



**High Speed Rail (London – West Midlands)
Act 2017**

HS2 Ltd

Buckinghamshire Council

Package 1 South Heath Cutting

Earthworks, Structures and Associated Works

**Schedule 17 Plans and Specifications Written
Statement for Information**

HS2 Consent Register Reference: BCL.PS.100023

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1 Introduction

1.1 Background Information

Table 1: Schedule 17 Address Details and Description of Works

Site	Details
Scheme	High Speed Two
Applicant	High Speed Two (HS2) Limited
Applicant Address	<i>c/o Agent:</i> EKFB, 5th Floor, Exchange House, 450 Midsummer Boulevard, Milton Keynes MK9 2EA
Site Address	<p>The site extends from the north of Frith Hill to the south of Leather Lane, between the settlements of South Heath and Great Missenden.</p> <p>The location of the works is centred on; X (Easting): 490186 and Y (Northing): 202316 and lies between HS2 line chainages 47+100 to 48+700.</p> <p>The South Heath Cutting Site Location Plan (Drawing No. 1MC06-CEK-TP-DLO-CS03_CL05-000004) identifies the extent of the Schedule 17 application site boundary in blue.</p>
Description	<p>Plans and Specifications submission under Schedule 17 to the High Speed Rail (London – West Midlands) Act 2017 for works comprising of:</p> <ul style="list-style-type: none"> • South Heath Cutting (Part of); • Havenfield Wood / Footpath GMI/2 Accommodation Overbridge; • Footpath GMI/12 Overbridge; • Earthworks associated with Havenfield Wood / Footpath GMI/2 Accommodation Access and associated maintenance access track; • Earthworks associated with GMI/2/1 footpath realignment; • Earthworks associated with Chiltern Tunnel North Portal and Compound and access track and realignment of footpath GMI/13/3 (U&A 1964); • Noise Barrier; • 4 No. Drainage ponds; • Drainage Ditches; • 2 No. Culverts (above ground elements only) <ul style="list-style-type: none"> ○ Havenfield Wood Drop Inlet Culvert; ○ South Heath Culvert; • Location of vehicle restraint barriers; and • Location of the permanent (security) fencing.

1.2 Terms of Reference

- 1.2.1 This Written Statement is compiled in accordance with the High Speed Two (HS2) Phase 1 Planning Memorandum and Planning Forum Notes (PFNs) as required by the planning regime established under Schedule 17 of the High Speed Rail (London – West Midlands) Act 2017 ([Link to Planning Forum Notes for Local Authorities](#)).
- 1.2.2 This statement provides Buckinghamshire Council (BC) with information to assist with the determination of the Plans and Specifications submission under Schedule 17, in relation to the above description of works.
- 1.2.3 The information in this Written Statement is provided for information to assist in determining the request for approval. It is not for approval.

1.3 Introduction to High Speed 2

- 1.3.1 HS2 is a new high speed railway network that will connect major cities in Britain. It will bring significant benefits for inter-urban rail travellers through increased capacity and improved connectivity between London, the Midlands and the North. It will release capacity on the existing rail network and so provide opportunities to improve existing commuter, regional passenger and freight services.
- 1.3.2 Phase One of HS2 will provide a dedicated high speed rail service between London, Birmingham and the West Midlands. It will extend for approximately 230km (143 miles). Just north of Lichfield, high speed trains will join the West Coast Main Line for journeys to and from Manchester, the North West and Scotland.
- 1.3.3 The application site (hereafter referred to as ‘the site’) lies entirely within the newly formed administrative area of Buckinghamshire Council (BC) Unitary Authority. The site was formerly mainly within the administrative area of Chiltern District Council (CDC).
- 1.3.4 Part of South Heath Cutting, which is included in this package for approval, falls outside this package and within the adjacent package area of AVDC Package 1 – South Heath to Wendover. The ‘other part of’ South Heath Cutting will be the subject of a separate Schedule 17 submission.
- 1.3.5 For further information on HS2 and the route through the CDC administrative area please refer to the Planning Context Report for CDC (May 2017), deposited with the Council by HS2 Ltd ([link to CDC Planning Context Report](#)).

1.4 High Speed Rail (London – West Midlands) Act 2017

- 1.4.1 The Act provides powers for the construction and operation of Phase 1 of High Speed Two. HS2 Ltd is the nominated undertaker in relation to the works subject to this Plans and Specifications submission ([Link to the Act](#)).
- 1.4.2 Section 20 to the Act grants deemed planning permission for the works authorised by it, subject to the conditions set out in Schedule 17. Schedule 17 includes conditions requiring the following matters to be approved or agreed by the relevant local planning authority (LPA):
- Construction arrangements (including large goods vehicle routes);

- Plans and Specifications;
- Bringing into use requests; and
- Site restoration schemes.

1.4.3 This is therefore a different planning regime to that which usually applies in England (i.e. the Town and Country Planning Act) and is different in terms of the nature of submissions and the issues that the LPAs can have regard to, in determining requests for approval.

1.4.4 Schedule 17 of the Act sets out the grounds on which the LPA may impose conditions on approvals or refuse requests for approval.

1.4.5 This Written Statement includes information supporting the Plans and Specifications submission in relation to the matters outlined in **Table 2** below.

Table 2: Schedule 17 Plans and Specifications Submission Details

Site	Details
Plans and Specifications (permanent works)	<ul style="list-style-type: none"> • South Heath Cutting (Part of); • Havenfield Wood / Footpath GMI/2 Accommodation Overbridge; • Footpath GMI/12 Overbridge; • Earthworks associated with Havenfield Wood / Footpath GMI/2 Accommodation Access and associated maintenance access track; • Earthworks associated with GMI/2/1 realignment; • Earthworks associated with Chiltern Tunnel North Portal and associated maintenance access track and realignment of footpath GMI/13/3(U&A 1964); • Noise Barrier; • 4 No. Drainage ponds; • Drainage Ditches; • Havenfield Wood Drop Inlet Culvert; • South Heath Culvert; • Location of vehicle restraint barriers; and • Location of the permanent (security) fencing.

1.4.6 The works to which this application relates, and the cumulative impact of the works in conjunction with other HS2 development, have been assessed and are compliant with paragraph 1.1.3 (bullet point 2) of the HS2 Phase 1 Environmental Minimum Requirements General Principles¹.

1.5 Code of Construction Practice

1.5.1 HS2 Ltd as the nominated undertaker is contractually bound to comply with the controls set out in the Environmental Minimum Requirements (EMRs). The EMRs include the High Speed Two Code of Construction Practice (CoCP) (London-West Midlands Environmental Statement - Environmental Minimum Requirements - Annex 1: Code of Construction Practice) (February 2017) ([Link to EMR CoCP](#)).

¹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/618074/General_principles.pdf

- 1.5.2 The works subject to this request for approval of Plans and Specifications will be undertaken in accordance with the Code of Construction Practice, and with the Class Approval issued by the Secretary of State (March 2017)².

1.6 Schedule 17 Statutory Guidance

- 1.6.1 The Schedule 17 Statutory Guidance issued by the Secretary of State (April 2021)³ provides guidance to all planning authorities determining requests for approval under Schedule 17 to the Act. Paragraph 20 of the Statutory Guidance states that planning authorities should not through the exercise of Schedule 17 seek to modify controls already in place such as the Environmental Minimum Requirements, other controls in the Act such as those under Schedule 4 or 33, or existing legislation.
- 1.6.2 As set out in the Statutory Guidance, Local Planning Authorities may request additional information they consider necessary to make a decision on the application. Planning authorities must only address relevant considerations when making a determination under Schedule 17. Therefore, any information requested should be relevant to the limited specified grounds of refusal. Annex 1 to PFN 17, Information for Decision Making, sets out further guidance on what information could be required to make Schedule 17 decisions. The need for further information should be identified during the pre-application stage.
- 1.6.3 When making decisions, Local Planning Authorities should have regard to the grounds set out in paragraphs 2(5) and (6) of Schedule 17. LPAs should clearly identify both the planning matter and the specific ground if proposing a conditional approval, or refusal of an application. The planning authority should also explain and give reasons as to why and how the design or external appearance ought to be modified relevant to the grounds.

1.7 Structure of Written Statement

- 1.7.1 This Written Statement is structured as follows:
- A description of the location and main characteristics of the works area is provided in **Section 2**;
 - **Section 3** describes the main works being undertaken in the area, as set out in Schedule 1 of the Act, and those that are the subject of this Schedule 17 Plans and Specifications submission;
 - The design criteria and rationale for the works which are the subject of this Schedule 17 Plans and Specifications submission are described in **Section 4**;

² <https://www.gov.uk/government/publications/high-speed-rail-london-west-midlands-act-2017-class-approval>

³ <https://www.gov.uk/government/publications/high-speed-rail-london-to-west-midlands-act-2017-schedule-17-statutory-guidance/high-speed-rail-london-west-midlands-act-2017-schedule-17-statutory-guidance>

- **Section 5** summarises the pre-submission engagement that was undertaken, including a list of the consultees, dates, attendees at meetings and a brief summary of the outcome of these discussions;
- A high level programme for the works and how they fit into the wider programme for other works in the area, as set out in Schedule 1 of the Act, is provided in **Section 6**; and
- **Section 7** identifies any other main consents, or known forthcoming consents associated with the works.

2 Site Location and Characteristics

2.1 Site Location

- 2.1.1 The site extends from the north of Frith Hill to the south of Leather Lane, between the settlements of South Heath and Great Missenden. The site broadly follows the alignment of Potter Row to the east and the A413 London Road to the west.
- 2.1.2 The site is located to the north west of South Heath, approximately 4km to the south of Wendover and 1km to the west of the Lees. Wendover is the largest nearby settlement.
- 2.1.3 The site is centred on National Grid Reference X (Easting) 490186 and Y (Northing) 202316. and lies between HS2 line chainages 47+100 to 48+700. The South Heath Cutting Site Location Plan (Drawing No. 1MC06-CEK-TP-DLO-CS03_CL05-000004) identifies the extent of the Schedule 17 application site boundary in blue.
- 2.1.4 The nearest residential properties are the scattered farmsteads that surround the site and the residential properties located to the west of South Heath and along Aylesbury Road, Frith Hill and Potter Row. These include Bury Farm, Park Farm, Park Hill, and Hammonds Hall Farm.
- 2.1.5 The Development Plan for the site comprises of the adopted Chiltern District Council Local Plan (CDC LP 1997) and the Adopted Core Strategy (CDC CS 2011). These documents identify the site as falling within the Green Belt and the Chilterns Area of Outstanding Natural Beauty (AONB). A new plan for this area was being prepared but has subsequently been withdrawn as of October 2021. The CDC LP does not make any reference to HS2. The CDC CS does refer to HS2, highlighting concerns regarding damage to the quality and tranquillity of the AONB and potential for irreversible harm.
- 2.1.6 The site is predominantly within the Lee and Buckland Common Undulating Plateau Landscape Character Area (LCA), with a small area falling within the Misbourne Upper Chalk River Valley LCA. The LCAs are shown on the South Heath Cutting Landscape Context Plan (Drawing No. 1MC06-CEK-TP-DPL-CS03_CL05-000037).

2.2 Site Characteristics

Land Use

- 2.2.1 The site is predominantly rural in character, with agriculture being the main land use. The land mainly comprises of medium sized arable fields. The arable fields are well-defined by mature hedgerows that connect with occasional isolated tree clumps. The area outside of the site is similarly characterised as arable agricultural land, interspersed with isolated dwellings and farmsteads.

Ecological Assets

- 2.2.2 The main environmental features relevant to the site are shown on the environmental baseline map for the area (Map CT-10-018 in the Community Forum Area (CFA) 09 Map Book) ([Link to Vol 2 CFA 09 Map Book](#)).

- 2.2.3 There are no designated sites within or close to the site, but there are three areas of ancient semi-natural broadleaved to the west of South Heath, namely Jenkin's Wood, Stockings Wood and Havenfield Wood. These woodlands fall outside the site but are adjacent to it.

Heritage Assets

- 2.2.4 There are no designated and non-designated heritage assets located within the site, but there are several within 500m of the site. These are shown on the environmental baseline map for the area (Map CT-10-018 in the Community Forum Area (CFA) 09 Map Book) ([Link to Vol 2 CFA 09 Map Book](#)).
- 2.2.5 There are several Grade II Listed buildings within 500m of the site as follows:
- A group of four Grade II Listed Buildings approximately 50m to the east of the site at Bury Farm (The Granary at Bury Farm, Smaller Barn at Bury Farmhouse, Large Barn at Bury Farm and Bury Farmhouse).
 - Two Grade II Listed Buildings approximately 200m to the north of the site at Cottage Farm (Stable Block at Cottage Farm and Woodlands Park Residential Home for the Elderly).
 - One Grade II Listed Building approximately 50m to the east of the site at Hammondshall Farm (Hammondshall Farmhouse).
- 2.2.6 Non-designated heritage assets close to the site include Hunt's Green Farm and Jones' Hill Wood to the north.
- 2.2.7 Archaeological investigations have been undertaken by the Enabling Works Contractor (EWC) in advance of permanent works. Details of these investigations can be found in section 3.7 of this Written Statement.

Water and Flood Risk

- 2.2.8 The site is within Flood Zone 1 according to the Environment Agency's Flood Map for Planning. Areas deemed to be in Flood Zone 1 have a low probability of flooding (land having a less than 1 in 1,000 annual probability of river or sea flooding).
- 2.2.9 The site is also located within a Groundwater Source Protection Zone (SPZ) Level 3. SPZs are defined around large and public potable groundwater abstraction sites. Sites within SPZ 3 are defined as the area around a source within which all groundwater recharge is presumed to be discharged at the source. The purpose of SPZs is to provide additional protection to safeguard drinking water quality through constraining the proximity of an activity that may impact upon a drinking water abstraction.
- 2.2.10 A Drainage Demonstration Report (DDR) (Document Ref. 1MC06-CEK-TP-REP-CS03_CL05-000006) has been submitted as part of this package which provides further detail on the water and flood risk and the basis for the drainage design. The DDR is submitted for information only.

2.3 Surrounding Highway Network

Highways

- 2.3.1 The site extends from the north of Frith Hill to the south of Leather Lane and is located adjacent to the A413 London Road. The A413 London Road runs on a north – south alignment and connects Aylesbury in the north to Great Missenden in the south and provides access to the M40 Motorway.
- 2.3.2 A network of minor roads surrounds the site. These roads provide connections to the strategic road network, surrounding small villages and isolated farmsteads.

Public Rights of Ways

- 2.3.3 There are four Public Rights of Ways (PRoWs) that bisect the site. These are GMI/2/1, GMI/12/1, GMI/13/3 and GMI/32/1. The PRoWS are shown on the South Heath Cutting Site Location Plan (Drawing No. 1MC06-CEK-TP-DLO-CS03_CL05-000004).

3 Description of the Works

3.1 Introduction

- 3.1.1 This Written Statement supports the Schedule 17 submission for approval of Plans and Specifications for CDC Package 1 - South Heath, as outlined in Tables 1 and 2 of this Written Statement.
- 3.1.2 References to the Proposed Scheme refer to all the works within the site unless otherwise specified.
- 3.1.3 The Plans and Specifications submitted for approval and for information are listed in the Proforma accompanying this application (Document Ref. 1MC06-CEK-TP-APP-CS03_CL05-000005).
- 3.1.4 The Scheduled Works under the Act associated with this submission are set out in Section 3.2. A description of the proposed works for approval are set out in Section 3.3.
- 3.1.5 Section 3.4 summarises the indicative mitigation relevant to the works being submitted in accordance with paragraph 7.5.2 of the Planning Memorandum. The information in Section 3.4 is not for approval under Schedule 17 Plans and Specifications.
- 3.1.6 Sections 3.5 - 3.7 provide information on other aspects of the works to assist in understanding the context of the works being submitted for approval. The information in Sections 3.5 - 3.7 is not for approval under Schedule 17 Plans and Specifications.
- 3.1.7 Information on the design rationale and justification for this submission is set out in Section 4.

3.2 Works for Approval

- 3.2.1 The relevant Scheduled Works as set out under Schedule 1 of the Act, to which this Schedule 17 submission relates to are:
- *Work No. 2/14 - A railway (8.3 kilometres in length) partly in tunnel and partly on viaduct commencing by a junction with Work No. 2/1, at its termination, continuing north-westwards, and terminating at a point 240 metres north-west of the roundabout joining the A413 London Road with Small Dean Lane; Work No. 2/14 includes a viaduct over the A413 London Road, the Marylebone to Aylesbury Line and Small Dean Lane.*
 - *Work No. 2/19 - An accommodation access road, commencing on the access road to Havenfield Lodge, at a point 618 metres south-west of the junction of that road with Potter Row and terminating on that road at a point 137 metres south-west of that junction. Work No. 2/19 includes a bridge over Work No. 2/14.*

3.3 Description of the Proposed Works For Approval

- 3.3.1 Through the site, the HS2 line will continue to run in a south-east to north-west direction in South Heath Cutting. South Heath Cutting is approximately 3km in length in total, of which 1.7km falls within this submission. The earthworks associated with the Cutting require approval.
- 3.3.2 South Heath Cutting is required to set the HS2 line below existing ground levels and therefore several overbridges are required to maintain existing accommodation access to the local farms and to ensure PRowS are retained. These overbridges, comprise of the Havenfield Wood/Footpath GMI/2Accommodation Overbridge and Footpath GMI/12 Overbridge. The Overbridges require approval, as well as their associated earthworks,
- 3.3.3 Other matters for approval include earthworks associated with the Havenfield Wood / Footpath GMI/2 Accommodation Overbridge and associated maintenance access track, earthworks associated with the GMI/2/1 footpath realignment, earthworks associated with the Chiltern Tunnel North Portal and Compound and access track and realignment of footpath GMI/13/3 (U&A 1964), Noise Barriers, 4 No. drainage ponds, drainage ditches, 2 No. Culverts, the location of the vehicle restraint barriers and the location of the permanent (security) fencing. With regards to the culverts only those works above ground are submitted for approval.
- 3.3.4 Chiltern Tunnel North Portal does not form part of this submission. This application only seeks approval for the compound where the North Portal will be located and the access track to the compound.
- 3.3.5 All of the works for approval are described below and are shown on the South Heath Cutting General Arrangement Plan – For Approval Sheets 1 and 2 (Drawing Nos. 1MC06-CEK-TP-DGA-CS03_CL05-000016 and 1MC06-CEK-TP-DGA-CS03_CL05-000017).
- 3.3.6 The Proposed Scheme accords with the HS2 Phase 1 Environmental Statement (ES) (London-West Midlands ES Volume 2 Community Forum Area Report, CFA9 Central Chilterns, November 2013) as described in paragraphs 2.214 and 2.2.16. ([Link to Vol 2 CFA 09 Map Book](#)).

The Proposed Scheme assessed in the HS2 Phase 1 ES is shown on the maps for the area (Map CT-06-033 and CT-06-034a in the Community Forum Area 9 Map Book) ([Link to Community Forum Area 9 Map Book](#)).

Proposed Structures For Approval

- 3.3.7 The location and appearance of the structures for approval are shown on the following drawings for approval:
- South Heath Cutting General Arrangement Plan – For Approval (Sheet 1 of 2) - 1MC06-CEK-TP-DGA-CS03_CL05-000016
 - South Heath Cutting General Arrangement Plan – For Approval (Sheet 2 of 2) - 1MC06-CEK-TP-DGA-CS03_CL05-000017
 - South Heath Cutting Footpath GMI/2 Accommodation Overbridge – Cross Section and Parapet Detail – For Approval - 1MC06-CEK-TP-DDE-CS03_CL05-000024

- South Heath Cutting GMI/2 Accommodation Overbridge – Parapet Module Details – 1MC06-CEK-TP-DDE-CS03_CL05-000052.
- South Heath Cutting Footpath GMI/2 Accommodation Overbridge – Plan on Deck – For Approval - 1MC06-CEK-TP-DPL-CS03_CL05-000093
- South Heath Cutting Footpath GMI/2 Accommodation Overbridge – Longitudinal Section and Elevation – For Approval - 1MC06-CEK-TP-DSE-CS03_CL05-000052
- South Heath Cutting Footpath GMI/12 Overbridge – Cross Section and Parapet Detail – For Approval - 1MC06-CEK-TP-DDE-CS03_CL05-000035
- South Heath Cutting Footpath GMI/12 Overbridge – Plan on Deck – For Approval - 1MC06-CEK-TP-DPL-CS03_CL05-000105
- South Heath Cutting Footpath GMI/12 Overbridge – Longitudinal Section and Elevation – For Approval - 1MC06-CEK-TP-DSE-CS03_CL05-000060
- South Heath Cutting Footpath GMI/12 Overbridge – Elevation Details - 1MC06-CEK-TP-DSE-CS03_CL05-000060
- South Heath Cutting Havenfield Drop Inlet Culvert – Culvert Plans and Section – For Approval - 1MC06-CEK-TP-DPL-CS03_CL05-000107
- South Heath Cutting South Heath Culvert – Culvert Plan and Section – For Approval - 1MC06-CEK-TP-DPL-CS03_CL05-000101
- South Heath Cutting – Noise Barrier Transition Details - 1MC06-CEK-TP-DDE-CS03_CL05-000053.

3.3.8 A description of each structure within the site is provided below. These should be read in conjunction with the plans being submitted for approval.

Overbridges and Common Design Elements

3.3.9 The Overbridges have been designed in accordance with the HS2 Design Vision Principles and other relevant HS2 standards.

3.3.10 The HS2 Design Vision Principles demand elegant, site specific and durable structures that will continue to perform and look good over the long term. These requirements are further detailed by the HS2 Design Handbook and HS2 Bridge Design Guide.

3.3.11 Furthermore, the bridges align with the design rationale for the Common Design Elements (CDEs) which has been developed and reviewed with the main works contractors and the Independent Design Panel and in discussion with the LPA. The Design Panel's remit is to ensure that the design decisions deliver against the Design Vision. The CDEs include frequently used structures, such as viaduct piers and rail overbridge parapets. The rail overbridge parapets form part of this submission. The piers for the overbridges are not CDEs, however the approach to their design [across all packages] has been consistent.

- 3.3.12 The CDEs have been the subject of a thorough engagement process in terms of their appearance and comply with HS2's goal of ensuring the HS2 infrastructure is easily recognisable as a brand and has a standardised appearance. The parapets have now been formally approved by the Planning Forum. The design for the CDEs follows what has been discussed as the CDE design approach.
- 3.3.13 The CDE structures are the normal starting point for determining the design of HS2 works as they support efficiencies in design and construction. In accordance with the Planning Memorandum, paragraph 4.4, there is a presumption in favour of the approval of the CDEs when submitted for Schedule 17 consent.
- 3.3.14 The parapets include a 'crease' a third of the way up the parapet. The bottom third is gently angled to face the ground and the top two thirds are angled towards the sky. The horizontal crease a third of the way up of the parapet is to provide a subtle contrast of light and shadow while the bottom edge of the parapet extends below the deck level to partially conceal the structural depth and throw the beams that support the deck into shadow. The parapets will also act as a noise barrier.
- 3.3.15 The parapet joints are consistent along the entire length of an individual structure and will be formed in pre-cast concrete. The external parapet face will be plain concrete.
- 3.3.16 The bridge piers, abutments and wingwalls will be formed using reinforced concrete and these in turn will be supported on reinforced concrete piles.
- 3.3.17 Pre-cast concrete elements of the structure will be finished to a high standard with single point sourcing for each like element on the structure. For example, all parapets will be sourced from the same pre-casting yard with the same aggregate and cement mix. This is to ensure a high visual quality across the structure with no mismatched elements or colour and finish. Unless otherwise noted on the Drawings For Approval all precast and in situ elements will be plain finished.
- 3.3.18 Those visible parts of the structures constructed of in situ concrete will be accurately aligned with an even surface and neatly set out shuttering. Care will be taken during detailed design in the provision of drip edges and specification of concrete finish to ensure that the 'freshness' of the concrete components during construction will weather and mellow in a controlled fashion over time.

Havenfield Wood / Footpath GMI/2 Accommodation Overbridge

- 3.3.19 Havenfield Wood / Footpath GMI/2 Accommodation Overbridge is required to carry Footpath GMI/2 over the HS2 line to the north of Havenfield Wood. It will provide access to Havenfield Wood. Havenfield Wood / Footpath GMI/2 Accommodation Overbridge crosses the HS2 line at chainage 48+420.
- 3.3.20 The location of the Havenfield Wood/Footpath GMI/2 Accommodation Overbridge is shown on the South Heath Cutting General Arrangement Plan For Approval Sheet 2 (Drawing No. 1MC06-CEK-TP-DGA- CS03_CL05-000017).

- 3.3.21 The Overbridge will carry a single carriageway road and will be approximately 54m long, 5.9m wide and up to 5m above existing ground level. The existing ground level ranges from approximately 188m to 194m AOD. The carriageway will be approximately 3.5m wide, with a green verge on one side whilst the narrower verge has an asphalt surface.
- 3.3.22 The construction of the Overbridge will involve land clearance and the construction of approach embankments. The approach embankments either side of the bridge will provide a ramp from existing ground level to deck level.
- 3.3.23 Details of the Havenfield Wood/Footpath GMI/2 Accommodation Overbridge is shown on the following Drawings:
- South Heath Cutting General Arrangement Plan – For Approval (Sheet 1 of 2) - 1MC06-CEK-TP-DGA-CS03_CL05-000016
 - South Heath Cutting Footpath GMI/2 Accommodation Overbridge – Cross Section and Parapet Detail – For Approval - 1MC06-CEK-TP-DDE-CS03_CL05-000024
 - South Heath Cutting GMI/2 Accommodation Overbridge – Parapet Module Details – 1MC06-CEK-TP-DDE-CS03_CL05-000052
 - South Heath Cutting Footpath GMI/2 Accommodation Overbridge – Plan on Deck – For Approval - 1MC06-CEK-TP-DPL-CS03_CL05-000093
 - South Heath Cutting Footpath GMI/2 Accommodation Overbridge – Longitudinal Section and Elevation – For Approval - 1MC06-CEK-TP-DSE-CS03_CL05-000052

Footpath GMI/12 Overbridge

- 3.3.24 Footpath GMI/12 Overbridge will carry Footpath GMI/12 over the HS2 line to the north of Park Farm. Footpath GMI/12 Accommodation Overbridge crosses the HS2 line at chainage 47+830. Footpath GMI/12 Overbridge is not a Scheduled Work.
- 3.3.25 The location of the Footpath GMI/12 Overbridge is shown on the South Heath Cutting General Arrangement Plan - For Approval Sheet 2 (Drawing No. 1MC06-CEK-TP-DGA- CS03_CL05-000017).
- 3.3.26 The Overbridge will carry a pedestrian only footway and will be 103m long, 3.9m wide and ties in with existing ground level at either abutment. The existing ground level ranges from approximately 192m to 194m AOD.
- 3.3.27 The footpath will be 2.5m wide. The bridge will be constructed on concrete piers that will be clad in exposed steel. The internal face of the bridge parapets will be oak lined with mesh panels and the outer bays of the bridge will be partially enclosed.
- 3.3.28 The exposed steel will weather over time to the characteristic dark russet finish of exposed weathering steel. Alongside the installation and maintenance benefits of weathering steel, the colouration; and in time progressively duller finish; provides an earthy and appropriately rural undertone to the bridge architecture. When viewed from a distance the matt finish of the steel will also appear similar in tone to the background landscape.

- 3.3.29 The construction of the Overbridge will involve land clearance and the construction of approach embankments. The approach embankments either side of the bridge will provide a ramp from existing ground level to deck level.
- 3.3.30 Details of the Footpath GMI/12 Overbridge is shown on the following Drawings:
- South Heath Cutting General Arrangement Plan – For Approval (Sheet 2 of 2) - 1MC06-CEK-TP-DGA-CS03_CL05-000017
 - South Heath Cutting Footpath GMI/12 Overbridge – Cross Section and Parapet Detail – For Approval - 1MC06-CEK-TP-DDE-CS03_CL05-000035
 - South Heath Cutting Footpath GMI/12 Overbridge – Plan on Deck – For Approval - 1MC06-CEK-TP-DPL-CS03_CL05-000105
 - South Heath Cutting Footpath GMI/12 Overbridge – Longitudinal Section and Elevation – For Approval - 1MC06-CEK-TP-DSE-CS03_CL05-000060
 - South Heath Cutting Footpath GMI/12 Overbridge – Elevation Details - 1MC06-CEK-TP-DSE-CS03_CL05-000060

Culverts

- 3.3.31 Two culverts are proposed within the site: Havenfield Wood Drop Inlet Culvert and South Heath Culvert. The location of these Culverts is shown on the South Heath Cutting General Arrangement Plan for Approval Sheet 1 (Drawing No. 1MC06-CEK-TP-DGA-CS03_CL05-000016).
- 3.3.32 Only those works above ground associated with the Culverts require Schedule 17 approval. The only works that will be visible above ground are headwalls and the inspection chamber access hatches.

Havenfield Wood Drop Inlet Culvert

- 3.3.33 Havenfield Wood Drop Inlet Culvert is located at chainage 48+400 and will provide a connection under the HS2 line from the eastern side of the HS2 line, discharging into the existing dry valley to the west of HS2.
- 3.3.34 Details of the Havenfield Wood Drop Inlet Culvert are shown on Drawing 1MC06-CEK-TP-DPL-CS03_CL05-000107.

South Heath Culvert

- 3.3.35 South Heath Culvert is located at chainage 47+560 and will provide a connection from the western side of the HS2 line at the Chiltern Tunnel North Portal, dropping into the proposed drainage pond further west, adjacent to the A413.
- 3.3.36 Details of the South Heath Culvert are shown on Drawing 1MC06-CEK-TP-DPL-CS03_CL05-000101.

Noise Barrier

- 3.3.37. A noise barrier is proposed within the site as detailed in **Table 3** below and as detailed in the Noise Demonstration Report submitted as part of the package (Document Reference: 1MC06-CEK-TP-REP-CS03_CL05-000003).

- 3.3.38. The noise barrier will be 3m in height above ground level and will be located at the top of the South Heath Cutting earthworks between chainages 47+630 and 47+820. This is a change from the acoustic mitigation detailed within the HS2 Phase 1 ES. The previously proposed mitigation consisted of earthworks, but BC officers have advised that a noise barrier would be the preference due to the extent of the earthworks that would be required. The noise barrier is designed to help reduce the perceived sound of the high-speed trains.
- 3.3.39. The location of the noise barrier is shown on the South Heath Cutting General Arrangement Plan Sheet 2 (Drawing No. 1MC06-CEK-TP-DGA-CS03_CL05-000017). The proposed appearance of the noise barriers is shown on the South Heath Cutting Noise Barrier Transition Details Drawing (Drawing No. 1MC06-CEK-TP-DDE-CS03_CL05-000053).

Table 3: Noise Barrier Details

Start Chainage	End Chainage	Length (m)	Up / Down Line	Barrier Type	Height Above Ground
47+630	47+820	190m	East (up)	B	3m

- 3.3.40. The noise barrier has a standardised appearance to give HS2 a recognisable look but have also been designed to be sensitive to their surroundings and character of the area because they will be visible to the public.
- 3.3.41. A Type B barrier is proposed within the site to reduce the visual impacts as this type has externally concealed steel posts. The steel posts will therefore be visible on the internal facing side of the barrier (facing towards the HS2 line) and invisible on the external facing side.
- 3.3.42. Facing the HS2 line, the internal surface of the noise barrier will be lined with acoustically absorptive material.
- 3.3.43. The finish to the inner and outer face on the concrete panels of the noise barrier, including the absorptive material will be agreed with the LPA via a planning condition.
- 3.3.44. The noise barrier will be constructed and installed in sections, using steel posts and concrete panels. The noise barriers have been designed to maximise the use of precast concrete panels to ensure a high-quality form and surface is achieved. Precast concrete panels also provide a durable and long-lasting structural solution requiring minimal maintenance.
- 3.3.45. At the point where the noise barrier ends, a termination panel is included which tapers the height of the barrier from 3 m down to 1 m.

Location of the Vehicle Restraint Barriers

- 3.3.46. Only the location of the vehicle restraint barriers requires Schedule 17 Plans and Specifications approval. The design of the vehicle restraint barriers is not yet known; however, such details are not subject to approval under Schedule 17 of the Act.
- 3.3.47. The location of the vehicle restraint barriers is shown on the General Arrangement Plan for Approval Sheet 1 (Drawing No. 1MC06-CEK-TP-DGA-CS03_CL05-000016).

- 3.3.48 Vehicle restraint barriers are proposed on both sides of the approach earthworks to Havenfield Wood / Footpath GM1/2 Accommodation Overbridge. They are required in advance of the bridge parapets and after the parapets on this overbridge in order to prevent errant vehicles leaving the highway.
- 3.3.49 The number of vehicle restraint barriers has been kept to an absolute minimum to reduce their visual impact. They have only been used when other measures have been considered inappropriate or ineffective to reduce the number and severity of injuries in the event that a vehicle leaves the carriageway and would otherwise encounter a hazardous feature.
- 3.3.50 The design of the vehicle restraint barriers alongside the highway verges has been optimised such that the barriers are set back as far as possible from the carriageway, subject to the technical constraints, in order that they are less visually intrusive. Where possible, planting is shown behind the barrier to mask the overall appearance of the barrier.

Location of the Permanent Fencing

- 3.3.51 HS2 needs to be continuously fenced for security and safety purposes to prevent access for trespassers. However, the location and type of fencing used at each location is dependent on the security, its functional requirement and the nature of the local landscape characteristics. Wherever possible, fencing has been avoided.
- 3.3.52 Only the location of the permanent fencing requires Schedule 17 Plans and Specifications approval. The permanent fencing comprises of boundary fencing, security fencing.
- 3.3.53 The location of the boundary fencing has not yet been determined and, therefore, this will form part of a future Schedule 17 Site Restoration / Plans and Specifications application. The boundary fencing has not yet been finalised because HS2 want to maximise the amount of land handed back to the landowner. This can only be done following the completion of the Proposed Scheme. The Act does not stipulate all items subject to Schedule 17 approval must be submitted as one single application.
- 3.3.54 The location of the permanent fencing (security fencing) is shown on the South Heath Cutting General Arrangement Plan – For Approval Sheets 1 and 2 (Drawing No. 1MC06-CEK-TP-DGA-CS03_CL05-000016 and 1MC06-CEK-TP-DGA-CS03_CL05-000017).
- 3.3.55 The appearance (type) of fencing is not subject to Plans and Specifications approval and any detail provided is for information only. The type of security fencing proposed is shown on the South Heath Cutting General Arrangement Plan – For Information Sheets 1 and 2 (Drawing Nos. 1MC06-CEK-TP-DGA-CS03_CL05-000018 and 1MC06-CEK-TP-DGA-CS03_CL05-000019). The colour of the security fencing will be powder coated black, as the most sympathetic in terms of landscape integration.
- 3.3.56 Security fencing will be located around the operational railway boundary, which includes the associated engineered earthworks that need to be secured in order to safeguard them from any damage. The security fencing will be continuous along the toe of embankments and top of cuttings. Where Security fencing has been removed around ponds by agreement of a departure from HS2 standards, stock proof fencing is proposed. The purpose of the stock proof fencing is

to delineate perimeters or boundaries and mitigate health and safety risk. This type of fencing will have a more natural appearance to minimise visual impacts.

3.3.57 As required by the HS2 Technical Standards, the security fencing has been located a minimum of 1.0m away from the top of the cutting or embankment toe and will tie into the headwalls for the bridges and culverts. However, wherever possible these standards have been challenged to make positive improvements to the Proposed Scheme and to address comments made during the pre-application meetings. The standards have been challenged by doing the following:-

- Changing the standard for fencing around ponds to stock proof fencing instead of Type 2 security fencing, wherever possible.
- Rationalising the amount of fencing around ponds by aligning the fencing so that is integrated with existing or proposed field boundaries or structures;
- The tie-ins adjacent to the structures and overbridges have been amended to reduce visual impact by aligning the fencing so that it sits as low as possible on the new approach earthworks and to maximise the ability of the landscape design to screen it;
- Where possible, the design has utilised the noise barrier or parapet as a security feature to reduce cluttering.

3.3.58 In challenging the HS2 standards consideration has been given to the following:-

- Access to the security fencing for maintenance. A reasonably level 3m wide strip should normally be provided parallel to the fence line for maintenance operations;
- The security requirement of the fencing;
- The visibility of the fencing; and
- The design implications of locating the fencing closer to the operational railway.

3.3.59 As a consequence, both the type of security fencing proposed and where it will be used it set out below:

- Stock Proof Fencing will be located around the perimeter of the track and land drainage ponds.
- Security Fencing Type 2 will be located along South Heath Cutting.
- Security Fencing Type 3 will be located on the approach to the Overbridges.
- Security Fencing Type 4 will be located around the earthworks associated with the Chilterns North Tunnel Portal

3.3.60 The security fencing has been designed to incorporate the ecological requirements where necessary to prevent animals accessing the tracks

3.3.61 The design and height of the permanent gates will be the same as the adjacent section of fence to ensure that security is not compromised by the gate when it is locked.

3.3.62 Two types of gates are proposed, one that allows for pedestrian access which will be located on footpath access points and has a width of 1.2m. The other is a vehicular access gate which will

be located at vehicular access roads with a width of 4m. The vehicular access gates will have a pedestrian gate attached to allow safe passage for pedestrians using this route. The gates are not shown on the drawings because their locations have not yet been finalised.

Proposed Permanent Earthworks For Approval

3.3.63 The proposed earthworks for approval are shown on the following drawings for approval. Landform Plans and Earthwork Cross Sections have been provided to indicate the existing and proposed ground levels.

- South Heath Cutting General Arrangement Plan – For Approval (Sheet 1 of 2) - 1MC06-CEK-TP-DGA-CS03_CL05-000016
- South Heath Cutting General Arrangement Plan – For Approval (Sheet 2 of 2) - 1MC06-CEK-TP-DGA-CS03_CL05-000017
- South Heath Cutting Proposed Landform Plan (Sheet 1 of 2) - 1MC06-CEK-TP-DPL-CS03_CL05-000035
- South Heath Cutting Proposed Landform Plan (Sheet 2 of 2) - 1MC06-CEK-TP-DPL-CS03_CL05-000036
- South Heath Cutting Earthworks Cross Sections (Sheet 1) - 1MC06-CEK-TP-DSE-CS03_CL05-000011
- South Heath Cutting Earthworks Cross Sections (Sheet 2) - 1MC06-CEK-TP-DSE-CS03_CL05-000012
- South Heath Cutting Earthworks Cross Sections (Sheet 3) - 1MC06-CEK-TP-DSE-CS03_CL05-000013
- South Heath Cutting Earthworks Cross Sections (Sheet 4) - 1MC06-CEK-TP-DSE-CS03_CL05-000014
- South Heath Cutting Earthworks Cross Sections (Sheet 5) - 1MC06-CEK-TP-DSE-CS03_CL05-000015
- South Heath Cutting Earthworks Cross Sections (Sheet 6) - 1MC06-CEK-TP-DSE-CS03_CL05-000016
- South Heath Cutting Pond Details and Sections (Sheet 1 of 2) - 1MC06-CEK-TP-DDE-CS03_CL05-000032
- South Heath Cutting Pond Details and Sections (Sheet 2 of 2) - 1MC06-CEK-TP-DDE-CS03_CL05-000033

South Heath Cutting (Part of)

3.3.64 The Chilterns Tunnel requires earthworks to reduce the ground to the levels required for the tunnel portal access. South Heath Cutting is up to 16m (level of track) below existing ground level. The existing ground level ranges from approximately 185m to 196m AOD within the site.

- 3.3.65 South Heath Cutting within the site will extend from chainage 47+220 to 48+700 and will be approximately 1.5km (1500m) in length. The total length of the cutting will extend beyond the site and will be 3180m in length. The HS2 line will be located at the base of the cutting.
- 3.3.66 At the landscape bund to the east of the HS2 line between chainage 47+830 and 48+770 the ground is at an existing level of 194m AOD sloping up to an existing level of 197m AOD. The proposed earthwork will increase the level to 201m AOD rising above South Heath Cutting to the east. The gradients of the outward slope range from 1 in 8 to 1 in 12, whilst the inner slope gradient will range from 1 in 3 to 1 in 4.
- 3.3.67 At the landscape bund to the west of the HS2 line between chainage 47+140 and 47+820 the ground is at an existing level of 182m AOD sloping up to an existing level of 185m AOD. The proposed earthwork will increase the level to 196m AOD rising above South Heath Cutting to the west. The gradients of the outward slopes will range from 1 in 4 to 1 in 25 whilst the inner slope gradient will range from 1 in 3 to 1 in 6.
- 3.3.68 The earthwork design for South Heath Cutting is shown on the Earthworks Cross Section Drawing Sheets 1-8 (Drawings Nos. 1MC06-CEK-TP-DSE-CS03_CL05-000011, 1MC06-CEK-TP-DSE-CS03_CL05-000012, 1MC06-CEK-TP-DSE-CS03_CL05-000013, 1MC06-CEK-TP-DSE-CS03_CL05-000014, 1MC06-CEK-TP-DSE-CS03_CL05-000015, 1MC06-CEK-TP-DSE-CS03_CL05-000016).

**Earthworks associated with Havenfield Wood / GMI/2 Accommodation Access
Realignment and associated Maintenance Access Track**

- 3.3.69 The Proposed Scheme includes ground level changes associated with the proposed realignment of Havenfield Wood / GMI/2 accommodation access on the approach to the Overbridge at chainage 48+420. To the west of the HS2 line, the existing ground levels rise from 162m AOD rising to 188m AOD. The proposed highway earthworks will be raised by up to 5m where it adjoins the proposed bridge abutment. Ground levels will be raised on the north side of the highway by approximately 1m before falling away to tie in with existing ground levels either side.
- 3.3.70 To the east of the HS2 line, the existing ground levels along the accommodation access rise from approximately 195m to 198m AOD. The proposed highway earthworks will be raised by up to 1m where it adjoins the proposed bridge abutment however the access will be set between the proposed landscape earthworks to the north and south.
- 3.3.71 Between chainage 48+400 - 48+450, the drainage pond access track off Havenfield Wood Accommodation access is at a level of approximately 197m AOD and existing ground level is 196m AOD.
- 3.3.72 The earthworks design for the realignment of Havenfield Wood /GMI/2 Accommodation Accesses are shown on the Proposed Landform plan Sheet 1 of 2 (Drawing No. 1MC06-CEK-TP-DPL-CS03_CL05-00035) and the South Heath Cutting Earthworks Cross Sections Sheet 6 of 8 (Drawing No. 1MC06-CEK-TP-DSE-CS03_CL05-00016).

Earthworks associated with Chiltern Tunnel North Portal and associated Maintenance Access Track and realignment of Footpath GMI/13/3

- 3.3.73 At the landscape bund to the south of the north tunnel portal between chainage 47+150 and 47+270 the ground is at an existing level of 182m AOD sloping up to an existing level of 185m AOD. The proposed earthwork will increase the level to 187m AOD rising above the Chiltern Tunnel North Portal. The gradients of the outward slope will range from 1 in 4 to 1 in 25 whilst the inner slope gradient will be 1 in 3 to 1 in 6.
- 3.3.74 To access the Chiltern Tunnel North Portal an access track is required from chainage 47+085, at an existing level of 188m AOD, to 47+610 at an existing level of 190m AOD ground level. At chainage 47+085 the proposed level will remain at 188m AOD and at chainage 48+610 the level will be reduced 11.0m to 179m AOD.
- 3.3.75 The access track includes a section of the realigned route of footpath GMI/13/3 which is a HS2 Act Schedule 4 work. The footpath will be diverted from the east of the HS2 Line around the Chiltern Tunnel earthworks and will connect with the access road to the Chiltern Tunnel North Portal described above, before connecting back into the original footpath alignment on the west side of the HS2 line. The route aligns with the description and route shown within Schedule 4.
- 3.3.76 A new section of footpath will also be installed from the Chiltern Tunnel Portal North access track to provide a connection from the realigned route of GMI/13/3 to Frith Hill as agreed under an Undertaking and Assurance (U&A) (Reference 1964). The footpath will be constructed 'at grade' without the need for any earthworks.
- 3.3.77 The earthworks design for the Chiltern Tunnel North Portal and associated access is shown on the Proposed Landform Plan Sheet 2 of 2 (Drawing No. 1MC06-CEK-TP-DPL-CS03_CL05-00036) and the South Heath Cutting Earthworks Cross Sections Sheet 1 of 8 (Drawing No. 1MC06-CEK-TP-DSE-CS03_CL05-00011).

Earthworks associated with the realignment of GMI/2/1

- 3.3.78 The Proposed Scheme includes the realignment of PROW GMI/2/1 as shown on the South Heath Cutting General Arrangement Plan – For Approval Sheets 1 and 2 (Drawing Nos. 1MC06-CEK-TP-DGA-CS03_CL05-000016 and 1MC06-CEK-TP-DGA-CS03_CL05-000017).
- 3.3.79 The PROW will be diverted on the east side of the HS2 line before crossing South Heath Cutting on the Havenfield Wood / Footpath GMI/2 Accommodation Overbridge. On the western side of the line the PROW will be diverted, running parallel to the HS2 line before re-joining the original PROW alignment further to the west.
- 3.3.80 On the east side of HS2 between chainage 48+120 and 48+340, the realigned GMI/2/1 will remain at existing ground level at a level of 197m AOD.
- 3.3.81 On the west side of HS2 between chainage 48+150 and chainage 48+440, the existing ground levels are 195m AOD and 184 m AOD respectively. On the completion of this access track, the level at chainage 48+150 will remain as existing whilst at chainage 48+440 the ground level will be raised to 189m AOD. The proposed levels are shown on the South Heath Cutting Earthworks Cross Sections Sheet 4 of 8 (Drawing No. 1MC06-CEK-TP-DSE-CS03_CL05-00014).

Drainage Ponds and Drainage Ditches

- 3.3.82 Four drainage ponds are proposed within this application, two for land and two for track drainage. This is less than originally proposed in the HS2 Phase 1 ES due to design development and additional survey data allowing the catchments to be optimised.
- 3.3.83 The location of the proposed drainage ponds and drainage ditches is shown on the South Heath Cutting General Arrangement Plan – For Approval Sheets 1 and 2 (Drawing Nos. 1MC06-CEK-TP-DGA-CS03_CL05-000016 and 1MC06-CEK-TP-DGA-CS03_CL05-000017).
- 3.3.84 Ponds 1 and 2 attenuate track drainage from South Heath Cutting before discharging to ground through infiltration.
- 3.3.85 Pond 3 attenuates land drainage and run-off from the east of HS2 as well as the landscape bunds to the south of the portal. This pond discharges to ground through infiltration.
- 3.3.86 Pond 4 attenuates run-off from land to the east of HS2 which is then discharged through Havenfield Wood Drop Inlet Culvert to the dry valley to the west of HS2.
- 3.3.87 The details of the drainage ponds are shown on the South Heath Cutting Pond Details and Sections Sheet 1 and Sheet 1 (Drawing Nos. 1MC06-CEK-TP-DDE-CS03_CL05-000033 and 1MC06-CEK-TP-DDE-CS03_CL05-000033). These drawings are submitted for approval. Approximate details of the ponds are shown in **Table 3** below.

Table 4: Pond Details

Pond Reference	Purpose	Maximum Pond Depth (m)	Pond Width (m)	Pond Length (m)	Slope Gradient
Pond 1	Track Drainage	5m	60m	110m	1:4
Pond 2	Track Drainage	4m	60m	65m	1:5 / 1:25
Pond 3	Land Drainage	4m	60m	90m	1:4/1.5
Pond 4	Land Drainage	2m	55m	100m	1:5/1.7

- 3.3.88 Two additional ponds are required to the north of Leather Lane, but these are not included within this package and will form part of the separate Schedule 17 application being submitted for the works at and surrounding Leather Lane.

- 3.3.89 The ponds have been designed to reduce their appearance in the landscape by minimising their size and through the introduction of new grassland wildflower meadow planting to integrate them into the landscape.
- 3.3.90 All the ponds have been designed to contain the 100 year rainfall event adjusted for predicted climate change. In addition, a minimum 300mm freeboard (i.e. the distance between the maximum water level and the top of the pond structure) is provided. Where appropriate, exceedance weirs have been provided that in the event of a blockage or a storm greater than the design event, diffused flows will discharge over the weir downhill of the HS2 alignment. Although these flows will be infrequent, they will be managed to not exacerbate any existing downstream flooding condition.
- 3.3.91 The track drainage ponds take rainfall run-off only (clean water), which will be removed from the track surface using filter drains and catchpits (SUDs), to intercept silt and detritus. The risk posed by the surface water runoff to the groundwater is low due to the protection afforded by the layers of unsaturated soils that lie between the base of the pond and the groundwater. Accidental spillage control measures in the form of penstocks have been provided in the upstream track drainage network.
- 3.3.92 The depth of the drainage ponds is shown on the South Heath Earthworks Cross Sections Sheets 1, 2 and 4 (Drawing Nos. 1MC06-CEK-TP-DSE-CS03_CL05-000011, 1MC06-CEK-TP-DSE-CS03_CL05-000012, 1MC06-CEK-TP-DSE-CS03_CL05-000014).
- 3.3.93 The drainage ditches are proposed along the east and wide side of the HS2 line. The drainage ditches will contain or catch water run-off from the higher ground. The drainage ditches will be open ditches that will range from 2m to 7m wide at ground level and a maximum 1.4m depth. The drainage ditches will have side slopes that range from 1 in 1 to 1 in 2 gradient. The size of each ditch will depend on topography and drainage capacity requirements.
- 3.3.94 Further information on the drainage ponds and drainage ditches is shown on the South Heath Drainage Plan (Drawing No. 1MC06-CEK-TP-DPL-CS03_CL05-000089 and 1MC06-CEK-TP-DPL-CS03_CL05-000090). This drawing is submitted for information only. A Drainage Demonstration Report has also been submitted for information only, this document provides further detail regarding the drainage strategy.

Works Not For Approval

- 3.3.95 This submission does not include for approval details of the Chiltern Tunnel North Portal or the associated North Portal Building and Compound. These elements will be submitted under a separate future Schedule 17 submission by the Align Joint Venture. As set out above, only the earthworks associated with the Chiltern Tunnel North Portal and Compound form part of this submission.
- 3.3.96 Leather Lane Overbridge and works in the surrounding area are required. These works do not form part of this application and will be the subject of a separate Schedule 17 submission.
- 3.3.97 The maintenance accesses and parking bays that do not require approval because no earthworks are required are shown indicatively on the South Heath Cutting General

Arrangement Plan – For Information Sheets 1 and 2 (Drawing Nos. 1MC06-CEK-TP-DGA-CS03_CL05-000018 and 1MC06-CEK-TP-DGA-CS03_CL05-000019).

- 3.3.98 There will be a 3.0m wide grassed maintenance access strip around the drainage ponds to allow for inspection or maintenance either on foot or by an all-terrain vehicle.
- 3.3.99 The parking bays in the vicinity of the drainage ponds are required to accommodate one tanker (17m x 3m) and two long-wheelbase vans (2 x 4.8m x 2.4m).
- 3.3.100 The finishes for the access tracks are not for approval under this Schedule 17 Plans and Specifications application. The typical construction for the access tracks will be 3.5m wide unbound stone surface. The typical construction details for the access tracks (and roads) are shown in Appendix 1.
- 3.3.101 The HS2 Act includes Scheduled Work No. 2/18C: *An access road commencing at a point 550 metres south-west of the junction of Frith Hill with King's Lane and terminating at a point 350 metres north-west of that junction.* This Scheduled Work will not be implemented as it is no longer deemed a necessary requirement following further design development.
- 3.3.102 As stated at paragraph 3.375 a new section of footpath is proposed to connect the realigned route of footpath GMI/13/3 to Frith Hill as agreed under an Undertaking and Assurance (U&A) (Reference 1964). The footpath will be constructed 'at grade' without the need for any earthworks. The footpath is not a Scheduled Work.
- Footpath GMI/2/1 has been realigned to the north of the HS2 line. The original proposed alignment for this path followed the top of the cutting slope. However, discussions with the LPA have resulted in the relocation of the footpath to the bottom of the slope as agreed under U&A 1965. There are no earthworks associated with the realigned route and the footpath is not a Scheduled Work.
- Related Submissions for Adjacent Works**
- 3.3.103 Additional Schedule 17 approvals will be sought for the proposed works that fall outside of the site. The 'other part of' South Heath Cutting will be the subject of a separate Schedule 17 submission.
- 3.3.104 Schedule 4 approvals will be sought for interferences with PRowS and formation of new highway accesses.
- 3.3.105 Schedule 33, Part 5 approvals will be sought for the permanent works, temporary works and discharges associated with the track and land drainage ponds.
- 3.3.106 The proposed related consents are set out in Section 7 of this Written Statement.

3.4 Indicative Mitigation

- 3.4.1 This section describes the indicative mitigation and enhancement proposals that have been submitted for consultation purposes in parallel with this Schedule 17 application and in accordance with paragraph 7.5.2 of the HS2 Phase 1 Planning Memorandum and Planning Forum Note (PFN) 10 ([Link to PFN10](#)).

- 3.4.2 Plans and Specifications consent under Schedule 17 of the HS2 Act is sought for the works listed in Table 1 of this Written Statement. Some mitigation (i.e. landscape bunds and noise barriers) is covered by Plans and Specifications and are submitted for approval. Other 'indicative mitigation' planting elements will form part of Schedule 17 Bringing Into Use (BIU) application under Paragraph 9 of Part 1 of Schedule 17 of the Act that will be made towards the end of the HS2 scheme construction on completion of the Schedule 1 Works. This will give the LPA an opportunity to agree that there are no reasonably practicable measures that need to be taken to mitigate the railway, in addition to those it has approved, or are detailed at that BIU application stage.
- 3.4.3 The Planning Memorandum (paragraph 7.5.2) states: 'When designs of HS2 works are submitted for approval, the nominated undertaker shall, where reasonably necessary for the proper consideration of the design proposed, provide an indication or outline of the appropriate mitigation measures (if any) which it intends to submit subsequently under paragraphs 9 or 12 of the Planning Conditions Schedule....' and '.....While not material to approvals under paragraph 2 or 3, this information will provide reassurance in advance of the request for approval under paragraph 9 that the mitigation is appropriate, and will present an opportunity to raise concerns.'
- 3.4.4 Details of the indicative mitigation and enhancement proposals submitted for consultation in accordance with paragraph 7.5.2 of the Planning Memorandum are shown on the Planting Plans and are the subject of a separate consultation (Letter Ref. 1MC06-CEK-TP-APP-CS03_CL05-000004).
- 3.4.5 Details of the indicative mitigation relevant to the design proposed in this application are shown on the following drawings and are described below. These drawings are submitted for information only.
- South Heath Cutting Landscape Planting Plan (Sheet 1 of 2) - 1MC06-CEK-TP-DPL-CS03_CL05-000030
 - South Heath Cutting Landscape Planting Plan (Sheet 2 of 2) - 1MC06-CEK-TP-DPL-CS03_CL05-000031
 - South Heath Cutting Planting Plan (Woodland and Hedgerows) (Sheet 1 of 2) - 1MC06-CEK-TP-DPL-CS03_CL05-000040
 - South Heath Cutting Planting Plan (Woodland and Hedgerows) (Sheet 2 of 2) - 1MC06-CEK-TP-DPL-CS03_CL05-000041
 - South Heath Cutting Planting Plan (Grassland) (Sheet 1 of 2) - 1MC06-CEK-TP-DPL-CS03_CL05-000042
 - South Heath Cutting Planting Plan (Grassland) (Sheet 2 of 2) - 1MC06-CEK-TP-DPL-CS03_CL05-000043
 - South Heath Cutting Environmental Masterplan Key Plan - 1MC06-CEK-TP-DPL-CS03_CL05-000044

- South Heath Cutting Environmental Masterplan (Sheet 1 of 2) - 1MC06-CEK-TP-DPL-CS03_CL05000045
- South Heath Cutting Environmental Masterplan (Sheet 2 of 2) - 1MC06-CEK-TP-DPL-CS03_CL05-000046

3.4.6 Details of planting and soft landscaping do not require approval of Plans and Specifications under paragraphs 2 or 3 of Schedule 17.

3.4.7 The mitigation will comprise part of the overall mitigation scheme in relation to the Scheduled Works listed in section 3.2 above.

Landscape

3.4.8 The landscape proposals have been developed in regard to the Lee and Buckland Common Undulating Plateau LCA within which the site is mainly located, Misbourne Upper Chalk River Valley LCA of which a small area of the site is located and Hyde Heath North LCA which the site is adjacent to in the south, as shown on the South Heath Cutting Landscape Context Plan (Drawing No. 1MC06-CEK-TP-DPL-CS03_CL05-000037).

3.4.9 The landscape design within the Chilterns has been informed by the Chilterns AONB Forum Group Detail Design Principles document and in discussion with Chilterns District Council, Aylesbury Vale District Council and Natural England.

3.4.10 This landscape falls within the nationally designated Chilterns Area of Outstanding Natural Beauty (AONB). This is a diverse chalk downland landscape with a strong sense of place and community. Its most notable feature is the extensively wooded north-west facing escarpment and associated broad sweeping views over the adjacent Aylesbury Vale such as from the Monument on National Trust land at Combe Hill (260m AOD) and from the Ridgeway national trail at Bacombe Hill. Typically, the landscape comprises a patchwork of mixed agriculture with woodland, set within hedged boundaries. Arable farming is concentrated on deep, well drained soils of the Upper Misbourne valley, a typical chalk downland dry valley, and along the scarp foot and foothills in the north. Wendover, an historic spring line nucleated settlement, featuring historic buildings, and dates back to medieval times, sits in a natural break or gap in the scarp at the head of the Upper Misbourne valley, which provides an important major north south road and rail route. There are extensive rights of way; which include the ancient Ridgeway national trail and Icknield Way Trail. Other local paths include Chiltern Way and Aylesbury Ring. Above the valley floors, undulating terrain and extensive clay-with-flint soils give rise to a diversity of land management practices including mixed farming, woodland, including blocks of ancient woodland at Jenkins Wood and Jones Hill Wood and common land. Settlement on the plateau is characterised by dispersed farmsteads and villages, linked by historic, small-scale routes such as Kings Lane and includes sunken lanes (holloways) such as Leather Lane and Bowood Lane.

3.4.11 There are two main landscape design considerations in respect of this area; the first and overriding approach is to conserve this high value sensitive chalk downland landscape and adopt a landscape design approach that creates significant screening and integration of the alignment of HS2. Through a collaborative design rationale to create a landscape which respects the local

highly valued distinctiveness of this place, its tranquillity, historic landscape and biodiversity links, and helps set the Chiltern Tunnel North Portal into the landscape and which fits with the local amenity. This approach applies to the north of GMI/12 footbridge.

- 3.4.12 To the south of GMI/12, the Chiltern Tunnel north portal is subject to a landscape design approach which is designed to frame the rail tunnel portal emerging from the backwall of the cutting which is 16m in height at the exit point immediately above the portal. Visible from only two locations, GMI/12 and from Footpath GM1/13 to the east of the cutting 500m and 320m from the portal entrance respectively, these views of the cutting 'are framed to the east, west and above the HS2 line by engineered cuttings at 1 in 3 to 1 in 4 gradients above the HS2 line. To the west of the HS2 line the access road to the tunnel portal building bisects the continuation of the west cutting and a further cutting to the west of the access track. The highest point of these cuttings is 20m above the level of the HS2 line at the portal entrance. The engineered cutting slopes will be planted with a grass sward which will reinforce the 'sheer' engineered cutting planes and the drama of this space will be accentuated through light and shade and the emergence of a high-speed train from the portal.
- 3.4.13 To the east of the HS2 line the strongest feature of the cutting 'skyline' will be Jenkins Wood, an area of ancient woodland. To form a strong backdrop to the cutting, the area immediately south and west of Bury Farm, a further woodland area will be planted around the crest of the embankment above the headwall of the portal. This will wrap around the earthworks crest to the west towards the portal building on the west of the HS2 line. Where the pylon cables pass over the tunnel embankment from north west to south east the planting species will include a native shrub mix so as not to interfere with the cables and to maintain the continuity of woodland / woodland edge cover. Beyond the crest of the earthwork above the tunnel portal Footpath GMI,13 will be diverted to the south of the tunnel portal. This route is accompanied by further woodland and woodland edge planting and the route will be screened from South Heath Cutting with earthworks and planting to the north of the re-routed path.
- 3.4.14 The Schedule 17 planting design within the Chilterns AONB area is set out on the South Heath Cutting Landscape Planting Plan Drawings Sheets 1 and 2 (Drawing Nos. 1MC06-CEK-TP-DPL-CS03_CL05-000030 and 1MC06-CEK-TP-DPL-CS03_CL05-000031).
- 3.4.15 The landscape planting approach for the site within the Chiltern AONB reflects the varying nature of the vegetation pattern within the local character area. The planting design introduces new woodland blocks to tie into the historic Lee and Buckland Common Undulating Plateau LCA pattern of ridgeline woodland and associated field boundary and lane side hedgerows. Some of the woodland blocks form part of the advanced planting works being undertaken by a separate contract. The detail of the advanced planting works will be submitted during the 'BIU' application. Pockets of line side vegetation have been introduced within the upper slopes of the cutting to help break up the linear, unnatural appearance of the vegetation along the top of the South Heath Cutting slope. Hedgerows are introduced to two fields to the west of the HS2 line which reinforce the field pattern and with accompanying wildflower meadow planting make biodiversity connection with the pond between chainage 47+ 680 and 47+760.

- 3.4.16 The landscape design will reinforce green infrastructure through linear planting, field boundary and lane side / Holloway hedgerows and wildflower field margins to provide connectivity across and along the route by tying into the scheme infrastructure overbridges, drainage culverts and the Chiltern Tunnel, and to link up with the new drainage infrastructure, balancing and infiltration ponds.
- 3.4.17 The new landforms to help visually screen and to set HS2 into the landscape would be designed to mimic the natural ground profiles of the adjacent slopes and to return much of the land back to agriculture. New hedgerows reinforced with shrub and high canopy species such as hawthorn and field maple would be planted to retain the scale and size of the historic field pattern. The most visible landscape earthworks assets within this area are South Heath Cutting and the embankment associated with the Chiltern Tunnel North Portal within the undulating lower slopes of the Lee and Buckland Common Undulating Plateau LCA within the low undulating foothills of the important scarp slope.
- 3.4.18 The significant features of the landscape such as the affected ancient sunken lanes at Leather Lane and Bowood Lane, would be retained as far as practically possible and the scale and character of the new realigned sections of these lanes would be kept as intimate and as rural as possible. This will be achieved through careful attention to levels and planting detail and coordinated across design disciplines to create a sustainable design outcome.

Ecology

- 3.4.19 Three Ecological Mitigation Sites will be created within the site as described below:
- Site 1 at Stocking's Wood (Chainage 47+600 to 47+800) will comprise of approximately 1.76ha semi-natural broadleaved woodland with two ponds and one hibernacula adjacent to Stocking's Wood.
 - Site 2 at Havenfield Wood (Chainage 47+950 to 48+100) will comprise of approximately 0.47ha semi-natural broadleaved woodland, approximately 2.84ha species-rich neutral grassland, two ponds, and habitat features suitable for amphibians and reptiles, including two hibernacula.
 - Site 3 at Havenfield Wood/Footpath GMI/2 (Chainage 48+200 to 48+500) will comprise of approximately 1.48ha of semi natural broadleaved woodland and woodland edge planting and 275m species-rich hedgerow adjacent to Havenfield Wood/Footpath GMI/2 Accommodation Overbridge.
- 3.4.20 The locations of the Ecological Mitigation Sites are shown on the South Heath Cutting Environmental Masterplan Sheets 1 and 2 (Drawings Nos. 1MC06-CEK-TP-DPL-CS03_CL05-0000450000465 and 1MC06-CEK-TP-DPL-CS03_CL05-000045000046).
- 3.4.21 Tree and shrub planting on the embankments to Havenfield Wood/Footpath GIM/2 Accommodation Overbridge will link the existing and proposed new woodland on either side of the route. The planting will be designed to encourage bats to fly at a safe height over the Proposed Scheme, thus reducing any severance created during construction. It will connect the locally available foraging habitat for bats on either side of the route.

- 3.4.22 Tree and shrub planting across the top of South Heath Tunnel Portal will link Jenkin's Wood, Stocking's Wood and Havenfield Wood.
- 3.4.23 Other habitat will be created primarily for landscape screening or compensation. It is likely that these measures will indirectly provide ecological benefits, for example foraging and sheltering opportunities for wildlife.
- 3.4.24 New hedgerow creation will be undertaken and connected habitat will be provided in the landscape scheme to compensate for losses of wildlife corridors that hedgerows provide. The species composition of the new hedgerows will be tailored to match hedgerows in the surrounding area and planting will be in accordance with the ecological principles of mitigation (HS2 Phase 1 ES Volume 5: Technical Appendices (Document Ref. Appendix CT-001-000/2) ([Link Vol 5](#))).
- 3.4.25 Mitigation measures to address the potential killing, injury and disturbance of badgers will be provided in accordance with the ecological principles of mitigation identified within the HS2 Phase 1 ES Volume 5: Technical Appendices (Document Ref. Appendix CT-001-000/2 ([Link Vol 5](#))). This will enable the provision of badger proof fencing and replacement setts where necessary. New planting within the ecological mitigation areas will benefit badgers present in those areas by improving foraging habitat and providing new opportunities for sett creation.
- 3.4.26 Habitat fragmentation affecting local bat assemblages, particularly those that commute along hedgerows and tree lines, will be mitigated through the provision of linear planting parallel to the scheme. This will provide flight lines to guide bats to safe crossing points both within and outside the site.
- 3.4.27 Construction of the scheme will involve the direct loss of bat roosts. This will be addressed by provision of replacement bat roosting habitat in accordance with the principles of mitigation as set out in ecological principles of mitigation Volume 5: Appendix CT-001-000/2 ([Link Vol 5](#)). Compensatory roosts will be located within the ecological habitat creation sites, and within suitable areas of retained vegetation beyond 50m of the railway alignment.

Noise Mitigation

- 3.4.28 The noise mitigation comprises of landscape earthworks and a noise barrier and are the only elements of mitigation that are submitted for approval as set out in Paragraph 3.3.1 to 3.3.4 above.
- 3.4.29 Scheme wide design updates have been considered in the noise modelling and are based on a track alignment which incorporates the reduction of track centres from 5.0m, as defined in the HS2 Act, to 4.7m from track centre line to centre line. By positioning the earthworks closer to the tracks, their effectiveness at screening noise has been improved.
- 3.4.30 The accompanying Noise Demonstration Report (NDR) (Document Ref: 1MC06-CEK-TP-REP-CS03_CL05-000003) demonstrates how all reasonable steps have been taken to reduce the combined airborne sound from altered roads and operational railways, predicted in all reasonably foreseeable circumstances, in order not to exceed the defined values for Lowest Observed Adverse Effect Level (LOAEL) from the HS2 Phase 1 ES.

3.4.31 Where it has not been reasonably practicable to achieve this objective, the NDR shows how airborne sound has been reduced 'As Far As is Reasonably Practicable'.

3.4.32 The NDR demonstrates that the design provides the required level of acoustic mitigation.

3.5 Construction Method

3.5.1 This section summarises the currently envisaged general construction methodology, programme, the main temporary works arrangements and other works. The arrangements described may alter and are for information and background only. They do not form part of this request for approval.

3.5.2 The works subject to this request for approval of Plans and Specifications will be undertaken in accordance with the HS2 CoCP [Link to EMR CoCP](#)) and the Class Approval issued by the Secretary of State (March 2017).

3.5.3 The temporary construction arrangements and interference with the PRowS and formation of new accesses will be the subject of a separate consent under Schedule 4 of the HS2 Act. All the other main consents likely to be required for the works are summarised in Section 7.

3.5.4 The temporary works arrangements, maintenance accesses and parking bays are shown indicatively on the South Heath Cutting General Arrangement Plan – For Information Sheets 1 and 2 (Drawing Nos. 1MC06-CEK-TP-DGA-CS03_CL05-000018 and 1MC06-CEK-TP-DGA-CS03_CL05-000019). Construction of the Proposed Scheme will utilise the South Heath Tunnel (north) Satellite Compound (Temporary Compound Area) located within the site.

3.5.5 The South Heath Tunnel (north) Satellite Compound will be used for civil engineering works north of Frith Hill to Leather Lane. The construction compound will not provide overnight worker accommodation.

3.5.6 It will be accessed via either:-

- Frith Hill, B485 Chesham Road, A413, A40 and M40 from the east; and
- the A413, A355, A40 and M40 and/or A413, B4009, A4010 and M40 and/or A413, B4009, A4010, A4129, A418 and M40 from the west.

3.5.7 Access to the Compound will be strictly controlled from a security hut that will be located at the entrance to the construction site. The security hut will be manned 24hrs a day throughout the construction period. The Compound will be monitored by 24hr CCTV surveillance and security patrols.

3.5.8

3.5.9 Demolitions will be required at one property and for one structure:

- One residential building and four associated outbuildings at one property (Mulberry Park Hill, located off Potter Row); and
- One National Grid pylon structure (ZL 434) at Frith Hill.

- 3.5.10 Closures and temporary and permanent diversions of roads and PROWs that bisect the site will be required as a result of the Proposed Scheme. These are summarised below. Schedule 4 applications will be submitted for these in line with the construction programme. Alternative routes for three of the PROWs will be required:
- Footpath GMI/13 will remain open during construction until it is permanently diverted 400m to the west over Footpath GMI/12 Overbridge adding an additional 750m;
 - A temporary alternative route for Footpath GMI/12 to the south for a period of approximately six to nine months, adding an additional 100m. It will then be permanently reinstated along its existing alignment across Footpath GMI/12 Overbridge; and
 - Footpath GMI/2 will remain open during construction. It will then be permanently diverted 200m to the west over Havenfield Wood / Footpath GMI/2 Accommodation Overbridge, adding an additional 550m.
- 3.5.11 Temporary diversion of two private accesses will be required:
- The access to Park Farm will require a temporary diversion along the diverted Footpath GMI/12 during the construction of Footpath GMI/12 Overbridge;
 - The access towards Havenfield Wood will require a temporary diversion along diverted Footpath GMI/2 during the construction of Footpath GMI/2 Accommodation Overbridge.
- 3.5.12 No watercourse diversions will be required.

3.6 Historic Environment

- 3.6.1 As set out within the HS2 Heritage Memorandum (part of the HS2 Environmental Minimum Requirements) explains that a route-wide Generic Written Scheme of Investigation: Historic Environment Research and Delivery Strategy (GWSI: HERDS) has been prepared in consultation with Historic England (HE) and the LPAs ([Link to HS2 Heritage Memorandum](#)). It sets out the research framework and general principles for design, evaluation, investigation, recording, analysis, reporting and archive deposition to be adopted for the design development and construction of HS2.
- 3.6.2 The HS2 Heritage Memorandum also sets out how the historic environment (including heritage assets and their setting) will be addressed during design. The HS2 Environmental Memorandum sets out the approach to landscape and visual mitigation which takes account of the historic environment.
- 3.6.3 In accordance with HERDS, Location Specific Written Scheme of Investigations (LSWSI) and Project Plans have been prepared and issued to Buckinghamshire County Council, now part of BC Unitary Authority.
- 3.6.4 LSWSIs set out the methodology, deliverables, programme, health, safety and environmental requirements, resources and interfaces necessary to deliver the surveys defined in the Project Plans.

- 3.6.5 The Project Plans establish the scope, aims, contribution to the GWSI: HERDS objectives, techniques, deliverables and reporting mechanism for the surveys. They also detail the results of engagement with the County Council's Archaeologist.
- 3.6.6 A LSWSI for Geophysical and Fieldwalking Surveys in Buckinghamshire was issued by HS2 to Buckinghamshire County Council (BCC) in January 2016. This document set out the strategy and methodology by which the non-intrusive surveys were carried out, including areas covered by this submission. BCC's Archaeologist was consulted on this document between August and October 2015 and comments were incorporated prior to any archaeological works being carried out.
- 3.6.7 The non-intrusive surveys took place in Spring 2016. A copy of the fieldwork report was provided to BCC's Archaeologist by HS2.
- An LSWSI for Geophysical Magnetometer Survey at South Heath Cutting, Buckinghamshire (AC100/W1) was issued by HS2 to BCC in January 2016. This LSWSI covered the sites including Park Hill, Hunt's Green, and South of Bowood Lane. This document set out the strategy and methodology by which the non-intrusive surveys were undertaken. BCC's Archaeologist was consulted on this document in early 2018 and comments were incorporated prior to any archaeological works being carried out. The non-intrusive surveys took place throughout 2018. A copy of the fieldwork report was provided to the County Council's Archaeologist by HS2.
 - An LSWSI for Trial Trench Evaluation at Stoke Mandeville Bypass, Aylesbury South Cutting, and East of Bishopstone, Aylesbury Embankment, Buckinghamshire. This document set out the strategy for intrusive works. BCC's Archaeologist was consulted on this document in 2017 and comments were incorporated prior to any archaeological works being carried out. The trial trenching began in March 2019. A copy of the fieldwork report will be provided to the BCC's Archaeologist by HS2.
- 3.6.8 Project Plans within the site (referred to below) have been issued by HS2 to BC. The Council was consulted for its initial advice and comment regarding the plans.
- A Project Plan for Geophysical Magnetometer Survey at South Heath Cutting, Buckinghamshire.
- 3.6.9 There are no additional relevant Heritage Agreements with the constraints listed above in relation to the Scheme. There are no additional built heritage assets that require demolition or would be subject to direct physical impact.
- 3.6.10 All of the Project Plans meet the site-specific objectives of the HS2 HERDS for each package of activity. The site specific objectives are outlined in HERDS.

3.7 Environmental Management During Construction

- 3.7.1 The Environmental Memorandum (part of the HS2 Environmental Minimum Requirements) sets out the arrangements for the management of environmental issues during construction and the CoCP sets out specific details and working practices that apply. The CoCP is supported by Local

Environmental Management Plans (LEMPs) which include specific measures by topic, relevant to each LPA area.

- 3.7.2 The LEMP relevant to the works subject to this Schedule 17 submission is the Chiltern and Wycombe District Council's Local Environmental Management Plan (July 2018) and can be found here ([Link to Local Environmental Management Plan](#)).
- 3.7.3 Environmental management arrangements during construction do not form part of this request for approval of Plans and Specifications under Schedule 17 and are submitted for information only.
- 3.7.4 As part of the LEMPs the Environmental Memorandum requires the preparation of site-specific management plans. These focus on mitigation, compensation, and monitoring requirements and opportunities for enhancement in relation to identified environmental topics, including nature conservation, terrestrial and aquatic ecology, water resources, geomorphology, recreation and amenity, landscape, public open space, and agricultural land.
- 3.7.5 Ecological surveys undertaken by HS2 for this application have identified the presence of the following protected species / habitats within, or near to, the site; each of which is described in further detail below:
- Great Crested Newts (GCN);
 - Bats;
 - Nesting Birds;
 - Badgers; and
 - Reptiles.

Great Crested Newts (GCN)

- 3.7.6 GCN have been recorded in three existing ponds north-west of South Heath. Two of these are within the site and one is outside the site but within 250m of the site boundary. The ponds inside the site will be lost to accommodate the construction works and the other one will be retained. Terrestrial habitat within the site boundary that may be utilised by GCNs from these three ponds will be lost to accommodate the construction works.
- 3.7.7 The loss of GCN habitat will affect the viability of the associated breeding populations and will result in an adverse effect on their conservation status. A translocation exercise will therefore be undertaken by suitably experienced and qualified ecologists working under the HS2 GCN Organisational Licence WML-OR25. Newts from the ponds to be lost and from terrestrial habitat to be lost within 250m of the three ponds will be translocated to an Ecological Receptor Site at Park Hill, in accordance with the GCN Mitigation Guidelines (Natural England, 2001). The Ecological Receptor Site has been created by HS2's Enabling Works Contractor (EWC) and is not subject to consent under this application.

Nesting Birds

- 3.7.8 Any hedgerow, woodland and other vegetation that is likely to support nesting birds and which requires clearance will be subject to inspection by a suitably experienced ecologist for nesting birds prior to its removal. Should any active bird nests be identified they will be left in situ and undisturbed until any chicks have fledged. Works within these areas will only commence once an ecologist has confirmed that any chicks have fledged and it is acceptable to proceed.

Bats

- 3.7.9 A bat assemblage was recorded using mature hedges, trees and tree-lined lanes at Leather Lane and King's Lane. The habitats were likely to be used for foraging and commuting between roosts and other foraging sites. Five species were recorded: common pipistrelle, soprano pipistrelle, *Myotis* species, noctule and serotine. The hedgerows are the only connectivity between the large areas of woodland to the east and west of the scheme.
- 3.7.10 In order to avoid the risk of causing disturbance to any bats, construction works are not planned to take place between the hours of sunset and sunrise when bats are active between the months of March and November.
- 3.7.11 Several trees within, and close to, the site have been assessed as having confirmed bat roosts or a high potential to support roosting bats, in particular scattered mature trees along hedgerows, within Jenkin's Wood and Havenfield Wood.
- 3.7.12 Any sites holding trees that require removal to accommodate the Proposed Scheme will be registered under the Bat Mitigation Class Licence WML-CL40 HS2 Phase 1 (London to West Midlands - Bats in Trees). This sets out the requirements for survey/inspection, mitigation and monitoring. This licence obviates the normal requirement to submit individual licence applications for each roost affected, provided the criteria for species/numbers are met. If not, an individual licence will be required. The class licence confirms the approach that must be adopted in all cases where there are licensable activities, based on the measures identified in Section 10 of the HS2 Ecology Technical Standards. For example, it may include the provision of artificial replacement roosts in advance of tree felling.
- 3.7.13 Bats have also been confirmed roosting within buildings at Park Farm within the site. These roosts will be lost as a result of construction of the Proposed Scheme. The loss of the roosts will be compensated by the provision of an artificial roost within a suitable retained area beyond 50m from the operational railway. The roosts will be removed under licence from Natural England, which will set out the requirements for survey/inspection, mitigation and monitoring. These works are being undertaken by the EWC and are not included as part of this application.

Badgers

- 3.7.14 Multiple badger setts of varying levels of use and importance have been identified through surveys since 2013, including a main sett [REDACTED] which would be retained. Since no main badger setts will be lost in this area, the creation of an artificial sett to compensate for the loss of badger setts will not be required within the site. The closure of any

badger setts will be undertaken in accordance with relevant best practice and under the HS2 scheme-wide organisational badger licence from Natural England (Reference WML-OR24).

- 3.7.15 In accordance with best practice, any excavations that could entrap badgers will be covered at night to prevent badgers and other animals from becoming trapped. Should this not be possible then access ramps will be provided to allow any animals to safely escape.

Reptiles

- 3.7.16 Small and medium populations of grass snake have been recorded to the west of South Heath within the site. Habitat suitable for reptiles in these areas will be cleared for the construction of the Proposed Scheme. Compensatory reptile habitat will be created in the Ecological Receptor Site at Park Hill (not subject to consent under this application) and an adjacent area of ecological habitat creation, comprising woodland, grassland, two ponds and habitat features suitable for grass snake, including hibernacula. This will provide a receptor sites for the reptile populations to the west of South Heath, as well as other reptile populations identified outside of the site.
- 3.7.17 Prior to the commencement of construction works, any reptiles present within the site would be relocated by suitably experienced ecologists to the Ecological Receptor Site at Park Hill. The translocation exercise would be undertaken in accordance with the Herpetofauna Workers' Manual published by the Joint Nature Conservation Committee Guidelines (Gent and Gibson, 2003).

4 Design Approach and Rationale

4.1 Introduction

4.1.1 This section outlines the design criteria and design rationale.

4.2 Design Rationale

4.2.1 The purpose of this application is to allow HS2 to pass beneath access routes and to screen the HS2 line in views by dropping it into a cutting, and to maintain access cross the HS2 line via the Overbridges. The Proposed Scheme put forward for Schedule 17 approval accords with this design rationale.

4.2.2 The design rationale that has informed the design of the Proposed Scheme includes:

1. Providing a sympathetic development that respects the landscape and ecological elements of the site and the wider landscape context;
2. Retaining and protecting as much existing vegetation as possible;
3. Retaining and protecting existing hedgerows, field patterns and fence lines, where possible, to reduce any potential negative impacts for navigating bats;
4. Minimising disruption during construction of the site and site delivery of materials through the surrounding area and settlements;
5. To avoid or reduce the adverse effects of the Proposed Scheme, such as airborne noise effects;
6. Integrating HS2 viaducts and associated assets;
7. Integrating HS2 earthworks cutting and associated assets including security fencing; and
8. Integrating and or screening HS2 earthworks embankments and associated assets, including security fencing.
9. Potential for greater biodiversity links and habitat creation.

4.3 Design Constraints

4.3.1 The general constraints and drivers which have informed the design of the Proposed Scheme include:-

- Accordance with the HS2 Design Vision, Landscape Design and the technical requirements set out in the HS2 Design Panel Handbook and HS2 Bridge Design Guide.
- Compliance with the CoCP (London-West Midlands Environmental Statement - Environmental Minimum Requirements - Annex 1: Code of Construction Practice) (February 2017) ([Link to EMR CoCP](#)) and HS2 Phase 1 ES;
- That all the works are contained within the Limits of Deviation (LoD) and Limits of Land to be Acquired or Used (LLAU);

- Compliance with all terms and conditions set out in the route wide GCN licence, granted by Natural England and held by HS2 Ltd;
- Providing safe access to the site for construction traffic;
- The 120-year design life required for all structures on HS2 provides a further constraint on appropriate bridge forms. Design life has a direct bearing on the suitability of materials in respect of their durability through weathering and/or corrosion and an impact on structural size and form with respect to material fatigue.
- Compliance with the design rationale for the CDEs. The parapets are CDEs being developed and reviewed with the main works contractors and Design Panel. Parapets have now been formally approved by the Planning Forum. The design for the CDEs follows what has been agreed as the CDE design approach.

4.4 Design Criteria and Rationale for Structures

- 4.4.1 Consideration has been given to the HS2 Efficiency Challenge Programme. This is where HS2 challenges contractors and designers to increase the efficiency of necessary works, and the design and construction process. Through early engagement in the design process, the Design for Manufacturer Assembly (DfMA) approach, where applicable, allowed construction and engineering challenges to be addressed. The DfMA is a design approach that focuses on ease of manufacture and efficiency of assembly.
- 4.4.2 The DfMA design approach adds benefits to the quality and durability of the structures, as the repetition and standardisation of offsite construction lead to improved and more efficient construction methods which reduce the risk of errors and poor-quality construction.
- 4.4.3 The DfMA design approach reduces the construction period and time spent onsite, therefore reducing impact on the public and stakeholders during the construction period.
- 4.4.4 The general principles of DfMA design are:
- Standardisation of components;
 - Reducing man-hours on site;
 - Product led delivery;
 - Contractor input from the start of design;
 - Increased construction efficiency and less wastage;
 - Producing workable details which are repeatable and less subject to error;
 - Collaborative Design integrating all Stakeholders at an early stage.
- 4.4.1 The overall structural form and detailing of the bridges, which includes viaducts has been developed to meet best practice design principles in line with the examples of what is acceptable in the HS2 Bridge Design Guide and complies with the HS2 Design Vision as explained below.
- 4.4.2 All the bridges align with the design rationale for CDEs being developed and reviewed with the main works contractors and Design Panel. Typical CDE are rail overbridge parapets, viaduct piers

and noise barriers. CDE are the normal starting point for determining the design of HS2 works as they support efficiencies in design and construction, have been through a consultation process in terms of appearance and comply with HS2's goal of ensuring the HS2 infrastructure is easily recognisable as a brand.

- 4.4.3 In respect of the design of bridges and other civil engineering structures the HS2 Design Vision principles demand elegant, site specific and durable structures that will continue to perform and look good over the long term. These requirements are further detailed by the HS2 Design Handbook and HS2 Bridge Design Guide that call for:

4.5 Design Approach

- 4.5.1 This submission includes two overbridges associated with HS2: the Havenfield Wood/Footpath GMI/2 Accommodation Overbridge and the Footpath GMI/12 Overbridge.

- 4.5.2 In respect of the design of the Overbridges and other civil engineering structures the HS2 Design Vision principles demand elegant, site specific and durable structures that will continue to perform and look good over the long term. These requirements are further detailed in the HS2 Design Panel Handbook and HS2 Bridge Design Guide. The HS2 Bridge Design Guide calls for:

- Each structure shall be elegant, with a consistent design language used – but standard parts should not simply be repeated;
- Simplicity is encouraged, but not crudity. Simplicity is seen as refinement, taking time and effort, it is not a lack of detail or articulation;
- Bridge design should not rely on colour but may be enhanced by it. Self-finished materials are strongly preferred;
- Families of bridge types, and their requirements, should be defined. Each family should have model designs with considerable flexibility for variation;
- Facilities for maintenance shall be discretely integrated, not after thoughts;
- Functional lighting (or a decision to use no lighting) shall be considered at the outset and discretely coordinated with the structure.

- 4.5.3 The overbridge designs have been developed after consideration of the span requirement, the topography and the skew angle of the crossing relative to the HS2 line.

- 4.5.4 The development of the design of these bridges has benefited from extensive and detailed pre-application consultation with Buckinghamshire Council Officers and their specialist landscape advisors. Areas of particular focus include:

- The integration of the abutments and bridge ends into the landscape and highway approaches;
- The coordination and rationalisation of maintenance access; and
- The incorporation of green verges and patterning to the parapets.

- 4.5.5 In each instance the design has been modified to include measures and design features arrived at through the consultation.
- 4.5.6 The parapets on the overbridges reflect the CDE design adopted across the MWCC packages. All the overbridges crossing HS2 provide a very high level of vehicle containment. The safety barrier on the approaches to the overbridges has been designed to provide the required level of safe containment.

GMI/2 Accommodation Overbridge

- 4.4.4 This overbridge can be best understood as belonging to a sequence of five bridge structures spanning the South Heath Cutting between the North Portal of the Chiltern Tunnel to the south and Bowood Lane to the north. Each bridge has unique requirements in terms of horizontal and vertical alignment, cutting width, carriageway provision and landscape tie ins. Nevertheless, and given their proximity to one another, a collective approach has been taken with their design.
- 4.4.5 The principal objective with the design of these structures has been to minimise the apparent number of components in their design. This approach follows the philosophy of railway structures designed and built in previous eras where overbridge form is the direct result of structural requirements and appropriate construction methods combined with an honest expression of materials and minimal if any superficial ornamentation. Whether constructed of masonry, brick or concrete the most successful railway structures are marked by visual simplicity and a lack of clutter.
- 4.4.6 Key to this approach is the refinement of key details and a focus on junctions in the design. The design of each of these bridges pays special regard to the pier to deck connection and the use of the parapet as a unifying element that is visually emphasised in the external elevation.
- 4.4.7 By combining bridge piers and crossbeams into single compositions the usual distinction between these elements has been avoided in this design. Instead, the form of the pier ties in directly with the form of the crosshead and in so doing visually connects with the underside of the deck behind the parapet. As a result, the combined pier/crosshead stands proud of the primary deck beams, allowing the controlled, faceted form to be the key component in the appearance of the below deck structure.
- 4.4.8 Above the deck, at the outer edges of the structure, the parapets follow the alignment of the carriageway and/or footpath surface. As such, and although the primary structural beams follow a straight alignment, the overall elevation of these bridges describes a shallow arc across the cutting.
- 4.4.9 The design of the bridge parapets is in accordance with the Common Design Element approved by the HS2 Planning Forum in November 2020. In consideration of the designated landscape setting the internal vertical face of the parapets will be subtly textured through the inclusion of high-quality polyurethane form liners in the casting process. The proposed pattern will run continuously across the internal elevation of the parapets.

- 4.4.10 Bridge abutments are set inboard of parapet line with the parapet modules extending beyond the ends of wingwalls to locate the connection with approach Vehicle Restraint Systems beyond the top of the cutting.
- 4.4.11 Maintenance access has been carefully integrated into the slope of the earthworks, with the leading edges of the stairways situated beneath the face of the slope. The stairways therefore do not interrupt longitudinal views of the cutting, instead they are set into the landform with only minimally detailed flat bar handrails standing proud of the surface.
- 4.4.12 The security fences which run along the east and west crests of the cutting tie into bridge ends at the abutments. In all instances the location of the tie-in is located such that the top line of the fence is lower than the top line of the bridge parapet.

GMI/12 Overbridge

- 4.4.13 Spanning the South Heath Cutting at its widest point approximately 0.5km to the north of the Chiltern Tunnel Portal, this bridge is a distinctive three span structure formed primarily in exposed weathering steel. The design is a carefully composed and detailed warren truss: an efficient and well understood structural approach that in this case has been developed with a close appreciation of detail, material quality and visual transparency.
- 4.4.14 The key considerations of user safety and structural efficiency coincide in this design: the cross sectional height of the truss has been determined in response to the requirements for bridge user protection and containment. With the truss structure predominantly located above deck level also forming the containment provision the overall height of the bridge, and hence impact on the wider landscape, has been minimised. Minimising the structural height in this way leads in turn to a maximum span of just over 40m, resulting in a three span bridge to achieve the necessary 100m length with support piers either side of the main central span over HS2.
- 4.4.15 The truss members are formed from weathering steel plates that are each turned away at an angle from the horizontal (in the case of the top and bottom chords) or from the vertical (in the case of the diagonal members). The purpose of arranging the primary structural members in this way is to emphasise the effects of light and shadow on the structure and present alternately very thin and comparatively broad faces to the viewer.
- 4.4.16 Consideration for the bridge user continues into the design of the structure in detail. In cross section, the overall configuration of the truss is splayed upwards and outwards such that the space defined by the structure widens towards the sky. In long elevation the requirement for solid containment above the deck is located above and to the sides of the HS2 tracks. The centre span therefore has a predominantly solid parapet, formed in weathering steel on the outside face but overclad with oak linings on the inside face. The use of oak provides a higher quality and more attractive environment to the bridge user while also relating the bridge back to its rural setting. In a similar manner the deck surface will be finished with resin bonded aggregate to match the local gravel material of the approach footpaths. Beyond the central high containment zone and on the approach spans either side of HS2 the opportunity for a more transparent parapet has led to the proposed use of stainless steel mesh as the infill material. This high quality material is durable and easily maintained while also providing good outward

visibility for bridge users, eliminating the oppressive sense of confinement that can often be experienced on railway and highway overbridges.

- 4.4.17 At the ends of the bridge the cross sectional form of the truss is continued beyond the abutments with parallelogram shaped 'cheek walls' that bookend the structure and provide neat tying in points with the security fences that run along the top edge of the cutting. The cheek walls screen views of the fencing and maintenance access stairways to the bearing inspection chambers beneath the deck.
- 4.4.18 The abutments are formed from concrete with rebates at the deck connection to distinguish the supporting and spanning elements of the structure. The abutments are set into the cutting slopes and located below deck level such that the bridge appears to 'spring' from the landscape. The intermediate piers are located either side of the HS2 line and support the structure at the connection points between the central solid portion of the bridge and the more transparent approaches either side. The cylindrical piers are formed from weathering steel to match the truss finish above and have been engineered to provide a slender and understated supporting structure for the bridge. The crossbeams are also formed from weathering steel and have been developed to create a simple and diminutive connection between the piers and bridge deck.
- 4.4.19 The exposed steel will weather over time to the characteristic dark russet finish of exposed weathering steel. Alongside the installation and maintenance benefits of weathering steel, the colouration; and in time progressively duller finish; provides an earthy and appropriately rural undertone to the bridge architecture. When viewed from a distance the matt finish of the steel will also appear similar in tone to the background landscape
- 4.4.20 The Landscape Proposals have been developed to blend the landscape mitigation earthworks in with existing contours so that they fit the landscape, to minimise disruption to important screen vegetation and to help integrate and screen HS2 and its associated assets.
- 4.4.21 Hedgerow, woodland edge and woodland is used to help integrate and or screen overtime the line of the engineered earthworks and structures north of GMI/12 along with other HS2 assets such as access or drainage ponds.
- 4.4.22 Existing vegetation which provides amenity and or biodiversity connectivity as well as helping to integrate new HS2 assets such as accesses or drainage ponds has been retained where practical to do so.

4.6 Options Considered

- 4.6.1 This section provides a summary of how the Proposed Scheme has been developed in accordance with the HS2 Design Vision, setting-out the approach to the scheme design and a justification for the scheme proposals.
- 4.6.2 Prior to the submission of the application, a series of pre-application meetings have been held with CDC and BC, largely focussed on the design aspects of the Proposed Scheme. A summary of the pre-submission engagement undertaken with the Council, as well as Natural England and Historic England is set-out in Table 3 and 4 of Section 5. Details of these discussions and revisions to the scheme design arising from these discussions are summarised in the paragraphs below.

However, where it has not been possible to incorporate changes to the scheme design from the pre-application discussions an explanation for this is also provided.

- 4.6.3 The design of the vehicle restraint systems alongside highway verges has been optimised such that the vehicle restraint barriers are only detailed where necessary and are set back as far as possible from the carriageway, subject to the technical constraints, in order that they are less visually intrusive. Where possible planting is shown behind the barrier to mask the overall appearance of the barrier.
- 4.6.4 As discussed previously, maintenance access stairways have been set into cutting slopes in response to comments from Officers. Handrails for all maintenance access stairways and galleries/platforms are to be fabricated from flat bar galvanised steel to ensure a clean minimalist aesthetic. Key clamp type handrailing is not proposed for South Heath as a result of these discussions.
- 4.6.5 In response to Officers requests green verges and patterned parapet inner faces have been provided on all bridges in South Heath with the exception of GMI/12 which is of a unique and more compact structural form. A green verge is provided on the wider verge. The narrower verge will have an asphalt surface due to structural constraints.
- 4.6.6 GMI/2 Accommodation Overbridge comprises a two span structure formed using steel beams and a reinforced concrete deck which is integral with the pier and abutments. Due to the significantly sloping ground, a three span structure was not considered appropriate and the main span is too long to allow precast concrete beams to be delivered to site. The verges on this bridge will also support vegetation in order that the structure fits with its setting.
- 4.6.7 Footpath GMI/12 Overbridge comprises a three span structure stretching between the crest of the cutting to the east and west. Initial proposals for GMI/12 presented to Officers were based on an alternative concept with a longer central span, and a commensurately taller truss structure. In terms of the user experience these proposals did not discriminate between approach spans and the area of increased containment over the railway. The landscape impact and undifferentiated user experience of this earlier design was noted and through a sequence of pre-app engagements in 2020 a revised concept was developed in close consultation with Officers. Feedback received on the revised concept was incorporated in full into the proposal in the submission including (but not limited to) the use of deck treatments sympathetic to local footpaths; oak internal facings; maximising transparency in the structure (where permissible).
- 4.6.8 In response to pre-application comments, the footbridge design has been developed to provide a slender structure that minimises visual impact above the surrounding landform. The width of deck has been increased to 2.5m to provide an open aspect for pedestrians and the solid side cladding has been reduced outside of the railway envelope and replaced with mesh, which will allow views of the railway below. Oak cladding on the inside face is proposed following ongoing discussions with BC since 2018. At the ends of the bridge, the parapets have been extended to over sail the cutting in order to reinforce the setting of the structure.
- 4.6.9 At all the overbridges, the security fencing has been located to tie in with the bridge parapets whilst not protruding above the parapets. In addition, the maintenance access to the abutments

and HS2 trackside has been coordinated with the security fence thereby addressing comments about clutter. Security fencing around drainage ponds has been rationalised or avoided to reduce the visual impact on the landscape by aligning the fencing so that it is integrated with existing or proposed field boundaries or structures or by departing from the standard for fencing around the ponds to stock proof fencing instead of Type 2 security fencing.

- 4.6.10 Fencing to track drainage ponds will comprise stock proof fencing. The fencing will align where possible with other fencing such as highway or other boundary fencing. Fencing to ponds will in most situations be associated with a perimeter hedgerow or screen planting.
- 4.6.11 Proposals have been adapted to emphasise the 'theatre' of a high speed train emerging from the north tunnel portal, deep in South Heath Cutting. This approach has been developed in consultation with the Local Planning Authority. The engineered cutting slopes will be planted with wildflower grass sward and infrastructure grass sward mixes which will reflect the consistent graded cut slope angles and variation will be generated from light, shade and the ripple of the breeze through the grass sward.
- 4.6.12 Proposed woodland and woodland edge planting will enclose the tunnel portal around the rim of the cutting that will form a continuous frame above the cutting, reinforcing the ancient woodland presence of Jenkins Wood. This continuous belt of planting will wrap around from the east, south and to the west sides of HS2 to the top of the spur above the portal building and will be repeated to the top of the cutting to the west of the portal access road which will enclose and emphasise the drama of the cutting.
- 4.6.13 To connect fauna and flora to the wider landscape setting and to the west of the HS2 line there is a further ecological corridor linked to the crest of South Heath Cutting via a proposed field hedgerow which connects to a woodland planted area lower down the slope towards the A413.
- 4.6.14 To the north of GMI/12 the approach to the landscape design has been developed, with the LPA to conserve and reinstate the existing landscape character to integrate HS2 into the landscape context of the AONB. Existing vegetation which provides amenity and or biodiversity connectivity as well as helping to integrate new HS2 assets such as accesses or drainage ponds has been retained where practical to do so. In particular the connectivity from the ancient woodland of Jenkins Wood is reinforced to the north and south through the introduction of proposed woodland and hedgerows.
- 4.6.15 One land drainage pond associated with South Heath Cutting (east side) has been split into two ponds in order to have a better fit with the landscape.
- 4.6.16 Where it is likely that vegetation under a structure i.e. a viaduct will not establish due to lack of light and rain penetration, a central level bound stone surface is proposed. The extent of the stone strip will be off set 3m from the parapet edge to maximise the establishment of vegetation under the structure. It is anticipated that the edges of the stone strip will over time be softened as vegetation, through natural colonisation finds its own limits.
- 4.6.17 Acoustic mitigation in the form of a 3m high noise barrier at the top of the cutting between Jenkin's Wood and Footpath GMI/12 Overbridge, as opposed to a taller earth bund has been provided in response to BC Officer's recommendations. The barrier, which will also provide the

security line, is considered to have less visual impact and will be screened by planting on both sides.

- 4.6.18 As stated previously a new section of footpath is proposed to connect the realigned route of footpath GMI/13/3 to Frith Hill as agreed under an Undertaking and Assurance (U&A) Reference 1964.
- 4.6.19 Footpath GMI/2/1 has been realigned to the north of the HS2 line. The original proposed alignment for this path followed the top of the cutting slope. However, discussions with the LPA have resulted in the relocation of the footpath to the bottom of the slope as agreed under U&A Reference 1965. The purpose of relocating the footpath is to provide visual screening of the HS2 line for users of the PRow.

4.7 Landscape Design Vision

- 4.7.1 The landscape design vision for the site is based on the two key factors; reinforcement and framing of the Chilterns Tunnel North Portal and the naturalised landscape design to the north of the pedestrian GMI/12 Overbridge. The Portal, which is situated at the north end of the Chilterns Tunnel over the HS2 line, is enclosed by South Heath Cutting to the north. The North Portal includes a Portal Building, associated hard standing and an access track leading from the south west of HS2. The Portal Building and associated hard standing do not form part of this submission.
- 4.7.2 The planting design for the North Portal includes woodland and woodland edge above the cutting and grassland wildflower swards which form a continuous link across the engineered embankment within the cutting and framing the portal. This will provide habitat connectivity from east to west and the simple planting layout will frame and highlight the engineered portal design and provide a setting for the infrastructure found in this location in the landscape context of the AONB.
- 4.7.3 Landscape design in the southern area adjacent to the Tunnel Portal focuses on the architecture and the 'drama' created by the HS2 trains emerging from the tunnel. Engineered side slopes in this area are to be planted uniformly with grass and wildflower swards to highlight different shades of the slopes and play with shadows at different times of the day. Woodland vegetation proposed along the top of the cutting and landscape bunds will help to add to the 'drama' and embrace the tunnel portal area by towering over it, creating a sense of enclosure, as well as provide visual mitigation and to the surrounding area.
- 4.7.4 There are a limited number of key visual receptors which the design development has considered. These include the residential receptors at Bury and Park Farms to the east of HS2 and users on the local PRow network including the PRow crossing points of GMI/12 and GMI/ 2 Overbridge.
- 4.7.5 Landscape design north of GMI/12 Overbridge focuses on integration of the HS2 line into the wider landscape. Existing field patterns are reinforced and visual mitigation provided to sensitive receptors in vicinity of the scheme.

4.7.6 A key focus of the Proposed Scheme at this location is the need to provide bat mitigation planting and additional woodland edge habitat following main construction work. This work will overtime provide a continuous network of boundary hedgerows and woodland edge connecting the existing and proposed woodland blocks across the Chiltern Green Tunnel.

4.7.7 The focus of the landscape proposals has been to connect the important reinstated bat mitigation planting with existing retained planting. At the tunnel portal, woodland and woodland edge planting are employed to integrate these elements, through framing their engineered forms. An important element of the planting is to make it appear as naturalised as possible, following the line of the top of the cutting and reinforcing the presence of Jenkins Wood.

4.8 Landscape Maintenance, Management and Monitoring

4.8.1 A Landscape Maintenance, Management and Monitoring Plan (LMMMP) will be prepared as part of the landscape detail design and will follow the requirements set out in HS2 Standard document. The purpose of this section is to provide an outline of the LMMMP requirements for the planting proposals at South Heath Cutting and which have been submitted for information.

4.8.2 The landscape planting proposals reflect the typical natural landscape features of the area, including woodland, woodland edge, hedgerows with hedgerow standards and tree copses and as such many of the planting features indicated on the landscape plans will require standard maintenance and management. However, there are key locations where the landscape proposals will require specific landscape maintenance and management requirements. These locations are:

- Wildflower meadow planting within the LLAU adjacent to the north portal of the HS2 line between chainage 47+190 and 47+840 which is required for integration and to create a very simple and continuous backdrop to the portal. At the portal, landscape proposals include grass sward areas and access track verges which will need to be regularly managed to ensure a low grassland sward; it is intended that this planting is managed by HS2 for its future management.
- Woodland and woodland edge planting on the top the Chiltern Green Tunnel North Portal has been designed to frame the proposed alignment of HS2. However, there will need to be regular monitoring of the planting to ensure that it establishes to reach its design aspiration. This woodland area may be managed partly as a coppice to the south of the earthworks crest to replace key vegetation lost during construction.

5 Pre-submission Consultation

5.1.1 Pre-submission consultation with the Local Planning Authority and other relevant statutory consultees is summarised in **Table 5** below.

Table 5: Pre-submission Consultation with LPA and Statutory Consultees

Consultee Name	Consultation Date	Method of Consultation / Attended by	Summary of Consultation Outcome
Chiltern District Council (now Buckinghamshire Council as of 1/4/20)	07/06/2018 06/06/2019 07/11/2019 06/03/2020 14/01/2021 11/02/2021 26/02/2021 04/03/2021 05/03/2021 09/03/2021 11/03/2021 16/03/2021 19/03/2021 24/03/2021 01/04/2021 20/04/2021	A series of pre-application meetings, largely held on a monthly basis between Chiltern District Council (CDC) Officers, Eiffage Kier Ferroviaire BAM (EKFB) (Main Works Contractor), Fusion (Enabling Works Contractor), HS2 Ltd, Design Joint Venture (DJV). Email	A range of planning matters discussed over a 34-month period, leading to the current Schedule 17 submission for South Heath. This has covered the following key areas: <u>Structures</u> The LPA queried the use of materials in the construction of the GMI/12 Overbridge and other structures. It was clarified that a full justification would be provided in the Written Statement and certain materials could potentially be subject to planning conditions. The design of the GMI/12 Overbridge was also updated to reflect LPA feedback on parapets and other details. More details on bridge abutments and fencing were requested and it was clarified that these would be further developed for the next iteration of drawings. <u>Noise</u> Noise assessment required to understand whether noise barriers will be required. Assessment later found no barriers would be required, and NDR will be shared with LPA in advance of Schedule 17 submission. <u>Ecology</u> Concerns raised over ecological impacts in terms of connectivity over either side of the cutting, access for animals through the noise barriers, and connectivity over bridge crossings. Landscape planting will provide ecological corridors either side of the line to guide animals to safe crossing points.

Consultee Name	Consultation Date	Method of Consultation / Attended by	Summary of Consultation Outcome
			<p><u>Landscape</u> LPA requested consideration of what types of planting would be suitable to the local landscape. This was considered and planting schedules were updated. LPA proposed landscaping and planting changes to maintain local character and views. These were changed in the design. Queries over planting around Jenkins Wood to screen PRow users were responded to and accepted.</p> <p><u>Drainage</u> Discussion of the design of drainage ponds to ensure a positive landscape and ecological impact. Clarification was given on how the drainage ponds follow Detailed Design Principles. Following feedback from the LPA, the drainage plan was updated to address downslope runoff from portal buildings.</p> <p><u>Culverts</u> LPA requested details of the drainage design showing how culverts would discharge water.</p> <p><u>Leather Lane</u> Discussions over impact on Leather Lane, a historic road. Various design changes agreed including to landscape design, ponds, and vegetation. The LPA also recommended changes to nearby ponds and the design was altered accordingly. As a result of these discussions works around Leather Lane have been removed from this package and will be the subject of a separate application under Schedule 17.</p> <p><u>North Tunnel Portal</u> LPA concern over designing landscape around Portal building before building design is finalised. Landscape design will evolve as building design evolves.</p> <p><u>South Heath Mid-Point Auto-Transformer Station</u> Discussion over visual impact of MPATS positioning and earthworks / planting to screen visual impact from the road.</p>

Consultee Name	Consultation Date	Method of Consultation / Attended by	Summary of Consultation Outcome
			<p><u>Bury Farmhouse</u> Discussion over using planting to screen visual impact on listed building. Bunding was extended to address this. Queries over visual and noise impact mitigation were also responded to.</p> <p><u>Park Farm</u> The LPA queried the noise impact on the historic building, and it was clarified that the noise assessment found no significant impact and no need for noise barriers. Queries on landscaping which were answered and accepted.</p> <p><u>Hammondshall Farm</u> The LPA wanted planting plans to be amended to ensure that visual impact was more effectively screened in the short and medium term. The planting plan was changed to reflect this.</p>
Buckinghamshire Council	02/12/2020 15/02/2020	Online meetings with elected members representing the North Chiltern Area	Introduction for elected members and overview of construction area and upcoming submissions and dates.
Great Missenden Parish Council	22/09/2020 20/10/2020 25/11/2020 16/12/2020 11/01/2021	Online meetings	General updates on works in the area. Meeting with selected committee members to discuss compound. Discussion on A413 traffic displacement, crossing points and upcoming closures.
The Lee Parish Council	17/11/2020 01/12/2020 10/12/2020 15/12/2020 12/01/2021 26/01/2021	Online meetings	General updates on works in the area. Discussion on A413 traffic, compounds, YBR crossing points and routes on hill top lanes.

Consultee Name	Consultation Date	Method of Consultation / Attended by	Summary of Consultation Outcome
Natural England	28/02/2021	Email	<u>Park Farm</u> Natural England recommended an ecology corridor in this area. Clarification was given on planting plans.
Archaeological advisor (Philip Markham) to Buckinghamshire County Council	Throughout 2017 -January 2018	Email	Initial advice and comment with regard to several Project Plans and Location Specific WSIs. Any comments with regard to the Sites discussed in these documents were incorporated prior to any archaeological work commencing. Copies of fieldwork reports were provided to the council.

5.1.2 Pre-submission engagement with other relevant stakeholders is summarised in **Table 6** below.

Table 6: Other Engagement Activities

Stakeholder Name	Engagement Date	Method of Engagement / Attended by	Summary of Engagement Outcome
Chilterns Society	15.09.2020	Online meeting	Introduction meeting with Fusion and National Grid to discuss utilities and programme updates, footpath closures, and communication.
Great Missenden & The Lee Parish Council Combined meeting	22/09/2020 25/11/2020 12/03/2021 01/04/2021 06/04/2021 20/04/2021	Online Meeting	Scheduled update meetings with the parishes jointly to deliver construction updates – moved from individual meetings to cover all aspects. Jointly delivered with Align and Fusion to create clarity and holistic approach to the works in the area.

Stakeholder Name	Engagement Date	Method of Engagement / Attended by	Summary of Engagement Outcome
	18/05/2021 01/06/2021 15/06/2021 17/06/2021 29/06/2021 13/07/2021 27/07/2021 10/08/2021 24/08/2021 07/09/2021 21/09/2021 05/10/2021 19/10/2021 02/11/2021 16/11/2021 30/11/2021 14/12/2021		<p>Feedback is greatly around use of Hill Top lanes and assurances through construction for mitigation for the residents locally.</p> <p>Design challenges towards Leather Lane in particular from local resident complaints about vegetation clearance. They want to see all aspects of structures for public feedback.</p> <p>Talked around working hour extensions and section 61's to cover earthworks seasons on main works and impacts on local residents.</p> <p>Landscaping interest and ways of mitigation for planting of interest – there has been a need to reflect the local characteristics within the designs and the challenge to keep existing landscape elements eg well known trees in the scope of the design and Holloway characteristics which are significant to the area are retained.</p>
Great Missenden Parish Council	14/10/2020 20/10/2020 18/11/2020 16/12/2020 12/02/2021 26/02/2021 23/03/2021	Online meeting	<p>General update meetings held regularly to discuss on going works and how it affects local residents.</p> <p>Discussions have been held around the haul road and mitigation planting (ref to U&A) and how we could explore this from what was used from Fusions planting</p> <p>Main concerns relate to lighting and construction disturbances which we have addressed from compound issues to temporary lightings.</p>

Stakeholder Name	Engagement Date	Method of Engagement / Attended by	Summary of Engagement Outcome
			Concerns put forwards about structures and ability to inform the residents although several discussions had about the act and schedule 17 design plans. Engagement held on grounds to look at alternative solutions to Leather Lane and mitigate losing as many of the oak trees/vegetation that remains down here as possible. Leather Lane is now the subject of a separate application under Schedule 17 due to the ongoing development of the design for this area.
Great Missenden Village Association (GMVA)	12/11/2020 24/02/2021 29/03/2021 17/05/2021 13/07/2021 16/08/2021 25/10/2021 30/11/2021	Online meeting	Monthly scheduled update meeting with the local village association. Main hot topics include <ul style="list-style-type: none"> Supporting local businesses – we’re working with them to produce ways of connecting the business together and keeping more people informed of the work as well as employment and supply chain opportunities Support for local funding initiatives – looking at funding CEF and BLEF and volunteering opportunities Local ecology and wildlife – they would like to see us include more ‘greening’ of the areas through bridges and footpaths and respecting the landscape of the AONB as well as the historic elements and ancient woodlands and how we can protect them.
The Lee Parish Council	17/11/2020 01/12/2020 10/12/2020 15/12/2020 12/01/2021 09/02/2021 26/02/2021 09/03/2021	Online meeting	Scheduled meeting as well as ad-hoc engagement for on the ground issues that are dealt with. Topics reflective of that of the Great Missenden meeting with more impact from the use of the hill top land and road conditions caused by early works. We have assurances to keep main works traffic away from the hill top lanes ie. Bowood, Leather Lane and Rocky Lane and we keep connectivity throughout the project.

Stakeholder Name	Engagement Date	Method of Engagement / Attended by	Summary of Engagement Outcome
	23/03/2021		
Amersham Parish Council	15/12/2020 26/02/2021 27/04/2021 25/05/2021 06/07/2021 07/09/2021 18/01/2022	Online meeting	<p>Scheduled construction update meetings held by Align where we support.</p> <p>Shared works along the A413 that may affect that residents, lorry routes and volumes of traffic impacts are discussed at length and traffic guides produced and joint communications delivered by main works contractors.</p> <p>Not directly impacted by EKFB main works or design.</p>
The Missendens Meeting	11/01/2021 17/02/2021 21/04/2021 01/05/2021 25/05/2021 02/09/2021 21/10/2021 01/12/2021	Online meeting	<p>Monthly meeting held by Bucks council joining all surrounding parishes from Chesham to The Lee around HS2 matters</p> <p>Feedback based around the traffic around the A413 and concerns about additional vehicles from EKFB and Align using the same routes through. Mitigation measures around safeguarding of school children and workforce travel plans discussed frequently.</p> <p>Ecology aspects include suggestions over including green bridges and green verges on the overbridges where available to enhance connectivity for wildlife and bat flight lines where we are removing established vegetation for permanent works.</p> <p>Hot topics include:</p> <ul style="list-style-type: none"> Construction lighting and noise from the compounds and works on site Ecology issues – green bridges and green verges to be included in the design A413 Traffic cumulative traffic issues and displaced local traffic across all construction teams

Stakeholder Name	Engagement Date	Method of Engagement / Attended by	Summary of Engagement Outcome
			<ul style="list-style-type: none"> • Workforce travel plans during construction period • Vegetation clearance along routes with designated ancient woodlands/trees of significant age and design changes to reflect mitigation around these • Concern about care for the AONB within our design and respectful integration between the two • Landscape designs to encompass the significance of the AONB • Spoil movement and mass haul strategy highly anticipated and will be advised when confirmed.
Chiltern Society / HS2 meeting	15/09/2021 02/02/2021 11/03/2021 30/03/2021 01/04/2021 22/06/2021 05/07/2021 03/08/2021 14/09/2021 26/10/2021 07/12/2021 06/01/2022	Online meeting	<p>Scheduled meeting with Fusion / Align and HS2 for all updates. Regular discussions around programme of works and upcoming applications affecting the AONB.</p> <p>Footpath and connectivity discussed at length and positive outcomes for phasing amongst the works and ability to re-route long distance walking routes through the Chilterns.</p> <p>Programme phasing and upcoming works discussed alongside utilities works as well.</p> <p>The group hold their own regular meetings for Chilterns Society members which include regular updates for construction progress contributed to from EKFB, Align and Fusion.</p>
Little Missenden Parish Council	17/02/2021 17/03/2021 13/07/2021 17/08/2021 19/10/2021	Online meeting	<p>Scheduled update meeting with Fusion and Align to support their works.</p> <p>Focus is on traffic volumes along the A413 and displaced traffic and worker accommodation/workforce travel plans for the area.</p>

Stakeholder Name	Engagement Date	Method of Engagement / Attended by	Summary of Engagement Outcome
	18/11/2021		Little impact on the parish from our main works.
NCA community 1:1	27/04/2021 03/06/2021 27/07/2021 28/09/2021	Teams meeting	<p>Regular engagement virtual drop in events held where members of the public can come and discuss any topics of interest.</p> <p>For the area we have seen a pattern towards;</p> <ul style="list-style-type: none"> • Traffic impacts locally • Work and employment opportunities • Lighting and noise complaints • Some interest over portal designs with cross over information from Align.

6 Construction Programme

6.1.1 A high-level programme for the works subject to this submission and how they fit into the overall programme for other works in the area is contained in **Table 7** below. The programme for works on the site may vary from the indicative dates shown.

Table 7: Proposed Programme and Sequence of Works

Anticipated Start on Site Date (quarter (Q) /year)	Activity	Estimated Completion of Works (quarter/year)
Q1 2021	Mobilisation	Q1 2021
Q1 2021	Clearance	Q1 2021
Q2 2021	Earthworks	Q3 2024
Q3 2022	Landscaping	Q1 2025
Q1 2025	Demobilisation	Q1 2025

7 Other Consents

7.1.1 Other main consents likely to be required for the works are summarised in **Table 8** below. Consent requirements may alter during design development and further consents not identified in Table 8 may be required.

Table 8: Other Consent Requirements

Consent	Works Requiring Consent
HS2 Act, Schedule 4, Part 1	New permanent vehicle maintenance access off Leather Lane, Havenfield Wood and Frith Hill
HS2 Act, Schedule 4, Part 2	Interference with the PRowS GMI/2, GM1/12 and GMI/13. Temporary diversions during construction and permanent realignments.
HS2 Act, Schedule 33, Part 5	Permanent works, temporary works and discharges associated with the drainage ponds.
Bat Mitigation Class Licence WML-CL40 HS2 Phase 1 (London to West Midlands - Bats in Trees	Works requiring the removal or disturbance of trees or other features supporting roosting bats.
HS2 Great Crested Newt (GCN) Organisational Licence WML-OR25,	Works requiring vegetation removal within 500m of confirmed great crested newt breeding ponds.
HS2 Act, Schedule 17: Schedule 17: Bringing Into Use	Environmental Mitigation Planting and for the Scheduled Works listed in paragraph 3.2.1 above.
Site Restoration	After discontinuation of the use of any site for carrying out operations ancillary to the construction of any of the scheduled works, restore the site in accordance with a scheme agreed with the relevant planning authority.
HS2 Act, Schedule 18	Demolition of one residential building and four associated outbuildings at one property (Mulberry Park Hill, located off Potter Row); and one National Grid pylon structure at Frith Hill.
Section 81	Demolition notice
Any other relevant Schedule 17 Plans and Specifications submissions for adjacent or associated works	AVDC 1 – South Heath to Wendover Application for works associated with Leather Lane Application for the Chilterns Tunnel Portal North Building (a Key Design Element structure).
Schedule 4: Lorry routes	Approval of the lorry routes

8 Appendices

Appendix 1: Typical Construction Details for the Access Tracks and Roads

