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# HS2 railway, UK – route development to the hybrid bill: the environmental statement

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The environmental statement (ES) for the first phase of the UK's High Speed Two high-speed railway (London to West Midlands) was submitted with the hybrid bill for the project in November 2013. It described the phase one scheme both during construction and operation, detailed the main alternatives considered and reported the likely significant environmental effects and proposed mitigation to avoid or reduce these. The statement also provided the justification for the land that was proposed to be compulsorily acquired for the construction and operation of the scheme. Following its deposit, additional provisions were required to seek additional powers for changes resulting from the select committee process and design development. Any resulting new or different significant effects on the environment were reported in the accompanying ES. This work required the coordination of engineering and environmental consultancies over nearly a 5-year period. The ES also had to comply with parliamentary standing orders and the European environmental impact assessment directive.

## 1. Introduction

The deposit of the hybrid bill for phase one (London to West Midlands) of the UK's High Speed Two (HS2) high-speed railway included the coordinated preparation of one of the largest environmental statements (ESs) ever produced. The ES comprised approximately 46 000 pages across five volumes. It was prepared over a 22-month period and involved hundreds of engineers, environmental specialists and legal experts. This paper highlights some of the key aspects of its preparation.

## 2. Need for an environmental impact assessment (EIA) and ES

At the time of the preparation of the ES, the European EIA directive (EC, 2011) provided for the assessment of the environmental impacts of public and private projects. The objective of this directive was to identify and assess the likely significant environmental effects of a project, with a view to informing the decision maker as part of the development consent process.

Parliamentary standing order 27A (UK Parliament, 2015) requires the promoter of a hybrid bill to prepare and deposit an ES to inform parliament, as the decision maker, of the likely significant effects of a project on the environment. This standing order states that the ES should include

- information set out in part II of schedule 4 of the Town and Country Planning (EIA) (England and Wales) Regulations 1999, since revoked and replaced by the Town and Country Planning (EIA) Regulations 2011 (HMG, 2011) and
- as much of the information in part I of that schedule as is reasonably required to assess the environmental effect of the works.

The information required under part II of schedule 4 comprises (in summary)

- a description of the development, including information on its site, design and size
- a description of the measures envisaged to avoid, reduce and, if possible, remedy significant adverse effects
- the data required to identify and assess the main effects that the development is likely to have on the environment
- an outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for the choice made, considering the environmental effects
- a non-technical summary of the information.

## 3. Organisation

Several parties were involved in the preparation of the ES. These included the client – HS2 Ltd – its development partner and a number of professional services companies (PSCs). The PSCs included four EIA consultants (EIACs) and five civil engineering consultants. The four EIACs were each responsible for a different geographical area across the phase one route. These aligned to the four engineering consultants across the same geographical areas, with a separate engineering consultant for Euston station. In addition to the four EIACs, HS2 Ltd appointed an environmental overview consultant (EOC) to provide technical guidance, ensure route-wide consistency for the ES and technically review the ES prior to submission. Assessment of topics such as carbon dioxide, climate change, operational noise and vibration were undertaken on a route-wide basis by the EOC.

There were also four land referencing consultants whose role was to identify land ownership, arrange site access for surveys

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and contribute to the production of the book of reference for the hybrid bill. The book of reference identified the parcels of land likely to be acquired for the scheme, along with their ownership. Apart from the land referencing consultants, all other consultants had a direct contributory role to the ES by providing input into the ES suite of documents.

Key members from the Department for Transport (DfT), the parliamentary agents (Winckworth Sherwood and Eversheds) and members of the counsel team were involved in the development of policies, information papers and review of the outputs from the hybrid bill and the ES preparation process. The organisational structure of the phase one ES team is illustrated in Figure 1.

**4. Document structure and contents**

The structure of the ES was an early discussion topic at the phase one Environmental Leadership Group (ELG), which comprised members from HS2 Ltd, the development partner, the EOC and the EIACs. There were two options for the structure of the ES. One option was to structure by environmental topic and the other option was a split on a geographical basis. The ELG concluded both divisions were feasible and valid. However, to ensure the document was accessible to members of the public, priority was given to the geographical areas generally following the existing political boundaries (such as

parish, county or metropolitan borough boundaries). This meant that stakeholders local to a given geographical area could easily find information related to the scheme design and environmental impacts for the area within a single section of the report. The ES was, therefore, divided into area reports known as community forum areas (CFAs).

The CFAs consisted of local parish councils, county councils, metropolitan borough councils and city councils. Issues related to the design and impacts of the scheme were discussed at public events hosted by HS2 Ltd in each of the CFAs. Phase one comprised 26 CFAs in total, hence volume 2 of the ES comprised 26 reports. Figure 2 shows the structure of the ES, which is now described in more detail.

**4.1 Non-technical summary**

The ES included a non-technical summary, as required by the EIA directive. This document provided a summary in non-technical language. It described the scheme design, its construction and operation, its likely significant environmental impacts and effects, both beneficial and adverse, and the means to avoid or reduce these. ‘Impact’ was used throughout the ES to refer to changes to the environment that have the potential to occur because of the construction and/or operation of the scheme. ‘Effect’ was used throughout the ES to refer to the consequence of an impact to the receiving environment.

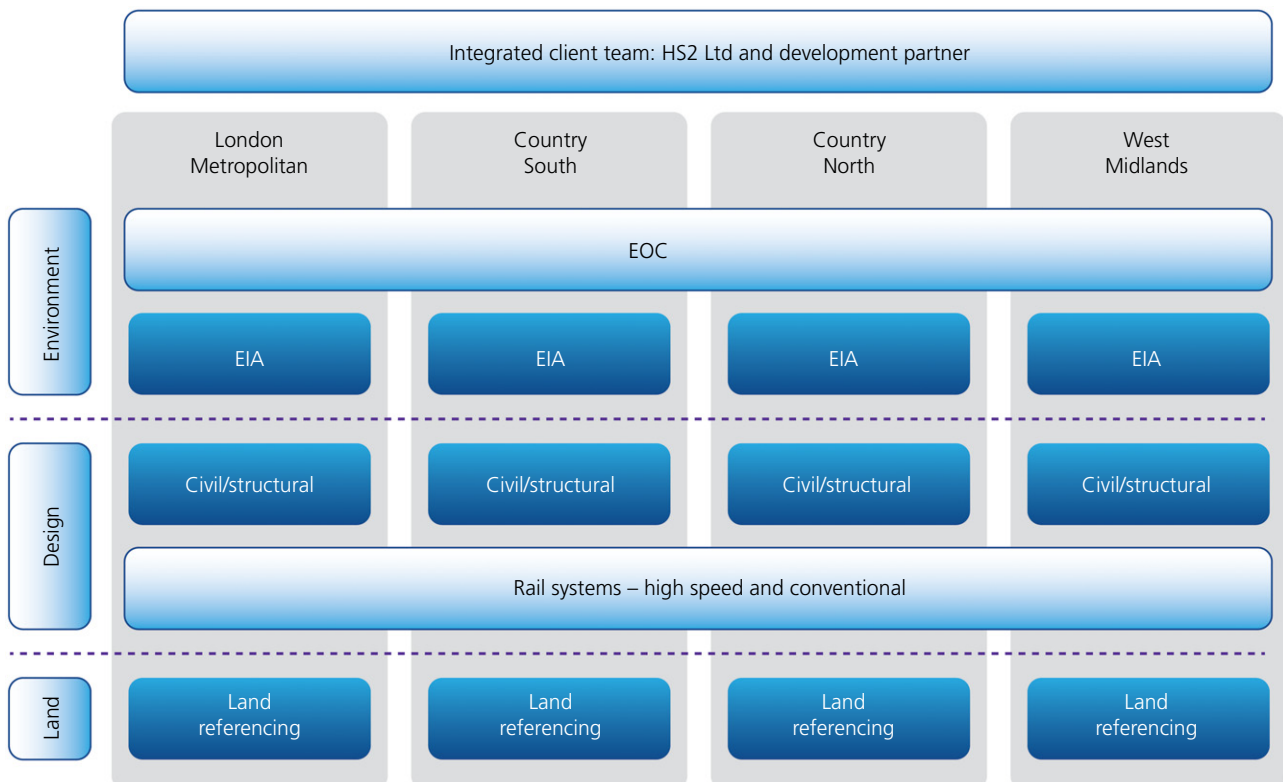


Figure 1. Organisational structure of the phase one ES team

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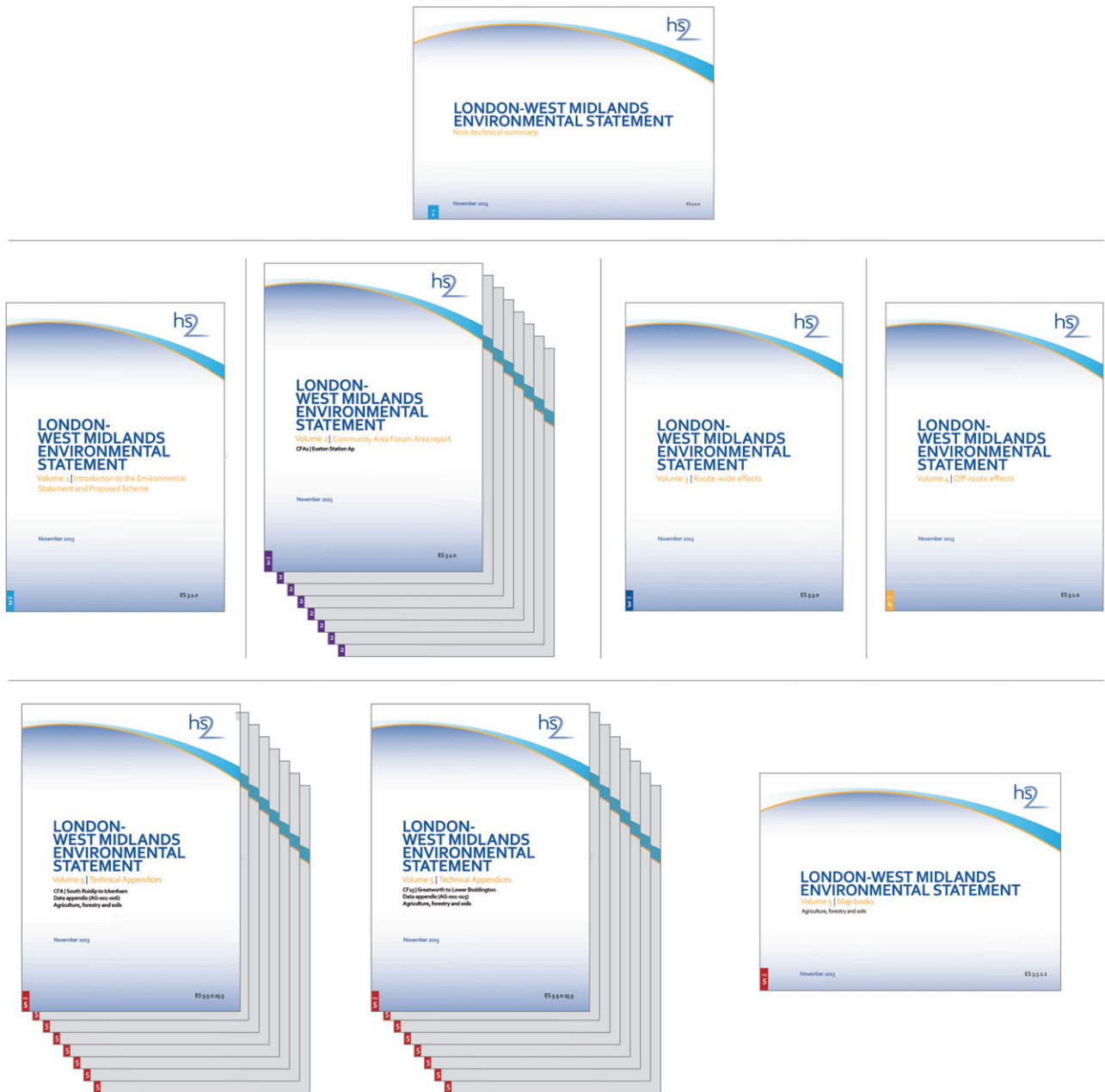


Figure 2. Structure of the ES

The ES also provided a summary of the strategic, route-wide and local alternatives that were explored during the design development process.

**4.2 Volume 1 – introduction and background information**

Volume 1 provided the introduction and background to the scheme. It introduced the scheme and its associated consent process, the hybrid bill and the EIA. It provided the background to HS2, explained the government’s case for HS2 and showed how the scheme had evolved. It also provided an overview of the

route, the service pattern and other operational characteristics, as well as the main physical features of the scheme and the general construction methods likely to be used to construct it.

Volume 1 also provided a summary of the various alternatives that had been considered at a strategic level and route-wide level and explained what local alternatives had been considered prior to the route announcement in January 2012. Local alternatives considered after 2012 were reported in the relevant CFA area report within volume 2, taking into account local stakeholder opinions.

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**4.3 Volume 2 – CFA reports and map books**

The purpose of the volume 2 CFA reports was to provide stand-alone reports that allowed readers to obtain information about a given community area without having to cross-refer to other volumes. Each report included an introduction to the phase one scheme, an overview of the area and a description of the scheme and its construction through the CFA. The impacts and effects associated with the construction and operation of the scheme were detailed in 12 environmental topics sections, from agriculture to water resources, as detailed in Table 1.

Each CFA report was accompanied by a CFA map book. These map books included non-technical drawings that aimed to simplify the engineering drawings that were published alongside the ES. The map books comprised several sets of drawings, which used base mapping reflective of 2013 Ordnance Survey (OS) data. The map books included the following.

- Construction phase drawings to illustrate the land potentially required during construction, the construction features, access requirements and infrastructure associated with construction of the scheme. The maps also showed the diversions of public rights of way and public access during the construction phase.
- Schematic drawings to illustrate permanent features, infrastructure, restored land and areas of landscaping, screening and ecological mitigation.
- Environmental baseline maps to display a range of environmental data layers.
- Photomontages illustrating the scheme during construction and operation.
- Maps showing the viewpoint locations from which the scheme had been assessed to give rise to significant visual effects during the construction and operational phases.

- Maps showing operational airborne noise and vibration impacts and likely significant effects, designed to help communicate visually the assessment process from the prediction of impacts to the determination of likely residual significant effects.

**4.4 Volume 3 – route-wide effects**

Some environmental topics could only be considered at a route-wide level, such as carbon dioxide and climate change. The ES also had to consider the cumulative effects of some topics across the full extent of the scheme. These route-wide effects were detailed in volume 3 of the ES. This also included a section specifically on the in-combination effects on the special landscape qualities of the Chilterns area of outstanding natural beauty (AONB), given the significance of this designated site and the fact that it extended across three CFAs.

**4.5 Volume 4 – off-route effects**

Some effects were identified outside the CFAs, either as a direct result of construction activities away from the main line of the route (e.g. to upgrade the existing rail network or depots to accommodate high-speed trains) or because of indirect effects (e.g. due to changes to passenger flow on the network). These so-called off-route effects were reported in volume 4 of the ES.

**4.6 Volume 5 – supporting information and environmental topic reports and map books**

There was a need to include several supporting documents and technical reports, including survey data and modelling outputs. These were appended to the main report within volume 5, which formed the bulk of the nearly 46 000 pages. This volume comprised

- the HS2 phase one draft ES consultation report
- the alternatives report

**Table 1.** HS2 phase one EIA topics and location within the phase one ES

EIA topic	ES volume 2 (CFA reports)	ES volume 3 (route-wide effects)	ES volume 5 (technical appendices)
Agriculture, forestry and soils	✓	✓	✓
Air quality	✓	✓	✓
Climate		✓	✓
Community	✓	Cross-reference to volume 2 only	✓
Cultural heritage	✓	✓	✓
Ecology	✓	✓	✓
EMI	EMI was scoped out of the impact assessment	EMI was scoped out of the impact assessment	✓ (details of potential receptors and supporting information only)
Land quality	✓	✓	✓
Landscape and visual	✓	✓ (in relation to Chilterns AONB only)	✓
Socio-economic	✓	✓	✓
Sound, noise and vibration	✓	Cross-reference to volume 2 only	✓
Traffic and transport	✓	✓	✓
Waste and material resources	✓	✓	✓
Water resources and flood risk	✓	✓	✓

AONB, area of outstanding natural beauty; EMI, electromagnetic interference

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- committed developments
- draft code of construction practice (CoCP)
- off-route effects supporting information
- planning data
- HS2 phase one EIA scope and methodology report and addendum
- the wider effects report
- technical appendices and map books for: agriculture, forestry and soils; air quality; climate; community; cultural heritage; ecology; electromagnetic interference (EMI); land quality; landscape and visual assessment; socio-economics; sound, noise and vibration; traffic and transport; waste; water resources.

**5. Delivery of the ES**

To ensure effective delivery of the phase one ES, delivery mechanisms, key dates, roles and responsibilities needed to be defined and agreed at the outset. This was detailed in an ES delivery plan. This key document was drafted early in the programme, but regularly reviewed and updated. The ES delivery plan provided an overview of the process to deliver the ES and instructions for the implementation of this process for all parties. It comprised sections on

- the review process and programme
- roles and responsibilities
- summary of key requirements
- ES final approval and sign-off.

Appended to the ES delivery plan was a responsible, accountable, consulted and informed (RACI) matrix, which was established to identify who had responsibility for each section of the ES. This identified individuals within the PSCs, appointed by HS2 Ltd, who had responsibility for different sections. The RACI matrix also identified the section reviewers, both technical and legal, and who was accountable for the final approval of that section. The RACI matrix was a key document throughout the preparation of the ES and was regularly updated and shared with all individuals

identified as having a role. The RACI matrix was used alongside the programme to inform individuals of forthcoming commitments and deadlines. This helped coordinate all individuals involved to ensure they had notification of key activities. The key dates associated with the delivery of the ES are provided in Figure 3.

It was recognised early on that, in order to work efficiently and manage the numerous interfaces between the EIACs, the EOC and HS2 Ltd, as well as the interfaces between the different PSCs, co-location of staff would be very beneficial. A dedicated area in HS2’s offices was set aside for the PSCs and teams to use and this enabled issues to be resolved quickly.

**6. Programme and reporting**

Given the interrelated nature of all the deliverables, reporting against the agreed programme was critical to ensure that the latter parts of the assessment and the time required for printing and production were not compromised by delays to earlier activities and by not understanding the impact of those delays. This required an understanding of how each function’s deliverables were dependent on each other and the timescales that were needed for each stage of works. Several workshops were held to identify these interdependencies between the different functions. For the ‘engineering–environment’ interface, a list of key information, including reports, maps and other relevant information was compiled to set out what was needed to be able to undertake the EIA. The timescales of when this information was needed were staggered according to what aspect of the assessment it was feeding into. For example, information to undertake the transport assessment was needed earlier in the process than information required for other parts of the assessment that were less time-critical. The outputs from many of the modelling topics fed other parts of the assessment. A typical sequence that needed to be followed is shown in Figure 4.

Control points were established in the programme and key milestones and the corresponding deliverables were set so that consultants for each function knew their review cycles and



Figure 3. Key dates associated with the delivery of the ES. SMR, scope and methodology report



Figure 4. Example EIA programme sequencing

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deadlines. Individuals were accountable for delivery. If a milestone could not be achieved, those involved in the handover would discuss what action was required to ensure the programme could be maintained. This may have resulted in an agreed delay, a staged handover of deliverables, the agreement of a common set of assumptions between relevant parties to be able to take the work forward or a change to the review cycle for that aspect of the work.

An operations room was established to track and coordinate the delivery of the various components of the ES. The operations room played a critical role in ensuring that the key internal stakeholders were kept informed on progress, all the information was in the right format for printing and the documents were deposited and delivered to the right locations at the time of the deposit of the hybrid bill.

**7. Preparation of the ES**

The main steps in the preparation of the ES are set out in Figure 5, and described in the following.

**7.1 EIA scope and methodology**

To ensure that the ES was robust, consistent and compliant with prevailing legislation and best practice for each EIA topic, the scope of the assessment and the assessment methodology to be followed was determined and defined. It was also important to obtain buy-in on the proposed scope and methodology from the stakeholders, and therefore a consultation was held on the EIA scope and methodology report (SMR). The consultation was held for an eight-week period from 4 April 2012 until 30 May 2012. The purpose of the consultation was to seek responses on the appropriateness of the proposed approach to the development of the EIA and the subsequent ES, inviting feedback from statutory bodies in particular. The SMR was updated as a result of feedback from the

consultation and the updated SMR was published in autumn 2012 and appended to the ES. In addition, an addendum to the SMR was also appended to the ES, which detailed where the methodology presented within the SMR had been amended or advanced due to

- changing legislation (e.g. The Controlled Waste (England and Wales) Regulations 2012 (HMG, 2012)) or industry best practice guidance (e.g. best practice guidance on monitoring water voles (Natural England, 2011))
- refinement during its application within the EIA or
- further feedback on the outlined methodology received from stakeholders including statutory bodies following the ongoing application of that methodology.

**7.2 Data collection and surveys**

As outlined by the scope and methodology for each topic, the type of data required as well as the geographic coverage was determined. Baseline data were classified as either spatial or non-spatial. Spatial data were managed in a geographical information system (GIS) by the consultants and HS2 GIS teams. It was recognised that local authorities and statutory authorities would hold a lot of this information and therefore HS2 Ltd sought to put in place service level agreements with these bodies to ensure the timely receipt of these data.

With regard to surveys, the EIACs had to work closely with the land referencing consultants to identify where land access should be prioritised to be able to undertake surveys in accordance with the relevant season and to programme surveys as access became available. Whilst every effort was made to access as much land as possible, at the time of the main assessment there were still areas of land where access had not been agreed. For these areas, a precautionary principle was adopted, whereby the assessment assumed a reasonable

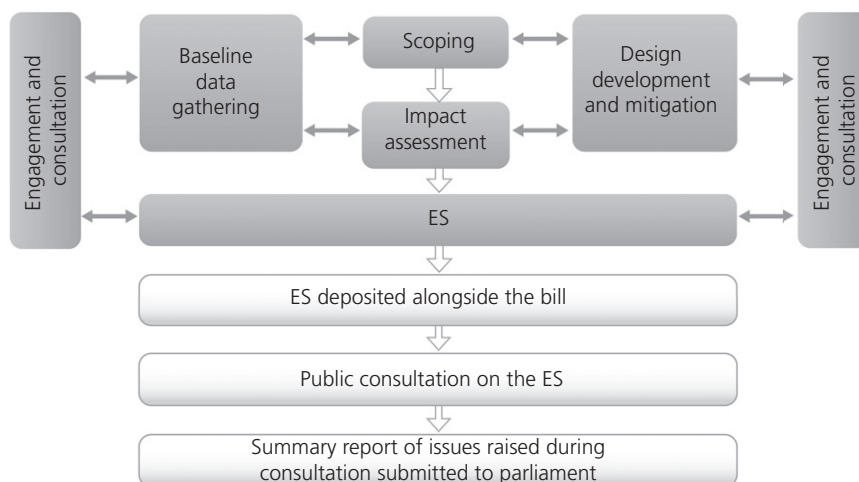


Figure 5. Schematic illustration of the EIA process for phase one

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worst-case scenario based on the information available; for example, it assumed that certain species were present if suitable habitat was evident based on existing information (e.g. information from record centres or from aerial photographs). As access became available after the deposit of the hybrid bill and the ES, surveys were undertaken to validate the assumptions made. These environmental surveys were reported as part of the supplementary environmental statements (SEs) that were published alongside the additional provisions (APs) to the bill.

### 7.3 Integrated design development and EIA

Following the route announcement in January 2012 it was recognised by HS2 Ltd that an integrated approach to the development of the design was necessary. This was to ensure that all disciplines involved in the design could review changes being considered.

Optioneering exercises, also known as sifts, were used to set out different options for the design of an element of the scheme. An appraisal matrix was completed for each option, setting out how the option performed against several criteria, including environment, engineering, construction and logistics, operational performance and cost. These matrices were used to determine the best overall option. Optioneering meetings were held to which the leads from the different disciplines were invited to review and discuss the options and the associated matrices. The output of the sifts were fed into the next stage of the design. Additionally, prior to each control point, an interdisciplinary design review was held. These reviews were generally held as workshops during which the design would be presented by the engineering team, and the environment function and other functions commented on the design. Each comment was discussed and any amendments to the design were agreed and addressed for the formal submission of that design stage. In this way, environmental impacts of the design could be addressed early on, but were also balanced with impacts on the other functions.

An iterative review of the design was required for the EIA to inform design development and for mitigation to be integrated into it. Some environmental mitigation could be embedded into the design and construction of the railway infrastructure while other measures required additional design mitigation. This required an early analysis of likely significant effects, based on early design information. An example of this was HS2 Ltd's approach to noise mitigation, which aligned with the government's noise policy statement (Defra, 2010). HS2 Ltd's approach to mitigation was described in published information papers (HS2, 2017) to help ensure transparency and consistency.

To identify appropriate mitigation and ensure a consistent approach to mitigation along the line of route, mitigation workshops were held for each CFA and included engineers and environmental specialists from the EIACs, the EOC and

HS2 Ltd. Representatives from the stakeholder and property teams also attended. The workshops were used to review each piece of mitigation – the type of mitigation, the impact it was mitigating, its suitability to provide the intended mitigation, the land use and so on. Where appropriate aerial photography and OS base mapping was used to understand the reason for the location of mitigation (e.g. to provide connectivity between two habitats), the workshops were also used to challenge assumptions made. As the initial outcomes from the EIA became available there were further iterations to avoid or mitigate the significant effects.

### 7.4 Draft ES

In advance of the submission of the ES accompanying the hybrid bill, a draft ES was prepared for public consultation. The hybrid bill process and the EIA directive (EC, 2011) do not require consultation on a draft ES, however HS2 Ltd was keen to provide an opportunity for stakeholders to understand the emerging design and the likely environmental impacts of this design. The draft ES followed a similar structure to the ES and was published on 16 May 2013, with the public consultation running until 11 July 2013. The consultation was launched to give members of the public an early opportunity to comment on the design of the phase one route and its environmental impacts as well as the measures identified for managing and reducing them. The consultation resulted in 20944 responses and a draft ES consultation summary report was published in volume 5 of the ES. This provided a high-level summary of the main themes resulting from the draft ES consultation and identified where these had been addressed in the main ES that accompanied the phase one hybrid bill. It also described the main themes and HS2 Ltd's responses relating to the comments received on the draft CoCP; where the draft ES consultation led to design change proposals, these were also described in the report. In parallel with the draft ES consultation, the DfT consulted on 14 proposed design refinements to the route announced in January 2012.

### 7.5 Production of the ES – tools and templates

For the development of the draft ES, a guidance document and a template were developed. The guidance document was developed by the EOC to ensure a consistent approach was applied by the EIACs. It was updated numerous times throughout the development of the draft ES, the main ES and APs to reflect the different stages of the scheme and the learning from each preceding stage. It covered topics including the use of plain English, style and formatting conventions, internal reviewing and templates.

Following production of the draft ES, two exemplar reports were produced to aid drafting of each of the volume 2 CFA reports for the main ES (one for an urban area and another for a rural area, recognising the different needs for each of these settings). These were developed jointly between the

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EIACs, the EOC and HS2 Ltd through a series of focus groups.

A focus group was established for each environmental topic (as detailed in Table 1) and comprised a topic specialist from both HS2 Ltd and the EOC, at least one representative from each EIAC, a GIS/mapping specialist and a moderator. The moderator's role was to ensure consistency with the ES requirements and structure across topic groups. Three focus groups were held for each topic over a one-month period and a standard agenda was set for each meeting. This included lessons learnt from the draft ES, the agreement of common assumptions, identifying cross-topic relationships, identifying policy decisions required and identifying mapping requirements for the topic.

A common document structure was developed for the volume 2 reports, and this was used in the topic focus groups to ensure a consistent approach by each topic. At the end of the series of focus groups, the exemplar reports were issued for internal review followed by review by the legal team. A page-turn was held by key reviewers and, at the end of the process, two exemplar reports were approved and cascaded, along with the structure template, to the EIACs as a basis on which to draft all the volume 2 reports. These documents, despite being an invaluable guide to the production of the volume 2 reports, could not have been all-encompassing in terms of the issues addressed. As such, a common-sense approach was required to be applied by the authors of individual CFA reports to address issues additional to those in the template.

### 7.6 ES review and approval

To ensure the ES was robust, a detailed multi-stage review and approval process was established. This included technical, legal and stakeholder reviews. The non-technical summary and volumes 1 to 4 of the ES were all subjected to a detailed review process. This commenced with reviewers independently reviewing the documents that were saved onto a shared server. The reviewers comprised technical leads, area team representatives, legal experts (parliamentary agents and barristers) and style guide reviewers. Each reviewer type received guidance on the aspects of the document they should be considering. HS2 Ltd's head of environment was responsible for the final technical sign-off of the ES.

At each review stage, the document's author and the nominated reviewers undertook a page-turn (a meeting to review comments) on each document. The review process was critical to ensuring that the ES

- was consistent along the line of route, despite different consultants leading the EIA across four geographic areas and on a route-wide basis
- followed the agreed scope and methodology for each EIA topic

- clearly articulated the approach taken and the findings of the EIA
- presented evidence coherently and logically, and
- met the requirements of the EIA directive, and hence the relevant standing orders.

### 8. AP and SES

Post-deposit of the hybrid bill in November 2013, additional bill powers were required as a result of negotiations with petitioners, instructions from the select committee and design development reflecting further information from stakeholders (including utility companies). These changes needed to be assessed to determine if they resulted in any new or different significant environmental effects. The outcomes of these changes were reported in the AP ES.

The potential for new or different significant effects also arose from other sources, such as changes to baseline information, new survey data, changes to the construction programme and so on. Where these did not impact the hybrid bill powers, any new or different significant effects resulting from these changes were reported in a SES. There were five AP ESs and four SESs.

The AP and SES process introduced its own challenges. To ensure that a consistent approach was applied to determining whether a change would result in a new or different significant effect by each of the four EIACs, it was necessary to develop new guidance and establish some criteria. This was collaboratively developed for each topic by the HS2 Ltd technical directorate, EOC and EIAC topic leads and the legal teams. The criteria for determining a significant effect, as set out in the SMR and corresponding technical notes, were reviewed and adapted as necessary taking into consideration other criteria such as the duration of the impact and the location of the receptors. Assessments were undertaken by the topic assessors, who also used their professional judgement as necessary.

During the change process, it was recognised that the assessment was dependent on the scale of the design change. A given design change did not necessarily affect every environmental topic and, as such, some topics could be scoped out of the assessment. To this end, a scoping form was developed and implemented whereby each environmental topic was reviewed to identify whether it was relevant to the change. A justification was required for each topic scoped out. This was reviewed by the relevant topic leads to confirm agreement. Those topics scoped in progressed to full assessment using the methodology set out in the SMR and the additional guidance developed.

### 9. Environmental minimum requirements (EMR)

To ensure that the environmental effects of the proposed scheme will not significantly exceed those assessed and reported in the ES (including the AP ES and SES), the



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Secretary of State established a set of controls known as the EMR. The EMR are contained in a suite of documents that sit alongside the provisions set out in the hybrid bill itself. These documents were drafted by the parliamentary agents and the draft EMR were published alongside the hybrid bill and the ES in November 2013. They were updated during the select committee process and final versions were published by royal assent in February 2017. The nominated undertaker is the body appointed by the Secretary of State after royal assent to take forward the detailed design and implementation of the proposed scheme after the hybrid bill has been enacted. The nominated undertaker is required to comply with the EMR and the other hybrid bill controls.

The EMR, together with the controls in the hybrid bill, ensure that the impacts assessed in the ES will not be exceeded, unless this results from a change in circumstances that was not foreseeable at the time the ES was prepared, or any such changes will be unlikely to have significant adverse environmental effects, or will be subject to a separate consent process and further EIA.

The EMR also impose requirements on the nominated undertaker to use reasonable endeavours to adopt measures to reduce the adverse environmental effects reported in the ES, provided that this does not add unreasonable cost or delay to the construction or operation of the proposed scheme.

The EMR include the following.

- General principles, in which the Secretary of State commits that the environmental impacts reported in the ES are not exceeded. Furthermore, it requires the nominated undertaker to use reasonable endeavours to adopt mitigation measures to further reduce any adverse impacts.
- A CoCP, which sets out measures to provide effective planning, management and control during construction.
- An environmental memorandum, which 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 phase one is carried out with due regard for environmental considerations.
- A planning memorandum that sets out an agreement between the government and the local planning authorities relating to the processing of detailed planning approvals under the provisions of the bill, including the design and appearance of stations, bridges, viaducts, ventilation shaft headhouses, tunnel portals, noise barriers and earthworks.
- A heritage memorandum that sets 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.
- Undertakings and assurances given during the passage of the hybrid bill.

## 10. Conclusion

This paper has described the approach taken to successfully prepare and publish an ES for HS2 phase one within a very challenging timescale. This outcome was achieved using a collaborative approach that required the expertise and experience of many of the UK's environmental and engineering consultants, as well as parliamentary agents and counsel. The primary lesson learned from delivery of the phase one ES is the need to have a robust, integrated programme with key milestones and handover dates, which is also realistic.

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