

High Speed 2 - 1MC06 - Stage One C2 - MWCC –  
North Portal of Chiltern Tunnels to Brackley

## South Heath Cutting and South Heath to Wendover Noise Demonstration Report

**1MC06-CEK-TP-REP-CS03\_CL05-000003**

Rev	Date	Author	Checked by	Approved by	Revision Details	EKFB Reviewer
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<input type="checkbox"/> LOV	<input type="checkbox"/> Approval
<input type="checkbox"/> LUL	<input type="checkbox"/> No Objection
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<input type="checkbox"/> TFL	
<input type="checkbox"/> Utilities Company	
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## Glossary of Terms

Term	Description
AFARP	As far as is reasonably practicable
AP	Additional Provisions
ARFC	All reasonably foreseeable circumstances
BC	Buckinghamshire Council
BS	British Standard
CBA	Cost Benefit Analysis
CoCP	Code of Construction Practice
CRN	Calculation of Railway Noise
CRTN	Calculation of Road Traffic Noise
dB	Decibel
dB(A)	'A' Weighted Decibel.
EIA	Environmental Impact Assessment
EMRs	Environmental Minimum Requirements
ES	Environmental Statement
LOAEL	Lowest Observed Adverse Effect Level
LPA	Local Planning Authority
LpAeq	'A' Weighted Equivalent Continuous Sound Level
LpAmax	Maximum 'A' Weighted Sound Pressure Level
NDR	Noise Demonstration Report
Nominated undertaker	The body or bodies appointed to implement the powers of the hybrid Bill to construct and maintain the railway
NPV	Net Present Value
SES	Supplementary Environmental Statement

Term	Description
SOAEL	Significant Observed Adverse Effect Level
the Act	The High-Speed Rail (London – West Midlands) Act 2017
TNPM	Train Noise Prediction Model
TSI	Technical Specifications for Interoperability
ToR	Top of Rail
U&As	Undertakings and Assurances

## EXECUTIVE SUMMARY

This Noise Demonstration Report is compiled in accordance with the High Speed Two (HS2) *Phase 1 Planning Memorandum* and *Planning Forum Note 14: Operational Noise from the Railway and Altered Roads (PFN 14)*.

The purpose of this report is to provide Buckinghamshire Council (BC) with supporting noise assessment information to assist with the determination of the

- South Heath Cutting—and Associated Earthworks - Plans and Specifications submitted under Schedule 17 of the High-Speed Rail (London – West Midlands) Act 2017.
- South Heath to Wendover –and Associated Earthworks - Plans and Specifications submitted under Schedule 17 of the High-Speed Rail (London – West Midlands) Act 2017

This report demonstrates how all reasonable steps have been taken for the combined airborne sound from altered roads and operational railways, predicted in all reasonably foreseeable circumstances, not to exceed the lowest observed adverse effect levels. The mitigation has been assessed as far as is reasonably practicable at this stage in the design process and has been shown to result in effects within the scope of those reported in the HS2 ES.

The presented options have been selected on the basis that they reduce noise as far as reasonably practicable and represent the optimum balance between maximising the acoustic benefits, whilst minimising visual impacts and considering other environmental aspects, engineering constraints, value for money and stakeholder engagement. The selected option has also been informed by the consultation process with the Council. BC indicated that the noise barrier would be preferable to an earthworks option as this would allow the land to be available for future agricultural use. Option 3 was therefore agreed to be the preferred option during stakeholder engagement.

For **South Heath** the assessment shows:

- The **Proposed Design** has the same minor and moderate  $L_{Aeq}$  impacts levels above LOAEL as reported in the Phase 1 ES and one fewer negligible impact above LOAEL than the ES.
- The **Proposed Design** has fewer LOAEL for  $L_{max}$  noise levels than presented within the Phase 1 ES. Overall, the acoustic performance of the Proposed Design is therefore similar to that reported in the ES (as amended).

Visually, a 190m long barrier 3m above ground level located at the crest of the cutting when compared to the ES assessed 1.4km long 3m barrier at the cutting crest would have noticeable local landscape and visual benefit for the sections where it has been removed. The proposed barrier would have no adjacent earth mound, in contrast to the ES assessed barrier which had a 2m high earth screen bund immediately adjacent to it. The barrier would therefore form a local linear landscape feature, albeit shielded in views by the adjacent retained mature boundary hedgerow on its east side and overtime screened by a combination of the existing hedgerow and the proposed planting. This screening would result in a similar landscape and visual effect as reported in the ES for the same section of barrier with an associated screen bund.

A modified earthworks option in lieu of the 190m noise barrier was considered and proposed to BC during consultation. BC indicated that the noise barrier would be preferable as this would allow the

land to be available for future agricultural use. Option 3 was therefore agreed to be the preferred option during stakeholder engagement.

For **South Heath to Wendover** the assessment shows:

- The **Proposed Design** results in no adverse impacts whatsoever, in accordance with the EIA methodology.

The **Proposed Design** has the same number of  $L_{max}$  noise levels above LOAEL as presented within the Phase 1 ES.

An earthworks design was proposed in the ES and therefore the visual effects are neutral.



# 1 Introduction

## 1.1 Background and Aim

The purpose of this report is to provide Buckinghamshire Council (BC) with supporting noise assessment information to assist with the determination of both the South Heath Cutting and Associated Works - Plans and Specifications and the South Heath to Wendover –and Associated Earthworks - Plans and Specifications, submitted under Schedule 17 of the High-Speed Rail (London – West Midlands) Act 2017.

This Noise Demonstration Report (NDR) has been compiled in accordance with the *High Speed Two (HS2) Phase 1 Planning Memorandum (paragraph 7.5.2)* and *Planning Forum Note 14<sup>1</sup>: Operational Noise from the Railway and Altered Roads*.

The information in this NDR shows, as far as is reasonably practicable at the current stage in the design process, how the proposed noise mitigation performs and the expected conditions. 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.

To determine optimal mitigation measures a number of options have been assessed. The mitigation design options are presented in Section 4.

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 Schedule 17 submission. In consultation with BC Council, it was requested that a noise assessment for the North Portal building is included in the Noise Demonstration Report to fully present the noise effects at South Heath.

## 1.2 Structure of Report

This report comprises the following sections:

- Policy, Requirements and Standards
- Description of the Works
- Methodology
- Options appraisal
- Assumptions
- Results of the assessment of the proposed noise mitigation
- Conclusions

## 1.3 Site Location

The area for the South Heath Cutting and Associated Works application is shown on the South Heath Cutting Site Location Plan (Drawing No. 1MC06-CEK-TP-DLO-CS03\_CL05-000004) presented in Appendix A and reproduced as Image 1 below.

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<sup>1</sup>

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/833184/PFN\\_14\\_Operational\\_Noise.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/833184/PFN_14_Operational_Noise.pdf)



A High-Speed Design Partnership



**High Speed 2 - 1MC06 - Stage One C2 - MWCC –  
North Portal of Chiltern Tunnels to Brackley  
1MC07-CEK-TP-REP-CS03\_CL05-000003**

The application area for the South Heath to Wendover –and Associated Earthworks is shown on the South Heath to Wendover Site Location Plan (Drawing No. 1MC06-CEK-TP-DPL-CS03\_CL05-000074) presented in Appendix A and reproduced as Image 2 below.

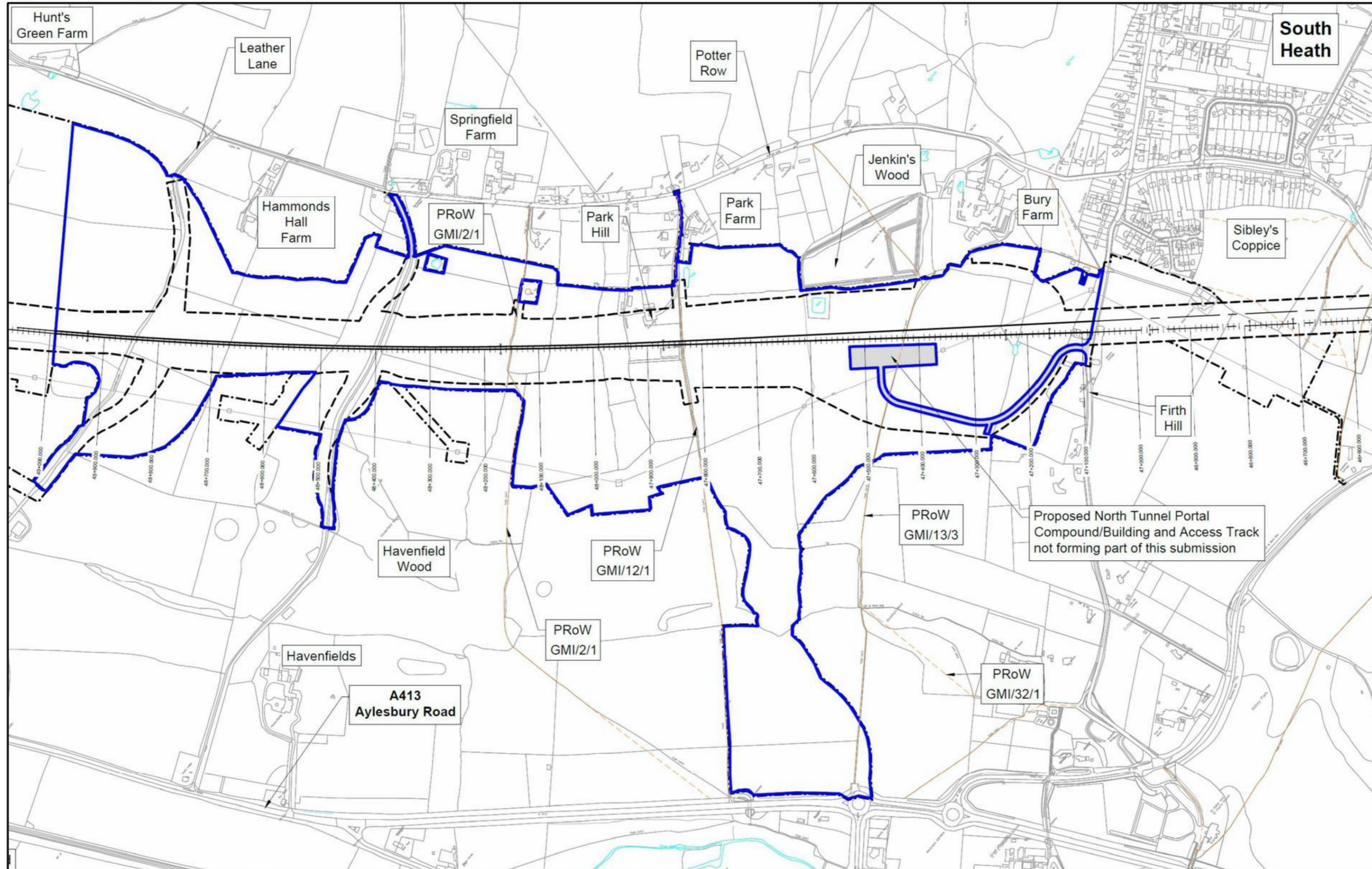


Image 1 South Heath Cutting Site Location Plan (Drawing No. 1MC06-CEK-TP-DLO-CS03\_CL05-000004) presented in Appendix A

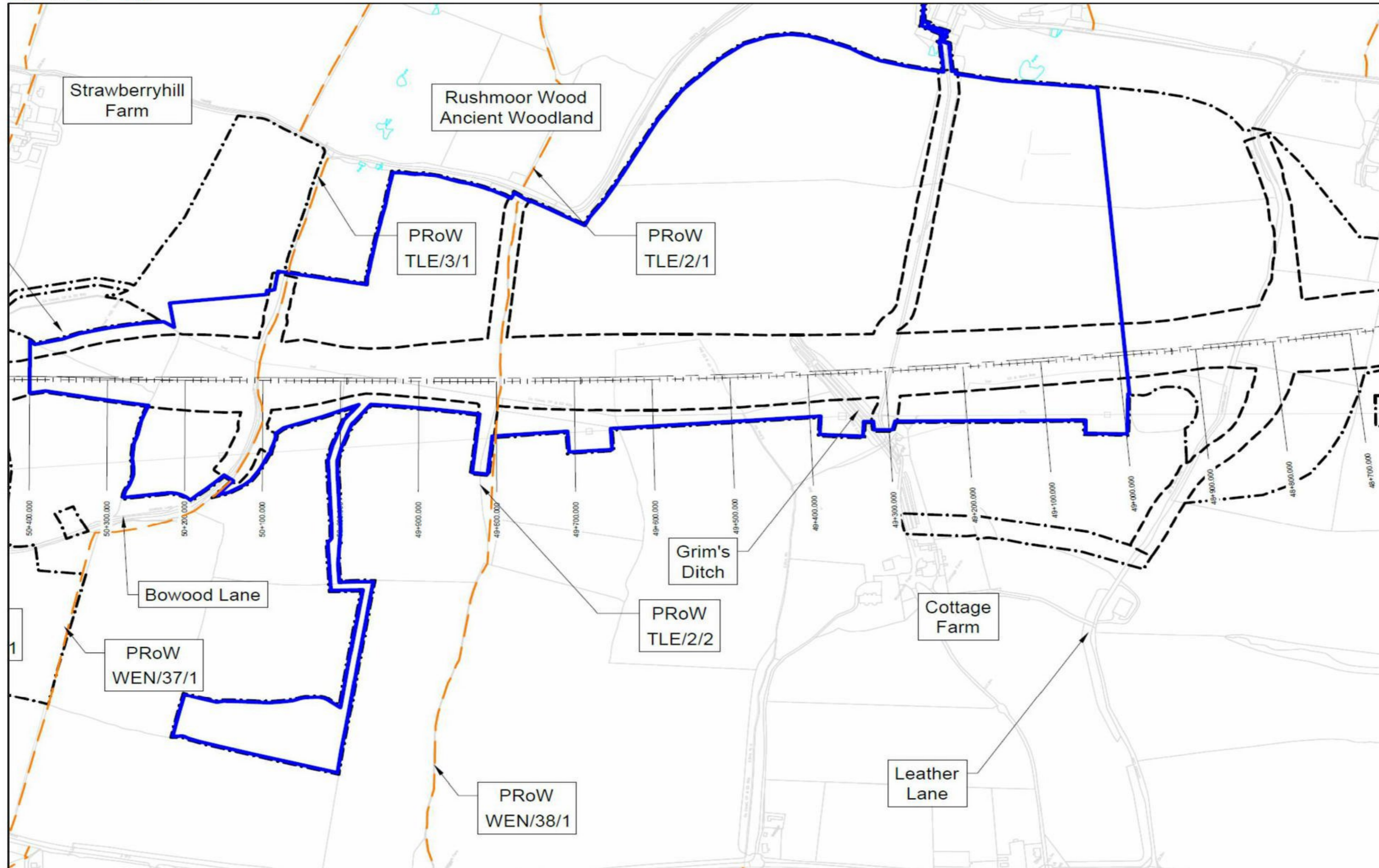


Image 2 South Heath to Wendover Site Location Plan (Drawing No. 1MC06-CEK-TP-DPL-CS03\_CL05-000074) presented in Appendix A

General descriptions of both the South Heath Cutting and South Heath to Wendover areas is presented below:

- South Heath Cutting - The application site boundary extends from the north of Frith Hill to the north of Leather Lane, between the settlements of Wendover, 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.

The closest 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.

- South Heath to Wendover - The site is located approximately 1.5km to the south of Wendover and 3km to the north of Great Missenden. The Lees lies 1km to the east and Dunsmore lies 2km to the east.

The nearest receptors are Strawberryhill Farm, Hammond's Hall Farm and Hunt's Green Farm to the north of the HS2 line and Cottage Farm and Wendover Dean Farm to the south of the HS2 line. There are further scattered farmsteads and individual residential properties located along the A413, Bowood Lane, Leather Lane and King's Lane and the adjacent local tracks off them.

The sensitive receptor locations are presented on Image 3 below; referenced to the receptor numbers defined in the HS2 Stage 1 ES documentation.

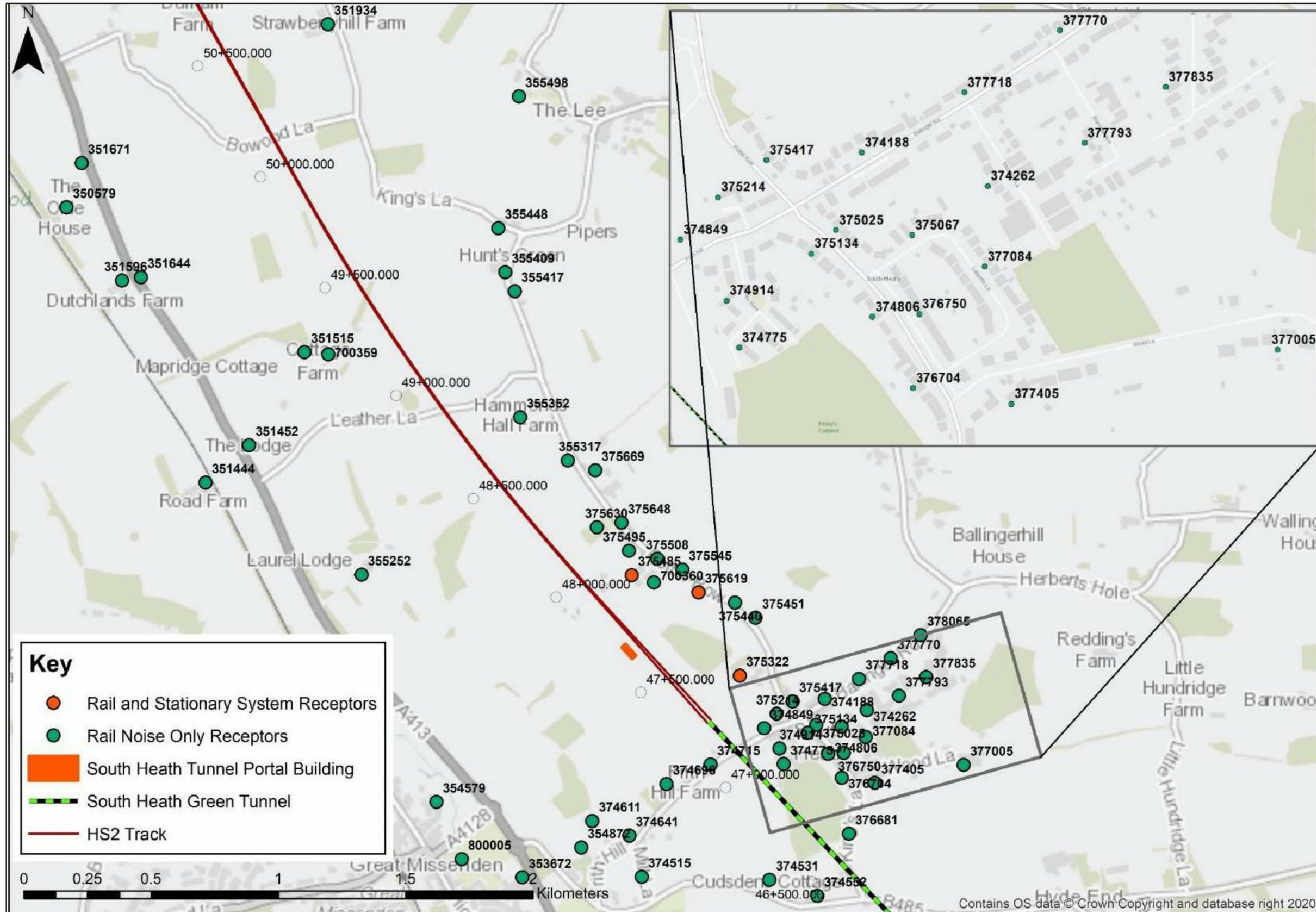


Image 3 Receptor locations for South Heath Cutting and South Heath to Wendover area

## 2 Policy, Requirements and Standards

High Speed Two (HS2) is the Government's proposal for a new high-speed north-south railway. The proposal is being taken forward in two phases: Phase One will connect London with Birmingham and the West Midlands.,

The High-Speed Rail (London – West Midlands) Act 2017, referred to from this point forward as "*the Act*", provides powers for the construction and operation of Phase 1 of High Speed Two, for which HS2 Ltd is the nominated undertaker. The Secretary of State has also published Environmental Minimum Requirements (EMRs), which set out the environmental and sustainability commitments that will be observed in the construction of the Proposed Scheme.

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 various matters to be approved by the relevant Local Planning Authority(ies) (LPA).

Schedule 17 of *the Act* sets out the specific grounds on which the LPA may impose conditions on approvals or refuse requests for approval. With respect to noise one of the specific grounds the LPA may refuse to approve plans or specifications is if "*the design or external appearance of the building works ought to be modified to preserve the local environment or local amenity and is reasonably capable of being so modified*".

Paragraph 7.5.2 of the Planning Memorandum states that when submitting designs for approval under Schedule 17 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. Where works for approval will have a mitigating effect in relation to the operational noise from the railway or new roads, the nominated undertaker will provide information to show, so far as is reasonably practicable at that stage in the design process, how the noise mitigation performs and the expected conditions. While not material to approvals under paragraph 2 or 3 this information will provide re-assurance in advance of the request for approval under paragraph 9 that the mitigation is appropriate and will present an opportunity to raise concerns."*

This report provides information about how the noise mitigation, proposed at this stage of the design development, performs and the expected conditions.

When seeking 'Bringing Into Use' approvals in relation to the relevant scheduled works under Schedule 17(9), an update to this report will be provided to the Local Planning Authority in order to assist it in determining whether there are any reasonably practicable measures which need to be taken for the purposes of mitigating the effect of the work or its operation on the local environment or local amenity.

The following section provides a summary of the EMRs and relevant information papers that have been produced to explain the commitments made in *the Act* and the Undertakings and Assurances (U&As) given by the Secretary of State, and how they will be applied to the design and construction of HS2 Phase 1.

## 2.1 Environmental Minimum Requirements (EMRs)

The EMRs set out environmental and sustainability commitments that will be observed during the construction and operation of the Proposed Scheme. The EMRs include the Code of Construction Practice (CoCP) and a series of other supporting documents.

The EMR general principles state:

*The controls contained in the EMRs, along with powers contained in the Act and the Undertakings given by the Secretary of State, will ensure that impacts which have been assessed in the ES will not be exceeded, unless any new impact or impacts in excess of those assessed in the ES:*

- *results from a change in circumstances which was not likely at the time of the ES<sup>2</sup>; or*
- *would not be likely to be environmentally significant<sup>3</sup>; or*
- *results from a change or extension to the project, where that change or extension does not itself require environmental impact assessment (EIA) under either (i) article 4(1) of and paragraph 24 of Annex 1 to the EIA Directive<sup>4</sup>; or (ii) article 4(2) of and paragraph 13 of Annex 2 to the EIA Directive<sup>5</sup>; or*
- *would be considered as part of a separate consent process (and therefore further EIA if required).*

In the circumstances described in the first bullet point above, if the significant adverse impacts identified in the ES are likely to be exceeded, HS2 and their contractors will take all reasonable steps to minimise or eliminate those additional impacts. If despite these reasonable steps, significant adverse impacts remain HS2 and their contractors will report them.

## 2.2 HS2 Information Paper E20: Control of Airborne Noise from Altered Roads and the Operational Railway

HS2 Information Paper E20 outlines the measures that are required to be put in place to control operational airborne noise. It sets out various objectives to minimise operational noise effects as summarised below.

- HS2 and their contractors will take all reasonable steps to design and construct the scheme so that the combined airborne noise predicted, in all reasonably foreseeable circumstances (ARFC), does not exceed LOAEL as set out in Appendix B. Where it is not reasonably practicable to achieve this objective, HS2 and their contractors will reduce airborne noise “As Far As Reasonably Practicable” (AFARP).
- Noise insulation will be offered with the aim that operational airborne noise from the scheme does not give rise to significant adverse effects on health and quality of life that would otherwise be

<sup>2</sup> In addition, Supplementary Environmental Statements and Additional Provision Environmental Statements were published and tabled by the Promoter in July 2015, September 2015, October 2015 and December 2015.

<sup>3</sup> i.e. a situation that could not reasonably have been anticipated at the time of the Environmental Statement. This covers all effects (both positive and adverse) where those effects are simply of no environmental significance.

<sup>4</sup> 2011 consolidated EIA Directive (2011/92/EU).

<sup>5</sup> Broadly, this would not allow those changes or extensions to the project (once it has received Royal Assent) which would give rise to adverse environmental effects within the EIA.



expected when airborne noise exceeds the significant observed adverse effect levels (SOAEL) (Appendix B).

## 2.3 HS2 Information Paper E22: Control of Noise from the Operation of Stationary Systems

Information Paper E22 describes the measures that will be adopted to control the effects of noise from the operation of stationary systems designed and installed by the nominated undertaker for delivering the Proposed Scheme. The main objectives listed in Information Paper E22 are stated below.

- The nominated undertaker will design, construct, operate and maintain the stationary systems so that the rating level of the fixed installations in normal operation at the worst affected residential receptor, minus the background level, is not more than -5 dB, determined in accordance with BS 4142:2014.
- Where it is not reasonably practicable to achieve this objective, the nominated undertaker will develop and adopt robust procedures to ensure that sound from all stationary systems is reduced as far as is reasonably practicable. In such cases, the nominated undertaker will design, construct, operate and maintain the stationary systems so that, under all reasonably foreseeable circumstances, the rating level of the stationary systems in normal operation at the worst affected residential receptor, minus the existing background level, is not more than +5 dB, determined in accordance with BS4142:2014.
- Special consideration will be given to the assessment of sound from stationary systems when the background level is low, namely where the background levels are less than 30 dB.

## 3 Scheduled Works

### 3.1 Application Design

#### 3.1.1 South Heath

The works submitted for approval comprises of the South Heath Cutting, Leather Lane overbridge and highway realignment, Havenfield Wood Accommodation overbridge and Footpath GMI/12 overbridge, land and track drainage infiltration ponds, noise fence barriers, permanent fencing and gates and highway and footway construction. Further details of these works are described below and are shown on the 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).

#### **Proposed Permanent Earthworks for Approval**

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 of 8) - 1MC06-CEK-TP-DSE-CS03\_CL05-000011
- South Heath Cutting Earthworks Cross Sections (Sheet 2 of 8) - 1MC06-CEK-TP-DSE-CS03\_CL05-000012
- South Heath Cutting Earthworks Cross Sections (Sheet 3 of 8) - 1MC06-CEK-TP-DSE-CS03\_CL05-000013
- South Heath Cutting Earthworks Cross Sections (Sheet 4 of 8) - 1MC06-CEK-TP-DSE-CS03\_CL05-000014
- South Heath Cutting Earthworks Cross Sections (Sheet 5 of 8) - 1MC06-CEK-TP-DSE-CS03\_CL05-000015
- South Heath Cutting Earthworks Cross Sections (Sheet 6 of 8) - 1MC06-CEK-TP-DSE-CS03\_CL05-000016
- South Heath Cutting Earthworks Cross Sections (Sheet 7 of 8) - 1MC06-CEK-TP-DSE-CS03\_CL05-000017
- South Heath Cutting Earthworks Cross Sections (Sheet 8 of 8) - 1MC06-CEK-TP-DSE-CS03\_CL05-000018
- 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