moderate adverse significant to likely residual temporary minor adverse significant.
- 7.8.3 The SES2 changes and AP2 amendments will remove the temporary major traffic severance significant effects for non-motorised users at A51 Stafford Road, between the A5192 Eastern Avenue and A515 Featherbed Lane. The temporary moderate traffic significant severance effects for non-motorised users will also be removed at: Newlands Lane, between the B5014 Uttoxeter Road and the HS2 route; and Dawson Lane, between Pipe Lane and the HS2 route.
- 7.8.4 The SES2 changes and AP2 amendments will also remove the temporary major traffic severance significant effect for non-motorised users at B5014 Uttoxeter Road between Stonyford Lane and Common Lane. The temporary moderate traffic significant severance effects for non-motorised users will also be removed at: B5014 Uttoxeter Road between Stonyford Lane and the HS2 route; and Pipe Lane between School Lane and Pipe Wood Lane. The removal of these effects is the same as that reported in the SES1 and AP1 ES relating to AP1-001-003.
- 7.8.5 The SES2 changes and AP2 amendments will reduce traffic severance effects for non-motorised users at the following locations:
- A51 Stafford Road between A515 Featherbed Lane and the boundary with the Colwich to Yarlet area (CA2) close to the A460 Wolseley Road – will reduce from a temporary major adverse significant effect to a likely residual temporary moderate adverse significant effect;

- A513 Rugeley Road/Kings Bromley Lane between Shaw Lane and the B5014 Uttoxeter Road – will reduce from a temporary major adverse significant effect to a likely residual temporary moderate adverse significant effect; and
- Hollow Lane between Blithbury Road and Colton Bridleway 33 – will reduce from a temporary major adverse significant effect to a likely residual temporary moderate adverse significant effect.

7.8.6 The SES2 changes and AP2 amendments will give rise to a new traffic severance effects for non-motorised users at the following locations:

- Blithbury Road between the B5103 Colton Road and Hollow Lane – a new likely residual temporary minor adverse significant effect;
- Blithbury Road between the B5014 Uttoxeter Road and construction access to the replacement facility for Mayfield Children’s Home – a new likely residual temporary moderate adverse significant effect;
- Wood End Lane between the A38 Rykneld Street and the A515 Lichfield Road – a new likely residual temporary major adverse significant effect;
- B5014 Lichfield Road between A515 Lichfield Road and Shaw Lane – a new likely residual temporary moderate adverse significant effect;
- Jonghams Lane – a new likely residual temporary minor adverse significant effect;
- B5234 Duffield Lane between the compound access and Rangemore Hill in Needwood – a new likely residual temporary minor adverse significant effect; and
- B5017 Henhurst Hill between Rangemore Hill in Needwood and Postern Road – a new likely residual temporary minor adverse significant effect.

7.8.7 The SES2 changes and AP2 amendments will also give rise to a new temporary moderate adverse traffic severance effect for non-motorised users on Common Lane, between the B5014 Uttoxeter Road and Pipe Lane. This new significant is the same as that reported in the SES1 and AP1 ES relating to AP1-001-003.

7.8.8 The construction traffic changes will remove the indirect likely residual significant effect at properties on or adjacent to Blithbury Road/Hollow Lane between Blithbury and Colton.

7.8.9 The changes in traffic flows will give rise to different likely residual temporary in-combination significant effect on the following community resources due to a change in the duration of the effect. However, this will not change the level of significance of the effects reported in the main ES:

- eight properties around Rileyhill, due to an increase in the duration of the significant temporary in-combination effect;
- five properties south-west of Kings Bromley, due to an increase in the duration of the significant temporary in-combination effect;

- Trentside Meadows, due to an increase in the duration of the significant temporary in-combination effect;
- seven properties north and south of Blithbury Road, due to a decrease in the duration of the significant temporary in-combination effect; and
- the duck pond in Stockwell Heath, due to a decrease in the duration of the significant temporary in-combination effect.

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