

HIGH SPEED RAIL (LONDON - WEST MIDLANDS)

Supplementary Environmental Statement 2 and
Additional Provision 3 Environmental Statement

Volume 3 | Route-wide effects

September 2015

SES2 and AP3 ES 3.3



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Department for Transport

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Contents

Structure of the HS2 Supplementary Environmental Statement 2 and Additional Provision 3 Environmental Statement	1
1 Introduction	3
1.1 Background to High Speed Two	3
1.2 Introduction to the SES2 and AP3 ES for High Speed Two	3
1.3 Terminology used to describe the HS2 scheme	4
1.4 Scope of this report	4
1.5 Structure of this report	6
Part 1: Supplementary Environmental Statement 2	7
2 Climate	7
2.1 Introduction	7
2.2 Scope, assumptions and limitations	7
2.3 Carbon footprint methodology	8
2.4 Green house gas implications of the SES2 design changes	8
2.5 Conclusions	9
3 Cultural heritage	9
4 Ecology	10
4.1 Introduction	10
4.2 Changes to the assessment of effects	11
4.3 Cumulative effects	11
5 Socio-economics	12
5.1 Introduction	12
5.2 Changes to the assessment of effects	12
6 Traffic and transport	12
6.1 Introduction	12
6.2 Changes to the assessment of effects	12
7 Waste and material resources	13
7.1 Introduction	13
7.2 Changes to the assessment of effects	13

8	Phase One and Phase Two combined impacts	15
8.1	Introduction	15
8.2	Summary of changes to combined impacts	15
	Part 2: Additional Provision 3 Environmental Statement	16
9	Climate	16
9.1	Introduction	16
9.2	Changes to the assessment of effects	16
10	Cultural heritage	16
11	Ecology	16
11.1	Introduction	16
11.2	Changes to the assessment of effects	17
11.3	Cumulative effects	17
12	Socio-economics	17
12.1	Introduction	17
12.2	Changes to the assessment of effects	18
13	Traffic and transport	18
13.1	Introduction	18
13.2	Changes to the assessment of effects	18
14	Waste and material resources	18
14.1	Introduction	18
14.2	Changes to the assessment of effects	18
15	Phase One and Phase Two combined impacts	18
15.1	Introduction	18
15.2	Summary of changes to combined impacts	19
16	References	24

List of tables

Table 1: Scheme definitions	4
Table 2: HS2 construction emissions (tCO ₂ e) comparison	9
Table 3: Summary of SES2 scheme excavated material quantities	14
Table 4: Combined impacts of Phase One (original scheme, AP2 revised scheme and AP3 revised scheme) and Phase Two	19

Structure of the HS2 Supplementary Environmental Statement 2 and Additional Provision 3 Environmental Statement

The Supplementary Environmental Statement 2 (SES2) and Additional Provision 3 Environmental Statement (AP3 ES) comprises:

- the non-technical summary (NTS): This provides a summary in non-technical language of the SES2 (Part 1) and the AP3 ES (Part 2) and of the likely significant environmental effects, both beneficial and adverse, including those which are new or different to those reported in the High Speed Two (HS2) Phase One Environmental Statement (ES) submitted to Parliament in November 2013 in support of the hybrid Bill ('the Bill') for Phase One of HS2 (referred to as 'the main ES'). In the case of community forum areas (CFAs) 4 and 5 and relevant route-wide effects, account is also taken of the SES and the AP2 ES both deposited in July 2015;
- Volume 1: introduction to the SES2 and the AP3 ES. This introduces the supplementary environmental information and design changes included within the SES2 and amendments which have resulted in the need to amend the Bill within the AP3 ES. It also explains any changes to the scope, methodology, assumptions and limitations required for the environmental impact assessment (EIA) and approach to consultation;
- Volume 2: CFA reports for CFAs 1 to 5 and associated map books. The structure of the CFA reports within Volume 2 vary as follows:
 - CFA1 is split into two parts. Part 1 comprises the SES2 for the Euston station and approach area. Part 2 describes the amendments requiring additional provisions in the Bill. Part 1 is further split into Part 1A and Part 1B. Part 1A provides a summary of: new environmental baseline information; a description of the revised scheme for Euston, including a comparison with the original scheme described in the main ES; and a summary of the key changes to the likely residual significant effects arising from the revised scheme for Euston compared to the original scheme. Part 1B provides a complete assessment of the revised scheme for the Euston station and approach area, whether or not these are different likely significant environmental effects from those reported in the main ES. This assessment includes the effects of the amendments to the Bill. The Volume 2 CFA1 report of the SES2 therefore replaces the Volume 2 CFA1 report of the main ES;
 - CFAs 2 and 3 report any new or different likely significant environmental effects arising from the SES2 changes and AP3 amendments compared to those reported in the main ES; and

SES2 and AP3 ES Volume 3 – Route-wide effects

- CFAs 4 and 5 report any new or different significant environmental effects arising from the SES2 changes compared to the SES submitted in July 2015 and taking into account any relevant AP2 amendments assessed in the AP2 ES submitted in July 2015; and
- Volume 3: route-wide effects. This describes new or different likely significant route-wide effects arising from the supplementary environmental information and design changes included within the SES2 (Part 1) and amendments within the AP3 ES (Part 2) compared to those reported in the main ES, as updated by the SES. The AP1 and AP2 amendments are taken into account where relevant;
- Volume 5: appendices and map books. This contains supporting environmental information and associated maps; and
- glossary of terms and list of abbreviations. This contains any new or different terms and abbreviations which are not already explained in the main ES.

In the main ES and the AP2 ES, Volume 4 presented an assessment of the likely significant environmental effects that will occur in locations away from the route. None of the SES2 changes or AP3 amendments occur or lead to likely significant effects in off-route areas (i.e. outside the CFAs). Volume 4 is therefore not included within the SES2 and the AP3 ES.

1 Introduction

1.1 Background to High Speed Two

- 1.1.1 The hybrid Bill for high speed rail between London and the West Midlands ('the Bill') was submitted to Parliament together with an Environmental Statement (ES) in November 2013 ('the main ES'). If enacted by Parliament, the Bill will provide the powers to construct, operate and maintain Phase One of High Speed Two (HS2). This phase of HS2 will provide a new north-south railway between London, Birmingham and the West Midlands. Phase Two of HS2 will comprise new lines between the West Midlands, Leeds and Manchester, completing what is known as the 'Y network'. Phase Two is not the subject of this document.
- 1.1.2 Since the deposit of the Bill, the need for a number of amendments (i.e. changes that require amendments to the Bill) to the scheme have been identified. These have been promoted in Parliament through two Additional Provisions (APs). One was deposited in Parliament in September 2014 ('AP1'), which focused on CFAs 7 (Colne Valley) to 26 (Washwood Heath to Curzon Street). The second was deposited to Parliament in July 2015 ('AP2'), which focused on CFAs 4 (Kilburn (Brent) to Old Oak Common) to 26. These were each accompanied by AP ESs.
- 1.1.3 In addition, a Supplementary Environmental Statement ('SES') was deposited in July 2015 alongside the AP2 ES. The SES focused on CFAs 4 to 26 and described and assessed the consequences of new environmental baseline information, changes to construction assumptions, design changes that do not require amendments to the Bill, and corrections to the main ES.

1.2 Introduction to the SES2 and AP3 ES for High Speed Two

- 1.2.1 The need for a number of additional amendments to the Bill have been identified for CFAs 1 to 3. Those amendments that require amendments to the Bill are being promoted via Additional Provision 3 ('AP3'). The associated AP3 ES lists these amendments and reports the associated likely significant environmental effects (refer to Section 1.3 in Volume 1 for the full list of the AP3 amendments).
- 1.2.2 In addition to these amendments, there are also a number of design changes within CFAs 1 to 3 and other changes within CFAs 1 to 5 that do not require amendments to the Bill. These are reported in a second Supplementary Environmental Statement ('the SES2') (refer to Section 1.3 in Volume 1 for the full list of the SES2 changes).
- 1.2.3 The most substantial of the SES2 changes relate to Euston station. Following deposit of the Bill and subsequent discussions with stakeholders, Sir David Higgins undertook a review of the delivery of HS2 Phase One, as set out in HS2 Plus: a report by David Higgins, in March 2014¹. The review questioned whether the Euston proposal was ambitious enough in delivering the best value to the local area and the national economy and suggested further work should be done on an alternative level deck design.
- 1.2.4 Following the HS2 Plus report, the Department for Transport, HS2 Ltd, Network Rail and Transport for London (TfL) began to develop revised proposals for the station,

¹ Department for Transport, (2014), HS2 Plus: a report by David Higgins.

taking account of the need to minimise disruption to the operation of the conventional station and to enable oversite development in order to meet the aspirations of the Euston Area Plan. This included engagement with the London Borough of Camden and relevant train operating companies. This has involved the reconsideration of previous options, including a level deck option, and the development of new options in the light of the changed requirements. This has led to a revised design and construction programme for CFA1 that is assessed in the SES2 and the AP3 ES.

- 1.2.5 The SES2 and the AP3 ES are separate environmental statements, but have been produced as combined volumes.

1.3 Terminology used to describe the HS2 scheme

- 1.3.1 In order to differentiate between the original scheme assessed as part of the main ES and subsequent changes, the terms in Table 1 are used throughout the SES2 and the AP3 ES.

Table 1: Scheme definitions

Scheme name	Definition	Relevant CFAs
the original scheme	the Bill scheme submitted to Parliament in November 2013, which was assessed in the main ES	1 – 26
the AP1 revised scheme	the original scheme as amended by the AP submitted in September 2014	7 – 26
the SES scheme	the original scheme with the design changes described in the SES submitted in July 2015	4 – 26
the AP2 revised scheme	the SES scheme as amended by the AP2 submitted in July 2015	4 – 26
the SES2 scheme	the original scheme as updated by the SES scheme, with the design changes described in the SES2 submitted in September 2015	1 – 5
the AP3 revised scheme	the SES2 scheme as amended by the AP3 submitted in September 2015	1 – 5

- 1.3.2 The following terms are also used to differentiate between design changes included in the SES2 and amendments included in the AP3 ES:

- ‘SES2 design changes’ – changes to the scheme reported in the SES2 that do not require amendments to the Bill; and
- ‘AP3 amendments’ – changes to the scheme reported in the AP3 ES that require amendments to the Bill.

1.4 Scope of this report

- 1.4.1 Route-wide effects are those considered to be appropriately assessed at a geographical scale greater than that presented within the Volume 2, CFA reports. A formal scoping process has been undertaken for the SES2 design changes and AP3 amendments in order to determine whether there is potential for the change or amendment to give rise to new or different significant route-wide environmental effects compared with those reported in Volume 3 of the main ES.

SES2 and AP3 ES Volume 3 – Route-wide effects

- 1.4.2 These new or different route-wide effects, are reported in the SES2 (Part 1) or AP3 ES (Part 2) of this document, depending on whether they arise from SES2 design changes or AP3 amendments. Parts 1 and 2 are divided into environmental topics which are presented in the same order as reported in Volume 3 of the main ES.
- 1.4.3 In addition to describing the new or different likely significant route-wide effects as a result of the AP3 amendments, Part 2 also takes account of the impacts of the SES2 changes reported in Part 1.
- 1.4.4 Some environmental topics have been scoped out of the route-wide assessment, since their effects are localised in extent and have no potential to cause significant route-wide effects. These environmental topics are: air quality; community; landscape and visual impact assessment; and sound, noise and vibration. In addition, there are not considered to be new or different significant route-wide effects for: agriculture, forestry and soils; land quality; or water resources as a consequence of the SES2 changes or AP3 amendments and these topics are not reported in this volume. For those topics that are included in this volume, the assessment has found that there are no new significant environmental effects and only limited differences to those reported in Volume 3 of the previous ESs.
- 1.4.5 Supplementary environmental information covers the route from CFA 1 (Euston station and approach) to CFA5 (Northolt Corridor) and the SES2 design changes and AP3 amendments cover the route from CFA1 to CFA3 (Primrose Hill to Kilburn).
- 1.4.6 An assessment of the Chilterns Area of Outstanding Natural Beauty (AONB) has not been included within the route-wide assessment because the nature and extent of the SES2 changes and AP3 amendments will not lead to new or different significant effects in this area.
- 1.4.7 The climate and waste and material resources assessments are reported at a route-wide level in this volume rather than within the Volume 2, CFA reports. This follows the approach taken in the main ES.
- 1.4.8 Given that the methodology for each environmental topic assesses effects in a different way appropriate to that environmental topic, the approach to route-wide effects varies between environmental topics. The extent and basis of the route-wide assessments is explained in each of the environmental topic sections in Volume 3 of the main ES. The Scope and Methodology Report (SMR) (Volume 5: CT-001-000/1 of the main ES), the SMR Addendum (Volume 5: CT-001-000/2 of the main ES) and the SMR Addendum 3 (Volume 5: CT-001-000/4 of this SES2 and AP3 ES) should also be referred to.
- 1.4.9 The standard measures that will be used to mitigate likely significant adverse environmental effects during the construction and operation of the scheme are described in the main ES, Volume 1, Section 9 and the draft Code of Construction Practice submitted in support of the Bill. Implementation of these measures has been assumed in this SES2 and AP3 ES.
- 1.4.10 Following the approach taken for the main ES, committed developments are considered within the assessments but only referred to if there is the potential for new or different significant cumulative effects.

1.5 Structure of this report

1.5.1 The report is structured as follows:

- Section 1: Introduction;

Part 1: Supplementary Environmental Statement 2

- Section 2: Climate;
- Section 3: Cultural heritage;
- Section 4: Ecology;
- Section 5: Socio-economics;
- Section 6: Traffic and transport;
- Section 7: Waste and material resources; and
- Section 8: Phase One and Phase Two combined impacts.

Part 2: Additional Provision 3 Environmental Statement

- Sections 9 – 15: the environmental topics are as listed above for Sections 2–8 in Part 1: and
- Section 16: References.

Part 1: Supplementary Environmental Statement 2

2 Climate

2.1 Introduction

- 2.1.1 Volume 3 of the main ES reported the assessment of the greenhouse gas (GHG) emissions from the original scheme during construction and operation.
- 2.1.2 Volume 3 of the AP1 ES reported that the potential impact of the AP1 amendments on the carbon footprint would be negligible and therefore did not warrant any further assessment.
- 2.1.3 Volume 3 of the SES and AP2 ES reported that the SES design changes would have a negligible impact on the carbon footprint reported in the main ES. Whilst the AP2 revised scheme was reported to lead to an increase in construction GHG emissions, the overall conclusions of the assessment remained as in Volume 3 of the main ES.

2.2 Scope, assumptions and limitations

- 2.2.1 A scoping assessment was undertaken to determine if the SES2 design changes would be likely to result in a material difference to the GHG emissions of the original scheme (see Section 1.3 in Volume 1 for the full list of SES2 design changes).
- 2.2.2 The methodology for determining which design changes are material to GHG emissions comprises quantitative and qualitative assessments. See Appendix CL-002-000 (Volume 5) for a more detailed description of the process.
- 2.2.3 The SES2 design changes were reviewed both individually and as a group following this approach to determine whether each change is considered to be potentially material or not in the context of the scale of GHG emissions of the original scheme.
- 2.2.4 The scoping exercise considered both construction and operational GHG emissions. Two SES2 design changes with the potential to impact materially the original scheme's construction carbon footprint were identified:
- revised scheme for the Euston station and approach area; and
 - removal of the proposed section of the HS1-HS2 Link (proposed as part of the original scheme) in CFAs 2 and 3 and all associated construction works.
- 2.2.5 None of the SES2 design changes were identified as having the potential to materially impact on the operational or modal shift GHG emissions of the scheme. For example, the operational emissions from Euston station over 60 years will increase by 4% due to the new station design, but this is only a 0.8% increase in the GHG associated operational emissions and only a 0.3% increase in the overall carbon footprint (considering total construction and operational GHG emissions). Changes to HS2's operational GHG emissions as a result of the removal of the HS1-HS2 Link are expected to be negligible since the trains that would have used the link to connect with HS1 services infrastructure will instead be terminating their journey at Euston,

which is a roughly comparable distance when considered within the context of the whole scheme. It is also unlikely that the removal of the HS1-HS2 Link would result in a significant number of passengers changing their travel patterns. As a result, operational emissions are not considered any further in the assessment.

2.2.6 Refer to Appendix CL-002-000 (Volume 5) for the complete summary of the scoping exercise.

2.3 Carbon footprint methodology

2.3.1 The methodology used to assess GHG emissions remains unchanged. No changes have been made to the underlying assumptions of the carbon footprint methodology (e.g. carbon factors adopted, the density and weight of construction material, or transport vehicles assumed for logistics). See the SES2 and AP3 ES Appendix CL-002-000 (Volume 5).

2.4 Green house gas implications of the SES2 design changes

2.4.1 Construction GHG emissions in the main ES were reported at 5,590,000 tonnes carbon dioxide equivalent (tCO₂e)² under the central scenario (Scenario A)³ and 5,300,000 tCO₂e under a stretch scenario (Scenario B)⁴.

2.4.2 The impact of the two potentially material SES2 design changes compared to the main ES are:

- an increase in construction GHG emissions of 290,000 tCO₂e (Scenario A) and 225,000 tCO₂e (Scenario B) associated with the Euston design change⁵; and
- a reduction in construction GHG emissions of 39,000 tCO₂e (for both Scenario A and B) associated with the removal of the HS1-HS2 Link⁶.

2.4.3 In combination the impact of these SES2 design changes compared to the main ES, is an increase in construction GHG emissions of 225,000 tCO₂e (Scenario A) and 160,000 tCO₂e (Scenario B)⁷. This is equivalent to a 4% and 3.1% increase for Scenario A and B respectively.

2.4.4 The SES2 design changes combined with the AP2 revised scheme (including SES1 changes) increases construction GHG emissions by 430,000 tCO₂e (Scenario A) and 355,000 tCO₂e (Scenario B), equivalent to a 7.7% and 6.7% increase respectively.

2.4.5 Table 2 summarises the change in GHG emissions as a result of the potentially material SES2 design changes.

² Tonnes carbon dioxide equivalent is a metric used to compare the emissions from various greenhouse gases based on their global warming potential.

³ The construction carbon footprint is presented as a range based on two scenarios. Scenario A is a central figure based on likely improvements in carbon efficiency within the construction industrial by 2020. For further information see Section 5.1 of Volume 3 of the main ES.

⁴ The construction carbon footprint is presented as a range based on two scenarios. Scenario B is a "stretch" figure based assuming that the construction industry is able to implement its research on carbon efficiency. For further information see Section 5.1 of Volume 3 of the main ES.

⁵ This change reflects the Euston design changes including a substantially larger station but also uses a more specific data set providing a more accurate assessment of the GHG emissions associated with the station.

⁶ GHG emissions saved due to the removal of the HS1-HS2 Link include: a reduction of construction material for the tunnel; a shorter length of track; and a reduction in tunnel boring machine energy consumption since the tunnelling length is reduced.

⁷ These figures also include GHG emissions associated with changes in the movement of materials as a result of the potentially material SES2 design changes.

Table 2: HS2 construction emissions (tCO₂e) comparison

	Scenario A	Scenario B
Original scheme	5,590,000	5,300,000
SES2 revised scheme	5,815,000	5,460,000
Difference (tCO ₂ e)	225,000	160,000
Difference (%)	4%	3.1%
SES2 scheme and AP2 revised scheme	6,020,000	5,655,000
Difference (tCO ₂ e)	430,000	355,000
Difference (%)	7.7%	6.7%

2.5 Conclusions

- 2.5.1 The impact of the SES2 design changes on the original scheme is considered to be minor, increasing construction GHG emissions by 4% and 3.1% respectively for Scenario A and B.
- 2.5.2 In combination with the AP2 revised scheme, the changes increase the original scheme's construction GHG emissions by between 7.7% (Scenario A) and 6.7% (Scenario B).
- 2.5.3 The main contributors to HS2's construction GHG emissions remain the same (i.e. bridges and viaducts, tunnels, stations and track).
- 2.5.4 The SES2 design changes are considered to have a negligible effect on the operation of the scheme and therefore the GHG benefits associated with the SES2 scheme's operation remain as reported in the main ES.
- 2.5.5 The overall conclusions from this assessment remain the same as in Volume 3 of the main ES.

3 Cultural heritage

- 3.1.1 Volume 3 of the main ES reported that the original scheme would not have a direct physical effect on any World Heritage Site and would not require the demolition of any Grade I or Grade II* listed building. Since the submission of the main ES, the war memorial at Euston Square Gardens that was due to be removed as a result of the construction of the original scheme, has been re-graded from a Grade II to Grade II*.
- 3.1.2 Volume 3 of the main ES also reported that across the entire route of the original scheme, a number of designated assets would be significantly affected through direct physical impact.
- 3.1.3 The AP1 ES and the SES and AP2 ES were not considered to require an assessment of heritage assets at a route-wide level and this topic was scoped out.

- 3.1.4 The designated assets significantly affected through direct physical impact as a result of the SES2 scheme (including relevant AP1 and AP2 amendments) include:
- heritage assets comprising:
 - one registered battlefield;
 - one scheduled monument;
 - one Grade II* listed building entry;
 - 17 Grade II listed buildings entries; and
 - alteration to a curtilage wall to a Grade I listed building; and
 - historic landscape assets comprising:
 - two Grade II* registered parks and gardens;
 - 81 lengths of historic hedgerow; and
 - 26 areas of ancient woodland⁸.
- 3.1.5 There are no new heritage assets affected as a result of the SES2 design changes.

4 Ecology

4.1 Introduction

- 4.1.1 Volume 3 of the main ES described the likely significant effects on ecological resources that will occur on a route-wide level as a consequence of the construction and operation of the original scheme. The route-wide assessment addressed significant effects at the regional and national level, and in-combination effects not discussed within Volume 2 of the main ES.
- 4.1.2 Volume 3 of the AP1 ES reported that the AP1 amendments lead to only minor changes in the ecological effects reported in the main ES. These changes were not sufficient to generate new or different significant effects at a route-wide level.
- 4.1.3 Part 1 of Volume 3 of the SES and AP2 ES reported new and different significant adverse effects as a consequence of changes relating to designated sites; the ancient woodland inventory; areas that have been identified as likely to be added to the ancient woodland inventory; and additional data relating to bat populations at Waddesdon and Quainton (CFA12), Calvert, Steeple Claydon, Twyford and Chetwode (CFA13), and Radstone (CFA14).
- 4.1.4 This section of the SES2 and AP3 ES identifies any new or different significant effects on ecological resources to those reported in Volume 3 of the main ES, and where relevant updated by the SES, as a consequence both of updates to baseline data and SES2 design changes. It also considers the SES2 scheme with any relevant AP1 and AP2 amendments to identify the potential for any additional cumulative effects at the

⁸ The main ES reported that the original scheme would directly affect 19 areas of ancient woodland. However, this figure considered four ancient woodlands located in close proximity as a single ancient woodland area. Between the submission of the main ES and the SES and AP2 ES, four additional woodland areas were formally added to the ancient woodland inventory. This leads to a combined total of 26 areas of ancient woodland.

route-wide level. Consideration is given to the potential for impacts on species, habitats and sites designated on the basis of their importance for nature conservation.

4.2 Changes to the assessment of effects

Designated sites

- 4.2.1 New survey baseline data collected in CFAs 1 to 3 since the production of the main ES (September 2013) does not alter the impacts on statutory designated sites reported in the main ES. The effects on statutory designated sites are therefore unchanged.
- 4.2.2 Part 1 of Volume 3 of the SES and AP2 ES reported that the scheme would result in habitat loss and/or fragmentation of 90 Local Wildlife Sites (LWS), 62 of which would be subject to impacts likely to result in effects on the integrity of the site. The removal of the HS1-HS2 Link means that the scheme will have no impacts (or corresponding effects) upon the North London Line Site of Borough Importance Grade II (SBI.II), thus reducing the total number of LWSs affected by habitat loss and/or fragmentation to 89, and reducing the number of LWSs subject to impacts on site integrity to 61. However, this does not affect the route-wide effects on ecological networks described in the main ES, which, following the implementation of proposed mitigation and compensation, were considered not likely to be significant.

Habitats and protected or notable species

- 4.2.3 The new baseline information obtained since publication of the main ES in CFAs 1 to 3 and the SES2 design changes will not result in any new or different likely significant effects on habitats or protected or notable species that are of relevance at the route-wide level.

4.3 Cumulative effects

- 4.3.1 The SES2 scheme will result in habitat loss and/or fragmentation at 89 LWSs, 61 of which would prior to mitigation result in significant effects on the integrity of the site.
- 4.3.2 Assuming that all AP1 and AP2 amendments are accepted by Parliament then the total number of LWSs subject to adverse effects would increase to 90 due to the potential for adverse effects at Moor Covert and Pool SBI (see SES and AP2 ES Volume 2, CFA21 AP-021-004). This precautionary assessment assumes an adverse effect on the integrity of Moor Covert and Pool SBI, therefore increasing the number of LWSs subject to significant effects on site integrity to 62. However, this does not affect the route-wide effects on ecological networks described in the main ES, which, following the implementation of proposed mitigation and compensation, were considered not likely to be significant.
- 4.3.3 For all other resources/receptors the route-wide level effects of the SES2 scheme and the proposed AP1 and AP2 amendments acting in combination would be as reported in Volume 3 of the main ES, where relevant, updated by the assessment reported in Volume 3 of the SES and AP2 ES.

5 Socio-economics

5.1 Introduction

5.1.1 Direct and indirect socio-economic effects of the original scheme were reported in the main ES at a route-wide and CFA level and described the following:

- route-wide construction employment created (direct and indirect);
- employment in businesses directly and indirectly affected by construction;
- operational employment; and
- operational effects on existing business employment.

5.1.2 Volumes 3 of the AP1 ES and of the SES and AP2 ES reported that the design changes and amendments would not generate new or different significant effects at a route-wide level for socio-economics.

5.2 Changes to the assessment of effects

5.2.1 The total employment displaced by construction of the original scheme (8,430 jobs) will fall to 7,820 displaced jobs as a result of the SES2 design changes. This is a result of 480 jobs no longer being displaced within CFA1 and 130 jobs no longer being displaced within CFA2 due to the HS1-HS2 Link no longer being required. Total construction jobs created by the SES2 scheme remains the same as for the original scheme. Whilst total displaced employment figures given in Volume 3 of the main ES may change to a small degree, any such change is considered to be negligible in a route-wide context and will not change the conclusions of the assessment. The proposed SES2 design changes will therefore not result in any new or different significant route-wide effects.

6 Traffic and transport

6.1 Introduction

6.1.1 Volume 3 of the main ES provided an overview of the approach to and conclusions from the route-wide traffic and transport assessment of the original scheme. It considered the impacts that may occur over a wide area due to changes in travel patterns.

6.1.2 Volume 3 of the AP1 ES reported that the AP1 amendments would not generate new or different significant effects at a route-wide level for traffic and transport.

6.1.3 Volume 3 of the SES and AP2 ES presented a number of corrections to the route-wide assessment reported in the main ES. The corrections resulted in minor local changes, and did not generate any new or different significant route-wide effects.

6.2 Changes to the assessment of effects

6.2.1 In the SES2 scheme, there will be a large number of individual changes in the Euston area, each comprising standard possessions of the railway which will vary in duration depending on the scale and complexity of the works planned. The impacts from these

SES2 changes will be mitigated through the measures described in the main ES, and individually the possessions are not considered to generate significant effects at the route-wide level. The cumulative route-wide effects on the West Coast Main Line over the period of construction as a result of these minor possessions will therefore not change the assessment in the main ES, that there will be no significant route-wide effects arising from the scheme.

7 Waste and material resources

7.1 Introduction

- 7.1.1 Volume 3 of the main ES presented a route-wide assessment of the likely significant effects associated with the off-site disposal to landfill of solid waste that would be generated by the construction and operation of the original scheme.
- 7.1.2 The waste and material resources topic was scoped out of Volume 3 of the AP1 ES as the AP1 amendments would not give rise to new or different significant route-wide effects.
- 7.1.3 Volume 3 of the SES and AP2 ES reported that the SES design changes would not generate new or different significant route-wide effects. It further reported that the construction of the AP2 revised scheme would lead to an increase in the total quantity of inert waste and that the resultant effect associated with the off-site disposal of this waste would be minor adverse, compared to negligible as reported in the main ES. The total quantities of non-hazardous and hazardous waste associated with the construction of the AP2 revised scheme were greater than those reported in the main ES; however the level of significance remained the same.

7.2 Changes to the assessment of effects

- 7.2.1 The SES2 design changes considered in assessing whether there would be potentially new or different significant effects on waste and material resources, are:
- revised scheme for the Euston station and approach area; and
 - removal of the proposed section of the HS1-HS2 Link (proposed as part of the original scheme) in CFAs 2 and 3 and all associated construction works.
- 7.2.2 Table 3 presents a summary of the revised excavated material quantities forecast for these two SES2 design changes.

SES2 and AP3 ES Volume 3 – Route-wide effects

Table 3: Summary of SES2 scheme excavated material quantities

Category of excavated material ⁹	CFA1 Euston station and approach (tonnes)			HS1-HS2 Link ¹⁰ (tonnes)			Total Change (tonnes)
	Original scheme	SES2 scheme	Change	Original scheme	SES2 scheme	Change	
Selected fill	0	0	0	0	0	0	0
General engineering fill	1,787,653	2,201,767	414,114	0	0	0	414,114
Environmental mitigation earthworks fill	188,645	198,009	9,364	0	0	0	9,364
Topsoil	0	0	0	0	0	0	0
Agricultural subsoil	0	0	0	0	0	0	0
Unacceptable material Class U1A	0	0	0	790,358	0	-790,358 ¹¹	-790,358
Unacceptable material Class U1B	65,777	73,797	8,020	17,219	0	-17,219	-9,199
Unacceptable material Class U2	799	724	-75	33,191	0	-33,191	-33,266
Total	2,042,874	2,474,297	431,423	840,768	0	-840,768	-409,345

7.2.4 The effect of the two SES2 design changes on the quantity of excavated material generated is a net reduction of 409,345 tonnes, when compared to the quantities reported in the main ES. This represents a route-wide reduction in excavated material equivalent to 0.3% of the total quantity reported in the main ES, and a reduction in the quantity of surplus excavated material of 3.6%.

7.2.5 The main ES and AP2 ES reported the following residual effects:

- negligible (main ES) or minor (AP2 ES) effect on inert waste landfill capacity;

⁹ Categories as defined in Department for Transport; Highways Agency, Manual of Contract Documents for Highway Works, Volume 1 – Specification for Highway Works, Series 600 Earthworks; <http://www.dft.gov.uk/ha/standards/mchw/vol1/>; Accessed 20 August 2015.

¹⁰ The excavated material quantities reported here for the HS1-HS2 Link, were reported in the main ES within CFA2 and CFA3. The quantities reported in these CFAs comprised of excavated material from a number of design elements, and the quantity forecast specifically for the HS1-HS2 Link was not reported separately. The excavated material quantity forecasts for each CFA were provided in the main ES in Volume 5: Appendix WM-001-000.

¹¹ Positive numbers indicate an increase in excavated material between the main ES and SES2; negative numbers indicate a decrease in excavated material.

- moderate adverse effect on non-hazardous waste landfill capacity (considered to be significant) (main ES and AP2 ES); and
- moderate adverse effect on hazardous waste landfill capacity (considered to be significant) (main ES and AP2 ES).

7.2.6 The changes as a result of the SES2 scheme are not considered to result in any new or different significant route-wide effects, with respect to the original scheme and the AP2 revised scheme.

8 Phase One and Phase Two combined impacts

8.1 Introduction

8.1.1 Volume 3 of the main ES presented a tabulated summary of the potential total impacts of both Phase One (original scheme) and Phase Two on a range of environmental receptors. Phase Two of HS2 will comprise new lines between the West Midlands, Leeds and Manchester, completing what is known as the 'Y network'. Impacts of the original scheme were based on design data and assessments undertaken as part of the EIA or assessments prepared in support of the January 2012 updated Appraisal of Sustainability report for Phase One. The Phase Two data was taken from the Phase Two Sustainability Statement, published in July 2013.

8.1.2 Volume 3 of the AP1 ES reported that the amendments would result in very minor or negligible changes to the figures given in the main ES and would not result in any material difference in the information on Phase One and Phase Two combined impacts.

8.1.3 The SES design changes and the AP2 amendments reported in Volume 3 of the SES and AP2 ES were assessed as being likely to result only in very minor or negligible changes to the figures given in the main ES.

8.2 Summary of changes to combined impacts

8.2.1 The SES2 design changes will result in very minor or negligible changes to the combined impact figures given in Volume 3 of the main ES.

Part 2: Additional Provision 3 Environmental Statement

9 Climate

9.1 Introduction

9.1.1 Volume 3 of the main ES reported the assessment of the GHG emissions of the original scheme during construction and operation. Section 2 in Part 1 of this volume reports that none of the subsequent SES and SES2 design changes have been identified to have a material impact on the overall conclusions of the GHG assessment in the main ES.

9.2 Changes to the assessment of effects

9.2.1 A scoping assessment identified that none of the AP3 amendments would materially impact the original scheme's carbon footprint, therefore no further assessment was carried out.

9.2.2 For further detail on the scoping methodology applied see Part 1, Section 2.2 of this document and Appendix CL-002-000 (Volume 5) for the scoping outcomes.

10 Cultural heritage

10.1.1 There are no changes to the list of affected heritage assets in Section 3 in Part 1 of this volume as a result of the AP3 amendments.

11 Ecology

11.1 Introduction

11.1.1 Volume 3 of the main ES described the likely significant effects on ecological resources that will occur on a route-wide level as a consequence of the construction and operation of the original scheme. The route-wide assessment addressed significant effects at the regional and national level, and in-combination effects not discussed within Volume 2 of the main ES.

11.1.2 This section of the report identifies any new or different significant route-wide effects on ecological resources due to the proposed AP3 amendments compared to that reported for the SES2 scheme (Section 4, Part 1 of this volume). The assessment presented in this section of the report also considers the AP3 revised scheme in combination with any relevant AP1 and AP2 amendments to identify the potential for any additional cumulative effects at the route-wide level. Consideration is given to the potential for impacts on species, habitats and sites designated on the basis of their importance for nature conservation.

11.2 Changes to the assessment of effects

Designated sites

- 11.2.1 The AP3 amendments will not alter the impacts on statutory designated sites reported in the main ES. The effects on statutory designated sites are therefore unchanged from those reported in main ES, as updated by the SES.
- 11.2.2 Part 1 of this document reported that the SES2 scheme would result in habitat loss and/or fragmentation of 89 LWSs and significant effects on the integrity of 61 of these LWS. The Regent’s Park Site of Metropolitan Importance (SMI) was subject to small scale habitat losses as a result of the original scheme. The AP3 revised scheme will result in additional habitat loss from the SMI, however no significant effect on the SMI is expected and therefore no new or different effects on ecological networks are anticipated.

Habitats and protected or notable species

- 11.2.3 The AP3 amendments will not result in any new or different significant effects on habitats or protected or notable species that are of relevance at the route-wide level.

11.3 Cumulative effects

- 11.3.1 The AP3 revised scheme will result in impacts on 89 LWSs. For 61 of these LWS, significant effects on the integrity of the site are furthermore expected prior to the implementation of mitigation.
- 11.3.2 Assuming that all AP1 and AP2 amendments are accepted by Parliament then the total number of LWS subject to adverse effects would increase to 90 due to the potential for adverse effects at Moor Covert and Pool SBI (see SES and AP2 ES Volume 2, CFA21 AP2-021-004). This precautionary assessment assumes an adverse effect on the integrity of Moor Covert and Pool SBI, therefore increasing the number of LWS subject to significant effects on site integrity to 62. However, this does not affect the route-wide effects on ecological networks described in the main ES, which, following the implementation of proposed mitigation and compensation, were considered not likely to be significant.
- 11.3.3 For all other resources/receptors the route-wide level effects of the AP3 revised scheme acting in combination with the proposed AP1 and AP2 amendments would be as reported in Volume 3 of the main ES, as updated by the SES and SES2.

12 Socio-economics

12.1 Introduction

- 12.1.1 Volume 3 of the main ES presented a route-wide assessment of the direct and indirect socio-economic effects. Section 5 in Part 1 of this volume reports that none of the subsequent SES and SES2 design changes will generate any new or different significant route-wide effects for socio-economics.

12.2 Changes to the assessment of effects

- 12.2.1 The AP3 amendments will have minimal impacts on the total numbers of existing employment affected by construction and the total numbers of construction employment created. Whilst the employment figures given in Volume 3 of the main ES may change to a small degree, any such change is considered to be negligible and will not change the conclusions of the assessment.
- 12.2.2 None of the amendments proposed as part of the AP3 revised scheme have been identified to result in any new or different significant route-wide effects.

13 Traffic and transport

13.1 Introduction

- 13.1.1 Volume 3 of the main ES provided an overview of the approach to and conclusions from the route-wide traffic and transport assessment. Section 6 in Part 1 of this volume reports that none of the subsequent SES and SES2 design changes would generate any new or different significant route-wide effects.

13.2 Changes to the assessment of effects

- 13.2.1 None of the amendments proposed as part of the AP3 revised scheme will result in any new or different significant route-wide effects.

14 Waste and material resources

14.1 Introduction

- 14.1.1 Volume 3 of the main ES presented a route-wide assessment of the likely significant environmental effects associated with the off-site disposal to landfill of solid waste that will be generated by the construction and operation of the original scheme. Section 7 in Part 1 of this volume reports that none of the subsequent SES and SES2 design changes will generate any new or different significant route-wide effects.

14.2 Changes to the assessment of effects

- 14.2.1 A scoping assessment identified that none of the AP3 amendments would give rise to new or different significant route-wide effects, therefore no further assessment was carried out.

15 Phase One and Phase Two combined impacts

15.1 Introduction

- 15.1.1 Volume 3 of the main ES presented a tabulated summary of the potential total impacts of both Phase One (the original scheme) and Phase Two on a range of environmental receptors. Section 8 in Part 1 of this volume reports that the subsequent SES and SES 2 design changes would result in very minor or negligible changes to the figures in the in main ES.

15.2 Summary of changes to combined impacts

15.2.1 Table 4 presents a summary of the potential total impacts of Phase One (the original scheme, AP2 revised scheme and AP3 revised scheme) and Phase Two on a range of environmental receptors. Impacts of the Phase One, original scheme, were based on design data and assessments undertaken as part of the main ES or assessments prepared in support of the January 2012 updated AoS Report for Phase One¹². The data for the AP2 revised scheme and AP3 revised scheme is taken from the SES and AP2 ES and SES2 and AP3 ES respectively. The Phase Two data is taken from the Phase Two Sustainability Statement¹³.

Table 4: Combined impacts of Phase One (original scheme, AP2 revised scheme and AP3 revised scheme) and Phase Two

	Phase One			Phase Two (Phase Two Manchester and Phase Two Leeds)	Overall Total (Phase One AP3 revised scheme and Phase Two)
	Original scheme	AP2 revised scheme ¹⁴	AP3 revised scheme ¹⁵		
Route characteristics (km)					
Total	225.5 ¹⁶	216.0 ¹⁷	216.0 ¹⁷	335.2	551.2
At grade	0.1	0 ¹⁸	0 ¹⁸	24.1	24.1
Tunnel	53.4	47.9 ¹⁸	47.9 ¹⁸	27.3	75.2
Cutting	73.8	76.0 ¹⁸	76.0 ¹⁸	130.9	206.9
Viaduct	18.5	16.4 ¹⁸	16.4 ¹⁸	47.0	63.4
Embankment	65.2	62.6 ¹⁸	62.6 ¹⁸	105.9	168.5
Property and settlements					
Demolitions (residential)	339 dwellings ^{19,20} (265 buildings)	335 dwellings (248 buildings)	333 dwellings (246 buildings)	278	611

¹² Booz & Co. Temple (2012), High Speed 2 London to West Midlands Appraisal of Sustainability – Post Consultation Route Refinements.

¹³ Temple ERM (2013), High Speed Rail: Consultation on the route from the West Midlands to Manchester, Leeds and beyond Sustainability Statement Volume 1: main report of the Appraisal of Sustainability.

¹⁴ The AP2 revised scheme assumes that the AP1 amendments have been implemented.

¹⁵ The AP3 revised scheme assumes that the AP1 and AP2 amendments have been implemented.

¹⁶ This total includes another 14.5km attributed to retaining walls and stations.

¹⁷ This total includes another 13.1km attributed to retaining walls and stations. This total includes the removal of the HS1-HS2 Link.

¹⁸ This total includes the removal of the HS1-HS2 Link.

¹⁹ This figure excludes student accommodation at Curzon Street on the basis that this is a commercially operated business for short term lets (and is included as two buildings under commercial/retail demolitions).

²⁰ This figure excludes future baseline (i.e. committed residential development not currently completed).

SES2 and AP3 ES Volume 3 – Route-wide effects

	Phase One			Phase Two	Overall Total
	Original scheme	AP2 revised scheme ¹⁴	AP3 revised scheme ¹⁵	(Phase Two Manchester and Phase Two Leeds)	(Phase One AP3 revised scheme and Phase Two)
Demolitions ²¹ (community)	21 community facilities ²²	21 community facilities ²³	20 community facilities	4	24
Demolitions (commercial/retail)	404 units (312 buildings) ²⁴	408 units (312 buildings)	368 units (295 buildings)	227	606
Demolitions (manufacturing/industrial)				11	
Total demolitions (including residential) ²⁵	600 buildings ²⁶	582 buildings	560 buildings	520	1,080

Employment and housing

Permanent jobs created	2,200 ²⁷	2,200 ²⁷	2,200 ²⁷	1,400	3,100 ²⁸
Construction jobs created	14,600 ²⁹	14,600 ²⁹	14,600 ²⁹	10,000	24,600
Jobs supported ³⁰	30,000 ³¹	30,000 ³¹	30,000 ³¹	48,700-70,300	78,700-100,300
Houses supported	5,620 ³¹	5,620 ³¹	5,620 ³¹	5,200-7,600	10,820-13,200
Jobs displaced	8,430 ³²	8,510 ³³	7,900 ³⁴	4,800	12,700

Noise

²¹ This total includes the community facilities that are demolished and not re-provided.

²² This figure is provided for the number of community resources (i.e. a cluster of buildings providing a single resource is reported as a single demolition). This figure does not include the demolition of buildings which will not prevent the continued operation of a community resource (e.g. outbuildings or other ancillary structures), however these are included under total demolitions.

²³ Two community facilities are being re-provided: Burton Green Community Hall and Wendover Cricket Ground.

²⁴ This figure includes some properties which also provide community resources, e.g. public house, local services.

²⁵ This total includes the total number of residential, community, commercial/retail/manufacturing/industrial & miscellaneous buildings.

²⁶ This number is different to that published in the Phase Two Sustainability Statement (which was based on data in the Draft Environmental Statement) as there have been some changes to the design and more detailed knowledge of other buildings not previously referenced (e.g. outbuildings).

²⁷ Indicative direct operational employment figure which has been estimated to the nearest 100 jobs.

²⁸ Figures are not additive as some jobs associated with classic compatible services for Phase One will transfer to Phase Two.

²⁹ Number reported as an approximate equivalent of permanent full time construction jobs.

³⁰ Figures account for jobs displaced.

³¹ Booz & Co. Temple (2012), *High Speed 2 London to West Midlands Appraisal of Sustainability – Post Consultation Route Refinements*.

³² Jobs displaced comprise jobs relocated elsewhere in the UK economy and jobs lost, due to land being acquired for the construction and operation of the original scheme.

³³ Jobs displaced comprise jobs relocated elsewhere in the UK economy and jobs lost, due to land being acquired for the construction and operation of the AP2 revised scheme.

³⁴ Jobs displaced comprise jobs relocated elsewhere in the UK economy and jobs lost, due to land being acquired for the construction and operation of the AP3 revised scheme.

SES2 and AP3 ES Volume 3 – Route-wide effects

	Phase One			Phase Two	Overall Total
	Original scheme	AP2 revised scheme ¹⁴	AP3 revised scheme ¹⁵	(Phase Two Manchester and Phase Two Leeds)	(Phase One AP3 revised scheme and Phase Two)
People affected by noise (WebTAG annoyance) (mitigated scheme)	~623 ³⁵	~623 ³⁵	~556	~1,600 ³⁶	~2,156
People affected by noise (WebTAG annoyance) per km	~2.9 ³⁵	~2.9 ³⁵	~2.8	~4.8	~3.9

Landscape

AONB crossed at surface (km)	8.9	8.9	8.9	0	8.9
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Cultural heritage

Scheduled Monuments directly affected	1	1	1	1	2
Registered Battlefields directly affected	1	1	1	0	1
Grade I & II* structures directly affected	1 ³⁷	1 ³⁷	2 ³⁸	0	2
Grade II structures directly affected	18	18	17 ³⁹	8	25
Registered parks and gardens directly affected	2	2	2	0	2
Conservation Areas directly affected	2	2	2	8	10

Biodiversity and wildlife

³⁵ The main ES reported that approximately 525 people will be affected by noise due to the original scheme. A number of areas were omitted from this calculation including Euston and the HS1-HS2 Link. The updated figure provided in the table accounts for these omitted areas.

³⁶ Figure rounded in Phase Two Sustainability Statement, July 2013.

³⁷ This comprises the alteration to a curtilage wall to a Grade 1 Listed building.

³⁸ This comprises the alteration to a curtilage wall to a Grade 1 Listed building. Since the submission of the main ES, the war memorial at Euston Square Gardens that was due to be removed as a result of the original scheme, has been re-graded from a Grade II to Grade II*.

³⁹ This figure includes the removal of the war memorial at Euston Square Gardens that has been re-graded from a Grade II to Grade II* since the submission of the main ES.

SES2 and AP3 ES Volume 3 – Route-wide effects

	Phase One			Phase Two	Overall Total
	Original scheme	AP2 revised scheme ⁴⁴	AP3 revised scheme ⁴⁵	(Phase Two Manchester and Phase Two Leeds)	(Phase One AP3 revised scheme and Phase Two)
Natura 2000 sites affected	0	0	0	0	0
Sites of Special Scientific Interests directly affected	2	2	2	13	3
Habitats of Principal Importance directly affected	41	41	41	62	103
Ancient Woodlands directly affected	26 ⁴⁰	26 ⁴¹	26 ⁴¹	14	40

Water resources and flood risk

Major rivers diverted	7	8 ⁴²	8 ⁴²	5	13
Route through Flood Zone 3 (km)	12.0	12.0	12.0	28.5	40.5
Station/depot occupation of Flood Zone 3 (ha)	2.1	2.1	2.1	23.6	25.7
Cutting or tunnel through a source protection zone 1 or 2 (km)	8.1	8.1	8.1	1.7	9.8

Land use resources

Active landfills crossed	0	0	0	5	5
Grade 1 and 2 agricultural land (km)	22.0	22.0	22.0	50.8	72.8

Waste and material resources

⁴⁰ In Table 42 in Volume 3 of the main ES, 19 sites were identified to be directly affected by the original scheme. Since publication of the main ES, four additional woodlands have been added to the ancient woodland inventory and three additional sites have been identified that were previously considered as a single ancient woodland area. This results in a total of 26 ancient woodland sites identified to be directly affected by the original scheme (refer to Section 5.2.6 and 5.2.7 in this report).

⁴¹ A further 11 sites are likely to be added to the ancient woodland inventory.

⁴² The additional river diverted as a result of the AP2 revised scheme from the original scheme is Mare Brook.

SES2 and AP3 ES Volume 3 – Route-wide effects

	Phase One			Phase Two	Overall Total
	Original scheme	AP2 revised scheme ⁴⁴	AP3 revised scheme ⁴⁵	(Phase Two Manchester and Phase Two Leeds)	(Phase One AP3 revised scheme and Phase Two)
Excavated material (million m ³)	62.2 ⁴³	62.4 ⁴³	62.6 ⁴³	29.00	91.6
Concrete (million tonnes)	13.62	13.04 ⁴⁴	13.04 ⁴⁵	6.77	19.81
Steel (million tonnes)	1.36	1.30 ⁴⁴	1.30 ⁴⁵	0.73	2.03

⁴³ This figure is the total quantity of excavated material that will be generated from the construction of Phase One. This includes excavated material that will be reused in the construction process as well as surplus excavated material that will be made available for use off-site or disposed of on or off-site. This total includes the removal of the HS1-HS2 Link.

⁴⁴ This total reflects the reduced length of the AP2 scheme as a pro-rata of the original scheme.

⁴⁵ This total reflects the reduced length of the AP3 scheme as a pro-rata of the original scheme. This total is based on track length and does not take into account the changes at Euston Station.

16 References

Booz & Co. Temple (2012), High Speed 2 London to West Midlands Appraisal of Sustainability - Post Consultation Route Refinements.

Department for Transport; Highways Agency, Manual of Contract Documents for Highway Works, Volume 1 – Specification for Highway Works, Series 600 Earthworks; <http://www.dft.gov.uk/ha/standards/mchw/vol1/>; Accessed 20 August 2015.

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Y13