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High Speed Rail  
(London-West Midlands)  
Local Environmental Management Plan  
London Borough of Hillingdon

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December 2017



## Department for Transport

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

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# 1 Introduction

- 1.1.1 This Local Environmental Management Plan (LEMP) sets out site specific control measures to be adopted by HS2 contractors working within the London Borough of Hillingdon (LBH) that will be developed further following consultation with relevant stakeholders. This LEMP builds upon but does not repeat the HS2 general environmental requirements set out in the Code of Construction Practice (CoCP) (available [online](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/593592/Code_of_Construction_Practice.pdf) at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/593592/Code\\_of\\_Construction\\_Practice.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/593592/Code_of_Construction_Practice.pdf)).
- 1.1.2 This LEMP contains control measures and the standards to be implemented within LBH. The sections within this LEMP should not be read in isolation from the other sections due to the interconnected nature of the measures between disciplines.
- 1.1.3 For ease of reference the LEMP mirrors the topic headings in the CoCP.
- 1.1.4 Information of relevance to the formation and development of this LEMP (as shown in figure 1) is contained within this document, or links are provided to where it can be accessed. This includes:
- Information from traffic, environmental surveys and ground investigation works. This could either be seasonal ecological surveys, tree surveys, air quality monitoring, noise monitoring, ground settlement or the results of the ground investigation showing levels of contamination in the ground and the nature of the ground;
  - Feedback on pertinent information from on-going engagement; and
  - Results of petitions from the Parliamentary process which have resulted in amendments to the mitigation measures contained within the CoCP.



**Figure 1:** Key work streams that will provide additional information for the LEMPs.

- 1.1.5 This LEMP has been prepared taking into account findings of the Environmental Statement (ES); the Additional Provision ES (AP ES); the Supplementary Environment Statement (SES) and AP2 ES; the SES3 and AP4 ES; and the SES4 and AP5 ES, where relevant. It has evolved during the Parliamentary process and engagement with the Local Authority and other stakeholders, such as members of the National Environment Forum, which have informed its development. This LEMP may be subject to further refinement, amendment and expansion as necessary as the project design progresses.
- 1.1.6 The Contractors will implement the requirements of the LEMPs and the CoCP through their own Environmental Management System (EMS), which will be certified to BS EN ISO 14001.
- 1.1.7 The nominated undertaker (HS2 Ltd)<sup>1</sup> and/or its Contractors will continue to engage with the local stakeholders. This will take the form of engagement events which will be carried out to introduce and brief the communities on local environmental information, management and mitigation as detailed within this document.
- 1.1.8 The HS2 Environmental Memorandum identifies key worksites along the route of HS2 Phase One that are environmentally sensitive in terms of nature conservation, terrestrial and aquatic ecology, water resources, geomorphology, recreation and amenity, landscape, public open space and agricultural land. The criteria for inclusion are 'worksites where a key significant impact (that has been agreed with the HS2 National Environment Forum<sup>2</sup> members) is generated in any of the environmental topics' as mentioned above.
- 1.1.9 The nominated undertaker will prepare site-specific management plans for these identified key environmentally sensitive worksites, focusing on mitigation, compensation and monitoring requirements, with opportunities for enhancement in relation to the identified environmental topics as outlined within the Environmental Memorandum. There is one such site within the LBH: the Mid-Colne Valley Site of Special Scientific Interest (SSSI), due to the following key environmental sensitivities; recreation, nature conservation, terrestrial and aquatic ecology, water resources and flood risk and landscape. The plan for this SSSI can be found in Appendix 3 of this LEMP.
- 1.1.10 The controls within this LEMP, as with those in the CoCP, are in line with HS2's Safe at Heart health and safety brand. Safe at Heart seeks to ensure that health and safety are at the heart of everything that we do including in the design, construction and operation of the scheme. This aim stretches beyond the scheme itself, through instruments such as this LEMP, and into the communities along the scheme to ensure that we protect their health, safety and wellbeing.

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<sup>1</sup>HS2 Ltd is the nominated undertaker. The two terms are used interchangeably throughout this LEMP.

<sup>2</sup>The National Environment Forum comprises Government departments and statutory bodies and was established to advise on environmental policy for HS2, including project-wide strategies for reducing the environmental impact of the line and principles for a Code of Construction Practice

- 1.1.11 For HS2 documents referenced in this LEMP, these can be found on the [www.gov.uk](http://www.gov.uk) website.

## 1.2 Area and scope

- 1.2.1 Plans showing an overview of LBH areas covered by this LEMP are shown within the Environmental Statement (ES) maps (CFA 6 and CFA 7, between chainages 19+000 to 28+500):
- CT-05-015b to CT-05-019a in Volume 2, for CFA 6 (Ref: ES 3.2.2.6); and
  - CT-05-019b to CT-05-023a for CFA7 (Ref: ES 3.2.2.7).
- 1.2.2 Updated plans are also shown in the Volume 2 map books of the AP ES (September 2014), the SES and AP2 ES (July 2015), the SES3 and AP4 ES (October 2015) and the SES4 and AP5 ES (December 2015).
- 1.2.3 Construction worksites and areas required for construction works are shown within the CT-05 maps.
- 1.2.4 It is anticipated that the following general descriptions of work activities are to take place during core and non-core working hours during the construction period within the LBH:
- advance works, including: site investigations further to those already undertaken; preliminary mitigation works; preliminary enabling works;
  - enabling works, including: utilities works in the wider area including National Grid's new Grid Supply Point (GSP) near Dews Lane; highway and public right of way (PRoW) diversions, building demolitions; site clearance, habitat removal, creation and environmental mitigation measures.
  - civil engineering works, including: establishment of construction compounds; site preparation and enabling works; main earthworks and structure works such as bored tunnel and vent shafts, earthworks, retaining structures and erection of bridges and viaducts; site restoration; and, removal of construction compounds;
  - high speed rail installation works, including: establishment of construction compounds; infrastructure installation such as laying ballasted tracks in open sections and slab track in tunnel sections, traction power supplies, overhead line equipment and communications features; connections to utilities; changes to the existing rail network and, removal of construction compounds; and
  - system testing and commissioning.

## **2 Purpose of the Local Environmental Management Plan**

- 2.1.1 This LEMP focuses on the area specific control measures by topic as relevant to construction works within the LBH area. The measures described will be applied by the nominated undertaker and its contractors throughout the construction period to reduce the potential environmental and community impacts within the LBH area during construction.
- 2.1.2 The nominated undertaker's contractors will develop detailed environmental site management mitigation through their EMS, taking into account this LEMP and the Environmental Minimum Requirements (EMRs).

## **3 Policy and environmental management principles**

- 3.1.1 Information relating to the HS2 Ltd sustainability policy and environmental management principles is provided in Section 3 of the CoCP.

## **4 Implementation**

- 4.1.1 Details relating to implementation, such as enforcement and site management measures, are provided in Section 4 of the CoCP.
- 4.1.2 On 16 November 2016 contracts were awarded for three Enabling Works Contractors (EWC) working on behalf of HS2 Ltd across Phase 1 of the project. The EWC covering the South area is the Costain-Skanska Joint Venture, a joint venture between Costain Ltd and Skanska Construction UK Ltd.
- 4.1.3 On 17 July 2017 contracts were awarded for HS2's Main Works Civils Contractors (MWCC). The MWCC for the South area is SCS JV. SCS is a joint venture between Skanska Construction UK Ltd, Costain Ltd and STRABAG AG.

## **5 General requirements**

- 5.1.1 General control measures relating to community relations, hours of work, pollution incident control and security etc. are identified in Section 5 of the CoCP.

## 5.2 Community relations

- 5.2.1 As detailed within Section 5 of the CoCP, the nominated undertaker and its Contractors will implement the Community Engagement Framework. The framework will focus on engagement during construction with the local communities and on the specific needs of protected groups (as defined in the Equalities Act 2010) especially those who may be affected by construction impacts in the immediate vicinity of the works. A range of tools will be used to achieve this that will tailor engagement to local needs.
- 5.2.2 Successful management of the project will involve understanding communities and their needs, actively engaging, listening and responding. The arrangements for this are set out in the HS2 Community Engagement Framework. Liaison with the local community will take place to consistently provide timely, clear tailored information on the construction programme, updates on forthcoming works. It will also provide the opportunity for members of the public to respond, discuss issues and provide feedback that can be acted upon. This information will be included in the local area plan for community engagement.
- 5.2.3 The local area plan will take account both of distinct geographic distribution of the communities throughout LBH and will involve the Contractors and any relevant third parties and stakeholders, for which there will be co-ordination arrangements.
- 5.2.4 For the purposes of this LEMP, a third party is an organisation with whom HS2 Ltd has entered into a legal agreement to undertake works on its behalf, to be delivered under the powers of the High Speed Rail (London – West Midlands) Act (the Act), or the third party's own powers (e.g. permitted development). Such agreements require the third parties to comply with the requirements of the Act and the EMRs, including the CoCP. Third parties relevant to this LEMP include, Highways England, and utility companies such as National Grid.
- 5.2.5 Ongoing engagement with local interests and community groups will occur during construction, as listed in Appendix 2 of this LEMP. (NB: This list is indicative and will be subject to change as more information becomes available).

### Advanced notice of works

- 5.2.6 The nominated undertaker and its Contractors are committed to informing communities on matters of interest and relevance. Therefore they will ensure that stakeholders affected by the proposed construction works, as outlined in the ES, will be informed in advance of works by methods outlined in the Community Engagement Framework and as per Section 5.1.4 of the CoCP.

### Working hours

#### Consents

- 5.2.7 The framework for seeking consents from LBH for working hours under Section 61 of the Control of Pollution Act 1974 is set out in the CoCP.

## Core working hours

- 5.2.8 Core working hours will be from 08:00 – 18:00 on weekdays (excluding bank holidays) and 08:00 – 13:00 on Saturdays. See also HS2 Information Paper D4: Working Hours.
- 5.2.9 A period of up to one hour before and up to one hour after core working hours will be required for start-up and close down activities as detailed within the CoCP. To maximise the productivity within the core working hours, the 1hr start up and close down periods will include activities such as deliveries, workforce arrival/departure, unloading, maintenance and general preparation works etc. During this period plant and machinery that is likely to cause disturbance to local residents will not be allowed to operate. This period will not be an extension of the core working hours. Working outside of these hours would need to be agreed through the section 61 consenting process with LBH. Emergencies (not repairs and maintenance) may be undertaken outside core hours.
- 5.2.10 Certain work activities at specific locations within the LBH area will need to take place outside of the core working hours for safety and engineering purposes. These work activities (which may include construction associated with infrastructure and rail works, including possessions) will be covered by the section 61 process and are likely to include:
- the Colne Valley Viaduct and the South Embankment;
  - demolitions, site preparation ,reinforced wall construction ,general earthworks, foundation and bridge works;
  - West Ruislip Portal construction (other civil/structural works);
  - continuous surface tunnelling activities;
  - excavated material handling for railhead formation and transport of excavated material;
  - Harvil Road pre-casting facility;
  - continuous operation of conveyors, pumping equipment and essential generators; and
  - the movement of trains into and out of the railhead in the Northolt tunnel and earthworks main compound during the day, evening and night.

## 5.3 Construction site layout and good housekeeping

- 5.3.1 The measures set out in Section 5.3 of the CoCP will be used to reduce the likelihood of an environmental incident or nuisance occurring.

## 5.4 Site lighting

- 5.4.1 All construction sites will be lit in accordance with the requirements of the CoCP as detailed within Section 5.4 and approval of site lighting in Schedule 17 Part 1 of the Act.

- 5.4.2 Site lighting will be designed to avoid light pollution to surrounding buildings, ecological receptors, structures used by protected species, local residents, railway operations, passing motorists and other sensitive land uses, where reasonably practicable.

## **5.5 Worksite security**

- 5.5.1 The intention is to achieve safe and secure worksites, with balanced and appropriate security measures that are commensurate with the risk, as detailed within Section 5.5 of the CoCP.
- 5.5.2 A security plan will be required for each site and where appropriate, security fencing and gates provided to perimeters of construction locations and site compounds. Fence type and construction will be appropriate to the level of security required and depend upon the likelihood of intruders, level of danger and visual impact to the environment.
- 5.5.3 Contractors will be responsible for ensuring that the site/working areas and plant and materials are secure from use by unauthorised persons at all times and plant machinery will be securely locked away and immobilised each night. Securing sites will involve the use of physical, electronic and human resources in a proportionate and cost effective manner.
- 5.5.4 In some situations, particularly in an urban setting, consideration will be given to extra visibility for the public and workforce at night e.g. use of half-timber / half-infill (i.e. perspex) at hoarding corners together with convex mirror to prevent blind spots. All sites will have security lighting to ensure the safety of passing pedestrians and other traffic.
- 5.5.5 Security provisions will be deployed at all HS2 sites and working areas on a 24/7 basis, this may include CCTV cameras, alarms and security personnel. This approach will help protect assets with measures that deter, delay and detect intrusion.

## **5.6 Hoardings, fencing and screening**

- 5.6.1 The site perimeter will generally be fenced with 2.4m high solid hoardings that will be appropriately decorated, in line with measures described within Section 5.6.1 of the CoCP, if appropriate.
- 5.6.2 Hoardings up to 3.6m high may, on occasions, be used to control construction noise. At locations where existing fencing may need to be removed a suitable alternative will be used. Specific hoarding heights in LBH will be included in this LEMP as and when the hoarding designs are finalised.
- 5.6.3 Where there are earthworks along the track, such as cuttings and embankments, temporary fencing will be erected along the site boundaries. The type of fence will be dependent upon the nature of use of the adjacent land, as well as environmental, design and safety considerations.
- 5.6.4 Opportunities to include temporary landscaping measures including but not limited to green hoardings, ivy screens, artificial ivy and instant hedging will be considered and

where reasonably practicable implemented where there are clear benefits to local air quality, biodiversity and visual appearance of the area, taking into account costs, longevity and ease of maintenance.

- 5.6.5 An advanced planting site has been identified on the west side of Harvil Road, to the south of the residents in South Harefield in order to screen their views of the Grid Supply Point facility.

## **5.7 Unexploded ordnance**

- 5.7.1 A risk assessment for the possibility of unexploded ordnance being found within construction areas will be carried out, as detailed within Section 5.7 of the CoCP.

## **5.8 Electromagnetic interference**

- 5.8.1 The impacts of electromagnetic interference during design and construction will be undertaken, as detailed within Section 5.8 of the CoCP.

## **5.9 Temporary living accommodation**

- 5.9.1 The provision of on-site workers' temporary living accommodation will be considered within CFA7 within the LBH and approved in advance by the local authority, as detailed within Section 5.9 of the CoCP.

## **5.10 Occupational healthcare**

- 5.10.1 The nominated undertaker will ensure there is provision for access to either on-site or near site occupational healthcare for site workers, as detailed within Section 5.10 of the CoCP.

## **5.11 Clearance and re-instatement of sites on completion**

- 5.11.1 This will be carried out as detailed within Section 5.11 of the CoCP.

## **5.12 Pollution incident control and emergency preparedness**

- 5.12.1 The Contractors' pollution incident control and emergency preparedness plan(s) will need to have due regard to local receptors as detailed in Sections 6 to 16 of this LEMP.
- 5.12.2 The Contractors will also consider measures and processes to be implemented in the event of environmental non-conformances.

### **Local control measures**

- 5.12.3 The Contractor's pollution incident control and emergency preparedness plan(s) will need to include the following pollution prevention and control mechanisms:
- static plant will be used with secondary containment measures such as plant nappies to retain any leakage of fuel or oil to reduce the risk of pollution;
  - spill kits will be provided where appropriate at four main and ten satellite compounds, to reduce the risk pollution; and

- the use of oil interceptors at site offices and work compounds.

5.12.4 The Contractors' pollution incident control and emergency preparedness plan(s) will need to have due regard to local context, such as the fact that the whole area is a nitrate vulnerable zone which is an area where nitrate pollution is a potential problem.

## **5.13 Fire prevention and control**

5.13.1 The Contractors' will ensure all construction sites and associated accommodation and welfare facilities will have in place appropriate plans and management controls to prevent fires. See also section 5.13 of the CoCP.

## **5.14 Extreme weather events**

5.14.1 The Contractors' pollution incident control plan will need to have due regard to the potential for extreme weather events and subsequent impacts on key receptors taking into account any proposed risk management or mitigation measures. See also Section 5.14 of the CoCP. Where necessary, the statutory bodies will be consulted with regards to emergency planning.

## **5.15 Carbon management plans**

5.15.1 The Contractors will produce carbon management plans, in accordance with the HS2 Carbon Minimisation Policy as detailed within Section 5.15 of the CoCP.

## **5.16 Interface management between adjacent construction areas**

5.16.1 The nominated undertaker will oversee the interface between the Contractors as detailed within Section 5.16 of the CoCP, which may be within the same or adjacent local authority boundaries.

# **6 Agriculture, forestry and soils**

6.1.1 General control measures relating to agriculture, forestry and soils are provided in Section 6 of the CoCP.

## **6.2 Sensitive receptors**

6.2.1 Approximately 176ha of agricultural land will lie within the construction boundary in the LBH area. All of this land is of moderate quality land in Subgrade 3b.

6.2.2 Approximately 145ha will be required permanently for the Scheme, with 31ha restored to agriculture.

6.2.3 The generally high quality soils that will be permanently displaced and reused in the design of the Scheme for agriculture and other uses, represent a sensitive receptor.

6.2.4 Some land uses situated adjacent to the construction boundary may be considered sensitive receptors, particularly in respect of farm infrastructure and crops. Potential impacts include interruptions to drainage systems, livestock water supplies and

irrigation systems, the potential for dust deposition on crops, particularly field vegetables; interruptions to farm and field accesses; and the maintenance of appropriate stock-proof fencing. This also applies to approximately 31ha of land within the construction boundary in LBH that is to be restored to agriculture.

## 6.3 Local control measures

- 6.3.1 Where topsoil and subsoil will be stripped across the site, a Soil Resources Plan (SRP) will be prepared. The SRP will establish the type and volume of the topsoil and subsoil to be stripped, the designated location of the stockpiles and the proposed use of conserved soils for land restoration. There is a commitment in the ES for the reuse of soils on the scheme.
- 6.3.2 In areas where compounds are to be created, it is envisaged that the area will be stripped of topsoil. Temporary material stockpiles will be clearly recorded and the topsoil will be reinstated.
- 6.3.3 In respect of storage areas for soil and excavated materials, and within the wider construction site, the presence and spread of invasive, non-native species (plants and animals) and noxious weeds will be controlled through the adoption of an appropriate management regime. This will identify and effectively treat areas which might also threaten adjoining agricultural areas.
- 6.3.4 Appropriate construction, handling, treatment and disposal procedures will be implemented in relation to invasive species and noxious weeds. Route-wide measures will also be implemented to promote bio-security and minimise the risk that invasive non-native species and diseases are spread as a consequence of the project. Further details are provided in the CoCP.
- 6.3.5 Measures for the protection of farm infrastructure and crops will be the subject of liaison with landowners, occupiers and land agents.
- 6.3.6 Following consultation with individual farmers, arrangements are being made with the farmers and documented in Farmers and Growers' packs. Details on the scope of these packs is included in the HS2 Guide for Farmers and Growers.

## 7 Air quality

- 7.1.1 General control measures relating to air quality are provided in Section 7 of the CoCP.
- 7.1.2 Contractors will be required to manage dust, air pollution, odour and exhaust emissions during the construction works in accordance with Best Practicable Means (BPM) and refer to current publications on 'best practice'<sup>3</sup>.

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<sup>3</sup> Guidance on the assessment of dust from construction and demolition: Institute of Air Quality Management (IAQM), February 2014  
Air Quality Monitoring in the Vicinity of Demolition and Construction Sites: IAQM, November 2012  
The Control of Dust and Emissions during Demolition and Construction: GLA Supplementary Planning Guidance Document, July 2014

## 7.2 Sensitive receptors

- 7.2.1 The Contractors' working methods will have due regard to local sensitive receptors where there may be impacts due to dust emissions from construction works and exhaust emissions of air pollutants from construction traffic vehicles travelling to and from construction areas.
- 7.2.2 For air quality, relevant sensitive receptors include locations where there are residential properties, other types of property where there is human exposure over extended periods, for example hospitals and schools, and locations where there are designated ecological sites with sensitive vegetation. The potential impacts are considered in terms of dust soiling on people and property; human health effects of dust and air pollutant emissions; and effects of dust deposition on vegetation.
- 7.2.3 Within the LBH the local sensitive receptors are mainly residential properties close to construction sites and along construction traffic routes. There are also a number of schools, hospitals and care centres including, Blenheim Day-care Centre, Ruislip High School, the Breakspear School and the Sacred Heart Catholic Primary School.
- 7.2.4 The locations of these receptors have been classified as 'low', 'medium' and 'high' risk using the Institute of Air Quality Management (IAQM) methodology<sup>4</sup>, in relation to emissions of dust from construction and demolition activities. Sensitive receptors are located within 20m of the site boundary and of dust generating activities along certain sections of the route. In the LBH the specific locations with relevant receptors that should explicitly be considered in the Contractor's working methods include residential properties at The Greenway, Ickenham Road and Harwell Close in West Ruislip and Dew's Farm Cottages in the Colne Valley. The sites around these areas are classified as 'high' risk.
- 7.2.5 Construction traffic emissions will have an impact at receptors adjacent to routes used by construction vehicles and where traffic is diverted or rerouted. Sensitive receptors adversely affected by changes in road traffic emissions during construction include the following:
- Ickenham High Road, Ickenham.
- 7.2.6 In addition, consideration should be given to air quality impacts on the following ecologically designated sites:
- Ruislip Woods Site of Special Scientific Interest (SSSI): a temporary material stockpile is proposed adjacent to Bayhurst Wood, which forms part of Ruislip Woods SSSI. The design incorporates a 25m buffer, which will not be used by construction traffic, between the stockpile area and Bayhurst Wood. Due to the use of this buffer, the dust control measures in the CoCP and the temporary nature of the works, there will be a low risk of impacts from dust deposition and negligible impacts due to construction traffic emission. The woodland for which the site is designated and therefore the integrity of the site will remain

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<sup>4</sup> Guidance on the assessment of dust from construction and demolition: Institute of Air Quality Management (IAQM), February 2014

unaffected.

- The Fray's Meadow SSSI is located within the Colne Valley, extending north from the A40. The proposed Uxbridge Golf Course haul road will cross an area at the eastern extent of the SSSI. The contractor's working methods should ensure dust emissions are managed effectively and in accordance with the draft CoCP where construction activities are occurring within and adjacent to the boundaries of the SSSI. Construction traffic emissions are expected to result in potentially significant effects due to increases in NO<sub>x</sub> concentrations within 50m of the A40 and increases in nutrient nitrogen deposition within 20m of the A40 at the southern extent of the SSSI. There are also expected to be increases in NO<sub>x</sub> concentrations and nitrogen deposition in the northern part of the SSSI, but these changes will not be significant. Most of the SSSI is set back at greater distances from roads and any changes in air quality will be for the duration of the construction period only. As a result the impact will be of limited duration and will affect a small part of the SSSI and is not likely to affect the integrity of the SSSI.
- The Mid-Colne Valley SSSI is crossed by the route and construction traffic routes are along the boundaries of the site. The contractor's working methods should ensure dust emissions are managed effectively and in accordance with the draft CoCP where construction activities are occurring within the boundaries of the SSSI. Construction traffic emissions are expected to result in potentially significant effects due to increases in NO<sub>x</sub> concentrations within 20m of the A412 Denham Way / North Orbital Road. The impact is predicted to be of limited duration and will affect a small part of the SSSI so is not likely to affect the integrity of the SSSI.

## 7.3 Local control measures

- 7.3.1 All the relevant methods outlined within the CoCP will be applied to control and manage potential air quality effects. These methods are considered sufficiently effective within areas in and around those listed in Section 7.2.2. In the LBH the key measures will include compliance with vehicle emission requirements; the provision of dust suppression measures to be carried out in all areas of the site that are likely to generate dust; measures to keep roads, accesses and vehicles clean; covering materials, deliveries or loads entering and leaving the construction site; buildings or structures to be demolished will be sprayed with water or screened as necessary, prior to and during demolition; and, the enclosure, shielding or provision of filters on plant likely to generate excessive quantities of dust beyond the site boundaries.
- 7.3.2 Dust suppression measures and works screening will be subject to approval in accordance with Schedule 17 of the Act. Further measures are detailed within Section 7 of the CoCP.
- 7.3.3 HS2 has set emission requirements and targets for the engines of contractor cars, vans, and heavy road vehicles. These have been developed for the whole route and are categorised as follows: London Low Emission Zone, Clean Air Zone and Rest of Route.

- 7.3.4 For the LBH the relevant categories for the vehicle emission standard is the London Low Emission Zone in the area to the east of Harvil Road and Rest of Route for the rest of Borough. Within the London Low Emission Zone there are requirements for heavy road vehicles to be powered by EURO VI (or lower) engines and for cars and vans to be Euro 6 diesel and Euro 4 petrol. There are also targets for the use of Ultra Low Emission Vehicles. Requirements for stationary plant and off road vehicles have also been set. HS2 has also set requirements for Non-Road Mobile Machinery (NRMM) (i.e. stationary plant and off road vehicles). These have been developed for the whole route and are categorised as follows: Central Activity Zone, Rest of Greater London and Rest of Country. For the LBH the relevant category of NRMM emission standard is Rest of Greater London, where the requirement is for NRMM to be powered by EU stage IIIB from 2017 (and EU stage IV from 2020)<sup>5</sup>. Further details on emission standards are given in HS2 Information Paper E31: Air Quality.

## 7.4 Monitoring Procedures

- 7.4.1 An inspection and monitoring programme will be implemented by the Contractors to assess the effectiveness of the control measures as outlined in section 7.3 of the CoCP. In the LBH the monitoring procedures may include monitoring of nitrogen dioxide around highways and continuous automatic monitoring of airborne dust, including setting a relevant site action level for dust (defined as a dust measurement threshold above which investigation will be required). The monitoring being undertaken by HS2 supplements existing air quality monitoring which is part of national and local authority surveys.
- 7.4.2 The monitoring of nitrogen dioxide around highways includes locations where the environmental statement, as amended, identified significant effects, locations selected by the community, certain locations not expected to be affected by the Scheme for comparison purposes, and locations co-located with automatic monitoring sites which are part of national and local authority surveys for comparison purposes. The monitoring programme, including locations for dust monitoring is in the process of being agreed. Monthly reports of monitoring data from HS2 air quality surveys are being made publically available throughout construction. These can be found on the HS2 website at this address: <https://www.gov.uk/government/collections/monitoring-the-environmental-effects-of-hs2>.
- 7.4.3 The HS2 Air Quality Strategy gives further information on monitoring, including the process to determine where monitoring would be required and the monitoring methods to be used. This document is available at the same website address as referenced in paragraph above.

## 8 Cultural heritage

- 8.1.1 General control measures relating to cultural heritage are provided in Section 8 of the CoCP. Further control measures for Cultural Heritage are provided in the Hs2 Phase

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<sup>5</sup> Roman numerals are also used within the NRMM EU regulations but are not directly comparable to the road vehicle Euro standards.

One Heritage Memorandum within the Environmental Minimum Requirements and the specific documents identified therein.

- 8.1.2 A route-wide Generic Written Scheme of Investigation: Historic Environment Research and Delivery Strategy (GWSI:HERDS) has been prepared which sets out the general principles for design, evaluation, mitigation, analysis, reporting and archive deposition to be adopted for the design development and construction of the Scheme.
- 8.1.3 Works associated with the Scheme will impact both designated and non-designated assets in LBH. Full details of the works to be undertaken (i.e. archaeological investigations and built heritage recording) will be determined during the detailed design and will be set out in Project Plans and Location-Specific Written Scheme of Investigations (LS-WSI).
- 8.1.4 Schedule 18 and Schedule 19 to the Act concern how legislation in respect of listed buildings and scheduled monuments respectively apply to the Phase One works. Schedule 20 to the Act provides a regime for the removal of human remains and related funerary monuments.

## 8.2 Sensitive receptors

- 8.2.1 Details of all designated and non-designated heritage assets within 500m of the land required, temporarily or permanently, for the construction of the Scheme are listed in Volume 5 of the ES (Appendix CH-002-006 and CH-002-007 and the Cultural Heritage Map Books for Euston and London Metropolitan, ES 3.5.1.4.1, and for Country South, ES 3.5.1.4.2).
- 8.2.2 Contractors will have due regard for the following designated heritage assets:
- four Scheduled Monuments including:
    - a medieval moated site at Pynchester Farm (RUL001);
    - Brackenbury Farm moated site (RUL002), which is also a Grade II listed building;
    - Ruislip motte and bailey (RUL003); and
    - Pale Park, Ruislip (RUL004).
  - two Grade I listed buildings of high value including:
    - St Mary's Church in South Harefield (CVA062); and
    - Breakspear House in South Harefield (CVA063).
  - three Grade II\* listed buildings including:
    - the Church of St Giles on Swakeleys Road (RUL041);
    - the Great Barn to the west of Manor Farm Yard, Ruislip (RUL050);
    - 9-15 High Street, Ruislip (RUL059);
    - the Dovecote at Breakspear House in South Harefield (CVA064);
    - a footbridge over the River Colne to the north of Denham Court (CVA015); and
    - the Almshouse, Harefield (within asset grouping CVA068).

- one conservation area of high value due to the presence of Grade I or II\* listed buildings at Harefield (asset grouping CVAo68);
- three conservation areas that can be considered of high value in their association with the Grand Union Canal (a high value asset) at:
  - Denham Lock (CVAo04);
  - Blackjacks and Coppermill Lock (CVAo86); and
  - Widewater Lock (CVAo37).
- 76 Grade II listed buildings. 15 of these stand in the Ruislip Village Conservation Area, 16 are within the Ickenham Conservation Area whilst 17 are in Harefield. The others include Highway Farm comprising a group of farm buildings (RUl006) and structures associated with the Australian Military Cemetery in Harefield (CVAo59 and CVAo60). St Leonards Farm and barn to the east (RUl064), Copthall Farmhouse (RUl008) and Crows Nest Farm (RUl065) are more isolated buildings in the rural part of the study area;
- one Grade II registered park and garden of moderate value at Harefield Place (CVAo55); and

8.2.3 Details of all designated and non-designated heritage assets within 500m of the land required, temporarily or permanently, for the construction of the scheme are listed in Volume 5 of the ES (Appendix CH-002-006 and CH-002-007) and Volume 5 Cultural Heritage Map Books for Euston and London Metropolitan Area, and for Country South (Maps CH-01-018b to CH-01-024).

## 8.3 Local control measures

- 8.3.1 Where practicable, construction methodologies will be required to reduce the impacts on heritage assets. The CoCP sets out the provisions that will be adopted to control those effects, including the use of appropriate equipment and methods to limit ground disturbance and settlement followed by monitoring, protection and remediation. A programme of settlement monitoring and the implementation of avoidance measures where appropriate will be undertaken by the Contractor. Detailed provisions with regard to settlement and listed buildings are outlined in the Settlement Policy / HS2 Information Paper: C3 Ground Settlement.
- 8.3.2 Those listed buildings which may require works to maintain or restore their character, or for the affixing of monitoring apparatus are named in Table 2 of Schedule 18 of the Act. Listed buildings named in Table 2 are also covered by a Heritage Agreement with LBH, which sets out arrangements for obtaining approvals for protective or monitoring works to these buildings.
- 8.3.3 Where practicable, below ground assets will be preserved in situ beneath mitigation earthworks through the adoption of appropriate design measures.
- 8.3.4 Where practicable, construction methodologies will reduce the impacts on buried and upstanding remains.

- 8.3.5 The programme of archaeological and built heritage works will be undertaken by specialist Contractors appointed by the nominated undertaker prior to and during, the construction period in accordance with the provisions of the LS-WSI for archaeology and built heritage.

## 8.4 Monitoring

- 8.4.1 Appropriate monitoring of heritage will be undertaken as necessary, as detailed within Section 8.4 of the CoCP.

# 9 Ecology

- 9.1.1 General control measures relating to ecology are provided in Section 9 of the CoCP.

## 9.2 Sensitive receptors

- 9.2.1 The following locations which lie within or are adjacent to the Scheme in LBH are designated for nature conservation. These locations are shown within the Volume 5 map books of the main ES (ES 3.5.1.5.6 and 3.5.1.5.7) and all reference the chainage section on the route). They include:

- Ruislip Woods Site of Special Scientific Interest (SSSI), which is also a National Nature Reserve (NNR) and a Site of Metropolitan Importance (SMI);
- Fray's Farm Meadows SSSI, land required for the construction of the Scheme will cross the eastern area of the SSSI (Ch25+500);
- Denham Lock Wood SSSI, located approximately 100m south of the Scheme (Ch26+000);
- Mid-Colne Valley SSSI, the land required for the construction of the Scheme will cross Harefield No. 2 Lake, Savay Lake, Korda Lake, Harefield Moor Lake, the Long Pond and is adjacent to Broadwater Lake (Ch27+500 to Ch30+000);
- Ranston Covert and Battlesford Wood, part of which is ancient woodland, comprises the largest extent of woodland in the Mid-Colne Valley SSSI;
- Poor's Field Site of Metropolitan Importance (SMI) is part of the Ruislip Woods SSSI and NNR and is adjacent to land required for the construction of the Scheme (Ch24+000);
- London's Canals SMI, located partly within the land required for construction of the Scheme at the Grand Union Canal, between Harefield No.2 Lake and Savay Lake (Ch26+300 to Ch27+500);
- Mid-Colne Valley SMI, which overlaps most of the Mid-Colne Valley SSSI (Ch27+500 to Ch29+200);
- Ruislip Golf Course and Old Priory Meadows Site of Borough Importance (SBI.I), two sections on opposite banks of the River Pinn (Ch24+000);

- Dew's Dell SBI.I, located partly within land required for construction of the Scheme west of Harvil Road (Ch26+500);
- Victoria Road Railway Banks SBI.II, located partly within the land potentially required for the utilities works associated with the construction of the Scheme (Ch18+000 to Ch20+500);
- Yeading Brook between Roxbourne Park and Ruislip Gardens SBI.II, partly within the land required for utilities works associated with the construction of the Scheme (Ch19+500 to Ch21+400);
- Herlwyn Park Recreation Ground and Railway Banks SBI.II, partly within the land required for utilities works associated with the construction of the Scheme (Ch22+500 to Ch23+000);
- Mad Field Covert, Railway Mead and the River Pinn SBI.II, partly within land required for utilities works associated with the construction of the Scheme (Ch24+000 to Ch24+500);
- Common Plantation and Park Wood SBI.II, adjacent to the land required for utilities works and possible road junction improvements (Ch24+000 to Ch25+000);
- Central Line West Ruislip Branch SBI.II, adjacent to land required for utilities works for the construction of the Scheme (Ch24+600 to Ch26+000);
- Brackenbury Railway Cutting SBI.II, located partly within the land required for the construction of the Scheme (Ch24+800 to Ch25+000);
- Newyears Green SBI.II, located partly within the land required for the construction of the scheme (Ch25+200 to Ch25+800);
- Harefield Hall and The Lodge SBI.II, located within land required for the realignment of the National Grid overhead power lines (Ch24+000);
- Breakspear House Woods SBI.II, adjacent to the Scheme, east of South Harefield (Ch26+800 to Ch27+500);
- Fray's Valley Local Nature Reserve (LNR), located adjacent to land required for construction of the Scheme (Ch25+500 to Ch26+500);
- Denham Quarry Park LNR, crossed by the scheme at the location where Denham Court Drive passes over the River Misbourne (Ch26+500 to Ch27+600);
- Denham Country Park (LNR) located partly within the land required for construction of the Scheme (Ch27+000);
- the River Colne east of Denham Biological Notification Site, located partly within land required for construction of the Scheme, south of the Chiltern Main Line (Ch27+000);
- Northmoor Hill Wood LNR (8.7ha) is approximately 250m south of the land

required for the amendment and is designated for ancient woodland; and

- The northern most section of Newyears Green Covert is designated as ancient woodland.

9.2.2 Sensitive habitat receptors outside of designated sites are displayed within the Volume 5 map books of the ES (3.5.1.5.6 and 3.5.1.5.7). These include:

- areas of mature semi-natural, mainly secondary broadleaved woodland with small areas of plantation are present along the corridor of the River Pinn, Ickenham Green, within agricultural areas in the west at Copthall Covert (Ch24+500 to Ch25+800);
- Bayhurst Wood (Ch25+500 to Ch26+000);
- in addition to the ancient woodland within the designated sites, Pinnocks Wood, a broadleaved ancient semi-natural woodland is partly in land required for the construction of the Scheme (Ch25+800);
- small areas of woodland including an ancient woodland, Pinnocks Wood (Ch25+500) and woodlands at Widows Cruise Covert and Fragmaor Covert (Ch26+000 to Ch26+700);
- Hedgerows near Bayhurst Wood, Copthall Farm; (Ch25+000);
- an area of relatively species-rich wet grassland is present between the River Pinn and Ruislip Golf Course (Ch23+500 to Ch24+500);
- Rough-grassland swards have developed where agricultural grassland has been left non-grazed and uncut including fields south of the railway between the River Pinn and Breakspear Road South and in the Ickenham Green area (Ch24+500 to Ch24+700);
- Three main types of mosaic and transition habitats have been identified within the railway land. The three types include varying complexes of scrub, rough grassland tall herb ruderal vegetation and bare ground in differing proportions. Victoria Road Railway Banks SBI.II includes this habitat (Ch18+000 to Ch20+500);
- There are extensive stands of species-rich ephemeral vegetation on crushed brick and concrete substrates at the vacant industrial site at the South Ruislip vent shaft main construction compound. This occurs in mosaic with scrub and bare ground (see Volume 5 maps for specific locations);
- The Yeading Brook between Roxbourne Park and Ruislip Gardens SBI.II (Ch19+500 to Ch21+400);
- Ickenham Stream (Ch24+000 to Ch24+500);
- The River Pinn (Ch24+500);

- A short section of the Newyears Green Bourne is within the land required for construction of the Scheme, west of Harvil Road, near Dew's Farm (Ch25+800 to Ch26+400);
- There are a number of water bodies in the western part of this area, including ponds and a drain at Ruislip Golf Course (Ch23+700), ponds at Brackenbury Farm (Ch 24+700), ponds at the pharmaceutical research facility (Ch24+800) and ponds in fields to the south and north-west of Bayhurst Wood (Ch25+000 to Ch26+400);
- The complex habitats around the River Pinn include areas of secondary and plantation woodland, thorn and bramble scrub, tall-herb vegetation, rough grasslands and river and water-margin habitats that, in juxtaposition to one another, are unusually extensive for outer London (see Volume 5 maps for specific locations);
- occasional stands of swamp along the river (Ch28+200);
- small areas of swamp vegetation are present around Broadwater Lake, Korda Lake and Harefield Moor Lake (Ch27+500 to Ch29+400);
- Approximately 30ha of semi-natural broadleaved woodland in land required for construction of the Scheme in this area. The majority is in either the Mid-Colne Valley SSSI or Mid-Colne Valley SMI (Ch27+500 to Ch30+000);
- Small areas of woodland are present in a number of other designated wildlife sites and in farmland including Harefield Hall and The Lodge (Ch24+000), Pinnocks Wood (Ch25+500); Widows Cruise Covert and Fragmoor Covert (Ch26+000 to Ch26+700); Dew's Dell (Ch26+300) and Breakspear House (Ch26+800 to Ch27+500);
- Grassland to the south of the Chiltern Main Line, between the River Colne and Grand Union Canal. This habitat is in both the Mid-Colne Valley SMI and Denham Country Park LNR (Ch26+600);
- ponds in the vicinity of Uxbridge Golf Course (Ch25+700) and east of South Harefield (Ch27+500);
- at least four ditches in Uxbridge Golf Course (Ch25+700) or west of the Grand Union Canal, south of the Chiltern Main Line (Ch26+500);
- small areas of scrub are present in the vicinity of Dew's Farm (Ch26+300); and
- The Gatemead bridleway and land adjacent to the amendment is used by bats from bat assemblages associated with the Brackenbury Farm and Gatemead Farm area reported in the main ES (assumed to support maternity roosts of common pipistrelles and non-maternity roosts of rarer bat species), which are both of up to county/metropolitan value.

9.2.3 Key protected or important species known or assumed to occur in the vicinity of the works are:

- bats, including roosts and foraging and commuting routes;

- breeding birds and wintering bird assemblages;
- great crested newts;
- common reptiles;
- fish assemblages;
- otters;
- badgers;
- terrestrial invertebrate;
- aquatic macro-invertebrates; and
- flora.

9.2.4 Further information on designated sites and legally protected species occurring in this area can be found within Volumes 2 and 5 of the ES.

9.2.5 Contractors will check whether any protected species licences are required prior to work commencing or where such licences have been obtained, to ensure compliance with the requirements of the licence.

9.2.6 All actions required to comply with licences, will be undertaken by suitably qualified specialist ecologists licensed to undertake the work.

## 9.3 Local control measures

9.3.1 The standard ecological issues and associated control measures outlined in **Table 1** are of particular relevance to this area.

**Table 1: Standard ecological issues and control measures relevant to this area**

| Species/species group | Issue                                                                                                                          | Standard control measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Designated Sites      | The Scheme affects SSSI, LNR and non-statutory wildlife sites.                                                                 | 1) Where practicable, measures to reduce habitat loss should be included in planning of construction works, such as avoiding siting temporary material stockpiles, construction materials and vehicle parking within designated sites;<br>2) Potentially hazardous materials should also be located away from designated sites and stored correctly; and<br>3) Specific measures for control of surface water and for air and water-borne pollution should also take account of the proximity of these designated sites. |
| Bats                  | All UK bat species and their roosts (even if bats are not present) are fully protected under both UK and European legislation. | 1) Adhere to requirements of licensed and, where relevant, Ecology Site Management Plans.                                                                                                                                                                                                                                                                                                                                                                                                                                |

| Species/species group | Issue                                                                                                                                                                                                                                                                                                             | Standard control measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                       | The Scheme will result in the loss of confirmed bat roosts in trees and buildings.                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                       | Retained bat roosts are present in close proximity to the Scheme. Caution is required to ensure that these roosts are not disturbed during works.                                                                                                                                                                 | <ol style="list-style-type: none"> <li>1) Where practicable, undertake activities causing disturbance during seasonal periods when bats are absent;</li> <li>2) Ensure lighting is directed away from known roosts;</li> <li>3) Reduce night time working in close proximity to retained roosts; and</li> <li>4) Where practicable, temporary structures will be erected to screen the exit of retained roosts from construction areas.</li> </ol>                                                                          |
|                       | The Scheme will result in the loss of trees and buildings identified as having moderate or high potential to support roosting bats, but no evidence of their use has been identified to date through survey work.                                                                                                 | 1) <b>Adopt precautionary approach. Follow appropriate Working Method Statement for demolition of buildings and felling of trees.</b>                                                                                                                                                                                                                                                                                                                                                                                       |
|                       | The Scheme will result in the loss of and disruption to bat foraging areas and commuting routes.                                                                                                                                                                                                                  | <ol style="list-style-type: none"> <li>1) Where practicable, undertake activities causing loss or disruption during seasonal periods when bats are likely to be less active.</li> <li>2) Retain as much of the key habitat for as long as possible and establish new areas as quickly as possible to reduce the effects.</li> <li>3) Ensure lighting is directed away from foraging areas and commuting routes.</li> <li>4) Reduce night time working in close proximity to foraging areas and commuting routes.</li> </ol> |
| Breeding birds        | <p>The nests and eggs of all bird species are legally protected against being damaged, disturbed or taken.</p> <p>Some species are specially protected against disturbance whilst nesting.</p> <p>The Scheme will result in the loss of nesting bird habitat, including vegetation, buildings and structures.</p> | <ol style="list-style-type: none"> <li>1) Habitat clearance will be conducted outside of the bird nesting season (March to August inclusive) where practicable.</li> <li>2) If habitat clearance is carried out during the nesting season then an appropriate Working Method Statement shall be completed in place in advance of clearance works commencing;</li> </ol>                                                                                                                                                     |
| Great crested newt    | <p>Great crested newts and their habitats are fully protected under both UK and European legislation.</p> <p>The Scheme will result in the loss of water bodies and terrestrial habitat associated great crested newt populations.</p>                                                                            | 1) Adhere to requirements of HS2 great crested newt organisational licence, method statements, and Ecology Site Management Plans.                                                                                                                                                                                                                                                                                                                                                                                           |
| Otter                 | <p>Otters are fully protected under both UK and EU legislation.</p> <p>All major watercourses crossed by the Scheme have otters present or are potentially suitable to support</p>                                                                                                                                | <ol style="list-style-type: none"> <li>1) Adhere to requirements of licences and, where relevant, Ecology Site Management Plans;</li> <li>2) Ensure that route of safe passage for otters is maintained throughout construction at crossing points;</li> </ol>                                                                                                                                                                                                                                                              |

| Species/species group | Issue                                                                                                                                                                                                                                                          | Standard control measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                       | <p>them. It is not expected that there will any fragmentation of otter movement routes, however, there is the potential for disturbance during construction along some parts of the Scheme.</p>                                                                | <p>3) Use fencing as required to prevent otters being forced over existing road crossing; and</p> <p>4) Reduce light spill onto watercourses.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Common reptiles       | <p>Common species of reptile (grass snake, adder, common lizard and slow worm) are protected from intentional killing or injury.</p> <p>Common reptiles are widespread, and the Scheme will result in the loss of confirmed and potential reptile habitat.</p> | <p>1) Where works have the potential to kill or injure reptiles, but there is suitable habitat immediately adjacent to the work site that could support a viable population (with enhancements where necessary) the Habitat Manipulation and Displacement approach should be followed. A Working Method Statement should be produced in advance of works commencing.</p> <p>2) Where there is no suitable habitat immediately adjacent to the work site, the Reptile Translocation approach should be followed. A Working Method Statement should be produced in advance of works commencing. This will include details of the approach, any exclusion fencing required, and details of the receptor site.</p> |
| Badger                | <p>Badgers and their setts are protected under the Protection of Badger Act 1992.</p> <p>Badgers are widespread, and the Scheme will result in the loss of badger habitat, including setts.</p>                                                                | <p>1) Adhere to the requirements of the HS2 badger organisational license, method statements and Ecology Site Management Plans.</p> <p>2) Avoid badger setts to reduce disturbance where they do not need to be closed.</p> <p>3) Badgers are a mobile species and can create new setts in a short period of time. Contractors to be aware of the potential for badger setts to be present within or adjacent to work sites – works to be stopped if potential setts are identified and an ecologist contacted for advice.</p>                                                                                                                                                                                 |
| Hazel dormouse        | <p>Hazel dormice and their habitat are fully protected under both UK and EU legislation. The Scheme will result in the loss of habitats that are suitable for hazel dormouse, although this species has not been recorded along the Scheme to date.</p>        | <p>1) Where relevant adhere to requirements of licences and Ecology Site Management Plans.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

| Species/species group | Issue                                                                                                                                                                                                                                                                                                                      | Standard control measure                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Water vole            | <p>Water voles are fully protected under UK legislation.</p> <p>The Scheme will result in the loss of confirmed and potential water vole habitat.</p>                                                                                                                                                                      | <ol style="list-style-type: none"> <li>1) An appropriate Working Method Statement should be produced in advance of works commencing, where relevant.</li> <li>2) Adhere to requirements of translocation licence, where relevant.</li> <li>3) Contractors to be aware of the potential for water voles to be present within or adjacent to work sites – works to be stopped if water vole evidence is identified and an ecologist contacted for advice.</li> </ol> |
| Invasive species      | <p>There is a risk of work sites and adjacent land supporting invasive non-native species (INNS), as defined in Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), in particular Japanese knotweed.</p> <p>INNS have been already recorded along some parts of the Scheme through previous survey work.</p> | <ol style="list-style-type: none"> <li>1) All land required for the works, and immediately adjacent land (where practicable) shall be surveyed for the presence of INNS, with a focus on high-risk species.</li> <li>2) A Biosecurity Management Plan shall be produced in advance of works commencing, where required.</li> </ol>                                                                                                                                 |
| General               | Unexpected discovery of legally protected species during works.                                                                                                                                                                                                                                                            | <ol style="list-style-type: none"> <li>1) There will be a procedure to follow in the unexpected event that protected species are identified during construction. This will include seeking appropriate licences and consulting with Natural England.</li> <li>2) Unexpected finds of great crested newts or badgers are covered by the organisational licences and works must be in accordance with those licences.</li> </ol>                                     |

- 9.3.2 Further information on the control of ecological impacts is provided in HS2 Information Paper E2: Ecological Impact, Section 9 of the CoCP, in Technical Note: Ecological principles of mitigation within Volume 5 of the SES2 and AP3 ES (Scope and methodology report addendum (CT-001-000/2)).

## 9.4 Monitoring

- 9.4.1 Contractors will be required to undertake appropriate monitoring of the consequences of construction works on ecological resources and of the effectiveness of the management measures designed to control ecological effects, as detailed within Section 9.3 of the CoCP.

## 10 Ground settlement

- 10.1.1 General control measures relating to ground settlement are provided in Section 10 of the CoCP. Specific measures to reduce and repair settlement and requirements with regard to assessment, surveys and monitoring are contained in the Settlement Policy / HS2 Information Paper C3: Ground Settlement.
- 10.1.2 Requirements for monitoring will be confirmed by the settlement report prepared during the detailed design stage. Where determined as necessary, monitoring will be undertaken on selected adjacent buildings, structures and the conventional railway tracks. Baseline readings will be taken prior to the commencement of excavation.
- 10.1.3 The monitoring strategy, methodology and programme, including the choice and location of monitoring equipment, will be discussed and agreed with the local authorities and land/building owners prior to commencement of construction.
- 10.1.4 Where significant building movement is predicted to be caused by excavation induced ground movements, ground treatment/improvement techniques might be required to ensure that if ground movement occurs, it stays within agreed and acceptable limits thereby limiting the impacts on buildings.
- 10.1.5 Monitoring may be required where existing sensitive buildings/structures/utilities are in close proximity to the planned excavation works. An assessment of the sensitivity of each building/structure/utility in close proximity to the excavation works will be carried out at the detailed design stage. This will then inform the design/specification of the monitoring system for that building/structure/utility and will also inform the design of any movement mitigation works if these are deemed necessary by the designer.
- 10.1.6 Prior to the commencement of construction, structural surveys and condition/defect surveys will be commissioned where structures are at likely risk of potentially damaging settlements.

## 11 Land quality

- 11.1.1 Further land quality study work including intrusive ground investigation (where needed) and analysis will be conducted prior to construction in order to confirm areas of suspected land contamination that could be disturbed or encountered during construction of the Scheme. Contaminated sites beyond the Scheme will be considered only in terms of their potential impact on the Scheme. For the purposes of this LEMP it is assumed that no new land quality constraints will be identified during these pre-construction surveys. If new constraints are identified then the LEMP would be updated accordingly. No contaminated sites (in accordance with the meaning defined in Part IIa of the Environmental Protection Act, 1990) have been formally identified by the Regulator (in accordance with the Contaminated Land (England) Regulations 2000) within the Scheme.

11.1.2 General control measures relating to land quality are provided in Section 11 of the CoCP.

## **11.2 Potential contamination sources and sensitive receptors**

11.2.1 The following land with potentially contaminative existing or historical uses has been identified as a possible contaminative risk to HS2 works (and can be seen in Volume 5 map book of the main ES (LQ-01-008a – LQ-01-012):

- Oil depot south of Newyears Green Covert;
- The existing Chiltern Main Line;
- Historical infilled gravel pit;
- Historical landfill on land off Harvil Road;
- Dew's Farm historical landfill;
- Harefield Marina historical landfill;
- Various former works and depots that now form part of Victoria Road trading estates (at the location of the South Ruislip vent shaft);
- Railway land located in the far western part of the study area; and
- The pharmaceutical research facility along Breakspear Road South.

11.2.2 With regard to the above identified contaminative risks, the Contractors will have due regard to the following sensitive receptors:

- people, including residents in existing properties, local employees, e.g. at the existing railway, construction and/or maintenance workers;
- controlled waters, including groundwaters in The Chalk bedrock (principal aquifer) and various Secondary A aquifers;
- the built environment, including buildings, property and underground structures and services;
- the natural environment ; including ecological receptors of Ruislip Woods SSSI, Fray's Farm Meadows SSSI, Mid-Colne Valley SSSI and Denham Lock Wood SSSI;
- people, including construction and/or maintenance workers and end users of the railway; and
- the Rivers Pinn, Yeading Brook, Ickenham Stream and their tributaries.

## **11.3 Local control measures**

11.3.1 Ground investigations are being undertaken to confirm areas of potential contamination within the Scheme. Following development of a conceptual ground model, risk assessment and a remedial strategy will be prepared, as needed. Consultation with the LBH and the Environment Agency should take place, as

appropriate, during the formulation of the remedial strategy, which will include measures to be taken if unexpected contamination is encountered as outlined in Section 11 of the CoCP.

- 11.3.2 Contaminated soils or groundwater excavated from the site are to be separated from other materials and, wherever reasonably practicable, will be reused within the Scheme, where needed and suitable for use. Treatment techniques are likely to include stabilisation methods, soil washing and appropriately permitted bio-remediation to remove oil contaminants. Contaminated soil disposed off-site will be taken to a soil treatment facility, another construction site (for licensed treatment, as necessary, and reuse) or an appropriately permitted landfill site.
- 11.3.3 Excavation through Dew's Farm historical landfill and Harefield Marina historical landfill will be required. Should the ground investigation discover contaminated materials within the area required to construct the cutting in these locations, it will be excavated, then treated and re-used, or removed, as appropriate. In addition ground (landfill) gas and/or leachate control systems will be constructed where necessary to manage ingress to the Scheme or control migration pathways external to the works where pathways have been affected adversely by the construction.
- 11.3.4 Similar measures will be undertaken at other sites where contaminated soils or groundwater are identified during the investigation and / or construction processes.

## **11.4 Minerals**

- 11.4.1 There are no mineral safeguarding areas, preferred areas or areas of search in the LBH. No mitigation measures have been identified.

# **12 Landscape and visual**

- 12.1.1 General control measures relating to landscape and visual are provided in Section 12 of the CoCP.

## **12.2 Sensitive receptors**

- 12.2.1 With reference to the set-up and location of temporary works, the Contractors will have due regard to limiting impacts of the character of the following landscape character areas (LCAs):
- Ruislip Golf Course LCA;
  - Harefield Farmland Valley Slopes LCA; and
  - Colne River Valley LCA.
- 12.2.2 The Contractors will also have due regard to limiting visual intrusion on the following visual receptors:
- residents in the area, particularly on Trenchard Avenue, Portal Close, West

Ruislip station, Ickenham Road Bridge, Josiah Drive , Ickenham Park, Ickenham Close, Hoylake Crescent, The Greenway, residents of St. Leonards farm, and along the perimeter of the settlements of South Harefield and Harefield;

- users of Blenheim Care Centre, Ruislip Golf Course club house, Hillingdon Outdoor Activities Centre (HOAC) and the pharmaceutical research facility;
- people travelling through Public Right of Way (PRoW) (Footpath U45 Celandine), PRoW (Footpath U38) connecting Breakspear Road South with Newyears, PRoW (Footpath U49) between Harvil Road and Breakspear Road South, to the south of the Chiltern Main Line, PRoW (Footpaths U36 and U37) connecting Bayhurst Wood with Newyears Green Lane, Grand Union Canal PRoW, Harvil Road, and Moorhall Road;
- business units on Ickenham Road;
- Viewpoint AP4.049.2.008: view south and west from The Drive and Georgian Close;
- Viewpoint 049.3.005: view west from PRoW (Footpath U50);
- Viewpoint 049.2.007: view north and east from dwelling on Harvil Road and from Harvil Road;
- Viewpoint 051.3.002: view north along the Grand Union Canal PRoW (Footpath U72) and the Colne Valley Trail PRoW (Footpath U75);
- Viewpoint 051.4.003: view north from Chiltern Main Line;
- Viewpoint 052.4.001: view south from Harvil Road;
- Viewpoint 052.3.002 view south from the northern edge of Harefield No.2 Lake from PRoW (Footpath U34);
- Viewpoint 052.6.003: view south from Dogs Trust Harefield including Highway; and
- Farmhouse, grade II listed (in CFA6).

12.2.3 The Contractors will be made aware of the location of the following sensitive sites:

- vegetation removal along the southern boundary of the Ruislip Golf Course;
- partial clearance of vegetation from Newyears Green Covert;
- removal of lakeside vegetation within the Colne Valley, woodland vegetation along the River Colne; and
- removal of vegetation as the Scheme crosses the Grand Union Canal.

12.2.4 The Contractors shall also discuss the possibility of advance planting off-site with landowners, and the LBH to further screen the locations listed above.

## **12.3 Local control measures**

- 12.3.1 Measures that have been incorporated into the draft CoCP to avoid or reduce landscape and visual effects during construction include the following (see Volume 5):
- maximising the retention and protection of existing trees and vegetation where possible;
  - use of well-maintained hoardings and fencing;
  - designing lighting to avoid unnecessary intrusion onto adjacent buildings and other land uses;
  - replacement of any trees felled as a consequence of construction works;
  - appropriate implementation, establishment and maintenance of planting and seeding works and implementation of landscape management measures, to continue through the construction period as landscape works are completed;
  - temporary bunds to be positioned to screen views to the route construction;
  - involvement in the specific location of construction compound layouts and site access in relation to existing vegetation to reduce visual impacts where practicable; and
  - the specific location of temporary material stockpiles to reduce visual impacts.

## **12.4 Trees**

- 12.4.1 The Contractors will give consideration to where trees and other planting can be established early in the construction programme. For example, where trees require removal due to utility works early in the programme, replacement trees will be provided at the earliest possible opportunity, where reasonably practicable. The nominated undertaker will ensure any early planting during construction is maintained to promote healthy growth.
- 12.4.2 Where practicable, the Contractors will carry out surveys and determine the details of tree retention and protection measures, in accordance with BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations, in advance of any works in the vicinity of trees.

## **12.5 Site Buildings for Office and Welfare**

- 12.5.1 Site buildings will generally be of a temporary modular type; they will typically be multi-storey to maximise construction space and limit land take.

# 13 Noise and vibration

- 13.1.1 General control measures relating to noise and vibration are provided in Section 13 of the CoCP and additional information is provided in Information Paper E23: Control of construction noise and vibration.

## 13.2 Sensitive receptors

- 13.2.1 Noise and vibration construction assessment locations, at sensitive residential and non-residential properties, are identified in the London Metropolitan sound, noise and vibration – Volume 5 map book (ES 3.5.1.9.1), and in the Country South sound, noise and vibration – Volume 5 map book (ES 3.5.1.9.2).
- 13.2.2 Noise insulation is being offered for qualifying buildings as defined in the noise insulation and temporary rehousing policy within HS2 Information Paper E23. Noise insulation or temporary rehousing will mitigate residents being significantly affected by levels of construction noise inside their dwellings.
- 13.2.3 Qualification for noise insulation and temporary re-housing will be identified. Qualifying buildings are being identified in the Camden area early enough so that noise insulation can be installed, or temporary rehousing provided, before the start of the works predicted to exceed noise insulation or temporary rehousing criteria.
- 13.2.4 One residential building (Oak Farm on Breakspear Road South) is currently identified as qualifying for a noise insulation package as detailed within the noise insulation and temporary rehousing policy and further detailed assessment would be required to confirm this.
- 13.2.5 The avoidance and mitigation measures in this area will avoid airborne construction noise adverse effects on the majority of residential receptors and communities. Non-residential sensitive receptors for which the ES has reported likely adverse impacts from construction noise are located at;
- Ruislip Golf Club;
  - The Fairways Carvery Restaurant;
  - The Church of Jesus Christ of Latter Day Saints; and
  - Hillingdon Outdoor Activities Centre (HOAC).

## 13.3 Local control measures

- 13.3.1 Site specific best practicable means measures to control noise and vibration have been identified through the Parliamentary process and discussions with the LBH, and reflected in this document. Furthermore, site specific measures will be identified by the Contractor on a site-by-site and activity-by-activity basis and agreed with LBH through the Section 61 process. As identified in the ES, examples of best practicable means measures that may be employed by the Contractor to control noise and vibration include:

- controlling noise and vibration at source - for example the selection of low vibration methods i.e floor sawing concrete slabs ; review of construction programme and methodology to consider quieter methods i.e use of hydraulic pulverisers for demolition;
- arranging the layout of compounds to reduce noise impacts where construction compounds are in close proximity to noise sensitive receptors. This may include placing any stacked portacabins between noisy works and sensitive receptors; and
- additional height hoardings which may, on occasion, be used to control construction noise. These will be subject to approval in accordance with the requirements of Schedule 17 Part 1 of the Act.

13.3.2 One residential building (Oak Farm on Breakspear Road South) is forecast to experience noise levels higher than the noise insulation trigger levels as defined in the CoCP (Section 13) or are identified in the ES as qualifying for a noise insulation package as detailed within the Noise Insulation and Temporary Rehousing Policy.

13.3.3 Local control measures will be periodically reviewed, including following any material changes in the proposed construction method and appointment of the Contractor.

## 13.4 Monitoring

13.4.1 The nominated undertaker requires its Contractors to undertake and report such monitoring as is necessary to ensure and demonstrate compliance with all noise and vibration commitments and the requirements of the CoCP.

13.4.2 In the LBH, further pre-construction baseline monitoring at specific locations is proposed to be undertaken and specific monitoring locations are currently being agreed with the LBH. It should be noted that alternative locations may be identified as a result of these discussions.

13.4.3 As set out in section 4.3.10 of the CoCP, where the nominated undertaker's Contractors are monitoring noise, dust and air quality with equipment capable of streaming data in real time, this will be made available to the LBH if a written request is received by the nominated undertaker. In addition, monthly noise monitoring reports will be made publically available throughout construction. The monthly reports include information on the measurement methodology and monitoring locations. These can be found on the [the HS2 website at this address: https://www.gov.uk/government/collections/monitoring-the-environmental-effects-of-hs2](https://www.gov.uk/government/collections/monitoring-the-environmental-effects-of-hs2).

13.4.4 All noise and vibration monitoring equipment should hold a valid calibration certificate issued by either a United Kingdom Accreditation Service (UKAS) accredited calibration laboratory or equipment manufacturer.

# 14 Traffic and transport

14.1.1 Route-wide, local area and site specific traffic management measures will be implemented during the construction of the project on or adjacent to public roads, bridleways, footpaths and other PRow affected by the Scheme as necessary. These measures are guided by Section 14 of the CoCP.

14.1.2 The CoCP sets out a number of measures to ensure the impacts from construction traffic on the local community are reduced by its contractors where reasonably practicable:

- A Route-wide Traffic Management Plan (RTMP) setting out generic traffic management measures to be implemented during the construction of the project;
- The Local Traffic Management Plans (LTMP) will set out matters such as planned worksites, lorry routes and the programme of major traffic management measures expected to be necessary within particular areas along the route;
- Contractors will prepare site specific traffic management measures, which will be subject to consultation and, as necessary, consent;
- Contractors will prepare construction workforce travel plans with the aim of encouraging the use of sustainable modes of transport to reduce the impact of workforce travel on local residents and businesses;
- For road cleanliness Contractors will be required to use all reasonably practicable measures to avoid/limit and mitigate the deposition of mud and other debris on the highway; and
- HS2 will require its Contractors to undertake such appropriate monitoring as is necessary to ensure compliance with the requirements of the CoCP, and this will include the maintenance of records of traffic management measures installed.

14.1.3 Information relating to construction traffic is also provided in Information papers:

- D11: Maintaining access to residential and commercial property during construction;
- E13: Management of traffic during construction; and
- E14: Highways and traffic during construction – legislative provisions.
- E30: Vehicle flow management and safety requirements during construction.

## **14.2 Local control measures**

### **Sensitive Receptors**

- 14.2.1 In relation to traffic and transport, key sensitive receptors will need to be considered when the Contractor develops the overall programme within the LTMP and the site specific traffic management schemes.
- 14.2.2 In the LBH, these include Swakeleys Road, Breakspear Road South, Harvil Road, Ickenham Road, Ladygate lane, B467 Swakeleys Road, Harvil Road and Moorhall Road/Moorfield Road, the A412 Denham Avenue/Moorfield Road junction, A412 North Orbital Road/Denham Green Lane junction, A412 Denham Way/North Orbital Road, and A40/Swakeleys Roundabout and Swakeleys Road/Harvil Road junction and local roads that are affected by the Scheme.
- 14.2.3 Requirements for considering how impacts can be mitigated, as far as reasonably practicable, will be addressed appropriately through the development of the LTMPs or site specific measures and discussed at the Local Traffic Liaison Group meeting, established in accordance with the CoCP and the Route-wide Traffic Management Plan.

### **Site access**

- 14.2.4 A number of vehicle access points to the construction sites will be required and so the construction vehicle movements will be spread over a number of roads within the area of the works. Highway access notifications and/or approvals will be undertaken in accordance with Schedule 4 of the Act.
- 14.2.5 Routes for construction traffic will be subject to approval of the relevant planning authority in accordance with Schedule 17 of the Act when large construction vehicle movements exceed 24 single movements (12 two way movements) per day and/or from a site.
- 14.2.6 Any permanent highway works outside the limits of deviation as outlined in the Act will be subject to normal Highways legislation and Highway Authority powers.

## **14.3 Works to the Highway and Access Measures**

- 14.3.1 Temporary road closures and diversions of the following roads will be required:
- temporary short term closure (up to approximately six months) of Chalfont Lane requiring a temporary traffic diversion of approximately 6.1km via A412 Denham Way/North Orbital Road, Woodland Road, Hornhill Road, Shire Lane, Rickmansworth Lane, Denham Lane and West Hyde Lane;
  - temporary long term closure (up to approximately five years and six months) of Chalfont Lane requiring a temporary diversion of approximately 1.6km via A412 Denham Way/North Orbital Road, Woodland Road, Hornhill Road and the new temporary link road between Hornhill Road and Shire Lane/Chalfont Lane, temporary closure of Tilehouse Lane (up to one year six months) requiring a temporary traffic diversion of approximately 5.2km via A412 Denham Way/North Orbital Road and Denham Green Lane.

- 14.3.2 Alternative routes for the following PRow will be required, namely:
- a temporary alternative route for Footpath U34, to the east for a period of approximately three years and nine months;
  - a temporary alternative route for the Grand Union Canal western tow path, to the east for a period of approximately three years and nine months;
  - a temporary alternative route for Footpath U49, along the eastern boundary of the Northolt Tunnel and Earthworks Main Compound, for a period of approximately 9 years;
  - There will be a temporary diversion of Footpath U50 around the stockpile areas, adding 350m to the length of the footpath, west of Harvil Road and east of Uxbridge Golf Course in CFA7, as part of AP4 proposals;
  - Temporary diversion of footpaths U36, U37 and U38, over a period of approximately one year, during deposition of surplus excavated materials north of Newyears Green Lane; and,
  - Temporary diversion of footpaths U43, U45 and U47, along a route parallel to Breakspear Road South and under the existing Chiltern Line underbridge.
- 14.3.3 All temporary closures and diversions will be subject to submissions and notifications to the relevant highway authority.

## **14.4 Monitoring procedures**

- 14.4.1 Each Contractor will be responsible for monitoring to ensure compliance with the relevant requirements of the RTMP, LTMP, the requirements of the provisions of the Act, assurances and undertakings, site specific drawings and site specific traffic requirements and conditions.

# **15 Waste and materials**

- 15.1.1 All waste will be managed in accordance with the waste hierarchy which aims to reduce waste at source and to reduce the quantity that requires final disposal to landfill. This applies to excavated material arising on-site, which will be reused within the Scheme as far as reasonably practicable, as well as material from demolition and construction activities. This approach is described in greater detail in the HS2 Phase One Information Paper E3: Excavated Material and Waste Management and in Section 15 of the CoCP.

## 15.2 Local control measures

### Testing and classification of materials

- 15.2.1 The 'basic characterisation'<sup>6</sup> of excavated material will be determined by the Contractor to ascertain the potential for reuse, recycling, recovery or disposal to inert, non-hazardous or hazardous landfill.
- 15.2.2 A Materials Management Plan will be developed in accordance with the Definition of Waste: Development Industry Code of Practice<sup>7</sup> to set out the processes to be adopted in respect of the reuse of excavated materials either on the Scheme or transferred to another development site.
- 15.2.3 In the event that excavated material is to be sent for disposal, which shall be the option of last resort, testing and classification of will be undertaken by the Contractor in line with the Environment Agency's guidance. This includes:
- Waste Sampling and Testing for Disposal<sup>8</sup>;
  - WM3 – Guidance on the classification and assessment of waste (1st edition 2015)<sup>9</sup>.

### Transport of waste and materials

- 15.2.4 Opportunities for the off-site re-use of surplus excavated material will therefore be identified and utilised where reasonably practicable. Surplus excavated material will only be sent to landfill as an option of last resort. Further information on the approach to the management of material and waste is provided in HS2 Information Paper E3: Excavated Material and Waste Management.

## 16 Water resources and flood risk

- 16.1.1 General control measures relating to water resources and flood risk are provided in Section 16 of the CoCP.

### 16.2 Sensitive receptors

- 16.2.1 The Contractors will have due regard to the following sensitive local water resource receptors:
- Local aquifers:
    - Alluvium (Secondary A aquifer); Shepperton Gravel (Secondary A aquifer); Lambeth

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<sup>6</sup> Basic characterisation' refers to the characterisation of excavated material to help define the type of re-use for which it is suitable (e.g. DMRB soil classes). Characterisation of waste would include the allocation of an EWC code (in accordance with The List of Wastes (England) Regulations 2005 SI No. 895) and a detailed evaluation of the waste properties. The latter is based on a combination of the detailed knowledge of the source process and chemical testing.

<sup>7</sup> CL:AIRE Definition of Waste: Development Industry Code of Practice, version 2, March 2011

<sup>8</sup> Environment Agency (2013), *Waste Sampling and Testing for Disposal to Landfill*, March 2013.

<sup>9</sup> Environment Agency (2015), Technical Guidance WM3 – Guidance on the classification and assessment of waste (1st edition 2015) (1st Edition 2015).

Group (Secondary A aquifer); Seaford Chalk (Principal aquifer) and Newhaven Chalk (Principal aquifer);

- eight licensed groundwater abstractions are present within the area;
- Source Protection Zones (SPZs): The route passes through Zone 1 and Zone 2 of a SPZ in this area;
- surface water features: Yeading Brook (East and West Arms), Ickenham Stream and tributaries, River Pinn, Newyears Green Bourne, River Colne, Grand Union Canal, Harefield No.2 Lake, Savay Lake and unnamed pond adjacent to Savay Lake, Korda Lake, Harefield Moor Lake, Long Pond, Broadwater Lake Nature Reserve, one small pond at Lord Halsbury Memorial Playing Fields, two drains and one small pond at Ruislip Manor, several small ponds and drains at Ruislip Gold Course, three small drains and pond south east of Newyears Green covert, and numerous small ponds within 1km radius of the Scheme; and
- Water dependent habitats: River Colne, adjacent flooded gravel pits (including Savay Lake which is an important fishery), the Grand Union Canal and the Mid-Colne Valley SSSI.

16.2.2 The Contractor's pollution incident control plan will have due regard to the local flood risk sources (i.e. surface, artificial, groundwater and sewers) and key receptors and take into account any proposed risk management and/or mitigation measures.

16.2.3 The Contractors will have due regard to the River Pinn, the River Colne and Newyears Green Bourne within Environment Agency Flood Zones 2 and 3, which is an area that is at risk of river flooding.

## **16.3 Potential sources of contamination**

16.3.1 Potential sources of contamination are detailed within Section 11 of this LEMP.

## **16.4 Local control measures**

16.4.1 Measures identified in Section 16 of the CoCP, including detailed method statements, will aim to reduce potential adverse effects on surface water or groundwater quality or flows associated with construction. This will include release to groundwater, watercourses of surface water sewers in the surrounding receptors and could require the use of appropriate measures such as bunds of non-erodible material or silt or sediment fences adjacent to watercourses, such as Ickenham Stream, River Pinn, Newyears Green Bourne, the Grand Union Canal and the River Colne.

16.4.2 As outlined in the CoCP, best practice measures will be used (e.g. through the use of silt traps and appropriate attenuation, if required) prior to the discharge of water to watercourses, groundwater or surface water sewers, subject to obtaining the required permits or consents. This could apply to runoff from wheel washing facilities or from general construction activities. As noted in Section 5.12 of this document, a pollution incident control management system will incorporate procedures for alerting relevant

water supply companies and reducing impacts to public supply SPZ's and local private abstractions in this area.

- 16.4.3 Where there is the possibility that work may affect aquifers, a groundwater monitoring plan will be implemented, as outlined in Section 16 of the CoCP.
- 16.4.4 A programme of groundwater and surface water monitoring will be undertaken prior to, during and following completion of the construction works. The monitoring programme scope and duration will be developed and agreed with the Environment Agency and where appropriate in consultation with relevant stakeholders.
- 16.4.5 If dewatering from excavations is required, it will be carried out in consultation with the Environment Agency and will take into consideration risks posed to water quality or quantity.
- 16.4.6 If required, appropriate guidance will be adhered to, including the Piling and Preventative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention<sup>10</sup>. Groundwater and surface water monitoring plans will be prepared, where piling could affect below ground contamination.
- 16.4.7 Temporary excavated material stockpiles, construction compounds and site offices will be located outside of areas at risk of flooding where reasonably practicable, to avoid having an impact on the risk of flooding. Where construction compounds cannot be located outside flood risk areas, there will be a site specific flood risk management plan prepared prior to construction to manage the potential risks. These plans will take account of the flood risk assessments produced for the ES and include any proposed risk management or mitigation measures, if required.
- 16.4.8 Drainage from the works will be attenuated and discharged to watercourses or sewers, under agreement, at a controlled rate and, where required, with approval of the Environment Agency and, where appropriate, the drainage authority in accordance with Schedule 33 Part 5 of the Act.
- 16.4.9 In certain instances, the excavated retained cut is at a level below the natural ground water table. Mitigation, where necessary with continuous piles or grouting, will ensure that any changes to local groundwater levels and flow are minimised through the use of cut-offs and applying relatively short time-scales for dewatering.
- 16.4.10 Additional information, such as how the Scheme complies with the Water Framework Directive, as well as further provisions for engagement with stakeholders, monitoring and protection of local water resources are outlined in HS2 Information Paper E1: Control of Environmental Impacts and HS2 Information Paper E4: Water resources and flood risk.

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<sup>7</sup>Environment Agency (2001), Piling and Preventative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution

## Appendix 1: Glossary of Terms

|            |                                                                                                                                                                                                                                                                                            |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AP         | Additional Provision                                                                                                                                                                                                                                                                       |
| CFA        | Community Forum Area                                                                                                                                                                                                                                                                       |
| CoCP       | Code of Construction Practice                                                                                                                                                                                                                                                              |
| CoPA       | Control of Pollution Act 1974                                                                                                                                                                                                                                                              |
| Contractor | The Contractor on a construction site responsible for planning, managing and co-ordinating themselves and/or the works and all other contractors working on their site, or any other contractor directly employed by the nominated undertaker to undertake key construction works on site. |
| ES         | Environmental Statement                                                                                                                                                                                                                                                                    |
| EMS        | Environmental Management System                                                                                                                                                                                                                                                            |
| HGVs       | Heavy Goods vehicles                                                                                                                                                                                                                                                                       |
| HS2        | High Speed 2                                                                                                                                                                                                                                                                               |
| HS2 Ltd    | High Speed Two Limited - is a company wholly owned by the Department for Transport, established in 2009 to develop plans for a new high speed network and present a proposed route connecting London - West Midlands.                                                                      |
| IAQM       | Institute of Air Quality Management                                                                                                                                                                                                                                                        |
| IP         | Information Paper                                                                                                                                                                                                                                                                          |
| LBH        | London Borough of Hillingdon                                                                                                                                                                                                                                                               |
| LCAs       | Landscape character areas                                                                                                                                                                                                                                                                  |
| LEMP       | Local Environmental Management Plan                                                                                                                                                                                                                                                        |
| LTMP       | Local Traffic Management Plan                                                                                                                                                                                                                                                              |

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nominated undertaker | The body or bodies appointed to implement the powers of the Act to construct and maintain the railway.                                                                                                                                                                                                                                                                                                                                           |
| PRoW                 | Public rights of way                                                                                                                                                                                                                                                                                                                                                                                                                             |
| RRVs                 | Road Rail Vehicles. A vehicle which can operate both on rail tracks and road, often used for railway maintenance                                                                                                                                                                                                                                                                                                                                 |
| RTMP                 | Route-wide Traffic Management Plan                                                                                                                                                                                                                                                                                                                                                                                                               |
| SBI                  | Site of Biological Importance                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Scheme               | The Scheme to which this LEMP relates is the proposed high-speed railway between London - West Midlands. This is a high speed railway between London - West Midlands with a connection via the West Coast Main Line at conventional speeds to the North West and Scotland. It includes four high speed rail stations at London Euston, Old Oak Common (West London), Birmingham Airport (Birmingham Interchange) and Birmingham (Curzon Street). |
| Section 61           | Section 61 of the Control of Pollution Act 1974 (which sets out procedures seeking and obtaining local authority consent to measures for the control of noise and vibration on construction sites).                                                                                                                                                                                                                                              |
| SES                  | Supplementary Environmental Statement                                                                                                                                                                                                                                                                                                                                                                                                            |
| SLI                  | Site of Local Importance                                                                                                                                                                                                                                                                                                                                                                                                                         |
| SMI                  | Site of Metropolitan Importance                                                                                                                                                                                                                                                                                                                                                                                                                  |
| SPZ                  | Source Protection Zone                                                                                                                                                                                                                                                                                                                                                                                                                           |
| SRP                  | Soil Resources Plan                                                                                                                                                                                                                                                                                                                                                                                                                              |
| SSSI                 | Site of Special Scientific Interest                                                                                                                                                                                                                                                                                                                                                                                                              |

# Appendix 2: Non-exhaustive list of Local Interest and Community Groups in Hillingdon

*NB: This list is not exhaustive and may be subject to change as more information becomes available*

- Businesses:
  - Colne Valley Regional Park Community Interest Company;
  - Groundwork South;
  - Harleyford Aggregates Ltd;
  - The Ruislip Rifle Club;
  - Ruislip Golf Course (owned by LBH) and associated golf club;
  - Uxbridge Golf Course (owned by LBH) and associated golf club;
  - Hillingdon Outdoor Activities Centre;
  - Blenheim Day-care Centre;
  - AR Hendricks;
  - West London Composting Ltd.;
  - West London Waste Authority;
  - parade of shops on West End Road next to Ruislip High School;
  - Thames Water Utilities Ltd.;
  - Affinity Water;
  - National Grid;
  - Network Rail;
  - Chiltern Railways;
  - Affinity Water;
  - Scottish and Southern Energy (SSE);
  - British Telecom (BT); and
  - Merck Sharpe Dohme.
- Organisations:
  - London Borough of Hillingdon;

- Transport for London;
- Greater London Authority;
- Harefield Hospital;
- Inland Waterways Association;
- London Wildlife Trust;
- Harefield Infant School;
- Harefield Junior School;
- The Ruislip Chamber of Commerce;
- Governing Body of the Breakspear School;
- Governing Body of Vyners School;
- Ruislip High School;
- Governing Body of Sacred Heart Catholic Primary School;
- St. Giles Church;
- South Ruislip Christian Fellowship Centre;
- Church of Jesus Christ, Ickenham Road;
- Latter Day Saints, Ickenham Road;
- West London Tutorial College;
- Canal and Rivers Trust;
- Ramblers Association;
- Stop HS2;
- HS2 Action Alliance;
- Harefield Marina;
- Harefield Academy;
- Harefield Community Centre;
- Widewater Place Business Park;
- Bear on the Barge pub; and
- Broadwater Sailing Club.
- Residents Groups:
  - Harefield Residents and Tenants Association;
  - Ickenham Residents' Association;

- Ruislip Residents Association;
- South Ruislip Residents Association; and
- North Ruislip Residents Association.

**Appendix 3: Environmentally Sensitive Sites:  
Site Specific Management Plan**

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High Speed Rail  
(London-West Midlands)  
Key Environmentally Sensitive  
Worksite Management Plan  
Colne Valley Regional Park

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December 2017



## Department for Transport

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

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# 1 Introduction

## 1.1 Background

- 1.1.1 The HS2 Environmental Memorandum ([https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/593596/Environmental\\_Memorandum.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/593596/Environmental_Memorandum.pdf)) identifies key worksites along the Phase One route that are environmentally sensitive. These sites are considered particularly environmentally sensitive in relation to the following environmental topics: nature conservation, terrestrial and aquatic ecology, water resources, geomorphology, recreation and amenity, landscape, public open space, and agricultural land. The criteria for their selection is set out in the HS2 Environmental Memorandum.
- 1.1.2 The key environmentally sensitive worksites across Phase One of HS2, from south to north, are:
- Colne Valley;
  - Chilterns Area of Outstanding Natural Beauty (AONB);
  - Bernwood Forest;
  - Radstone and Helmdon Disused Railway; and,
  - Berkswell Marsh.
- 1.1.3 The management plans for these key environmentally sensitive worksites are being prepared and published prior to the commencement of works which may affect them. The preparation and publication of these plans is, therefore, determined by the Phase One construction programme. These plans will be developed as HS2 Contractors develop their designs and programme.
- 1.1.4 This management plan is for the Colne Valley Regional Park, focusing particularly on the Mid-Colne Valley Site of Special Scientific Interest (SSSI).

## 1.2 The Colne Valley Regional Park in the Context of HS2

- 1.2.1 The Colne Valley Regional Park (CVRP) stretches over 40 square miles, with 200 miles of river and canal and more than 60 lakes. The central section of the park contains the Mid-Colne Valley SSSI, which consists of open standing water and woodland habitats of value for breeding birds, along with a smaller area of calcareous grassland. All relevant authorities must have regard to the purpose of conserving and enhancing the areas natural beauty when performing their functions, as required under Countryside and Rights of Way Act 2000.
- 1.2.2 The Phase One HS2 enters the area in cutting, travels over a viaduct through the majority of the area and then returns to near grade at the northern end of the Colne Valley. A map of the Colne Valley Regional Park and Mid-Colne Valley SSSI in relation to the Phase One route is shown on drawing reference PH1-HS2-GI-MAP-C000-000002.
- 1.2.3 The CVRP falls within the scope of three Environmental Statement (ES) Community Forum Area (CFA) Boundaries: CFA 6 South Ruislip to Ickenham; CFA 7 Colne Valley and CFA 8 The

Chalfonts and Amersham. The Mid-Colne Valley SSSI lies within CFA 7. These documents provide detail of the assessment of the route, outline of the work and sensitive receptors.

- 1.2.4 The CVRP falls within Chiltern District, London Borough of Hillingdon, Buckinghamshire County Council, South Bucks District Council, Hertfordshire County Council and Three Rivers District Council. The majority of the Mid-Colne Valley SSSI is within the London Borough of Hillingdon.
- 1.2.5 The Colne Valley is identified in the HS2 Environmental Memorandum as being a key environmentally sensitive worksite in relation to the following key environmental topic areas:
- Recreation;
  - Nature conservation and terrestrial and aquatic ecology;
  - Water resources and flood risk; and
  - Landscape.

### 1.3 Purpose of the Management Plan

- 1.3.1 The purpose of this management plan is to:
- Identify future works potentially affecting the CVRP from Contractors and third parties in relation to HS2;
  - Focus on mitigation, compensation and monitoring requirements and opportunities for enhancement in relation to specific environmental topics;
  - Identify synergies between different stakeholder organisations in terms of opportunities.
- 1.3.2 This management plan has been prepared to satisfy the commitments set out within the HS2 Environmental Memorandum and to support the Local Environmental Management Plan (LEMP) for the Chilterns LEMP, Three Rivers and South Bucks LEMP and the London Borough of Hillingdon LEMP. The management plan is part of a suite of documents which identify environmental issues, controls and opportunities in relation to the CVRP including:
- The Environmental Minimum Requirements which contains the CoCP and the HS2 Environmental Memorandum;
  - Schedule 17 controls under the HS2 Act 2017 (the Act). KESWMP's will support Schedule 17 submissions and Town and Country Planning Applications within the CVRP and where appropriate, heritage applications under Schedule 18, 19 and 20;
  - This management plan supports the Mitigation Plan developed by the CVRP Panel as set out in the High Speed 2: Additional Mitigation Plan for the Colne Valley (October 2017);
  - Ecology Site Management Plans (ESMP). The site-specific ESMP provide the maintenance and management requirements for ecological mitigation sites; five of which are proposed within the CVRP: Colne Valley Viaduct South Embankment Wetland Habitat, Colne Valley Viaduct South Embankment Grassland Habitat, Harvil

Road Woodland Habitat and Tilehouse Lane Cutting Woodland Habitat, Merck, Sharp & Dohme) MSD Ponds and advanced planting;

- Protective provisions. The Act also contains provisions which give protection to bodies affected by the scheme. These include: highway authorities, utility undertakers, the Environment Agency, the Canal and Rivers Trust, and harbour and airport authorities. Typically these provisions enable HS2 Contractors to undertake works affecting their infrastructure but require approval of the details to be obtained. Paragraph 12 of Schedule 31, Part 1 of the Act requires the nominated undertaker not to deposit soil or material, or store any plant, or erect scaffolding or other structures, in or over a highway without the consent of the highway authority;
- Legally binding consenting and licensing process. HS2 Limited will be submitting licenses and consents in accordance with the Schedules of the Act; and,
- The Environmental Management Systems implemented by HS2 Contractors (as defined in the CoCP) including contract level and site level environmental management plans.

## **1.4 Process of developing the management plan**

- 1.4.1 On 16 November 2016 contracts were awarded to three Enabling Works Contractors (EWC) working across Phase One of HS2. The EWC contracts run until November 2020 with an option for HS2 to extend these for a further two years.
- 1.4.2 Fusion are the EWC for Area Central. Area Central covers an area of the Phase One route from east of Harvil Road in the London Borough of Hillingdon to Southam in Warwickshire and is split into three sectors (C1, C2 and C3).
- 1.4.3 Costain Skanska Joint Venture (CSJV) are the EWC for Area South. Area South covers the Phase One route from Euston Station in London Borough of Camden to Harvil Road in the London Borough of Hillingdon. Area South is split into four sectors (S1 and S2 being the main areas and S3 and S4 covering Euston Station and Old Oak Common Station).
- 1.4.4 The approximate boundaries of the Area Central sectors relevant to the AONB are shown on drawing reference: PH1-HS2-GI-MAP-C000-000002.
- 1.4.5 Fusion have produced this management plan, with input from CSJV, on behalf of HS2. Fusion is a joint venture between Morgan Sindall Infrastructure Services, BAM Nuttall Ltd and Ferrovial Agroman.
- 1.4.6 The EWC are carrying out a range of survey and investigation works which commenced in early 2017. The EWC will also be carrying out some construction work including the provision of early ecological mitigation sites. Fusion have produced this plan as they are the first Contractor to carry out works within the vicinity of the CVRP.
- 1.4.7 On 17 July 2017 contracts were awarded for HS2's Main Works Civils Contractors (MWCC). The MWCC covering the majority of the CVRP and the Mid-Colne Valley is Align (sector C1). Align is a joint venture between Robert McAlpine, Bouygues, and Volker Fitzpatrick. Skanska Costain Strasberg (SCS) will also be working within the CVRP as a MWCC. The MWCC are

currently developing the scheme design and the programme for the main civils construction works.

- 1.4.8 The earliest date that Align are anticipated to start on site within the CVRP is March 2019. It is anticipated that Align will take the lead on updating this management plan in 2018 as they will be implementing the majority of above ground construction works affecting the CVRP.
- 1.4.9 HS2 Contractors are working collaboratively, along with relevant third parties such as utilities companies, in relation to works within the CVRP, such as Cadent Gas.
- 1.4.10 As the MWCC are still developing their design and construction programme this management plan currently focuses on works being undertaken by Fusion and CSJV within the CVRP which includes surveying, surface and groundwater monitoring, creation of ecological mitigation sites and tree planting, utilities diversions and minor road works, as well as site clearance and demolition. It is also expected that the majority of opportunities within the CVRP will be identified by the MWCC through the design process. Therefore, the opportunities identified at this stage are limited.
- 1.4.11 This management plan is intended to be reviewed prior to any construction works taking place within the CVRP, whenever there is a significant change to works proposed in line with the revision of the LEMPS or on a six monthly basis, whichever is soonest. Updates of publication will be in line with publication of the LEMP.

## **1.5 Consultation**

- 1.5.1 National Environment Forum (NEF) members and relevant planning authorities will be consulted on the KESWMP following requirements within the HS2 Environmental Memorandum. In addition, the CVRP Panel will be consulted on this plan.
- 1.5.2 Copies of the updated plan will be made available for consultees by e-mail following revision. Comments from the consultees will be collated for consideration of further updates and amendments. Comments and discussions from attendance by HS2 and its Contractors at the CVRP Panel will also be taken into account for updates and amendments.
- 1.5.3 Following the Environmental Memorandum commitments, the management plan will be submitted with relevant Schedule 17 submissions to local planning authorities and, where appropriate, heritage applications.
- 1.5.4 HS2 Contractors will work closely with the CVRP Panel, communicating and consulting as appropriate on works within the area. The Panel provides recommendations on design and mitigation proposals for their section of the HS2 route. Regular representation at the CVRP Panel the HS2 Contractor leading on production and updates of the KESMP is beneficial to all parties to identify areas of concern, possible mitigation and compensation planting or alternatives that can be incorporated into design.

## 2 Overview of upcoming works within the Colne Valley Regional Park

### 2.1 General

- 2.1.1 Fusion and CSJV have been carrying out a range of survey and investigation works within the vicinity of the CVRP including the Mid-Colne Valley SSSI which commenced in early 2017 and will continue throughout 2018. Works include:
- 2.1.2 Environmental surveys such as ecological surveys, groundwater monitoring and surveys to support hydrological modelling. There will also be surveys to identify invasive species, such as Japanese knotweed, to support plans for future treatment and control; and,
- Engineering surveys, including soil surveys;
  - Construction of ecological mitigation sites;
  - Design and construction of advanced planting sites;
  - Site clearance and demolition;
  - Haul road and minor road works;
  - Utility diversions; and,
  - Archaeological investigations.

### 2.2 Early works

- 2.2.1 CSJV have been conducting site clearance for utilities works, including: National Grid's new Grid Supply Point (GSP) near Dews Lane, diversion of two gas mains in the vicinity of Harvil Road and a water main in the vicinity of Breakspear Road South. CSJV works commenced late 2017 and will continue till mid-2018.
- 2.2.2 The first construction works by the EWC in the CVRP will be creation of the Tilehouse Lane Cutting Woodland Habitat, in early 2018. The Tilehouse Lane ecological mitigation site will provide suitable habitat for reptiles as well as compensation to replace loss of woodland in the CVRP. The site will contain woodland, scrub and hedgerow planting and will include artificial bat roosts. The objectives for this site is to form part of the replacement woodland habitat to the west of the new high speed railway to compensate for similar habitat lost. See HS2 CT-o6 021 map book.
- 2.2.3 Site clearance and utility diversion works will take place in early 2018 to enable haul road construction and demolition in the MSD pharmaceutical site mid 2018 for SCS works on the Gatemead Embankment and Brackenbury Cutting.
- 2.2.4 Habitat creation works, including pond construction and advanced planting, will also take place in early 2018, north of the MSD site in New Years Green, as a receptor site for great crested newts.

- 2.2.5 Colne Valley Wetland is scheduled for construction in mid-2019 and is principally designed to help integrate the Ickenham Auto Transformer Feeder Station (IFTS) into the landscape as well as providing replacement woodland and wetland vegetation compensation. Colne Valley Grassland ecological mitigation sites is proposed for construction in Q1 2018. The site has the objectives to be a receptor site for reptiles and great crested newts, providing replacement pond provision and provide compensation for rank grassland lost elsewhere. See CT-06 019b map.
- 2.2.6 Planting of all the ecological mitigation sites will contribute to HS2 aim of “no net loss” in relation to biodiversity.
- 2.2.7 Advance landscape planting by EWC is currently anticipated to start in late 2018. The designs for these planting sites have not been finalised; they will take account of the Detailed Design Principles being developed by the CVRP Panel with the MWCC. In the CVRP the proposed advanced landscape planting sites are:
- Colne Valley Viaduct Advance Planting site – to screen views of the National Grid feeder station from South Harefield
  - Hornhill Road –to screen views of the M25 compound and the road realignment; and,
  - West Hyde Embankment – to provide visual screening for properties in West Hyde
  - MSD / New Years Green
- 2.2.8 There are utility diversions proposed during 2018 for power line diversion. This work will be carried out by National Grid and Fusion will provide environmental support including species translocations, where required.
- 2.2.9 Archaeological investigations including geophysical (non-intrusive) surveys and trial trenching are planned in early 2018 at a number of sites in the CVRP. Trenching works are currently proposed early in 2018 at the Harvil Road and Colne Valley ecological habitat sites off Harvil Road and Dews Lane respectively. The results of geophysical surveys and trial trenching will determine whether further archaeological excavations are required.
- 2.2.10 The main vegetation clearance within the CVRP for the construction of the main civils works is due to start in winter 2018/2019. It is currently anticipated that the EWC will carry out erection of security fencing, vegetation clearance, and species translocations in the area prior to MWCC carrying out construction.
- 2.2.11 The EWC ecology mitigation and advance planting sites are being created in advance of MWCC construction activities. There have been no in-combination impacts or multiple consenting process impacts identified from the EWC scope of work prior to MWCC mobilising on site. There have been no other development projects identified which are considered to lead to in-combination impacts on the CVRP with the proposed HS2 works.
- 2.2.12 There are other survey works anticipated to be carried out by the EWC for which the details and programme are currently being developed:
- Translocation of protected species into the ecological habitat creation sites at Tilehouse Lane Colne Valley Wetland and Grassland and Harvil Road; and,

- Assessment of hedgerow translocation and carrying out habitat translocation.

2.2.13 The following sections focus on the purpose of this KESWMP in relation to the technical topics identified in section 1.2.

## 2.3 Topic areas

### Nature Conversation, Terrestrial and Aquatic Ecology

#### *Mitigation, Compensation and Monitoring Requirements*

- 2.3.1 The ecological mitigation sites are mitigation for the loss of habitat due to the construction of HS2. The ecological mitigation sites have been designed with the intention of maximising the potential quality of the available habitat on each site. All sites have a bespoke maintenance, management and monitoring requirements to achieve the ecological objectives of that site.
- 2.3.2 Standard construction control measures specific to the locality have been outlined in Table 1 of the Three Rivers and South Bucks District Council Local Environmental Management Plan, Table 1 of the South Bucks District Council Local Environmental Management Plan and Table 1 of the London Borough of Hillingdon Local Environmental Management Plan and support the ecological mitigation as specified in the Environmental Statement (ES). Fusion will use method statements and construction management plans to ensure the environmental effects associated with construction are identified, planned for and managed in addition to those identified in the consents and licenses. Fusion and HS2 assure that these controls are being implemented through regular site visits, inspections and audits.
- 2.3.3 Whilst there have been protected species identified near the ecology mitigation sites there are no identified adverse impacts on them due to the scale and timing of the EWC construction works.
- 2.3.4 New packages of work will be reviewed and assessed for any impacts on the nature conservation, terrestrial or aquatic ecology and appropriate mitigation and compensation requirements implemented.
- 2.3.5 Monitoring requirements for protected and other species, and habitats, are determined through the licence application processes and through the ESMP for ecological mitigation sites. Monitoring of mitigation measures is required in the EMR's (para 6.5). Fusion will comply with HS2 Limited's route-wide licence for great crested newts and Badgers and will implement the class licence for bats where relevant. The early ecological mitigation sites are being created as receptors for protected species such as great crested newt as required under the HS2 route-wide licence.
- 2.3.6 The site-specific ESMP will be consistent with the requirements of the Environmental Minimum Requirements (CS498E March 2016) on management and monitoring (section 4.8). Section 4.8.6 states:
- 2.3.7 "Monitoring of the ecology mitigation and compensation measures is necessary to measure the extent to which the ecological objectives of the proposals are being met. The approach to monitoring will depend on which management option is adopted for a particular area of habitat and will be agreed on a site-specific basis"

### *Opportunities for Enhancement*

- 2.3.8 At the current time, opportunities for enhancement within the CVRP in conjunction with EWC works are being sought. Opportunities for enhancement will be identified during detailed scheme design and through discussion with consultees including the CVRP Panel and local authorities.

## **Water Resources and Flood Risk**

### *Mitigation and Compensation*

- 2.3.9 Following CoCP requirements, there are no anticipated impacts within the CVRP on water resources and flood risk from the early EWC works.
- 2.3.10 All design will incorporate a flood risk assessment. The Flood Risk Zone is defined by areas located in areas of flood risk (Flood Zone 2 or Flood Zone 3) or greater than 1ha in area and where required in support of a consent and/or approval application. For HS2 works the Environment Agency grant the consent and the Local Authority are consulted.
- 2.3.11 The Colne Valley Viaduct South Embankment Wetland, Grassland, Harvil Road and Tilehouse Lane ecological mitigation sites to be constructed within the CVRP are in Flood Zone 1 (fluvial flooding). The siting of the ponds has been designed outside the flood zone to prevent incursion by flood waters increasing the likelihood of introducing non-desirable species. Monitoring of the sites for flood incursion will be undertaken as part of the ongoing monitoring of all the sites.
- 2.3.12 The advanced landscape planting sites and other EWC and third party works sites will be fully assessed for flood risk as part of the Scheme design stage.

### *Monitoring Requirements*

- 2.3.13 Monitoring requirements will be agreed as part of scheme design dependant on the locality and severity of the flood risk in discussion with HS2 Limited, the Environment Agency and the Local Authority as appropriate. The consenting process will ensure appropriate monitoring is agreed and implemented. The hydrological monitoring is still being undertaken and when complete the models will be included in future assessments.

### *Opportunities for Enhancement*

- 2.3.14 Enhancement opportunities have been considered within the design and construction process and includes such opportunities as additional swales for the habitat mitigation sites and placement of reptile banks and hibernacula outside the floodplain or areas at risk.
- 2.3.15 Opportunities for further enhancement will be identified through consultation with consultees including the CVRP Panel and Lead Local Authorities Forum (LLFA) will continue to identify opportunities to reduce areas traditionally known to flood throughout the project.

## **Recreation and Amenity Impacts and Public Open Space**

### *Mitigation & Compensation*

- 2.3.16 Main works civils construction of HS2 within the CVRP will result in significant impacts, including loss of woodland, ancient woodland, grassland and impacts on landscape views. These impacts will be considered in more detail when the KESWMP is updated in relation to

the MWCC design and programme. The works proposed by the EWC are not anticipated to cause significant effects within the CVRP.

- 2.3.17 Woodland and ancient woodland loss will be minimised through the exploration of alternative options. There will be no woodland removed until it has been confirmed there are no design alternatives that are acceptable. Areas of amenity lost permanently through the scheme are being mitigated through design supported by the EWC, the MWCC in time and through HS2 Limited's support of the CVRP Additional Projects being developed by the CVRP Panel.
- 2.3.18 Public Rights of Way (PRoW) will be affected by the construction of HS2. The EWC and MWCC will work with the community and interest groups to mitigate for these disruptions through the provision of additional routes where possible linking sections of curtailed path and by enhancing PRoW with additional planting also if possible. The EWC is not stopping up any PRoW, these will be stopped up during main works. Any PRoW or bridleways affected by the works will be considered in order to minimise impacts on users of these public amenities.

### *Opportunities for Enhancement*

- 2.3.19 Comments received from the CVRP Panel, Local Authorities, Parish councils, community groups and interest groups during design and any opportunities identified for enhancement will be explored with the CVRP Panel, HS2 and local authorities.
- 2.3.20 Interested parties can propose enhancement opportunities to the EWC and the MWCC who will endeavour to work with these parties to develop and deliver the enhancements if practicable. All contractors are committed to providing community investment and the provision of PRoW and recreation and amenity improvements will be enthusiastically received to incorporate into the Contractor's suggestions.

## **Landscape and Visual**

### *Mitigation*

- 2.3.21 Sensitive landscape and visual receptors are outlined in the relevant LEMP and ES. Screening planting has been included within the Proposed Scheme design and is planned for sensitive landscape locations. The advance landscape planting is designed to provide early screening to local residents, businesses and for public amenity value in advance of the MWCC works. Further consultation will be undertaken as the advance landscape planting develops.
- 2.3.22 The CVRP Panel is working alongside HS2 and communicating with Fusion on additional integration and enhancement measures to reduce the landscape and visual effects of the scheme within the CVRP and its setting. The plans being developed by the CVRP Panel are in their early design phase but are welcomed by Fusion and will be taken on board with future Work Packages. Fusion have been consulted and have contributed to opportunities to develop the PRoW network within the Colne Valley as part of the enhancement.

### *Monitoring Requirements*

- 2.3.23 The advanced landscape planting will be monitored in accordance with Landscape, Maintenance, Management and Monitoring Plans which will be produced at detailed design stage for these sites by Fusion.

### *Opportunities for Enhancement*

- 2.3.24 Further opportunities for enhancement will also be highlighted and developed during design, especially when designing permanent infrastructure. The views of the CVRP Panel will be included as appropriate and consultation will be local authorities and other interested parties. Suggestions received from any party will be considered and discussed between the EWC or MCW (or both) and HS2 for the practicality and impacts and adopted or incorporated wherever feasible. For example, the opportunity to open up part of a woodland mitigation site was agreed by the EWC in another area but until the consent of the landowners has been agreed the idea will not be implemented.

### **Agriculture**

#### *Mitigation and Compensation*

- 2.3.25 Minimising the loss of any agricultural land, particularly the Best and Most Versatile agricultural land, i.e. Grades 1, 2, 3a, as well as mitigation and compensation for loss of Best and Most Versatile agricultural land will be principally within the MWCC scope.
- 2.3.26 The EWC work programme is not affecting high quality agricultural land; small junction improvements, habitat mitigation sites – generally sited on grazing land in the CVRP. The areas of agricultural land to be lost or adversely affected are outlined in the relevant LEMPs and ES as are local control measures. The proposed scoping matrix accompanying additional revisions of this KESWMP will identify cross topic opportunities and mitigation requirements in more detail.

#### *Monitoring Requirements*

- 2.3.27 A Soil Resources Plan (SRP) will be prepared by the HS2 Contractors on sites where topsoil and subsoil are being stripped and returned to agriculture, these areas have not been fully identified to date as the majority of the EWC works are associated with environmental mitigation measures in the form of advance tree planting and early ecology mitigation site creation or will be restored by the MWCC post construction.
- 2.3.28 The SRP will identify the type and volume of soils affected and the reuse potential within the footprint of the works or suitable donor site for land restoration. For agricultural land the SRP will include a target specification for restoration.

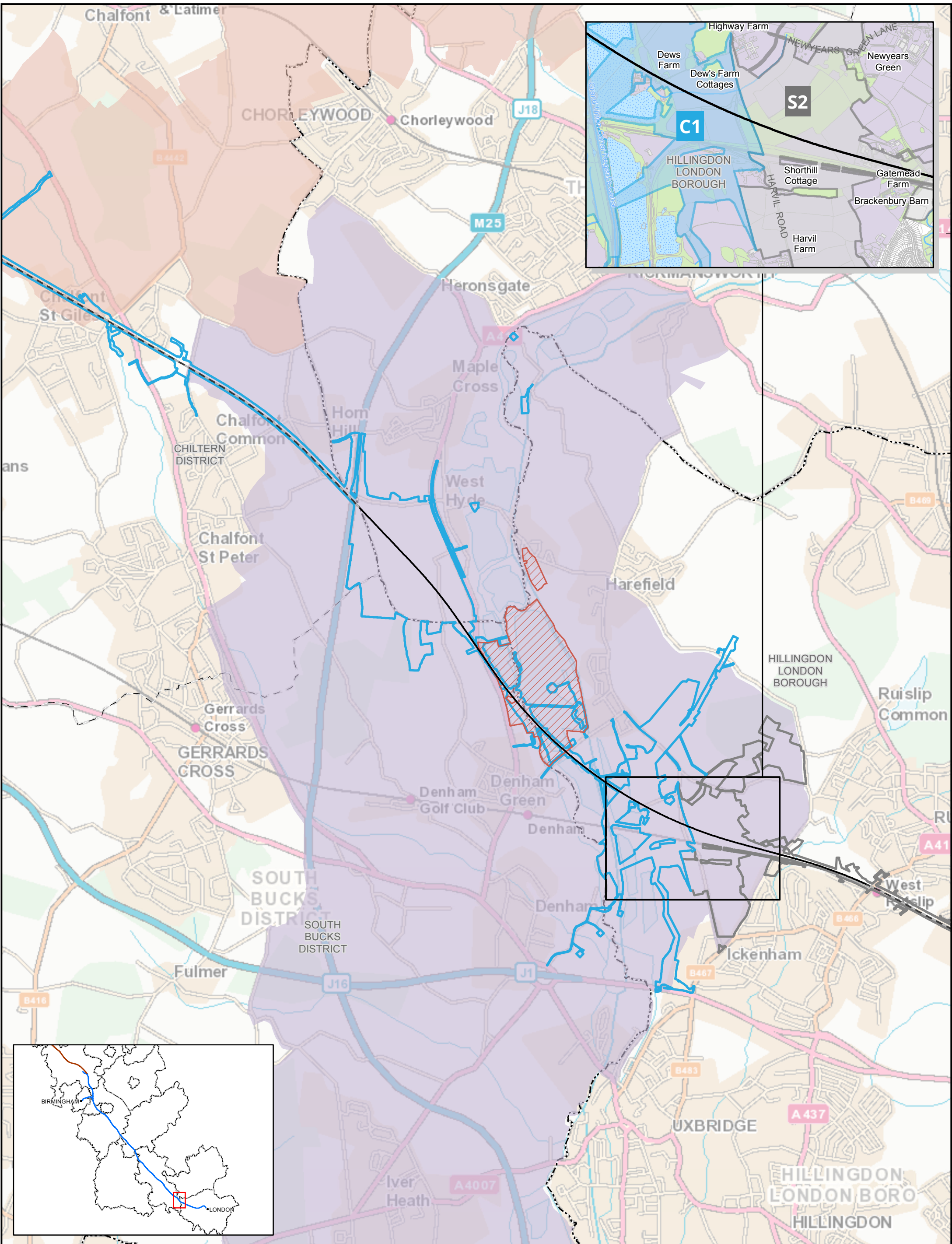
### *Opportunities for Enhancement*

- 2.3.29 Further opportunities for enhancement will also be highlighted and developed during design, especially when designing permanent infrastructure. The views of the CVRP Panel will be included as appropriate and consultation will be local authorities and other interested parties.

## **3 Summary**

- 3.1.1 This document addresses the impacts associated with the CVRP, with emphasis on the Mid-Colne Valley SSSI through the activities of the EWC. The nature conservation, terrestrial and aquatic ecology, water resources, geomorphology, recreation and amenity, landscape, public open space and agricultural impacts have been assessed and opportunities for enhancement within the CVRP and Mid-Colne Valley SSSI will be identified in future.

- 3.1.2 In-combination adverse impacts and the need for multiple consenting requirements during the EWC scope of works have been avoided within the CVRP through planning and communication with other EWC Contractors and third parties including the CVRP Panel. Each consent has been reviewed in accordance with the contract scope and the ES and HS2 Undertakings and Assurances but with widely spaced and disparate requirements the holistic nature of the consenting requirements is being assessed and will be addressed through the incorporation of a scoping matrix integrating topics and cross cutting themes and opportunities.
- 3.1.3 The KESWMP will be reviewed and revised as appropriate and on a six monthly basis by HS2 and its Contractors.



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**Legend**

- Route on surface
- Route in tunnel
- Chiltern Tunnels and Colne Valley Viaduct (C1)
- Chilterns AONB
- Colne Valley Regional Park
- Mid Colne Valley SSSI

Indicative HS2 sectors/contract boundaries derived by splitting the consolidated land boundary at the interface boundaries.  
Sector polygons derived from the ITT interface boundary documents, drawings and discussions with interface managers.  
This feature class should be treated as DRAFT

High Speed Two

Colne Valley Regional Park  
In Relation To Phase One Route

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