

LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

Draft Environmental Statement Consultation Summary Report
(CT-008-000)

November 2013

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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.

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

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1 Introduction

- 1.1.1 High Speed Two (HS2) is a new railway network proposed by Government. Consisting of two phases of development, the final scheme will provide a new rail link between London, the West Midlands, the East Midlands, South Yorkshire, Leeds and Manchester. Phase One of HS2, hereafter referred to as the 'Proposed Scheme', will involve the construction of a new railway between London and the West Midlands.
- 1.1.2 The Government commissioned an environmental impact assessment (EIA) of the Proposed Scheme to provide an Environmental Statement (ES), including a Code of Construction Practice (CoCP). A draft ES and draft CoCP for Phase One of HS2 were published for consultation on 16 May 2013. The draft ES was a 'snapshot' of the work in progress, described the HS2 route design as it stood at the time and the options that had been studied. It summarised the environmental impact assessment process to date and the potential significant effects that HS2 may have on the environment. It also identified the steps proposed to avoid, reduce or, where practicable, off-set any significant adverse effects that have been identified at this stage.
- 1.1.3 The draft CoCP described the key principles that will be followed to avoid, reduce or manage the construction effects described in the draft ES. It sets out a series of measures and standards – building on the experience of other major infrastructure schemes here in the UK – that will provide effective planning, management and control during construction to reduce, as far as is reasonably practicable, the potential impacts upon people, communities, businesses and the natural and historic environment.
- 1.1.4 Consultation on the draft ES and draft CoCP was held for a 56 day (8 week) period from 16 May 2013 until 11 July 2013. The purpose of the consultation was to provide those with an interest in the Proposed Scheme early sight of the developing proposals, the emerging environmental impacts, likely significant effects and the measures being proposed to manage and reduce negative effects at the time of publication.
- 1.1.5 The consultation on the draft ES asked local residents and businesses, local authorities, statutory consultees, national interest groups, Members of Parliament and other stakeholders and interested parties along the route for their views on the draft ES and the draft CoCP to help inform the final scheme.
- 1.1.6 The draft ES was made available to all stakeholders through the HS2 Ltd website. In addition a series of public consultation events were held during May, June and July 2013 in each of the 26 community forum areas (CFA) along the route of the Proposed Scheme (see Figure 1 for CFA locations).
- 1.1.7 HS2 Ltd employed an independent specialist response analysis company, Dialogue by Design, to receive, collate and analyse the 20,944 responses to the consultation. A report¹ explaining the numbers of responses received and the issues raised in relation

¹ Dialogue by Design (2013), High Speed Two Draft Environmental Statement for London - West Midlands, A Summary of Consultation Responses, HS2 Ltd, London

to each of the environmental topic areas and within the various CFA is available on the HS2 Ltd website.

- 1.1.8 This draft ES Consultation Summary Report provides a high level summary of the main themes which resulted from the draft ES consultation and identifies, in Section 5, where these have been addressed in the ES that will accompany the Phase One hybrid Bill. Section 6 describes the main themes and HS2 Ltd's responses relating to the comments received on the draft CoCP. Where the draft ES consultation has led to design change proposals, these are described in Section 7 of this report.
- 1.1.9 In parallel with the draft ES consultation, the Department for Transport (DfT) has consulted on fourteen proposed design refinements to the January 2012 announced route before finalising its plans for the Phase One hybrid Bill. These refinements either proposed new operational infrastructure, or involved alterations that resulted in potentially new or different environmental effects on people and/or the environment. The results of that consultation have been reported by Ipsos MORI in a Design Refinement Consultation Summary Report² which is available on the HS2 Ltd website.

² Ipsos MORI (2013), High Speed Two: London-West Midlands Design Refinement Consultation Final Summary Report, HS2 Ltd, London

2 Report structure

2.1.1 This report is structured as follows:

- Section 1 - provides an introduction to this report;
- Section 2 - describes the structure of this report;
- Section 3 - describes the methodology adopted to undertake the consultation;
- Section 4 - describes the process adopted for reviewing the responses received as a result of the consultation;
- Section 5 - provides a summary at a route wide level of the themes which have emerged from the consultation relating to the environmental topics in the draft ES. Section 5 is broken down into the following headings:
 - Non-technical summary;
 - Volume 1 – Introduction to the draft ES;
 - Agriculture, forestry and soils;
 - Air quality;
 - Climate;
 - Community;
 - Cultural heritage;
 - Ecology;
 - Land quality;
 - Landscape and visual assessment;
 - Socio-economics;
 - Sound, noise and vibration;
 - Traffic and transport;
 - Waste and material resources; and
 - Water resources and flood risk assessment;
- Section 6 - provides a summary of the themes raised in comments relating to the draft Code of Construction Practice;
- Section 7 - provides a summary of the changes made to the design and incorporated in the ES. Explanation is provided on those comments which did not result in a change following consultation on the draft ES. Section 7 is broken down into the following headings which relate to the community forum areas along the Proposed Scheme:

- Euston – Station and Approach (CFA 1);
- Camden Town and Hs1 Link to South Ruislip and Ickenham (CFA2 to CFA6);
- Colne Valley to Greatworth to Lower Boddington (CFA7 to CFA15);
- Ladbroke and Southam to Whittington and Handsacre (CFA16 to CFA22); and
- Balsall Common and Hampton-in-Arden to Washwood Heath and Curzon Street (CFA23 to CFA26).

2.1.2 These headings group CFA into the areas of responsibility of the HS2 design teams and have therefore allowed stakeholder concerns to be considered by those design teams most familiar with the local areas to which the issues are related. The area break down in Section 7 is shown diagrammatically in Figure 1.

Figure 1: CFA locations and groupings



3 Consultation methodology

- 3.1.1 During the consultation process, HS2 Ltd asked local authorities, statutory consultees, national interest groups, local representatives, Members of Parliament and all those with an interest in the Proposed Scheme for their views on the draft ES.
- 3.1.2 The draft ES was made available to the public through the HS2 Ltd website. Organisations and individuals were encouraged to make responses to the consultation in writing.
- 3.1.3 In addition a series of public information events were held during May and June 2013, with events held in each of the 26 community forum areas, as shown in Table 1.

Table 1: Draft ES consultation information events

CFA	Venue	Date
CFA1 Euston	Bengali Workers Association (Surma Community Centre), 1 Robert Street, London, NW1 3JU	24-05-2013
CFA2 Camden Town and HS1 Link	Castlehaven Community Association, 21 Castlehaven Road, London NW1 8RU (joint event with CFA1 Euston)	22-06-2013
CFA3 Primrose Hill to Kilburn (Camden)	Swiss Cottage Community Association, 19 Winchester Road, London NW3 3NR	22-05-2013
CFA4 Kilburn (Brent) to Old Oak Common	Old Oak Common Community and Children's Centre, 76 Braybrook Street, London W12 0AP	15-06-2013
CFA5 Northolt Corridor	Perivale Community Centre, Horsenden Lane South, Perivale, Middlesex UB6 7NP (joint event with CFA6 South Ruislip to Ickenham)	17-06-2013
CFA6 South Ruislip to Ickenham	The Emerald Rooms, West End Road, Ruislip, Middlesex HA4 6QX	23-05-2013
CFA7 Colne Valley	Denham Village Memorial Hall, Village Road, Denham, Uxbridge, Middlesex UB9 5BN	21-06-2013
CFA8 The Chalfonts and Amersham	Chalfont St Giles Memorial Hall, School Lane, Chalfont St Giles, Bucks HP8 4JJ	29-05-2013
CFA9 Central Chilterns	Great Missenden Memorial Centre & Buryfield Recreation Ground, Link Road, Great Missenden, Bucks HP16 9AE	30-05-2013
CFA10 Dunsmore, Wendover and Halton	Wendover Memorial Hall, Wharf Road, Wendover, Bucks HP22 6HF	29-06-2013
CFA11 Stoke Mandeville and Aylesbury	Stoke Mandeville Stadium, Olympic Lodge Hotel, Guttman Road, Aylesbury, Bucks HP21 9PP	24-06-2013
CFA12 Waddesdon and Quainton	Stoke Mandeville Stadium, Olympic Lodge Hotel, Guttman Road, Aylesbury, Bucks HP21 9PP	31-05-2013
CFA13 Calvert, Steeple Claydon, Twyford and Chetwode	Calvert Green Village Hall / Calvert Green Community Hall, Cotswolds Way, Calvert Green, Bucks MK18 2FJ	04-06-2013
CFA14 Newton Purcell to Brackley	Brackley Town Hall, Market Place, Town Centre, Brackley, Northants NN13 7AB	14-06-2013
CFA15 Greatworth to Lower Boddington	Boddington Village Hall, Warwick Road, Upper Boddington, Northants NN11 6DH	03-06-2013

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CFA	Venue	Date
CFA16 Ladbroke and Southam	Graham Adams Centre, St James Road, Southam, Warwickshire CV47 0LY	08-06-2013
CFA17 Offchurch and Cubbington	Cubbington Village Hall, Broadway, Cubbington, Leamington Spa, Warwickshire CV32 7JS	28-05-2013
CFA18 Stoneleigh, Kenilworth and Burton Green	Castle Farm Recreation Centre, Fishponds Road, Kenilworth, Warwickshire CV8 1EY	10-06-2013
CFA19 Coleshill Junction	The Link, 4 New Road, Water Orton, Birmingham, Warwickshire B46 1QU	01-06-2013
CFA20 Curdworth to Middleton	Middleton Recreation Room, Church Lane, Middleton, Tamworth, Staffs B78 2AL	07-06-2013
CFA21 Drayton Bassett, Hints and Weeford	Hints Village Hall, School Lane, Hints, Tamworth, Staffs B78 3DN	18-06-2013
CFA22 Whittington to Handsacre	The Guildhall, Lichfield, Bore Street, Lichfield, Staffs WS13 6LX	11-06-2013
CFA23 Balsall Common and Hampton-in-Arden	The Fentham Hall, Marsh Lane, Solihull, West Midlands B92 0AH	05-06-2013
CFA24 Birmingham Interchange and Chelmsley Wood	The Loft, Bluebell Centre, West Mall, Chelmsley Wood Shopping Centre, Chelmsley Wood, West Midlands B37 5TN	13-06-2013
CFA25 Castle Bromwich and Bromford	Firs & Bromford Sports & Community Centre, Cameronian Croft, Bromford, West Midlands B36 8UB	06-06-2013
CFA26 Washwood Heath to Curzon Street	Thinktank, Millennium Point, Curzon St, Birmingham, West Midlands B4 7XG	12-06-2013

3.1.4 In addition to the public information events, a number of meetings were held with various stakeholders at which HS2 Ltd sought to raise awareness of the draft ES and to seek subsequent written feedback. The following meetings (see Tables 2, 3 and 4) were held during the 56 day (8 week) consultation period - further details on these meetings are provided in Volume 1 of the ES.

Table 2: National Environment Forum

Attendees	Dates
English Heritage, Environment Agency and Natural England	23-05-2013

Table 3: Planning Forum

Attendees	Dates
Warwickshire County Council, North Warwickshire Borough Council, Aylesbury Vale District Council, Northamptonshire County Council, Staffordshire County Council, Solihull Metropolitan Borough Council, Birmingham City Council, Oxfordshire County Council, Buckinghamshire County Council.	22-05-2013
London Borough of Camden, London Borough of Brent, Westminster City Council, Royal Borough of Kensington and Chelsea, London Borough of Islington, London Borough of Ealing, London Borough of Hammersmith and Fulham, South Northants District Council, Warwickshire County Council, Hertfordshire County Council, Greater London Authority.	23-05-2013
London Borough of Camden, London Borough of Brent, Westminster City Council, Royal Borough of Kensington and Chelsea, Chiltern District Council, South Bucks District Council, South Northants District Council, Northamptonshire County Council, Warwickshire County Council, Buckinghamshire	19-06-2013

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Attendees	Dates
County Council, North Warwickshire Borough Council, Lichfield District Council, Birmingham City Council, Solihull Metropolitan Borough Council.	

Table 4: Non-Government Organisation Forum

Attendees	Date
The Heritage Alliance, Wildlife Trusts, Campaign for Better Transport, Campaign to Protect Rural England, National Trust, The Ramblers, Woodland Trust.	11-06-2013

4 Process for consideration of responses

- 4.1.1 HS2 Ltd accepted written responses to the consultation on the draft ES in the form of traditional hard-copy responses, emails and via the consultation website during the consultation period 16 May 2013 to 11 July 2013.
- 4.1.2 Comments on the draft ES were received by an independent specialist response analysis company, Dialogue by Design, who undertook an initial quantitative analysis of all the responses.
- 4.1.3 Where comments were specifically related to the Proposed Scheme design, further consideration was also given to these issues by HS2 Ltd.
- 4.1.4 Comments raised were considered by the technical environmental topic authors responsible for writing the relevant section of the draft ES and recommendations were made to HS2 Ltd on how these comments should be addressed.
- 4.1.5 In the majority of cases the environmental issues raised had been discussed previously with stakeholders and were already being considered and incorporated into the drafting of the ES to accompany the hybrid Bill. Such issues included noise mitigation and additional mitigation for landscape and ecology.
- 4.1.6 Many of the other issues raised were a reflection of the timing of the consultation in relation to how complete the draft ES was at the time of publication. A great deal of survey work and analysis has been completed since publication of the draft ES and, as a result, many of the concerns raised had already been addressed in the process of moving towards completion of the ES.
- 4.1.7 Some issues raised were not of direct relevance to the draft ES, for example those relating to the scope and methodology of the environmental assessment work which had already been taken into consideration as part of the earlier consultation on the draft Scope and Methodology Report³ (SMR) in 2012.
- 4.1.8 Section 5, 6 and 7 of this report provides a high level summary of the issues which were raised in relation to the consultation and how these have been addressed.

³ Arup/URS (2012), HS2 London to West Midlands EIA Scope and Methodology Report, HS2 Ltd, London.

5 Summary of comments relating to the environmental topics

5.1 Introduction

5.1.1 The following section sets out the key themes identified during the review of consultation responses and HS2 Ltd's response to each of these themes. Themes and responses are considered and presented by environmental topic set out following the structure of the ES.

5.2 Non-technical summary (NTS)

5.2.1 The main theme identified in the responses received during the consultation relating to the NTS for the draft ES and HS2 Ltd's subsequent response to this theme is as follows:

Detail provided in NTS

5.2.2 *A number of stakeholders requested more detail be included in the NTS document.*

5.2.3 The NTS is designed to provide a summary of the findings of the ES for a non-technical audience. More specific and detailed technical information is provided in the other ES volumes, such as the CFA Volume 2 reports.

5.3 Volume 1: Introduction to the Environmental Statement

5.3.1 The main themes identified in the responses received during the consultation relating to Volume 1 of the draft ES and HS2 Ltd's subsequent responses to these themes are as follows:

Design change requests

5.3.2 *A wide range of requests for additional design changes to the Proposed Scheme were received from stakeholders in response to the consultation on the draft ES.*

5.3.3 HS2 Ltd has reviewed and taken into consideration these design change requests. Section 7 of this report provides a summary of the main design changes which have been implemented since the draft ES was published. An explanation of why other changes requested in the responses to the consultation on the draft ES have not been taken forward is also provided.

Additional information on the consultation process

5.3.4 *A number of stakeholders made requests for additional information on the consultation process that will be undertaken for the ES during the hybrid Bill.*

5.3.5 Further clarification regarding the formal consultation process during the hybrid Bill was an agenda item for all community forums held during September 2013. Information on the process is also provided in the ES and further details will be published when the hybrid Bill is deposited in Parliament.

Consideration of alternatives

5.3.6 *There were a number of comments requesting more information on the alternatives to the Proposed Scheme which had been considered.*

5.3.7 The ES provides a more detailed explanation of the strategic, route-wide and local alternatives considered by HS2 Ltd.

Lack of data in the draft ES

5.3.8 *A wide range of stakeholders raised concerns regarding the lack of data in the draft ES, specifically information on baseline surveys; scope and methodology; cumulative impacts; and interface with other rail networks.*

5.3.9 The draft ES provided an assessment of the information available at the time of publication and some topics are such that they are dependent on having information that is only available during the finalisation of the developing scheme. Assessment work has continued since the draft ES was published and the amount of data provided in the ES has increased significantly. Unlike the draft ES the formal ES includes technical appendices of environmental information which has been used to inform the conclusions described in the ES. The structure of each topic appendix varies but broadly comprises:

- policy framework;
- baseline information including survey data; and
- any other material relating to the topic assessment.

5.4 Agriculture, forestry and soils

5.4.1 The main themes identified in the responses received during the consultation relating to the assessment of agriculture, forestry and soils in the draft ES and HS2 Ltd's subsequent responses to these themes are as follows:

Impact on woodland

5.4.2 *Some stakeholders raised concerns about the impact of the Proposed Scheme on woodlands, including the loss of woodland.*

5.4.3 HS2 Ltd recognises that woodlands are an important resource and the development of the Proposed Scheme has sought to avoid, mitigate or compensate for woodland impacts. The impacts and likely significant effects on woodland are addressed in the relevant sections of the ES. The ES also reports on the provisions that will be made for the creation of new woodland as part of the Proposed Scheme.

Woodland soils

5.4.4 *A number of stakeholders suggested that woodland soils should be used in the restoration process and incorporated into woodland mitigation planting sites.*

5.4.5 HS2 Ltd will, where reasonably practicable, translocate ancient woodland soils to new woodland planting sites and enhancement areas. Other woodland soils will be re-used where practicable. The areas where HS2 Ltd will utilise woodland soils are

described in the ES, with specific locations described in the relevant sections of the CFA reports within the ES.

Farm productivity

- 5.4.6 *In some cases, stakeholders expressed concern that there was a lack of analysis of the potential reduction in farm productivity as a result of the need for land required for the construction of the Proposed Scheme or farm severance. It was felt that this was compounded by the inbuilt assumption by HS2 Ltd that there is capacity for farms to adapt.*
- 5.4.7 The ES considers the physical and operational impacts and likely significant effects on individual farm holdings but does not consider any financial implications arising for individual holdings from the construction of the Proposed Scheme. Any potential reduction in farm productivity is a matter for compensation discussions between HS2 Ltd and individual farmers/landowners and is not a matter for the ES.
- 5.4.8 Parcels of severed land will be reduced by the provision of alternative access and where suitable and reasonably practicable, could be improved with the restructuring of land uses. Some of the land that has been identified as being severed will also be utilised in the Proposed Scheme as areas to be used for environmental mitigation (e.g. tree planting and wildlife habitat creation) to offset significant environmental effects that have been identified.

Communications with farmers

- 5.4.9 *A number of comments received indicated a level of dissatisfaction with the degree of communication with farmers who's land and businesses could potentially be impacted by the Proposed Scheme.*
- 5.4.10 HS2 Ltd has maintained dialogue with organisations such as the National Farmers Union (NFU), Countryside Land and Business Association (CLA) and the Central Association of Agricultural Valuers (CAAV) as a means to help improve dialogue with farmers and businesses. HS2 Ltd has also continued to meet potentially affected land and business owners to discuss the likely significant effects of the Proposed Scheme.

High quality agricultural land

- 5.4.11 *Concerns were raised by stakeholders that there may be a loss of high quality agricultural land resulting from land required for the construction of the Proposed Scheme.*
- 5.4.12 HS2 Ltd has sought to minimise the loss of high quality agricultural land as far as reasonably practicable. The ES identifies the specific areas and grades of land required temporarily and permanently for the construction of the Proposed Scheme. A clear policy commitment has been made on agricultural land restoration so that, where agreed, land will be returned to its pre-existing agricultural condition.
- 5.4.13 Good practice will be followed in carrying out soil handling operations in order to minimise damage to soil structure. Detailed soil surveys will be carried out and site

specific mitigation measures will be addressed in the Local Environmental Management Plan (LEMP)⁴.

Field water supplies and drainage

- 5.4.14 *Some concerns were raised by stakeholders in relation to the quality and continuity of field water supplies and drainage during construction of the Proposed Scheme.*
- 5.4.15 The draft CoCP⁵ accounts for the continuity of field water supplies and drainage. It states that all field drainage layouts and outfalls, fixed irrigation pipes and sources of irrigation water and fixed water supplies for livestock will be identified and that reasonable precautions will be taken during design and construction to protect and maintain these systems. Detailed proposals for the protection and continued functioning of these systems will be considered during the detailed design phase and maintained during construction.

Pollution of agricultural soils

- 5.4.16 *Some stakeholders raised concerns relating to the impact of air pollution and ground contamination on agriculture and soils as a result of construction of the Proposed Scheme.*
- 5.4.17 Specific measures to control air pollution (including dust mitigation) and prevent soil contamination during construction works are set out in the draft CoCP.

Viability of farming related businesses

- 5.4.18 *There was an expectation from some stakeholders that there will be compensation for the negative impacts that the Proposed Scheme may have on the viability of farming or agricultural businesses, including compensation for the loss of outbuildings used either for farming or business purposes.*
- 5.4.19 The purpose of an ES is to report on the likely significant effects produced as a result of the Proposed Scheme. As such, compensation falls outside the scope of the ES. Payment of compensation for land compulsorily acquired will be in accordance with the general statutory framework set out under the National Compensation Code⁶. Specific issues will be discussed directly with the affected property and landowners.

Extent of study area

- 5.4.20 *Concerns were raised by some stakeholders about the extent of the study area used to determine likely significant effects on agriculture, forestry and soils and whether this was sufficient.*
- 5.4.21 The study area used to assess the likely significant effects on agriculture, forestry and soils conforms to best practice guidance. The methodology and study area approach used for the assessment are described in the SMR and the SMR Addendum.

⁴ The LEMP will build upon the general environmental requirements contained within the CoCP and will set out how the project will adopt and deliver the required environmental and community protection measures within each relevant local authority area

⁵ Draft CoCP (see Volume 5: Appendix CT-003-000) The draft CoCP remains in draft and will be finalised through the Parliamentary process

⁶ The national compensation code is the collective term for the principles derived from both statute and case law, relating to compensation for compulsory acquisition, which ensures that when land is needed to build an infrastructure project, the owners receive compensation to help them to move house or to relocate a business. The compensation code also ensures that those who experience real, physical events, for example vibration or noise, from a scheme once it is in operation are entitled to compensation.

5.5 Air quality

5.5.1 The main themes identified in the responses received during the consultation relating to the assessment of air quality in the draft ES and HS2 Ltd's subsequent responses to these themes are as follows:

Air quality assessment

5.5.2 *Some stakeholders commented that there was a lack of air quality assessment presented in the draft ES.*

5.5.3 The assessments necessary to complete and publish information on air quality required more detail than that available at the time of publishing the draft ES. An assessment of air quality is an important consideration and the results of this assessment are now presented in the ES.

Construction dust monitoring

5.5.4 *Some stakeholders requested that dust monitoring be a requirement during construction.*

5.5.5 The ES describes a comprehensive set of mitigation measures intended to reduce dust emissions and the draft CoCP includes visual monitoring and site supervision to control dust at every construction site. Whilst it is not necessary to install dust monitoring at all construction sites those where a specific risk of dust is identified will be required to be monitored using specialist equipment. The monitoring of such sites will be discussed with the relevant local authority and the details specified in the LEMP.

5.6 Climate

5.6.1 The main themes identified in the responses received during the consultation, relating to the climate assessment in the draft ES, and HS2 Ltd's subsequent responses to these themes are as follows:

Assessment of climate change impacts

5.6.2 *Stakeholders expressed concerns about the level of detailed information presented in the draft ES on greenhouse gas (GHG) emissions and that the potential climate change impacts of the Proposed Scheme have not been properly assessed.*

5.6.3 Due to the nature of the assessment of GHG emissions and climate change this information was not finalised at the time of the publication of the draft ES. A detailed climate assessment has been finalised and is presented in the ES.

Publication of assumptions

5.6.4 *There were a number of requests for HS2 Ltd's assumptions used in the assessment of the climate change impacts of the Proposed Scheme to be stated in the ES (e.g. number of domestic flights displaced, load factors, number of trains etc).*

5.6.5 Assumptions relating to the assessment of climate change are presented in the ES.

Effect of modal shift

- 5.6.6 *The effect of modal shift caused by the Proposed Scheme was an issue raised by a number of stakeholders who suggested this subject should be addressed in greater detail in the ES. Specific concerns raised in the comments received included the carbon impact of driving further to reach HS2 stations and the potential replacement of domestic flights with long-haul flights.*
- 5.6.7 The assessments necessary to complete and publish detailed information on the effects of modal shift required more detail on the Proposed Scheme than that available at the time of publication of the draft ES. GHG emissions associated with travel to access HS2 stations have been incorporated into the analysis presented in the ES. A discussion on the re-use of airport slots due to modal shift of domestic /short haul air passengers onto the Proposed Scheme and their possible replacement with long haul flights is also included in the ES.

Effect of train speeds

- 5.6.8 *A number of stakeholders expressed concern in their responses that the speeds proposed for HS2 trains will use a disproportionate amount of energy.*
- 5.6.9 Analysis of the impact of proposed train speeds on energy consumption and the associated carbon emissions were undertaken and the results are presented in the ES.

Emissions during construction

- 5.6.10 *Concerns were raised by a number of stakeholders relating to the level of GHG emissions during construction and that no assessment will be undertaken to assess the potential impact.*
- 5.6.11 The climate assessment included in the ES presents the carbon footprint of both the construction and operation of the Proposed Scheme.

Compliance with climate change objectives

- 5.6.12 *Questions were raised by a number of stakeholders as to whether HS2 meets the UK's climate change objectives and what sort of supporting policies are needed to maintain HS2's low carbon credentials (i.e. land use planning restriction around out of town stations car parking restrictions, aviation policy).*
- 5.6.13 The climate assessment presented in the ES contains a review of related policies such as the Climate Change Act and the European Union Emissions Trading Scheme (ETS) and confirms the view of the Government that the Proposed Scheme can form an important part of the UK's low carbon future. A brief discussion on complementary transport and land use policies is also included in the ES.

5.7 Community

- 5.7.1 The main themes identified in the responses received during the consultation, relating to the community assessment in the draft ES, and HS2 Ltd's subsequent responses to these themes are as follows:

Effect on public rights of way

- 5.7.2 *A wide range of stakeholders raised concerns relating to the realignment or diversion of public rights of way (PRoW) along the route of the Proposed Scheme and the associated impacts on walkers and other path-users (including horse riders, for whom there are safety concerns associated with the noise of passing trains).*
- 5.7.3 Efforts have been made along the whole of the Proposed Scheme to keep realignments or diversions of PRoW to a minimum. Where changes to the existing PRoW are required, measures have been put in place to mitigate any likely significant effects where reasonably practicable. HS2 Ltd has worked closely with highway authorities and Local Access Forums⁷ in developing its proposals for PRoW. The alignment of bridleways has been an important consideration and, in discussion with relevant stakeholders, reviews of alignments have been undertaken and have been incorporated into the Proposed Scheme where reasonably practicable.

Access to green space

- 5.7.4 *The importance of maintaining provision and access to green space, both open countryside and urban green areas such as parks and nature reserves, during construction and operation was a theme raised by a number of stakeholders.*
- 5.7.5 HS2 Ltd has sought to minimise impacts on both the provision of, and access to, public open space and where appropriate has made provision for alternative green space and community facilities to mitigate for those directly affected by the Proposed Scheme. This information is presented in the ES.
- 5.7.6 The draft CoCP describes the appropriate controls which will be put in place to protect amenity in rural and urban areas from construction activities, including designated landscape areas, parks and open spaces and smaller green spaces in urban areas.
- 5.7.7 Where specific green spaces, parks, other outdoor facilities and PRoW have been identified through this consultation, checks have been undertaken to ensure these facilities have been correctly identified and assessed in the ES and, where reasonably practicable, access maintained or alternative provision provided.

Beneficial effects of natural environment

- 5.7.8 *Some stakeholders questioned the extent to which the beneficial effects of the natural environment and tranquillity on health and wellbeing were considered and taken into account in the draft ES.*
- 5.7.9 HS2 Ltd recognises the value of the natural environment and the beneficial effects it can provide to health and wellbeing. Consideration of this value is incorporated across a range of environmental topics and has helped inform the ES. For example, access to the countryside has been an important consideration in the environmental assessments and HS2 Ltd has sought to maintain public rights of way. The values

⁷ Set up under the Countryside and Rights of Way Act 2000 to advise local highway or national park authorities on the improvement of public access for the purpose of outdoor recreation and enjoyment of the area.

relating to 'tranquillity' are also included across several environmental topics in the ES.

Access to community facilities

- 5.7.10 *A number of stakeholders questioned how access to community facilities, including schools and hospitals, and the importance of ensuring safe routes for children walking to school had been taken into consideration in the draft ES. Comments were also received in relation to the importance of maintaining access for emergency vehicles during construction.*
- 5.7.11 Where reasonably practicable, HS2 Ltd has identified construction and permanent access routes which minimise the impact and likely significant effects on local communities and important community facilities, such as schools and hospitals.
- 5.7.12 For the construction phase, the draft CoCP identifies the types of site specific traffic management measures that will be implemented as appropriate. Further approval for construction traffic routes will be required from local authorities in accordance with the hybrid Bill. Prior to and during construction there will be regular consultation with emergency services to ensure that suitable access is maintained for these services. In addition, and in response to consultation, the draft CoCP has been further developed to include a requirement for a comprehensive community emergency plan to be put in place where relevant for each section of the work.
- 5.7.13 Comments received identifying a particular community facility that had not been properly accounted for or described in the draft ES have been reviewed to check that these have been included and adequately assessed in the ES.

Impact of construction noise and dust

- 5.7.14 *Reassurances were sought by a number of stakeholders that schools and hospitals will not be severely affected by noise, dust and other impacts during construction.*
- 5.7.15 The measures that will be put in place to control noise, dust and other construction impacts are described in the draft CoCP. Site specific details of how potential construction related impacts will be managed (such as noise and dust) will be a matter for the LEMP, which will be produced in consultation with the relevant local authorities.

Route and stations

- 5.7.16 *A range of comments were received which expressed dissatisfaction with the route of the Proposed Scheme and the number of stations. Some respondents felt that their communities will be impacted but would not benefit from the Proposed Scheme as they will not have direct local access to the service.*
- 5.7.17 Where specific suggestions have been made for alterations to the route, these have been considered by HS2 Ltd and are presented in section 7 of this report. The case for intermediate stations was investigated in 2009, re-examined following consultation in 2011 and the original analysis reviewed in 2013 in light of the evolution of the HS2 proposals. It was concluded that the introduction of intermediate stations would

increase journey times for through passengers and/or reduced train path capacity. A detailed assessment has been carried out and is presented in the Alternatives Report⁸.

Omissions from the community assessment

- 5.7.18 *A range of comments were received relating to perceived omissions within the community assessment presented in the draft ES; specifically cumulative effects, mitigation, compensation and property blight.*
- 5.7.19 Further assessment work has been undertaken since the publication of the draft ES and cumulative effects and mitigation of significant effects on communities are considered in the ES. Issues relating to compensation and property blight are beyond the scope of the ES and are considered elsewhere by HS2 Ltd.

5.8 Cultural heritage

- 5.8.1 The main themes identified in consultation responses relating to the assessment of cultural heritage in the draft ES and HS2 Ltd's subsequent responses to these themes are as follows:

Detail of cultural heritage information

- 5.8.2 *Some stakeholders expressed concern that there was limited cultural heritage information presented in the draft ES. Specifically that there is insufficiently detailed analysis of the impacts on cultural heritage assets and inadequate or inaccurate baseline data.*
- 5.8.3 The approach taken by HS2 Ltd in its assessment of cultural heritage follows best practice guidance. The ES and the assessment of effects is supported by technical appendices that provide the detailed information and analysis of a range of sources including data from English Heritage lists and registers, local authority historic environment records and archives, non-intrusive surveys.

Protection of cultural heritage assets

- 5.8.4 *Some stakeholders commented that the Proposed Scheme has not paid sufficient attention to the protection of cultural heritage assets, there is insufficient detail on the mitigation measures proposed or that the mitigation proposed is inadequate.*
- 5.8.5 The design and development of the Proposed Scheme has sought to avoid impacts upon heritage assets. HS2 Ltd seeks to avoid direct or indirect harm to valued historic cultural resources, to mitigate adverse impacts and to enhance such resources where practicable and has worked with English Heritage and local authority archaeologists to identify appropriate mitigation. HS2 Ltd has produced a draft Heritage Memorandum⁹ which considers the effects of the Proposed Scheme on heritage assets. The draft Heritage Memorandum sets out how the historic environment

⁸ HS2 Ltd (2013), High Speed Two: London - West Midlands Environmental Statement, Volume 5 Alternatives report (CT-002-000), Department for Transport, London

⁹ The Heritage Memorandum is part of a set of controls known as Environmental Minimum Requirements which the Secretary of State will establish to ensure that the environmental effects of the scheme will not exceed those assessed in the ES. The Heritage Memorandum will set out a commitment to limit the impact on the historic environment and will address the elements of the design and construction works that have a direct impact on heritage assets.

(including heritage assets and their setting) will be addressed during the design and construction of HS2 Phase One.

Impacts on cultural heritage assets

- 5.8.6 *Some stakeholders also stated that the assessment needed to consider both the impact on individual heritage assets as well as the overall impact on the historic environment. Concerns that impacts have not been assessed sufficiently or in a holistic manner.*
- 5.8.7 Further cultural heritage research and a more detailed assessment of the impact and likely significant effects from the Proposed Scheme on individual heritage assets, groups of assets and areas of historic landscape has been undertaken since the publication of the draft ES and is reported in the ES. This is supported by information presented in the technical appendices. The methodology used is presented in the environmental impact assessment Scope and Methodology Report.

Non-designated cultural assets

- 5.8.8 *There was concern raised by some stakeholders that the assessment was incomplete and inadequate as it should consider the impact of the Proposed Scheme on non-designated as well as designated cultural assets.*
- 5.8.9 The ES considers the impact and likely significant effects on both designated and non-designated assets, as set out in the SMR. A more detailed assessment of both the individual and cumulative impact of the Proposed Scheme on non-designated cultural heritage assets has been undertaken since publication of the draft ES. This is reported in the ES.

Impact on setting of heritage assets

- 5.8.10 *Some stakeholders stated that impacts on the setting of heritage assets (designated and non-designated) were not adequately considered. Related to this was a concern that the use of the Zone of Theoretical Visibility (ZTV) was not sufficient to consider all heritage assets.*
- 5.8.11 As part of the EIA process, cultural heritage specialists have worked closely with the landscape and visual impact specialists to understand and assess the impact of the Proposed Scheme on the setting of heritage assets. One of the tools used is the ZTV, which is prepared by the landscape specialists and, in addition to desk based research and site visits, the ZTV assists in the assessment of the impact of the Proposed Scheme on the setting of individual and groups of assets. Guidance provided by English Heritage and industry practice has been used, as set out in the SMR for the EIA. The ES contains the detailed cultural heritage research including an assessment of the setting of assets.

Significance criteria

- 5.8.12 *The level of significance given to a variety of heritage assets was questioned by some stakeholders.*
- 5.8.13 The approach to assessment has been undertaken in accordance with EIA regulations. An SMR has been produced which sets out the methodology for the assignment of

value/significance for heritage assets. This was produced in consultation with English Heritage and other relevant stakeholders.

Archaeological field evaluation

5.8.14 *The lack of archaeological field evaluation undertaken to inform the draft ES was of concern to a number of stakeholders.*

5.8.15 A programme of field evaluation has been undertaken to inform the ES submission. This work was on-going at the time of the draft ES being published and therefore the necessary detail was not available. However, assessment of archaeology is not only based on field evaluation. The research undertaken and subsequent assessment of heritage assets can be found in the SMR. The draft Heritage Memorandum addresses the elements of design and construction that have a direct impact on heritage assets.

Construction impacts

5.8.16 *Some stakeholders felt that the process to be followed should archaeological assets be discovered during the construction period was unclear.*

5.8.17 The draft Heritage Memorandum addresses the elements of design and construction that have a direct impact on heritage assets. The draft CoCP also sets out how the Nominated Undertaker and its lead contractors will manage the impact of construction works on heritage assets. This includes a programme detailing the implementation of cultural heritage works prior to and during construction and measures to be implemented in the event of unexpected discoveries of national significance made during the construction period.

Mitigation measures

5.8.18 *A number of stakeholders emphasised the need for measures to mitigate effects on other environmental topics, to be sensitive to the historic setting. Poorly designed mitigation measures could lead to further detrimental effects on heritage assets.*

5.8.19 The design of mitigation measures such as landscape works and planting has considered the presence of heritage assets. Close working between specialists has been carried out and will continue into the detailed design phase to reduce the effects of the Proposed Scheme on heritage assets.

5.9 Ecology

5.9.1 The main themes identified in the responses received during the consultation relating to the assessment of ecology in the draft ES and HS2 Ltd's subsequent responses to these themes are as follows:

Bechstein's bats

5.9.2 *A number of stakeholders raised specific concerns about the potential impacts of the Proposed Scheme on a population of Bechstein's bat in Buckinghamshire.*

5.9.3 Surveys undertaken through 2012 and 2013 have confirmed the presence of Bechstein's and other bat species in the vicinity of the route between Doddershall and Calvert.

- 5.9.4 Bechstein's bat is a European protected species and HS2 Ltd recognises the need to include appropriate mitigation in the Proposed Scheme to ensure the legal requirements relating to protection of these bats are met.
- 5.9.5 Through areas known to include bats crossing the Proposed Scheme will include a number of specific protection measures. Green overbridges comprising appropriate vegetation to encourage use by bats, and which will support existing known flight paths, have been included in a number of locations. In addition, a mitigation structure will be provided on a precautionary basis at Sheepphouse Wood to avoid potential impacts on bats crossing the HS2 corridor at this location.

Net gain in biodiversity

- 5.9.6 *A number of stakeholders suggested that HS2 Ltd should commit to a net gain in biodiversity, quoting the National Planning Policy Framework¹⁰ and the Natural Environment White Paper¹¹, and that the ES should demonstrate net gain or at least no net loss across the Proposed Scheme.*
- 5.9.7 In line with the National Planning Policy Framework and Natural Environment White Paper, HS2 Ltd will seek no net loss in biodiversity as part of its plans developed for the Phase One hybrid Bill. This will apply to the overall delivery of HS2 Phase One (rather than for each and every effect) and will be provided at a route-wide level to ensure that the delivery of mitigation and offsetting is appropriate and in accordance to the powers provided through the Bill. Habitat losses and gains will be measured using a modified version of the Defra biodiversity offsetting metric which has been developed in consultation with Defra and Natural England. The approach to the calculation of loss and gain to biodiversity has been included as an appendix to the ES.

Overbridges

- 5.9.8 *The use of overbridges to facilitate wildlife movements across the Proposed Scheme and reduce habitat fragmentation was questioned by some stakeholders. They considered the overbridges were too narrow and too few in number and that the Proposed Scheme would be a barrier to all species. Concerns were also expressed about the potential effectiveness of overbridges as wildlife corridors due to their proposed multi-purpose nature.*
- 5.9.9 The route will not be a barrier to all species. In the ES the potential barrier effect of the route is considered on a species and location specific basis. Where surveys have demonstrated a need, additional overbridges have been incorporated since the draft ES was published. There are also opportunities for wildlife to cross the route underpasses, bridges, culverts and viaducts. Based on existing survey information (and a precautionary assessment of likely impacts where details are not available) and the mitigation measures identified in the ES, there are considered to be sufficient and adequate crossing points in the design to avoid significant adverse effects on protected species.

¹⁰ Department for Communities and Local Government (2012), National Planning Policy Framework, HM Government, London

¹¹ Department for Environment, Food and Rural Affairs (2011), The Natural Choice: securing the value of nature, HM Government, London

Loss of ancient woodland

- 5.9.10 *A range of stakeholders expressed concerns about the loss of ancient woodland which cannot be replaced. The comments received suggested that the proposed areas of replacement woodland are inadequate to compensate for the loss. Stakeholders also questioned the 20-year timescale for when replacement woodland would be mature and the ability to successfully translocate ancient woodland soils, particularly where the translocations are proposed in currently intensively farmed agricultural land.*
- 5.9.11 The ES recognises that ancient woodland is an irreplaceable resource and any loss is a permanent significant residual effect. Compensation is offered, based on use of an offsetting metric which has been agreed with Defra and Natural England. Further consideration of the period to maturity of all habitats has been undertaken since the draft ES was published. It should also be noted that while the period to maturity for some habitats, and especially woodland, will be long, the areas of woodland habitat creation will provide valuable habitats for a range of protected species well before they are considered a 'mature woodland'.
- 5.9.12 The translocation of ancient woodland soils is a recognised best practice approach.

Loss of habitat connectivity

- 5.9.13 *Concerns were expressed by a number of stakeholders regarding the loss of habitat connectivity and suggestions made that the ES should provide more information on how proposed mitigation/compensation will ensure habitat connectivity.*
- 5.9.14 Further consideration has been given to this issue since the draft ES was published. Loss of habitat connectivity is considered at both a CFA and route-wide scale. The biodiversity offsetting metric also considered the role of those habitats lost and those to be created as part of ecological networks.

Species surveys

- 5.9.15 *A number of comments were received suggesting that further protected species surveys are required to meet the recommended standard of two to three years' survey data.*
- 5.9.16 HS2 Ltd is committed to undertaking further ecological surveys in 2014 during the hybrid Bill process.

Monitoring and management

- 5.9.17 *Requests were made for HS2 Ltd to provide a commitment to monitoring and management not only during construction but post-construction over the long term, with commitment to monitoring and reporting against effectiveness of mitigation. Particular questions were raised with regard to the funding for monitoring of newly created habitat and requests for greater detail on how it will be managed.*
- 5.9.18 Monitoring measures for the construction period are addressed in the draft CoCP and will be further developed in the LEMP.

- 5.9.19 A draft Environmental Memorandum¹² will be prepared and published alongside the hybrid Bill, which will consider the monitoring of the direct and indirect effects of the Proposed Scheme on biodiversity.

Ecosystem services

- 5.9.20 *A number of stakeholders suggested HS2 Ltd should look to apply the ecosystem service approach supported by Government, delivery through green infrastructure networks and the need for assessment of the likely residual significant effects on ecosystems services.*
- 5.9.21 Whilst there is currently no legislative requirement to provide an assessment of ecosystem services, HS2 Ltd is looking at the feasibility of Ecosystem Services Assessment scoping to help DfT and Defra better understand the application of this type of assessment to projects like HS2.

Colne Valley

- 5.9.22 *Concerns were raised by a range of stakeholders over disturbance of Colne Valley wetland complex during construction. It was suggested that enhancement of wetland habitats at Broadwater Lake and other parts of Colne Valley should be explored further.*
- 5.9.23 Mitigation measures and enhancement opportunities for the Colne Valley area are reported in the ecology section of the ES. This identifies a range of measures that will be included in the Proposed Scheme and includes additional measures introduced since the draft ES was published.

5.10 Land quality

- 5.10.1 The main themes identified in the responses received during the consultation relating to the assessment of land quality in the draft ES and HS2 Ltd's subsequent responses to these themes are as follows:

Sources of contamination

- 5.10.2 *Some stakeholders commented that sources or receptors of potential contamination had not been identified in the draft ES, or that there were errors in the detail provided in the draft ES.*
- 5.10.3 Where specific sources and receptors have been identified in responses to the consultation on the draft ES, checks have been undertaken to ensure these have been correctly included and assessed in the ES. Where potential errors have been identified, these have been reviewed and where appropriate updated in the ES.

Policy and guidance

- 5.10.4 *Concerns were raised by some stakeholders that there was a lack of assessment of relevant policy and guidance in the draft ES, e.g. in relation to contamination and ground gas monitoring.*

¹² The Environmental Memorandum is part of a set of controls known as Environmental Minimum Requirements which the Secretary of State will establish to ensure that the environmental effects of the scheme will not exceed those assessed in the ES. The Environmental Memorandum is a framework for HS2 Ltd and its contractors and stakeholders, such as the Environment Agency and Natural England, to work together to ensure that the design and construction of HS2 Phase One is carried out with due regard for environmental considerations.

- 5.10.5 Since the publication of the draft ES, the policy assessment has been reviewed to check that relevant policies and guidance have been included, for example, reference to CIRIA Report C665¹³ on assessing risks posed by hazardous ground gases to buildings.

Remediation and mitigation

- 5.10.6 *Some stakeholders questioned the treatment of land quality in the draft CoCP, and suggestions that it should include specific remedial solutions and mitigation measures for contamination. Such activities may affect air and water quality or may require waste management.*
- 5.10.7 These issues are addressed in the draft CoCP and locally specific measures will be identified in the LEMP. Where specific remedial or mitigation measures can be identified they are included within the ES.

Receptors

- 5.10.8 *Inclusion of additional receptors in the ES, including groundwater Source Protection Zones, aquifers and numerous specific surface water sources, was requested by some stakeholders.*
- 5.10.9 Aquifer status and groundwater source protection zones are considered within the ES as potential receptors for contamination, as are surface watercourses within the vicinity of the construction areas.

Pollution and contamination

- 5.10.10 *Further reassurance was requested by some stakeholders in relation to site investigations, storage of pollutants (including fuel), monitoring of pollution and contamination remediation during construction.*
- 5.10.11 As required by the draft CoCP, site investigations will need to be undertaken to confirm possible areas of contaminated soils or groundwater. Groundwater monitoring will also be required in certain areas prior to, during and post-construction. On the basis of the assessment of the investigation results, a remedial strategy will be devised for each area of concern. These issues are set out in the ES. The methods for storage of pollutants (e.g. fuel) are governed by the requirements of the draft CoCP.

5.11 Landscape and visual assessment

- 5.11.1 The main themes identified in the responses received during the consultation relating to the landscape and visual assessment in the draft ES and HS2 Ltd's subsequent responses to these themes are as follows:

Methodologies

- 5.11.2 *The methodology used to undertake the landscape and visual impact assessment including: the number and location of photomontages; the lack of inclusion of the ZTV in*

¹³ Wilson, S; Oliver, S; Mallett, H; Hutchings, H; Card, G (2007), Assessing risks posed by hazardous ground gases to buildings, CIRIA, London
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the draft ES and understanding of how this had been applied; and the extent of the assessment area was questioned by a number of stakeholders.

- 5.11.3 Further photomontages have been included in the ES (the SMR sets out the approach to producing and selecting photomontages). The purpose of the ES is to report likely significant effects and these are being used to provide an understanding of likely significant effects. Note that not all views identified in the ES will have a photomontage. The ZTV is included in the ES, with the SMR explaining how it should be interpreted. The extent of the ZTV was subject to consultation with relevant local authorities, Natural England, National Trust and Chilterns Conservation Board. The ES identifies both significant and non-significant effects within a 4km study area (i.e. 2km either side of the route of the Proposed Scheme).

Baseline data

- 5.11.4 *Concern was expressed by some stakeholders regarding the lack of detailed baseline data on the landscape and visual assessment and the justification for conclusions reached in the draft ES.*
- 5.11.5 The draft ES provided an assessment of the information available at the time of publication and some topics are such that they are dependent on having information that is only available during the finalisation of the developing scheme. Assessment work has continued since the draft ES was published and the amount of data provided in the ES has increased significantly. The ES contains a full baseline and justification for the conclusions reached in the landscape and visual assessment.

Lighting

- 5.11.6 *Some stakeholders identified that the draft ES did not contain an assessment of the effects of lighting.*
- 5.11.7 This information was not available at the time of publication of the draft ES however the ES does contain an assessment of lighting where appropriate, including any necessary mitigation measures.

Mitigation design and maintenance

- 5.11.8 *HS2 Ltd was asked by some stakeholders to continue to develop further mitigation, ensuring high quality and locally suitable designs and also that any mitigation measures incorporated into the design be preserved and maintained.*
- 5.11.9 HS2 Ltd has continued to develop mitigation measures, including those elements listed for further consideration in the draft ES and has a landscape management and maintenance strategy. During detailed design, further consideration will be given to mitigation measures and where appropriate further consents sought from local authorities.

Area of Outstanding Natural Beauty

- 5.11.10 *Concern regarding the adequacy of the specific Chilterns Area of Outstanding Natural Beauty (AONB) assessment, described in Volume 3, was expressed by some stakeholders. In particular how this assessment relates to those in CFA 8, 9 and 10 and whether due consideration has been given to the special landscape qualities of the AONB.*

5.11.11 An assessment of the effects of the Proposed Scheme on the Chilterns AONB has been taken at both the local level (as described in the reports for CFA 8, 9 and 10) and, due to its national importance, is also assessed in its own right. However, the approaches required for these two types of assessment require a different approach and a different means of reporting. The assessments relating to the Chilterns AONB has continued since the production of the draft ES. This further assessment, including consideration of the special landscape qualities of the Chilterns AONB is reported in the ES.

5.12 Sound, noise and vibration

5.12.1 The main themes identified in the responses received during the consultation relating to the assessment of sound, noise and vibration in the draft ES and HS2 Ltd's subsequent responses to these themes are as follows:

Protection from noise

5.12.2 *A number of stakeholders made requests for greater protection from operational and construction noise generated by the Proposed Scheme, through improved mitigation and design changes (e.g. tunnels).*

5.12.3 The draft ES identified additional noise mitigation options which were included within the consultation. The Proposed Scheme includes appropriate noise mitigation in response to the assessment and is reported in the ES.

5.12.4 On the basis of the consultation on the draft ES and ongoing consultation with local authorities, the draft CoCP has been further refined and the mitigation provided by the draft CoCP has been incorporated into the assessment reported in the ES.

Presentation of noise impacts

5.12.5 *Some stakeholders questioned how noise impacts were illustrated in the draft ES and why noise contour maps only show the average noise expected at different points along the route during the operational phase and not:*

- the noise arising from construction impacts;
- traffic noise (e.g. as a result of road alignments);
- the ambient noise (i.e. how much new noise is being introduced as a consequence of the Proposed Scheme);
- vibration; or
- peak levels.

5.12.6 All the points raised have been considered and are reported in detail in the ES and its appendices and associated tabulated data.

Baseline data

5.12.7 *Some stakeholders considered that measurement data was lacking in the draft ES and requested that sound, noise and vibration baseline data be shared.*

- 5.12.8 Further studies have been undertaken since the draft ES was published. The baseline data has been shared with stakeholders through the planning forum sub-group and is reported in ES.

Night time noise

- 5.12.9 *Concern was raised by some stakeholders about night-time noise impacts, especially around depots and maintenance loops.*

- 5.12.10 Further noise assessment work has been undertaken since the draft ES was published and issues relating to night time noise impacts around depots and maintenance loops are assessed in the ES. Significant effects are reported in the ES and any necessary mitigation provided where reasonably practicable.

Quiet rural areas

- 5.12.11 *Some stakeholders considered that noise impacts in quiet rural places, including AONB, PProW, canals and community facilities such as golf courses are not adequately assessed.*

- 5.12.12 Methodology for the assessment of noise impacts and likely significant effects was consulted on in 2012 and presented in the SMR. Tranquillity is assessed in the landscape and visual assessment in the ES with input from the sound, noise and vibration assessment.

- 5.12.13 Noise impacts in quiet rural areas where people live have been assessed in relation to noise change, which considers the situation both with and without the Proposed Scheme. Outdoor community facilities and open spaces have been assessed and have taken account of any quiet areas identified under policy and regulations. Consistent with the emerging National Planning Policy Guidance¹⁴, quiet shared community open areas have been assessed where they are linked to residential community areas where they are identified as being adversely affected by the Proposed Scheme.

Assessment methodology

- 5.12.14 *Some stakeholders disagreed with the use of 50dB lowest observed adverse effect level (LOAEL); application of World Health Organisation (WHO) guidelines; and validation of the approach.*

- 5.12.15 The methodology for the sound, noise and vibration assessment was consulted on in 2012 and is set out in the SMR. The methodology is in line with current and emerging government policy and also reflects relevant WHO guidelines.

Tunnel portals and viaducts

- 5.12.16 *Noise generation from tunnel portals and viaducts, including concerns that the noise protection on viaducts is not as effective as the earth bunds at reducing the noise was raised by a number of stakeholders.*

- 5.12.17 Continued noise assessment work has been undertaken since the draft ES was published and these issues are addressed in the ES. For viaducts, the potential noise impacts have been further assessed and additional mitigation added by increasing the

¹⁴ Department for Communities and Local Government (DCLG) (2012), National Planning Policy Framework, DCLG, London

height of parapets where required. For tunnels, additional mitigation has been added where necessary in the form of adapted portals, to reduce noise.

Construction

- 5.12.18 *Concerns were expressed by some stakeholders in relation to the impact of construction noise, vibration and working hours. For example, the effect of construction traffic and rail heads on heritage assets or buildings with unusual or sensitive construction and the potential effect from vibration and settlement caused by tunnel boring machines.*
- 5.12.19 HS2 Ltd will continue to seek all reasonably practicable measures to further reduce or avoid these effects. In doing so, HS2 Ltd will continue to engage with stakeholders to fully understand the receptor, its use and the benefit of the measures. The outcome of these activities will be reflected in the Environmental Minimum Requirements. These issues are addressed in the draft CoCP and the sound, noise and vibration section of the ES. Additional site specific measures will be included in the LEMP.

Local conditions

- 5.12.20 *Some stakeholders questioned how local conditions and matters that affect noise levels have been taken into consideration e.g. wind and topography.*
- 5.12.21 Local conditions are included in the assessment and details of how they have been taken into account are included in the SMR reported in the ES.

Significant effects criteria

- 5.12.22 *Criteria being used to determine potential significant effects on individual dwellings or groups of dwellings that do not constitute a community were questioned by some stakeholders.*
- 5.12.23 The adopted significance criteria are those proven from other large scale rail projects, for example HS1, which have been scrutinised and proven through project delivery. The criteria have been refined consistent with Government noise policy¹⁵ and ¹⁶ and the emerging National Planning Practice Guidance¹⁷. The criteria used by HS2 Ltd have been scrutinised by the independent Acoustics Review Group¹⁸. Full details of the methodology are set out in the ES.

Sensitive receptors

- 5.12.24 *Some stakeholders expressed the view that the effect of construction and operational noise on schools and education; health effects; and sleep disturbance needed to be considered in the ES.*
- 5.12.25 These effects are addressed in the ES. Consistent with the UK Government's Noise Policy, the Proposed Scheme is aiming to avoid significant adverse noise impacts on

¹⁵ Department for the Environment, Food and Rural Affairs (Defra) (2010), Noise Policy Statement for England, Defra, London

¹⁶ HM Government, (2006) (Amendment 2010), The Environmental Noise (England) Regulations 2006, The Stationery Office, London

¹⁷ National Planning Practice Guidance – Noise <http://planningguidance.planningportal.gov.uk>

¹⁸ The Acoustics Review Group was set up to ensure that HS2 Ltd's approach to High Speed Rail is rigorously scrutinised at every stage. The members of the group provide an independent and experienced perspective on the development of sound and vibration assessment methods and criteria and proposals for effective management and control of noise and vibration.

health and quality of life where reasonably practicable. HS2 Ltd will continue to seek all reasonably practicable measures to further reduce or avoid the effects of construction and operational noise and in doing so will continue to engage with stakeholders to fully understand the receptor, its use and the benefit of the measures.

Rayleigh waves

- 5.12.26 *Some stakeholders considered that the ground-borne noise and vibration assessment is insufficient; and that it needs greater consideration of underlying geology, Rayleigh waves and building damage.*
- 5.12.27 The occurrence of high levels of vibration from Rayleigh waves¹⁹ is relatively rare. This phenomenon is well understood and is mitigated by appropriate design and construction techniques (for example HS1 across Wennington Marshes). Work on ground-borne vibration assessment has been continued since the draft ES was published and these effects are addressed in greater detail in the ES.

5.13 Socio-economics

- 5.13.1 The main themes identified in the responses received during the consultation relating to the socio-economic assessment in the draft ES and HS2 Ltd's subsequent responses to these themes are as follows:

Visitor numbers

- 5.13.2 *Comments were received from a number of stakeholders expressing concerns about the impact of the Proposed Scheme on visitor numbers and the potential reputational damage to popular tourist destinations.*
- 5.13.3 The likely effect on businesses is assessed and reported in the ES. For example, the potential impact of the Proposed Scheme on Camden Market has been assessed in the ES from both a community and socio-economic perspective. In both cases the assessment concludes that there is not a significant effect as access is maintained and any impacts are on a very small part of the market for a short duration.

Isolation effects of road closures

- 5.13.4 *The potential isolation effects on businesses, particularly as a result of temporary road closures due to the construction of the Proposed Scheme, were raised by a number of stakeholders.*
- 5.13.5 HS2 Ltd has endeavoured to avoid and reduce the effects of the Proposed Scheme on businesses. Where specific businesses or temporary road closures have been highlighted, these comments have been reviewed to check that potential impacts and likely significant effects have been identified and considered in the ES.

¹⁹ Rayleigh waves is a relatively rare situation in which high levels of vibration can occur where trains are travelling at a speed known as the critical speed over a railway situated on weak ground conditions. The critical speed is dependent on the ground conditions below and is not confined to high speed railways.

Agricultural employment and farm viability

5.13.6 *Stakeholders raised concerns about the lack of assessment of the potential impact on agricultural employment and farm viability, due to loss or severance of agricultural land as a result of the Proposed Scheme.*

5.13.7 This issue is addressed in the ES with agricultural impacts addressed within the agriculture, forestry and soils assessment for each relevant CFA report. The implications of the Proposed Scheme for agricultural employment are considered at a route-wide level.

Blight

5.13.8 *A wide range of comments were received on the effects of blight including impact on property value, changes to the character of property and place and the level or lack of compensation.*

5.13.9 Issues relating to compensation and property blight are considered elsewhere by HS2 Ltd and are therefore beyond the scope of the ES.

Construction worker recruitment

5.13.10 *A number of stakeholders sought a guarantee that construction workers will be recruited from the local area.*

5.13.11 The projected level of construction employment created by the Proposed Scheme is set out in the ES. There will also be considerable opportunities for businesses and residents along the line of route in terms of supplying goods and services and obtaining employment. HS2 Ltd is committed to working with its suppliers to build a skilled workforce that fuels further economic growth across the UK and will work with local partners to help ensure local communities are best prepared for the jobs HS2 will create and encourage our supply chain to recruit locally. It is estimated the construction of the Proposed Scheme could provide opportunities for around 1,000 apprenticeships in the construction workforce. HS2 Ltd is committed to using the Proposed Scheme to maximise the creation of new apprenticeships, as well as enabling existing apprentices employed in the supply chain the unique opportunity to experience working on the Proposed Scheme.

5.14 Traffic and transport

5.14.1 The main themes identified in the responses received during the consultation relating to the traffic and transport assessment in the draft ES and HS2 Ltd's subsequent responses to these themes are as follows:

Lack of baseline data

5.14.2 *A large number of stakeholders' responses relating to the traffic and transport assessment raised concerns about the lack of baseline data and objections to the insufficient (or non-existent) transport assessments (TA) in the draft ES.*

5.14.3 This issue has been addressed since the draft ES was published, as a TA has now been undertaken and details are included in the ES. Baseline data has been collected on all

modes of transport and an assessment made of the impacts of the Proposed Scheme. This covers the range of positive and negative environmental impacts and likely significant effects deriving from the Proposed Scheme and is both detailed and comprehensive at a local level along the whole route. The TA includes the construction and operational phases of the Proposed Scheme and an evaluation of the impacts of, for example, the movement of HGVs during construction and the impact on other public transport services, pedestrians and road traffic. The TA also addresses the impact on existing rail services and passengers.

Movement of construction materials

5.14.4 *Concerns were raised by a number of stakeholders in their responses that the traffic and transport assessment does not appear to have taken into consideration the movement of excavated material and other construction materials.*

5.14.5 The movement of excavated material and other construction materials has been assessed as part of the TA and is included in the ES. HS2 Ltd has sought measures to reduce impacts. This approach has led to the use of sustainable placement areas where these are requested to reduce the likely significant effects.

Heavy Goods Vehicle (HGV) routing

5.14.6 *The routing of HGV traffic was a particular concern for a range of stakeholders. Comments included opinions that the roads identified as access routes for construction traffic in the draft ES are unsuitable for HGVs for a variety of reasons, including width, load-bearing restrictions, low bridges and presence of schools/hospitals.*

5.14.7 HGV trips have been assigned onto the road network using the most appropriate route between the points of origin, if known, or the nearest junction on the strategic network and the specified gate of entry at the construction compound. Motorways and A-class roads have been used where possible with lesser standard roads only being used where no alternative is available for accessing the construction compounds. Comments relating to specific routes have been reviewed to check that potential impacts have been accurately identified and addressed in the ES.

HGV use

5.14.8 *A number of stakeholders made the assumption that only HGVs using the public highway will be used to deliver construction materials and remove excavated materials and therefore made comments suggesting that this approach undermined the sustainability credentials of the Proposed Scheme.*

5.14.9 Not all excavated materials and construction materials will be transported by HGVs via the public highway. Where practicable, HS2 Ltd has identified opportunities to use alternative means of transport. For example, where practicable, construction materials will be moved along the route as it is constructed. It is also proposed that the rail network is used to remove much of the excavated materials from the London tunnels.

5.14.10 In relation to road based traffic, the draft CoCP states that 'the impact of road based construction traffic will be reduced by identifying clear controls on vehicle types, hours of site operation, and routes for large goods vehicles'.

Impact on classic rail services

- 5.14.11 *Comments were received from a number of stakeholders questioning the potential impact of both construction and operation on classic rail services and also on potential future planned rail improvement services. Specific concerns were raised in relation to works at Euston Station and Old Oak Common station.*
- 5.14.12 The interaction between the high speed and classic rail networks is addressed in the ES. The vast majority of construction-related activity affecting the classic rail network will take place during standard planned closures or partial closures and will have little or no impact on the travelling public. A small proportion of the planned works will however require some restriction of rail services that will have an impact. These impacts will be relatively minor and will be mitigated as far as possible through measures such as the careful programming of construction works to coincide with standard closures and partial closures that are required and planned for the general maintenance of the railway. Works will also be planned so that they can be undertaken in short overnight stages when passenger services will not be disrupted. Additionally, longer closures will be programmed at the weekend and on bank holidays to minimise the number of passengers affected.
- 5.14.13 The potential for likely significant effects at a route-wide level has been assessed at Euston Station and its approaches and on the West Coast Main Line as a result of the scale, frequency and length of the works proposed in these areas. Information is provided in the ES on how these impacts will, as far as reasonably practicable, be mitigated. No significant route-wide residual concerns have been identified at Euston or Old Oak Common.
- 5.14.14 Once operational, the increased capacity and improved journey times that will result from the Proposed Scheme and the additional services provided to take advantage of released capacity on the classic network will contribute to less congestion and passenger crowding.

Reinstatement of highways and PRow

- 5.14.15 *Concerns were raised by a wide variety of stakeholders about HS2 Ltd's commitment to reinstatement of highways, junctions, paths, bridleways etc. after construction.*
- 5.14.16 The Proposed Scheme design generally already incorporates reinstatement and replacement of routes to limit any adverse impacts. The traffic and transport sections of the ES address where reinstatement is not considered appropriate.

Use of the public highway

- 5.14.17 *A number of stakeholders' comments requested the exclusion of construction or worker related traffic from certain public highways.*
- 5.14.18 All access routes for construction traffic related to the Proposed Scheme have been reviewed for their suitability. Further consent will also be required from local authorities for routes to and from works sites for large goods vehicles in accordance with the hybrid Bill. This is addressed in the draft CoCP.

5.15 Waste and material resources

- 5.15.1 The main themes identified in the responses received during the consultation relating to the assessment of waste and material resources in the draft ES and HS2 Ltd's subsequent responses to these themes are as follows:

Waste management proposals

- 5.15.2 *Some stakeholders considered that that there was insufficient detail or information presented on the acceptability of the waste management proposals. In particular, how much waste will be generated, how it will be used and disposed of and, where capacity for waste disposal exists, how the assessment has taken account of local waste plans.*
- 5.15.3 A full assessment of the likely significant environmental effects of waste generation and management associated with construction and operation of the Proposed Scheme has been undertaken. This assessment takes into account relevant policy at national, region and local level and considers waste generation and management at a route-wide level with reference to the regions through which it is proposed that the route passes. This information is presented in the ES, including a forecast of the quantity of waste that will be generated during construction and operation within each CFA; how and where the waste will be managed; an assessment of the quantities of waste that will require disposal on-site or off-site to landfill; and consideration of the mitigation measures applicable to waste generation and management associated with the Proposed Scheme. The purpose of this is to provide an overall route-wide assessment that takes account of on-site re-use opportunities along the entire route (i.e. for excavated material) and which seeks to reduce the impact of traffic movements where practicable. It also takes into account the traditional regional level approach to management of waste materials.

Waste management details

- 5.15.4 *Lack of detailed information on waste management at a sub-regional and CFA level was of concern to some stakeholders who thought that waste had largely been considered on a route-wide basis.*
- 5.15.5 The likely significant environmental effects of waste generation and management associated with construction and operation of the Proposed Scheme are assessed on a route-wide basis with reference to the regions through which it is proposed that the route passes. The purpose of this is to provide an overall route-wide assessment that takes account of on-site re-use opportunities along the entire route (i.e. for excavated material). It also takes into account the traditional regional level approach to management of waste materials.

Secondary impacts

- 5.15.6 *Some stakeholders identified that the secondary impacts of the waste management approach, particularly in relation to the generation of transport movements needed to be taken into consideration.*
- 5.15.7 The off-site management of waste and surplus excavated material is covered in further detail in the route-wide assessment. A proportion of surplus excavated material will be subject to sustainable on-site placement to reduce transport

movements as far as is practicable. Work has been undertaken to consider the movement of bulk materials and this is reported in the transport assessment.

Cut and fill balance

- 5.15.8 *Scepticism that the aspirations for a balance between cut and fill material is achievable was expressed by some stakeholders, leading to concerns over how such surplus material will be managed.*
- 5.15.9 Excavated material will be managed on a route-wide basis to achieve, as far as is reasonably practicable, a cut and fill balance across the Proposed Scheme. Surplus excavated material will be managed either by sustainable placement²⁰ or off-site disposal to landfill.

5.16 Water resources and flood risk assessment

- 5.16.1 The main themes identified in the responses received during the consultation relating to the water resources and flood risk assessment in the draft ES and HS2 Ltd's subsequent responses to these themes are as follows:

Balancing pond design

- 5.16.2 *A range of comments were received from stakeholders suggesting that the design of mitigation-balancing ponds should be more sympathetic to their setting and large enough to allow natural colonisation.*
- 5.16.3 The ES provides only the indicative sizes and locations for balancing ponds. Opportunities for more sympathetic design of balancing ponds will be discussed with relevant stakeholders at the detailed design stage which is a post Bill activity.

Flood risk assessments

- 5.16.4 *Concerns were raised in a number of stakeholders' comments that appropriate flood risk assessments have not been conducted and that local flood event history has not been adequately considered during the design process.*
- 5.16.5 Flood risk assessments have now been undertaken along the route and are presented as an appendix to the ES. Environment Agency records and, where available, local data have been used to understand local flood event history. Comments which specify local knowledge of historical flood events and flood risk have been reviewed to check these are adequately assessed in the ES.

Compliance with the Water Framework Directive

- 5.16.6 *A number of stakeholders expressed concerns that appropriate measures to address the requirements of the Water Framework Directive (WFD) have not been accounted for in the draft ES.*

²⁰ The on-site placement for disposal of surplus excavated material to avoid causing environmental effects (e.g. transport) that would otherwise be associated with the off-site disposal of that material. 'On-site' in this context means within the land required for the purposes of the Proposed Scheme and 'off-site' means external land (or landfill site) which is not specifically required for the purposes of the Proposed Scheme.

- 5.16.7 A WFD compliance assessment is included in the ES. It is a route-wide, water body based assessment of compliance with WFD objectives and considers whether the Proposed Scheme has the potential to cause a deterioration of a water body from its current status or potential; and/ or prevent future attainment of good status or potential where not already achieved.

Culvert design

- 5.16.8 *A number of specific concerns relating to the design of culverts and their potential impact on watercourses and their ecology were raised by stakeholders.*

- 5.16.9 Since the draft ES was published, the provision and design of culverts have been further developed and refined. Culverts will be designed to be as short as reasonably practicable in order to minimise the length of watercourse in culvert and to maximise the amount of daylight received. The design has also taken into account ecological measures and includes setting inverts of culverts below the bed level of the watercourse to help retain a natural bed substrate and the inclusion of mammal ledges, where appropriate.

Mitigation

- 5.16.10 *Requests were made by a number of stakeholders that the use of green roofs, sustainable drainage systems (SuDS) and other green infrastructure are considered as part of the design to reduce surface water flood risk, improve quality of surface water run-off, local air quality and biodiversity.*

- 5.16.11 Features such as SuDS have been considered in the design process and will be developed further where practicable during detailed design.

Groundwater flows

- 5.16.12 *Concerns were raised in a number of stakeholders' responses relating to the potential for the construction and operation of the Proposed Scheme to cause contamination or altering of groundwater flows.*

- 5.16.13 Designs will include mitigation to avoid contamination or altering of groundwater flows.

- 5.16.14 Measures to mitigate risks from land contamination during the construction phase are set out in the draft CoCP and will be instigated as part of required remediation strategies.

- 5.16.15 Groundwater flow paths may be altered by the presence of scheme elements such as cuttings and tunnels. The measures contained in the draft CoCP will effectively manage drainage so the effects on groundwater are insignificant.

Pollution risks from construction works

- 5.16.16 *A number of stakeholders raised concerns around the potential for pollution and contamination particularly from construction works and the potential impact of tunnelling work on water resources and aquifers.*

- 5.16.17 Further consideration and assessment has been undertaken to assess the potential impacts of construction and proposed mitigation. For example, further consideration

has been given to where gas and leachate control measures may be required during construction in landfill areas. The draft CoCP includes management measures to be put in place to address potential pollution impacts.

6 Summary of comments relating to the draft Code of Construction Practice

- 6.1.1 The draft CoCP has undergone extensive consultation particularly with local authorities affected by the Proposed Scheme. This has led to constructive dialogue and a number of changes being incorporated into the draft CoCP.
- 6.1.2 The main themes identified in the responses received during the consultation relating to the draft CoCP in the draft ES and HS2 Ltd's subsequent responses to these themes are as follows:

Powers of statutory authorities

- 6.1.3 *Comments received from a number of stakeholders requested additional clarity around the powers of the statutory authorities with regard to the measures within the draft CoCP.*
- 6.1.4 The draft CoCP has been amended to include a new section that provides additional detail regarding the powers of the statutory authorities in relation to additional approvals. The amended section provides more clarity specifically around the powers of the Nominated Undertaker, the Secretary of State and class approvals²¹.

LEMP scope and timing

- 6.1.5 *Further clarity was sought from some stakeholders around the geographic scope of the LEMP and timing for consultation.*
- 6.1.6 The draft CoCP has been amended to clarify that the LEMP will be developed during the Parliamentary process and the initial detailed design stage and prepared by relevant local authority area.

CoCP compliance and monitoring

- 6.1.7 *Some stakeholders wanted greater assurance that there would be compliance with the draft CoCP and monitoring of the works by the Nominated Undertaker and lead contractors.*
- 6.1.8 The draft CoCP has been amended to strengthen the Environmental Management System and enforcement sections, including a requirement for the Nominated Undertaker to review the effectiveness of the measures included.

Construction compounds

- 6.1.9 *Concern was raised by a number of stakeholders with regard to the potential impact of construction compounds.*
- 6.1.10 The hybrid Bill will include an approval process for construction compounds which will require further local authority consent. The significant effects associated with construction compounds are included within the ES.

²¹ Under the provisions of the HS2 Bill the nominated undertaker will require approval of how certain matters are managed during construction to reduce the effects on the environment and local communities. The HS2 Bill provides for a class approval to be made by the Secretary of State for the approval of general construction matters, for example suppression of dust, and artificial lighting.

Working hours

- 6.1.11 *Some stakeholders raised concerns regarding works which could take place outside of core working hours and sought greater understanding of the powers of local authorities to agree to and enforce working hours.*
- 6.1.12 The draft CoCP sets out the core working hours and further measures will be included within the LEMP as appropriate. The working hours section of the draft CoCP has been amended to reiterate that the Nominated Undertaker's contractors will seek to obtain consents from the relevant local authority under Section 61 of the Control of Pollution Act 1974 for the proposed construction works.

Community engagement and emergency planning

- 6.1.13 *Greater clarity was sought by some stakeholders on community engagement and emergency planning, including for businesses and land owners.*
- 6.1.14 The draft CoCP has been amended to include additional information on the development of a comprehensive community emergency plan which will be put in place for each section of the work. The Nominated Undertaker will ensure that emergency procedures for each work site are developed and procedures have been put in place requiring the Nominated Undertaker's contractors to pay due consideration to the impacts of extreme weather events and related conditions during construction.

7 Summary of comments relating to the design of the Proposed Scheme

7.1 Introduction

- 7.1.1 The following section sets out the proposals and suggestions for design changes received during the draft ES consultation. Commentary is provided to distinguish whether or not the design change request has been incorporated into the Proposed Scheme and if not, the reasons why.
- 7.1.2 By their nature, design changes are location-specific and requests tend to be similar within geographic areas and, as such, the design change requests are addressed on a community forum area (CFA) basis. To provide the most appropriate consideration of a design change, the requests were analysed by the design engineers and technical specialists responsible for each section of the route. It should be noted that this is a slightly different approach from the manner in which the environmental-based responses were treated as they were generally addressed on a route-wide level.
- 7.1.3 In some areas, multiple requests were received regarding the same design change; in other areas, a single request was received. Where multiple requests were received on the same issue, these were considered as a theme resulting in a similar weighting to the range of issues.

7.2 Euston – Station and Approach (CFA1)

Design commentary for CFA1

- 7.2.1 The main themes raised in the comments relating to design of the Proposed Scheme within the area of Euston – Station and Approach (CFA1) are discussed below. This area is substantially urban in character and includes the proposed Euston Station, which attracted the majority of the responses.

Community

- 7.2.2 *Stakeholders expressed concern that the Maria Fidelis Lower Convent School will be located immediately adjacent to a main construction compound for the HS2 works.*
- 7.2.3 The school has two campuses located on either side of the current Euston Station. HS2 Ltd remains in discussion with the relevant landowner with a view to acquiring a site on Drummond Crescent, adjacent to the Maria Fidelis Senior School on Phoenix Road. If the site is acquired, the Lower School on North Gower Street would move onto this site which is further from the main construction compound.
- 7.2.4 *Concern was also expressed regarding the aesthetic design of the new walls along the edge of the railway in this area.*
- 7.2.5 Hs2 Ltd is proposing to deliver a high quality of design and finish. This issue will be addressed when the station is designed in detail following Royal Assent.

Railway design

- 7.2.6 *A request was raised to retain the existing Line-X track which passes underneath the other tracks on the approach to Euston Station to allow continuation of current operational access to the station.*
- 7.2.7 It is not possible to retain Line-X during construction and the Proposed Scheme does not include reinstatement of the line. However, the benefits of reinstatement after construction continue to be considered with relevant stakeholders. Reinstatement of Line-X could be incorporated within the limits of the hybrid Bill and the ES without adversely impacting on the date of commencement of HS2 services.
- 7.2.8 *A stakeholder proposed increasing the headroom on the classic railway.*
- 7.2.9 This has not been incorporated into the Proposed Scheme because it would necessitate further raising of bridges and associated railway structures causing substantial disruption and additional environmental effects.

Noise

- 7.2.10 *Stakeholders requested covering over the high speed tracks in the Park Village East cutting area to reduce noise effects.*
- 7.2.11 HS2 Ltd has reviewed cost of covering the track in the Park Village East cutting area and concluded that the changes requested would fundamentally alter the design for tunnel ventilation and fire safety resulting in a range of additional effects, both related to design and local environmental impacts.

Access

- 7.2.12 *Temporary provision to allow access to the Park Village East area at all times during construction has been requested by stakeholders.*
- 7.2.13 Whilst pedestrian access will be maintained throughout the construction period, provision of vehicular access to all properties has been considered but not been incorporated due to the impact this would have on construction methods and risk to the construction programme. Construction methodology is being developed to mitigate to minimise the loss of vehicular access wherever practicable.
- 7.2.14 *Concern was raised regarding the potential for creation of a cul-de-sac at Drummond Street and some stakeholders expressed a desire to have Drummond Street pedestrianised.*
- 7.2.15 During construction of the Proposed Scheme, Drummond Street will be a cul-de-sac for vehicular access. HS2 Ltd will endeavour to maintain a pedestrian route during the construction phase. During the operational phase of the Proposed Scheme HS2 Ltd currently propose that Drummond Street will be a through route, with a left turn only (northwards) onto Cobourg Street at its east end. Following completion of the HS2 works it will be for the local highway authority to decide whether Drummond Street should be pedestrianised.

7.2.16 *Stakeholders have requested that during construction of the Mornington Street and Hampstead Road overbridges temporary pedestrian routes and bridges are provided to allow continuous pedestrian and cycle access in these areas.*

7.2.17 This has been incorporated into the design of the Proposed Scheme.

Euston Station design

7.2.18 *Stakeholders asked for the provision of underground taxi facilities at Euston Station.*

7.2.19 It is proposed to provide for taxis in Cobourg Street. Locating the taxi facilities beneath the station would be very costly and require a long access ramp which cannot be accommodated in the current space.

7.2.20 *Numerous stakeholders stated that the HS2 terminus should not be located at Euston or that the Euston Station design should be as outlined in January 2012 (i.e. re-build the entire station with all platforms below ground level).*

7.2.21 In 2009 Hs2 Ltd undertook an exhaustive examination of alternative sites for the London terminus before recommending Euston as the only viable option, a conclusion that has been endorsed by successive Governments. Double deck options to minimise the land take have also been explored extensively. Building the WCML platforms underground would require HS2 platforms to be approximately 4m above Eversholt Street. This option would still require demolition of two housing blocks on the Regents park Estate and the National Temperance Hospital. It would be very expensive and disruptive to build and construction would take approximately 19 years.

7.3 Camden Town and HS1 Link to South Ruislip to Ickenham (CFA2 to CFA6)

Design commentary for CFA2 to CFA6

7.3.1 The main themes raised in the comments relating to design of the Proposed Scheme within areas of Camden Town and HS1 Link (CFA2); Primrose Hill to Kilburn (Camden) (CFA3); Kilburn (Brent) to Old Oak Common (CFA4); Northolt Corridor (CFA5); and South Ruislip to Ickenham (CFA6) are discussed in the following sections. As with Euston - station and approach area (CFA1), this area is more urban in nature. Issues raised relate more to this urban characteristic.

Highway works

7.3.2 *Stakeholders expressed concern over the potential closure of the Camley Street link, a pedestrian and cycle route linking Camley Street to Agar Grove in Camden.*

7.3.3 HS2 Ltd will seek to configure the proposed construction compound at Camley Street to minimise the duration of any closures to this route.

7.3.4 *Concern was expressed by stakeholders over the use of Jeffrey's Street as a route for construction traffic. Concerns were primarily related to the potential effect HGVs could have on their properties and the increased traffic they could experience if the road were reopened as a through route (it is currently closed to traffic at one end).*

- 7.3.5 HS2 Ltd has identified an alternative route for construction traffic which will avoid Jeffrey's Street and has addressed these concerns. In any event routes for construction traffic will need to be approved with the local authority prior to any works commencing.
- 7.3.6 *The reconstruction of eight rail bridges across Camden Town for the HS1-HS2 link will require the closure of strategically important roads for short periods of time. As such, stakeholders expressed concern about impacts to the area both to businesses and in relation to traffic congestion in the area.*
- 7.3.7 HS2 Ltd will aim to minimise these impacts by ensuring that no more than one full road closure will be implemented at any one time. In addition, the bridge reconstruction will be implemented in accordance with the draft CoCP.
- 7.3.8 *Concern regarding the year-long closure of Old Oak Common Lane was expressed as it is used to access local schools, Wormwood Scrubs and other community facilities on the south side of the Great Western Main Line (GWML).*
- 7.3.9 Although there is no alternative to closing the road, HS2 Ltd will review possible mitigation measures.
- 7.3.10 *Stakeholders requested that excavated material is transported to the Euroterminal site via conveyor or the temporary road bridge over the Grand Union Canal. They have also asked that the temporary bridge be made permanent to provide alternative access to the Euroterminal site away from Channel Gate Road.*
- 7.3.11 HS2 Ltd is proposing to use conveyors and the temporary bridge to transport excavated material but has no plans to convert the temporary bridge into a permanent structure. The temporary bridge could not be converted into a permanent structure. A permanent structure would be more costly to install with uncertain foreseeable benefits in the long term.
- 7.3.12 *Construction of the Victoria Road crossover box (a facility to allow HS2 trains to change tracks) would bisect Victoria Road which would have to be diverted, causing disruption.*
- 7.3.13 Design development has resulted in the shortening of the crossover box by approximately 50m and a re-siting of the box approximately 150m to the west. This means that the box no longer bisects Victoria Road and as a result a diversion is no longer required.
- 7.3.14 *The use of roads through and surrounding Ickenham and West Ruislip for construction traffic was highlighted by stakeholders as being of particular concern, given that local traffic routes are already heavily congested at peak times and the potential for additional traffic from HS2 to cause gridlock existed.*
- 7.3.15 HS2 Ltd is looking to address this issue by using excavated material locally reducing the need to transport it. This strategy would be used prior to the railhead in West Ruislip becoming operational at which point excavated material would be transported by rail on the Chiltern Line reducing construction traffic on local roads.

Ventilation shaft (Design)

- 7.3.16 *Concern was raised over the size and the design of the Adelaide Road shaft headhouse²². Stakeholders thought that the structure was too high and the design shown in the visualisations not in keeping with the local area.*
- 7.3.17 Further design development has resulted in the shaft being partially integrated into the slope leading down to the railway, therefore reducing the height of the shaft visible from Adelaide Road and the nearby properties by 5.5m.
- 7.3.18 *Stakeholders in the vicinity of the Salusbury Road shaft also expressed concern over the design of the structure. They commented that the design as shown in the visualisation was too "brutal".*
- 7.3.19 Detailed design of structures, such as the headhouses, will be subject to further consideration and the external appearance will need to be approved by the local authority.
- 7.3.20 *Stakeholders commented that construction of the proposed ventilation shaft at Mandeville Road would lead to the removal of a significant amount of vegetation which currently separates their properties from the existing railway line.*
- 7.3.21 The removal of existing vegetation is unavoidable in order to build the ventilation shaft. HS2 Ltd will look to replace the loss of existing vegetation with appropriate planting. At the appropriate time landscaping detail will need to be approved by the local authority.

Ventilation shaft (Location)

- 7.3.22 *A preference for an alternative location for the Salusbury Road shaft has been suggested by stakeholders. The local authority has planning permission to develop the site at Salusbury Road and local stakeholders are concerned about the potential effects of construction on the surrounding area.*
- 7.3.23 HS2 Ltd has explored the possibility of relocating the proposed shaft to an alternative site at Canterbury Works and although it would be technically feasible to do so, it was concluded that the preferred location will remain at Salusbury Road. This would avoid potential impacts on nearby residential dwellings and the adjacent primary school and avoid the routing of construction vehicles past these properties.
- 7.3.24 *Stakeholders also expressed concern over the positioning of the Adelaide Road ventilation shaft within the site of the local nature reserve.*
- 7.3.25 HS2 Ltd has looked at this closely and re-positioned the shaft eastwards so that it no longer impinges on the local nature reserve.

Tunnels

- 7.3.26 *Stakeholders commented that they would prefer the entire route of the HS1 – HS2 link to be tunnelled, in order to reduce the effects on the immediate area.*

²² The above-ground structure which typically sits at the top of a ventilation shaft or tunnel portal. These structures can be used for housing control equipment or for providing emergency access to tunnels.

- 7.3.27 HS2 Ltd has considered various tunnelling options and concluded that tunnelling the route would not substantially reduce the effects of construction on the local area and in some instances would increase the amount of property acquisition required to construct the link. Whilst tunnelling would avoid widening of the North London Line and replacement of eight bridges it would require permanent stopping up of roads and the loss of residential property. This substantial in the cost could not be justified by the environmental benefits once construction is complete.
- 7.3.28 *An extension of the Northolt Tunnel beyond Ickenham Road, to a point beyond Breakspear Road South, was requested by stakeholders suggesting that this would reduce operational noise effects on nearby residential dwellings as well as reduce effects on Ruislip Golf Club.*
- 7.3.29 HS2 Ltd have looked at the possibility of extending the tunnel and concluded that it would cost significantly more than the Proposed Scheme, without substantial environmental benefit. Noise barriers will be installed and extra vegetation planted to mitigate the effects of noise on the nearby properties.
- 7.3.30 *Some stakeholders raised concerns about the risk of settlement effects on properties resulting from the construction and operation of the HS2 tunnels. In the areas of both the Kilburn/Kensal and Gloucester Avenue tunnels, stakeholders asked that the tunnels follow the alignment of the existing WCML to reduce the effects on properties.*
- 7.3.31 While the alignment of the tunnel at Gloucester Avenue has moved slightly towards the WCML (due to the realignment of the portal structure at Euston), HS2 Ltd aims to ensure that there are no significant effects on properties above or close to tunnels, cuttings, embankments and other works either during or after construction. HS2 Ltd's general approach has been tried and tested on major infrastructure projects. Buildings will be classified into risk categories, to which appropriate settlement monitoring will be applied before, during and after construction. In addition, protective measures will be adopted to minimise the risk of damage due to settlement. Such measures could include the design of the infrastructure, ground treatment measures and, where shown to be necessary, by strengthening foundations. As such, no change has been made to the design of the Proposed Scheme as a result of this request.

Noise and effects of construction activities

- 7.3.32 *Concern was raised in the Ickenham and West Ruislip area by stakeholders over construction noise effects, especially as the construction compound from which the tunnelling activities will be run will be in operation on a 24 hour basis.*
- 7.3.33 Construction noise will be managed as part of a package of measures designed to reduce the effects of construction, contained within the draft CoCP. As a result, no change has been made to the location of the construction compound.
- 7.3.34 *Stakeholders in the vicinity of the Victoria Road and Old Oak Common construction compounds expressed concern over the potential for construction effects, such as working hours, noise, light pollution and dust.*

7.3.35 Construction activities will be carried out in accordance with the draft CoCP which sets out the standards and procedures to which a developer or contractor must adhere to in order to manage the potential environmental impacts when undertaking construction. In extreme cases, where it is not possible to effectively manage potential environmental impacts, it may be necessary to rehouse residents temporarily.

Hawley Wharf, Camden

7.3.36 *The Hawley Wharf development in Camden received planning approval in November 2012. Concern was raised that this development had not been taken into account in the design of the Proposed Scheme.*

7.3.37 Although not included in the draft ES, HS2 Ltd has been engaging with the developers of the Hawley Wharf scheme and LB Camden to design and phase construction in a manner that allows both the development and the HS1-HS2 link scheme to go ahead..

Access

7.3.38 *Access that is generally level (and easily traversed by those with mobility issues) to the east of Rowley Way on the Alexandra and Ainsworth Estate was highlighted as being particularly important. This was perceived to be a risk due to the proposed construction compound for the Alexandra Place shaft.*

7.3.39 Whilst the path may be diverted during the construction phase, HS2 Ltd will maintain level access for the duration of the construction; and will ensure that it is reinstated after construction.

7.3.40 *Comments were received regarding the suitability of having two access points to Old Oak Common Station, from Old Oak Common Lane and Scrubs Lane. It was thought that traffic in Old Oak Common Lane would increase in an already highly congested area and that another access should be built to Scrubs Lane.*

7.3.41 HS2 Ltd believes that the majority of passengers using the station are those interchanging from other lines and will therefore not impact on Old Oak Common Lane. Those accessing the station locally are predicted to come from the west, not the east and therefore an eastwards link to Scrubs Lane has not been incorporated into the design of the Proposed Scheme. Proposed improvements to the local roads will satisfy the predicted demand.

Operational characteristics

7.3.42 *A through-service station which allows for access to continental and high speed services via HS1 without the need for a station at Old Oak Common was suggested.*

7.3.43 The layout of the tracks at Old Oak Common station in the Proposed Scheme is designed to allow trains from the West Midlands and the North to switch directly onto the HS1-HS2 link. An interchange station at Old Oak Common which links with Crossrail, Heathrow Express and GWML services is an integral part of HS2 and will offer a large number of onward connections. As such, the intent of this request (to provide direct access from HS2 to services on the continent) has been met, whilst

expanded capabilities and services are being provided through the Old Oak Common station.

7.3.44 *It was requested that the spur to Heathrow should be included as part of the Phase One works.*

7.3.45 Phase One of HS2 has been designed so that a spur can be built from the main line to Heathrow sometime in the future without disrupting HS2 train services. In January 2013 a possible route for a spur was published but the Government has suspended further work on the spur pending the outcome of the Airports Commission's review of airport capacity in the south east, due to be completed in 2015.

7.3.46 *A concern was expressed regarding increasing the headroom on the classic railway.*

7.3.47 This has not been incorporated into the Proposed Scheme because it would necessitate further raising of bridges and associated railway structures causing substantial disruption and additional environmental effects.

7.4 Colne Valley to Greatworth to Lower Boddington (CFA7 to CFA15)

7.4.1 The main themes raised in the comments relating to design of the Proposed Scheme within the areas of Colne Valley (CFA7); The Chalfonts and Amersham (CFA8); Central Chilterns (CFA9); Dunsmore, Wendover and Halton (CFA10); Stoke Mandeville and Aylesbury (CFA11); Waddesdon and Quainton (CFA12); Calvert, Steeple Claydon, Twyford and Chetwode (CFA13); Newton Purcell to Brackley (CFA14); and Greatworth to Lower Boddington (CFA15) are discussed in the following sections. As this area is larger than those discussed previously in this Section, the number of design-related responses received was greater and tended to reflect different themes to those that arose in more urban areas.

Highway works and realignments

7.4.2 Through this section of the route a large number of roads cross or are affected by the alignment of the Proposed Scheme and a variety of requests were received regarding road realignments:

7.4.3 *Some stakeholders requested a realignment of the B485 Chesham Road and King's Lane where it crosses over the South Heath green tunnel to reduce land severance.*

7.4.4 The requested realignment has been incorporated into the Proposed Scheme.

7.4.5 *Some stakeholders requested a reinstatement of Bacombe Lane over the Wendover green tunnel, rather than a permanent diversion via Ellesborough Road.*

7.4.6 The requested reinstatement has been incorporated into the Proposed Scheme.

7.4.7 *A bypass of Stoke Mandeville was requested to avoid the impact of high road embankments and bridges otherwise required on the A4010 Risborough Road and Marsh Lane at Stoke Mandeville, although some concerns were raised regarding local impacts.*

- 7.4.8 The requested realignment has been incorporated into the Proposed Scheme^{23 24}.
- 7.4.9 *A realignment of the A418 to avoid impacts on a commercial property in the area was requested by some stakeholders.*
- 7.4.10 The requested realignment has been incorporated into the Proposed Scheme.
- 7.4.11 *A realignment of the A41 Bicester Road south-east of Waddesdon was requested by some stakeholders to avoid the proposed high road embankments and bridges (for the existing A41 Bicester Road and Blackgrove Road) otherwise required to cross the Proposed Scheme in this area, also enabling a future bypass of Waddesdon to be implemented by others if required.*
- 7.4.12 The requested realignment has been incorporated into the Proposed Scheme.
- 7.4.13 *A number of stakeholders requested the realignment of Station Road at Quainton and other local connecting roads to better match existing traffic priorities, whilst maintaining access to the Buckinghamshire Railway Centres.*
- 7.4.14 The requested realignment has been incorporated into the Proposed Scheme.
- 7.4.15 *Some stakeholders requested a reinstatement of Perry Hill on a new alignment to avoid the proposed closure of the road which is the main route from Buckingham to Calvert.*
- 7.4.16 The requested reinstatement has been incorporated into the Proposed Scheme.
- 7.4.17 *A number of other requests were made for changes to local road realignments. These include:*
- *a further realignment of the A4010 Risborough Road and Marsh Lane;*
 - *a further realignment of the A418 to avoid nearby residential properties;*
 - *a bypass of Nash Lee Road to the A4013 Wendover bypass in order to lessen the impact of having both access points taken from Nash Lee Road;*
 - *retention of Station Road at Quainton on its existing alignment with access to Doddershall and a solution found to enable access to the Buckinghamshire Railway Centre to be maintained;*
 - *an extension of the A41 Bicester Road realignment to provide a full by-pass for Waddesdon;*
 - *a realignment of the A4421 Buckingham Road to bypass the village of Newton Purcell to the east, rather than the current realignment to the west;*
 - *a re-instatement of Featherbed Lane which under the current proposal is to be closed;*
 - *provision of access to the Lower Thorpe construction compound from Banbury Road; and*

²³ HS2 Ltd (2012), Review of possible refinements to the proposed HS2 London to West Midlands Route, Department for Transport, London

²⁴ HS2 Ltd (2013), Design Refinement Consultation – Consultation Document London – West Midlands, Department for Transport, London

- *rerouting of the A361 to bypass the village of Chipping Warden to reduce impacts to the village.*

- 7.4.18 The majority of these requests have been received previously, generally during Community Forums or bilateral meetings. These requests have been considered by HS2 Ltd and it has been determined that the suggested design change would not result in an appreciable benefit compared to the Proposed Scheme but would in many cases increase cost and construction impacts; as such they have not been incorporated into the Proposed Scheme.
- 7.4.19 *Comments were also received regarding the alternative access arrangements and provision of temporary slip roads onto the M25, including the potential need to include traffic management between junctions 16 and 17.*
- 7.4.20 The M25 slip road has been incorporated into the Proposed Scheme and offers a means of reducing construction traffic on local roads. The implementation and use of the slip roads would be undertaken in agreement with the Highways Agency and would be designed to comply with relevant highway standards and to manage traffic flow safety.

Rail/highway and land drainage

- 7.4.21 *Concern was expressed regarding the location of balancing ponds and land drainage features as they were shown in the draft ES.*
- 7.4.22 A substantial review of these features has been undertaken since publication of the draft ES which has resulted in a more suitable arrangement of drainage facilities, including the removal of ponds from more sensitive areas. At the detailed design stage, there will be further opportunities to review specific drainage feature and flood compensation locations with individual landowners.

Proposed Scheme alignment

- 7.4.23 *Realignment of the route to avoid the demolition of Lower Thorpe Farmhouse was suggested.*
- 7.4.24 This issue has been raised previously at which point HS2 Ltd considered a number of design alternatives regarding this issue. However, this has not been incorporated into the Proposed Scheme due to the extensive length of realignment that would be required together with the creation of additional environmental impacts not caused by the Proposed Scheme.
- 7.4.25 *Requests for a general lowering of the alignment, in particular through the Chilterns, past Aylesbury, between Fleet Marston and Sheephouse Wood and past Lower Boddington have been made by a number of stakeholders.*
- 7.4.26 These changes have not been incorporated because it is considered that the Proposed Scheme includes appropriate mitigation for example noise fence barriers and landscape screening. This offers better balance between cost, environmental and construction impacts in these areas.
- 7.4.27 *Comments were received regarding increasing the headroom on the classic railway.*

7.4.28 This has not been incorporated into the Proposed Scheme because it would necessitate further raising of bridges and associated railway structures, causing substantial disruption and additional environmental effects.

PRoW (Bridleways and footpaths)

7.4.29 Stakeholders submitted a variety of proposals regarding specific PRoW in this area. Generally, these include requests to widen all footpath and accommodation bridges to a minimum of ten metres to allow them to function as wildlife corridors; suggestions for alternative routes or mitigation of temporary closures; and some specific changes requested to individual PRoW such as:

- alterations to Bridleway Rickmansworth 004 near the Chiltern Tunnel southern portal, including provision of an underpass or widening of the Tilehouse Lane bridge over the Proposed Scheme for safe use by horse riders and provision of a separate cantering route;
- diversion of Mixbury BR5 so as to provide a dry all season route;
- realignment of Bridleway WEN/57 to avoid the Wendover bypass;
- realignment of Footpath WEN/13A (Wendover) to improve a currently substandard PRoW;
- realignment of Bridleway 225/4/20 so as not to pass over the Proposed Scheme at Godington;
- realignment of Mixbury Bridleways 303/4 and 303/22 to avoid crossing of the Proposed Scheme and to reduce the length of the current diversion; and
- realignment of the Radstone Footpath AX7 diversion via the disused railway line to join Footpath AX15.

7.4.30 In general, a reasonable and suitably engineered solution has been provided in the current Proposed Scheme for each affected PRoW. There remains scope to make some changes as part of the future detailed design process.

7.4.31 Whilst the Proposed Scheme retains most Public Rights of Way (PRoW) that cross the route, a number are realigned or combined with other road or farm crossings of the Proposed Scheme to reduce the visual impact and associated cost of frequent bridge crossings.

Tunnels

7.4.32 Stakeholders stated a preference for locating the Proposed Scheme in a tunnel in various sections of the route –in this area including:

- an extended bored tunnel under the Colne Valley rather than a viaduct;
- a long tunnel through the Chilterns AONB;
- shorter extensions of the Chiltern tunnel past South Heath;
- enclosure of Wendover Dean viaduct or extended green tunnel south of Ellesborough Road in this same area;

- *extension of Wendover Green tunnel to the north;*
- *bored or green tunnel (or a land bridge) to avoid impacts to the National Trust Grade I property Hartwell House and associated Grade II* Registered Park and Garden and its setting by Aylesbury;*
- *a green tunnel at Sheephouse Wood;*
- *a green tunnel at Chetwode;*
- *use of retained slopes or tunnels at Turweston cutting;*
- *a green tunnel around Mixbury/Finmere;*
- *an extension of the Greatworth green tunnel past Greatworth Hall; and*
- *a tunnel for the benefit of the Fairford Leys Estate, Hawkslade and Walton Court (Aylesbury) area.*

7.4.33 The majority of these requests for tunnels have been received previously, generally during Community Forums and bilateral meetings. These tunnel requests have been considered by HS2 Ltd and it has been determined that whilst the design change would result in some environmental benefits compared to the Proposed Scheme, these could not be justified based on the increased costs and construction impacts that would occur. Alternative mitigation in the form of noise fence barriers and landscape screening has been incorporated into the Proposed Scheme design, where reasonably practicable.

Rivers, watercourses and floodplains

7.4.34 *With respect to the River Colne, the paramount issue has been reducing or avoiding the positioning of piles/piers within the river channel.*

7.4.35 The Proposed Scheme now incorporates a short river diversion to ensure no bridge piers lay within the river channel. Floodplain compensation is also provided. Detailed design elements of bridge structures will be subject to further approvals from the relevant local authority.

7.4.36 *Stakeholders requested a watercourse diversion at the location of the Lower Thorpe viaduct to reduce impacts created at both the watercourse and an on-line pond by the proposed viaduct.*

7.4.37 The draft CoCP include measures to address potential impacts of flood risk and ecological mitigation and the detailed design will address additional watercourse issues in a manner acceptable to the Environment Agency. As such, no change was made to the viaduct incorporated into the Proposed Scheme.

7.4.38 *Various responses were received from stakeholders regarding management of watercourse crossings and drainage.*

7.4.39 The Proposed Scheme includes appropriate mitigation incorporated as part of the drainage, flood risk and ecological assessments. The inclusion of culverts in some locations rather than viaducts as originally considered (e.g. the Lower Hartwell Ditch

in this area) and specific types of drainage requirements will be subject to more detailed work as the detailed design stage progresses.

7.4.40 *Concerns that flood plains need to be protected and structures removed, where possible, were received from stakeholders.*

7.4.41 Where it is not possible to relocate these structures, flood plain compensation and flood protection have been or will be provided.

Bridges and structures

7.4.42 *Concern was expressed regarding the structure type at the Small Dean viaduct so as to avoid impact on the Chiltern Railway that passes below the Proposed Scheme.*

7.4.43 The current design of the Proposed Scheme takes this into account.

7.4.44 *A retaining wall to protect Grim's Ditch has been requested.*

7.4.45 This is not being included in the Proposed Scheme as the necessary works to construct a wall would result in a similar loss of the ditch. The Proposed Scheme may be able to accommodate additional earthworks and planting to reinforce the feature of Grim's Ditch within the landscape, as part of the detailed design process.

Utilities

7.4.46 *Various responses were received suggesting that overhead power lines should be located underground for visual benefit and that the adequacy and diversion of utilities needs to be considered and raised with responsible agencies.*

7.4.47 HS2 Ltd has been working closely with the various utility companies affected by the Proposed Scheme, particularly National Grid and Western Power whose high voltage overhead power lines need diversion in several locations. Consideration has been given to diverting these underground, however this has not been proposed having taking into account substantial additional associated costs, maintenance requirements and the limited potential environmental benefits that would arise.

7.4.48 *Stakeholders requested that the auto-transformer station, maintenance access point and access track at the north end of the Chipping Warden tunnel be located on the west side of the Proposed Scheme rather than the east side.*

7.4.49 The additional mitigation incorporated into the Proposed Scheme should adequately address any significant impact and implementing the suggested change would result in similar impacts elsewhere.

7.5 Ladbroke to Southam to Whittington and Handsacre (CFA16 to CFA22)

7.5.1 The main themes raised in the comments relating to design of the Proposed Scheme within the areas of Ladbroke and Southam (CFA16); Offchurch and Cubbington (CFA17); Stoneleigh, Kenilworth and Burton Green (CFA18); Coleshill Junction (CFA19); Curdworth to Middleton (CFA20); Drayton Bassett, Hints and Weeford (CFA21); and Whittington to Handsacre (CFA22) are discussed in the following sections.

Highway works and realignments

- 7.5.2 Through this section of the route a large number of roads cross or are affected by the alignment of the Proposed Scheme and a variety of requests were received regarding road realignments:
- 7.5.3 *A realignment of Welsh Road near Offchurch to alleviate a road safety issue due to the change in priority of this junction resulting from the closure of Long Itchington Road.*
- 7.5.4 The requested realignment has been incorporated into the Proposed Scheme.
- 7.5.5 *The online construction of Dalehouse Lane in Kenilworth where it crosses the Proposed Scheme, with a temporary diversion to the north side, thereby keeping Dalehouse Lane on its existing alignment.*
- 7.5.6 This requested change has been incorporated in the Proposed Scheme.
- 7.5.7 *An optimised temporary diversion of the A46 Kenilworth Bypass with reduced land take near Kenilworth.*
- 7.5.8 This temporary diversion has been incorporated in the Proposed Scheme.
- 7.5.9 *Reinstatement of the A5 overbridge to avoid the previously planned diversion.*
- 7.5.10 This reinstatement has been incorporated in the Proposed Scheme.
- 7.5.11 *A reinstatement of the A515 Lichfield Road on the existing alignment to avoid the proposed permanent diversion of the road as well as a vertical realignment of the A515 Lichfield Road under the Proposed Scheme.*
- 7.5.12 This reinstatement has been incorporated in the Proposed Scheme.
- 7.5.13 *A vertical realignment of Faraday Avenue.*
- 7.5.14 This realignment has been incorporated in the Proposed Scheme
- 7.5.15 *Installation of passing places on Shaw Lane.*
- 7.5.16 These passing places have been incorporated in the Proposed Scheme.
- 7.5.17 *A number of other requests were made for changes to local road realignments.*
- 7.5.18 The majority of these requests have been received previously, generally during Community Forums or bilateral meetings. These requests have been considered by HS2 Ltd and it has been determined that the suggested design change would not result in an appreciable benefit compared to the Proposed Scheme but would in many cases increase cost and construction impacts. The most significant of these being the further realignment of the Banbury Road crossing of the maintenance loops near Wormleighton, together with the redesigning of sections of the cutting slopes.

Rail, highway and land drainage

- 7.5.19 *Concern was expressed regarding the location of balancing ponds and land drainage features as they were shown in the draft ES.*

7.5.20 A substantial review of these features has been undertaken since publication of the draft ES, which has resulted in a more suitable arrangement of drainage facilities, including removal of ponds from more sensitive areas. At the detailed design stage there will be further opportunities to review specific drainage feature and flood compensation locations with individual landowners.

Proposed Scheme alignment

7.5.21 *Stakeholders submitted a large number of requests to either relocate or lower the alignment throughout this area. The majority of these requests have been received previously, generally during Community Forums or bilateral meetings, and have subsequently been considered by HS2. The most substantial of these realignment requests include:*

- *lowering of the vertical alignment from the maintenance loops, near Wormleighton to Windmill Hill, near Ladbroke to go under the Oxford Canal;*
- *a general lowering of the alignment from the north end portal of the Long Itchington Tunnel to South Cubbington Wood;*
- *a reduced vertical alignment of the Proposed Scheme, past Chelmsley Wood over the M42/M6 slip road;*
- *relocation of the North Chord of the Delta Junction to the north side of Water Orton, through the Severn Trent former sewage works land. This issue was also covered by the Government's Response to the Design Refinement Consultation;*
- *a lowering of the vertical alignment near Lichfield to go under the West Coast Main Line (WCML), South Staffordshire Railway Line and the A38. This issue was also covered by the Government's Response to the Design Refinement Consultation; and*
- *Diversion of the Trent & Mersey Canal near Lichfield to lower the vertical alignment of the route north of Lichfield.*

7.5.22 None of the above requests have been incorporated into the current design of the Proposed Scheme. HS2 has carefully considered each request and concluded that the Proposed Scheme incorporates appropriate mitigation and offers a better balance between cost, environmental and construction impacts in these areas.

7.5.23 *Comments were received regarding increasing the headroom on the classic railway.*

7.5.24 This has not been incorporated into the Proposed Scheme because it would necessitate further raising of bridges and associated railway structures causing substantial disruption and additional environmental effects.

PRoW (Bridleways and footpaths)

7.5.25 *Stakeholders submitted a variety of proposals regarding specific PRoW in this area. Generally, these include requests to widen all footpath and accommodation bridges to a minimum of ten metres to allow them to function as wildlife corridors and some specific changes requested to individual PRoW such as:*

- *retention of the original diversion to the Harry Green Way over Windmill Hill and Footpath SM90 near Ladbroke; and*
- *a reduction of the proposed diversion of Footpath SM33 along the A423 between Ladbroke and Southam.*

7.5.26 In general, a reasonable and suitably engineered solution has been provided as part of the Proposed Scheme for each affected PRow. While the above requests are not included in the current design, there remains scope to make some changes as part of the future detailed design process.

7.5.27 Whilst the Proposed Scheme retains most Public Rights of Way (PRow) that cross the route, a number are realigned or combined with other road or farm crossings of the Proposed Scheme to reduce the visual impact and associated cost of frequent bridge crossings.

Tunnels

7.5.28 *Stakeholders stated a preference for locating the Proposed Scheme in a tunnel in various sections of the route in this area, including:*

- *a green tunnel between Hunningham Road and Welsh Road, near Offchurch rather than the deep cutting;*
- *a long tunnel through the hill on which South Cubbington Wood is located;*
- *a green tunnel through Stoneleigh Park (former National Agriculture Showground) before it crosses the River Avon heading north;*
- *a bored tunnel through Burton Green;*
- *a green tunnel past Hints; and*
- *a green tunnel through Whittington Golf Course.*

7.5.29 The majority of these requests for tunnels have been received previously, generally during Community Forums and bilateral meetings. These tunnel requests have been considered by HS2 Ltd and it has been determined that whilst the design change would result in some environmental benefits compared to the Proposed Scheme, these could not be justified based on the increased costs and construction impacts that would occur. Alternative mitigation in the form of noise fence barriers and landscape screening has been incorporated into the Proposed Scheme design, where reasonably practicable.

Rivers, watercourses and floodplains

7.5.30 *On the general issue of water management, stakeholders made comments regarding management of watercourse crossings. Further, comment was made that soakaways and other infiltration sustainable drainage systems (SuDS) should not be constructed on contaminated ground.*

7.5.31 It is considered that the Proposed Scheme provides a design that is compliant with current regulations for crossings of watercourses, including appropriate mitigation.

There were a number of requests to remove viaducts and this has been implemented in places, with embankments incorporating culverts now replacing the previously proposed viaducts (e.g. North Wood culverts). The inclusion of culverts in some locations will be subject to more detailed work in consultation with relevant authorities.

7.5.32 *Stakeholders expressed concern regarding the length of viaducts across floodplains in this area.*

7.5.33 The following of viaducts were reduced, with the embankment length increased accordingly:

- Cuttle Mill viaduct shortened from 140m to 22m;
- Hunts Green viaduct shortened from 133m to 4m;
- Langley Brook viaduct shortened from 184m to 90m;
- Drayton Bassett viaduct shortened from 247m to 150m; and
- Black Brook viaduct shortened from 125m to 105m.

Utilities

7.5.34 *Various responses were received suggesting that overhead power lines should be located underground and that the adequacy and diversion of utilities needs to be considered and raised with responsible agencies.*

7.5.35 HS2 has been working closely with the various utility companies affected by the Proposed Scheme, particularly National Grid and Western Power whose high voltage overhead power lines need diversion in several locations. Consideration has been given to diverting these underground, however this has not been incorporated into the current design taking into account associated substantial additional costs, maintenance requirements and limited potential environmental benefits that would arise.

7.6 Balsall Common and Hampton-in-Arden to Washwood Heath to Curzon Street (CFA23 to CFA26)

7.6.1 The main themes raised in relation to the design of the Proposed Scheme within the areas of Balsall Common and Hampton-in-Arden (CFA23); Birmingham Interchange and Chelmsley Wood (CFA24); Castle Bromwich and Bromford (CFA25); and Washwood Heath to Curzon Street (CFA26) are discussed in the following sections. Generally, this area and the concerns expressed reflected that of a more urban area, where the Proposed Scheme includes the design and construction of a station and associated services.

Road realignments and access

7.6.2 *Stakeholders expressed concern over the permanent closure of Park Street.*

7.6.3 In order to retain Park Street in its current location and keep it operational, the entire Curzon Street station would have to either be raised or relocated. A full transport

assessment has been carried out as part of the ES and it has been concluded that the surrounding roads (New Canal Street, Moor Street and Moor Street Queensway) can absorb the increased traffic as a result of the closure of Park Street. This proposal has not been accepted as it is unnecessary on traffic grounds.

- 7.6.4 *In the draft ES it was proposed to close both Diddington Lane and Meriden Road and replace them with a single new road over the Proposed Scheme.*
- 7.6.5 Following discussions with the community, the Proposed Scheme has been raised slightly to allow Meriden Road to remain open and therefore removing the need for a new road over the route. Diddington Lane will be closed as originally proposed.
- 7.6.6 *There have also been comments in relation to the proposed realignment of New Canal Street with a request that it should remain in its current alignment.*
- 7.6.7 If New Canal Street were to remain on its existing alignment it would need to be widened in order to accommodate predicted traffic flows. The widening of the road would impact on the Grade I listed wall adjacent to the existing Grade I listed Curzon Street Station building.

Railway alignment

- 7.6.8 *Comments were received asking for the headroom on the classic railway to be increased.*
- 7.6.9 This has not been incorporated into the Proposed Scheme because it would necessitate further raising of bridges and associated railway structures causing substantial disruption and additional environmental effects.

Construction

- 7.6.10 *As part of the Proposed Scheme design, a construction compound was located adjacent to New Canal Street on part of the new Eastside Park. A concern was raised by stakeholders as to the amount of parkland being lost to the construction compound.*
- 7.6.11 To reduce the loss of land required within the park, the construction compound has subsequently been relocated nearby, adjacent to the old Curzon Street station building, on existing hard standing currently used as a car park.

Cultural heritage and listed structures

- 7.6.12 *Concern was expressed regarding the retention of the listed Fox and Grapes Public House which is currently identified for demolition.*
- 7.6.13 The Fox and Grapes Public House is located at the western end of the proposed Curzon Street station. In order to retain the pub, the entire station would have to move eastwards further away from the existing Moor Street Station, Moor Street Queensway Road and the city centre. This option was considered but determined to be an undesirable change and as such has not been incorporated into the Proposed Scheme.
- 7.6.14 *Stakeholder responses requested replacement of the proposed surface level car parks at the Birmingham Interchange station with a single multi-storey car park, as was the original design in the 2011 Consultation.*

- 7.6.15 The surface level car parks reduce the impact on the setting of the Grade II* listed Park Farm building and also reduces the overall cost. To date, the emphasis on design has been to reduce impact where possible on listed structures and therefore the surface level car parks remain as part of the Proposed Scheme.

Infrastructure

- 7.6.16 *Some stakeholders requested that the reopening of the 'Whitacre Link' disused railway be incorporated into the Proposed Scheme.*
- 7.6.17 In order to achieve this, the Proposed Scheme would need to be raised vertically (or tunnelled) which would have multiple knock-on effects for the overall design. As such, the Proposed Scheme does not currently reflect this request.

Tunnels

- 7.6.18 *A tunnel through the Balsall Common area was suggested by a number of stakeholders.*
- 7.6.19 This tunnel, and associated options, have been considered previously by HS2 Ltd. The options resulted in increased cost which outweighed the environmental benefits and the tunnel proposal has therefore not been incorporated into the Proposed Scheme.

8 Conclusions

- 8.1.1 During the 56 day (8 week) consultation period 20,944 responses were received in relation to the draft ES and draft CoCP. A great deal of consideration has been given to the comments received and to how these could be addressed; whether through the ES, the draft CoCP or through design development.
- 8.1.2 For engineering, environmental or cost reasons it has not been possible to take on board all comments raised. However, the consultation process provided a robust analysis of the content of the draft ES and draft CoCP and helped to confirm findings and identify areas which required further justification or information. Responses received have influenced the drafting of the ES and led in part to changes to the ES and to the design of the Proposed Scheme. The ES now reflects the results of the analysis of consultation responses.
- 8.1.3 Where a change would be of proven benefit to local communities, the environment and/or the Proposed Scheme these have, where reasonably practicable, been incorporated.