HIGH SPEED TWO PHASE ONE INFORMATION PAPER

F2: INFRASTRUCTURE MAINTENANCE DEPOT STRATEGY

This paper outlines the reasons for the proposed infrastructure maintenance depot strategy for HS2.

It will be of particular interest to those potentially affected by the Government's proposals for high speed rail.

This paper was prepared in relation to the promotion of the Bill for Phase One of the scheme which is now enacted. Although the contents were maintained and updated as considered appropriate during the passage of the Bill (including shortly prior to the enactment of the Bill in February 2017) the contents are now historic and are no longer maintained.

If you have any queries about this paper or about how it might apply to you, please contact the HS2 Helpdesk in the first instance.

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1. Introduction

1.1. 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 and Phase Two will extend the route to Manchester, Leeds and beyond.

1.2. HS2 Ltd is the non-departmental public body responsible for developing and promoting these proposals. The company works to a Development Agreement made with the Secretary of State for Transport.

1.3. In November 2013, HS2 Ltd deposited a hybrid Bill[1] with Parliament to seek powers for the construction and operation of Phase One of HS2 (sometimes referred to as 'the Proposed Scheme'). The Bill is the culmination of nearly six years of work, including an Environmental Impact Assessment (EIA), the results of which were reported in an Environmental Statement (ES) submitted alongside the Bill. The Secretary of State has also published draft Environmental Minimum Requirements (EMRs), which set out the environmental and sustainability commitments that will be observed in the construction of the Proposed Scheme.

1.4. The Bill is being promoted through Parliament by the Secretary of State for Transport (the 'Promoter'). The Secretary of State will also appoint a body responsible for delivering the Proposed Scheme under the powers granted by the Bill.

1.5. This body is known as the 'nominated undertaker'. There may well be more than one nominated undertaker – for example, HS2 Ltd could become the nominated undertaker for the main railway works, while Network Rail could become the nominated undertaker for works to an existing station such as Euston. But whoever they are, all nominated undertakers will be bound by the obligations contained in the Bill and the policies established in the EMRs.

1.6. These information papers have been produced to explain the commitments made in the Bill and the EMRs and how they will be applied to the design and construction of the Proposed Scheme. They also provide information about the Proposed Scheme itself, the powers contained in the Bill and how particular decisions about the project have been reached.

[1] The High Speed Rail (London – West Midlands) Bill, hereafter 'the Bill'.

2. Infrastructure maintenance depot and sidings

2.1. So that its infrastructure can operate safely and efficiently, HS2 needs a comprehensive maintenance regime. This can only be effective by positioning maintenance teams and equipment at appropriate locations where they can reach the whole route with minimum disruption to train services.

2.2. This paper sets out the reasons behind the proposed maintenance strategy for HS2 infrastructure, including:

- an overview of the operational requirements associated with the infrastructure maintenance depot (IMD) facility;
- the reasons for its location and the site layout; and
- the steps that have been taken to mitigate the impacts of the facility on local residents.

2.3. Maintenance of the HS2 rolling stock is not included in this paper and can be found in the information paper F1: Rolling Stock Depot and Stabling Strategy.

3. HS2 infrastructure

3.1. Phase One will consist of a 188.6km line between London and Birmingham. A branch near Birmingham will form the beginning of Phase Two and provide a link to the West Coast Main Line; in London a link to HS1 had been proposed. However, in March 2014, the Secretary of State decided to take the necessary steps to remove this link from the Bill.

3.2. The HS2 line will be enclosed in a fenced off secure area containing various elements which make up the high speed line including:

- the train tracks;
- the ballast (naturally occurring gravel or crushed rock) or concrete slabs supporting the tracks;
- overhead structures providing power for the trains; and
- cuttings, embankments, tunnels, bridges and elements adjacent to the line such as signals, radio masts, signposts, power supply transformers.

3.3. With 18 trains per hour running over the tracks in each direction between 0500 to 2359 Monday to Saturday and from 0800 to 2359 on Sundays, at operating speeds of up to 225mph (360kph), a robust level of maintenance is required to ensure a safe and comfortable ride at all times.

4. Infrastructure maintenance strategy

4.1. The infrastructure maintenance strategy has been developed to provide a safe, reliable, efficient and environmentally-friendly way of maintaining all those elements, which make up HS2 infrastructure.

4.2. Maintenance is the general day-to-day upkeep of the railway that keeps trains running. It consists of:

- preventative maintenance to keep things working at their optimum level;
- predictive maintenance to address issues with equipment before it fails; and
- corrective maintenance to repair or replace elements once they have failed.

4.3. HS2's infrastructure maintenance strategy is to undertake a programme of preventative, predictive maintenance by gathering and analysing real-time information about the condition of all elements of HS2 infrastructure, so as to avoid corrective maintenance as far as possible.

4.4. This condition monitoring information will be obtained by:

- using active monitoring systems on passenger trains;
- running dedicated inspection trains with on board specialised measuring equipment;
- using automated fixed monitoring systems on the elements themselves (track controlling systems, security systems, fire detectors etc.) that flag up the need for additional maintenance before they fail; and
- maintenance teams undertaking on-site inspections.

4.5. On-site inspection work and the majority of maintenance work itself will normally be carried out along the route at night, once passenger train services are no longer operating. However, where urgent corrective maintenance is required, work will be undertaken at any time.

4.6. Maintenance teams and equipment will be based at a new Infrastructure Maintenance Deport (IMD) at Calvert. This will be centrally located in order to reduce travel distances to parts of Phase One requiring maintenance, maximising the use of the maintenance time available and minimising disruption to train services. Two maintenance loops will be located at intermediate positions along the route, providing additional stabling facilities for equipment and maintenance trains.

4.7. Two new IMD facilities are proposed as part of Phase Two, but the overall infrastructure maintenance strategy for Phase Two is yet to be developed. These facilities are expected to be similar to the Calvert IMD.

5. The infrastructure maintenance depot (IMD) location

5.1. Calvert IMD will be located on land adjacent to the main HS2 route, north-east of the Bicester to Bletchley Line and around 600m south of Steeple Claydon. It will extend due east for approximately 3km. In total it is expected to occupy an area of 37 hectares of land and will be 350m wide at the western end and 100m wide at the eastern end (referred to as option 2.3 as shown in figure 1.0).

5.2. The IMD functional requirements established (as detailed below) were used to assess the suitability of potential IMD sites and ensure that the selection process reflected the need to eliminate sites, which were functionally unsuitable, before consideration of a shortlist on environmental and engineering grounds.

5.3. One key functional requirement considered was that the new IMD had to be directly connected to both HS2 and the classic railway network to allow maintenance materials and equipment to be delivered to the depot by rail rather than by road.

5.4. Other functional requirements were a level and straight site, at least 1km in length, with road connections, away from built up areas and flood plain, and in a location where it would provide a low visual impact.

5.5. An initial assessment was carried out to determine the preferred geographic location for the site. Given the need for the location to be near the middle of the Phase One network and reasonably close to the national rail network, options focused on sites near two rail routes, the Aylesbury–Calvert line (referred to as the Aylesbury Link Railway Line) and the Oxford to Bletchley line (due to be upgraded as part of the East–West Rail project).

5.6. After careful evaluation, Calvert - close to the intersection between the Bicester to Bletchley Line, and with a chord (section of track) linking the two - was chosen as the preferred location. It provides the best access to and from the national rail network, which is essential for the delivery of maintenance materials and equipment.

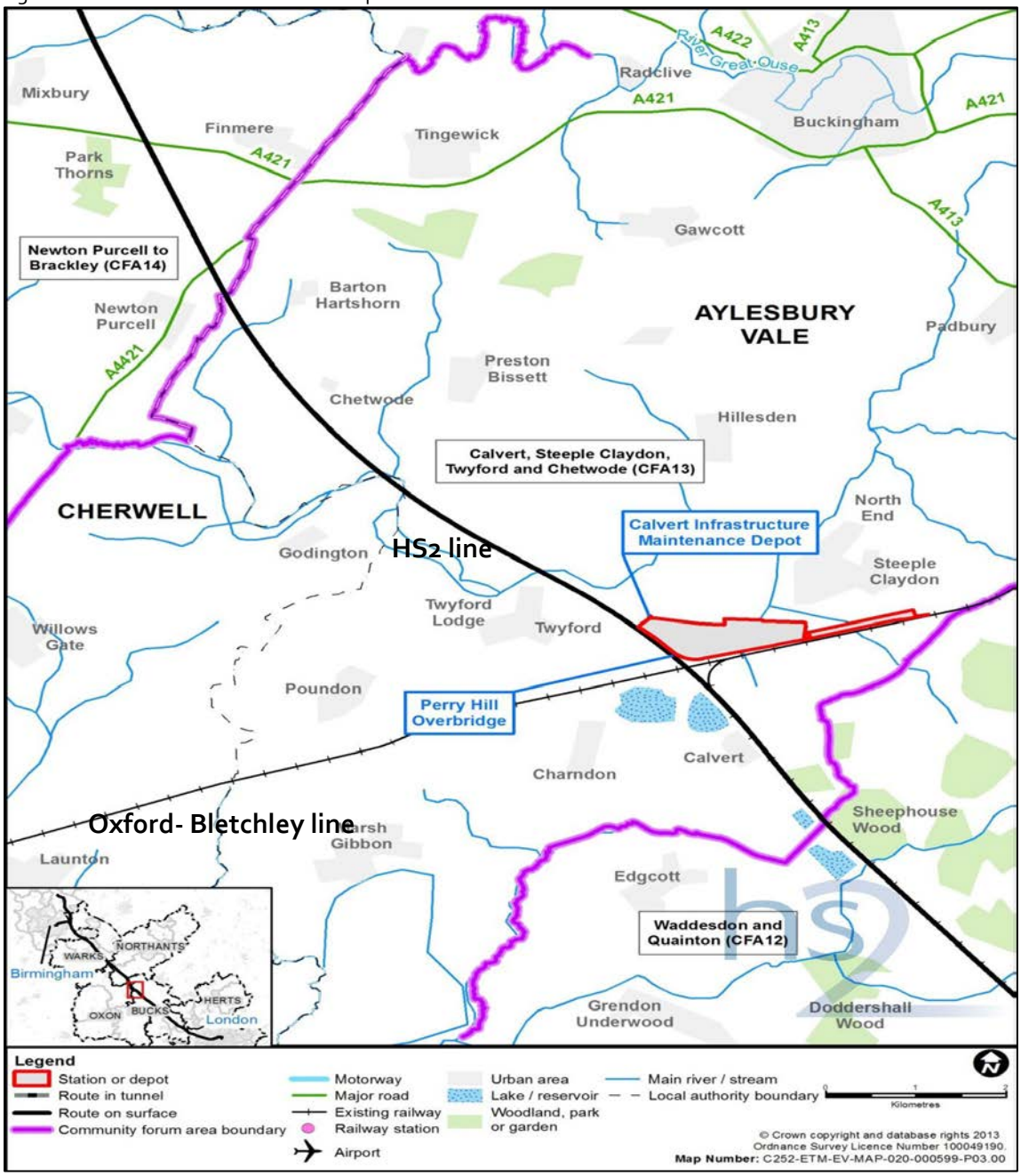
5.7. In 2011, six alternative sites near Aylesbury were evaluated, in response to local concerns raised during consultation regarding road access and the impact of night time working on residents of Steeple Claydon.

5.8. From these six alternate sites, two were initially identified for further investigation: one north-west of Aylesbury Vale Park Station and the other between Aylesbury and Waddesdon Village, close to the A41. However these were later discounted on the basis that:

- each would require new railway lines to be built linking them with the Bicester to Bletchley line which would more than double the build costs and significantly impact the operational costs;
- they were also near planned housing developments; and
- they were both more dominant in the Aylesbury Vale landscape, as they were surrounded by higher ground and elevated viewpoints, (e.g. Waddesdon Hill and Quainton Hill).

5.9. Therefore, on the basis of the process undertaken in 2009, and the subsequent alternative sites review, the original site at Calvert site remained the recommended location.

Figure 1.0: Calvert IMD's location on a map



Source: ES Volume 2 CFA 13 report: Calvert, Steeple Claydon, Twyford and Chetwode

6. Other maintenance features- loops and maintenance bases

6.1. In addition to the Calvert IMD, in order to maintain the railway infrastructure it would be necessary to place maintenance loops (a loop of track located adjacent to the main line) at intermediate positions along the route. This will provide a daytime stabling facility for engineering trains working in locations remote from the IMD.

6.2. The maintenance loops will also allow defective passenger trains to be shunted off the main line to reduce disruption to passenger services.

6.3. The proposed locations for these loops are:

- to the south of the A4010 Risborough Road near Stoke Mandeville; and
- at Wormleighton, south of Ladbrooke.

6.4. In order to minimise disruption to passenger trains, the maximum response time to any incident where an element of HS2 infrastructure has failed, has been set at one hour. The only way of achieving this is by providing additional maintenance bases along the route staffed with rapid response teams.

6.5. These maintenance bases will have facilities for maintenance staff, a small workshop, storage facilities and road access.

6.6. The proposed locations for these maintenance base sites are near Old Oak Common station and Birmingham Interchange Station.

7. IMD site layout

7.1. At this stage, there is only an outline design of the IMD, on which the land requirements and works in the Bill are based. The detailed design of the IMD will be subject to the special planning regime set out in Schedule 17 of the Bill. This means that the final plans and specification for the design of the IMD will be subject to local planning authority approval following Royal Assent.

7.2. The IMD will need to connect to both the northbound and southbound HS2 mainline tracks to allow maintenance trains to easily access the parts of the route where maintenance is required. These connections are made via chords from the IMD to the mainline tracks at Calvert Green and just south of Twyford.

7.3. As the majority of heavy materials will arrive by rail rather than by road, a chord will also be provided to connect the IMD to the Bicester to Bletchley line. Once in the depot these trains carrying heavy materials will be unloaded using rail based gantry cranes in two dedicated sidings where additional lay-down space is provided for the task.

7.4. It is expected that four engineering trains will be based at the IMD, which will undertake track monitoring and maintenance operations on the HS2 line. Engineering trains are 140m long. When in the IMD, they will occupy four out of the six open air train storage sidings within the site or be stored in four sidings within a large stabling shed.

7.5. The IMD will also consist of a range of buildings, varying in size but not exceeding 13m in height. These will include:

- a main workshop with a rail pit for heavy train maintenance;
- a building used to store and maintain vehicles such as fork lift trucks and road vehicles;
- two storage facilities, one covered and one open air, including storage for hazardous chemicals and waste;

- a workshop for light maintenance; and
- offices and accommodation for the IMD workforce.

7.6. There will also be sections of open track used purely for training staff as well as train washing facilities and fuelling points.

7.7. All these requirements have led to the need for a level site with a footprint of approximately 37 hectares that is 350m wide at the western end and 100m wide at the eastern end.

7.8. A planted landscape earthwork bund up to 5m high will be constructed on the north side of the IMD over the entire length to help integrate the site into the landscape and provide visual screening. The earthworks will be installed at an early stage of construction to allow vegetation to establish.

8. IMD operations

8.1. The IMD will be a 24-hour, 7-days-a-week facility. It is understandable that there will be concern about the local impacts of its operation. However, the site has been designed with a significant a level of mitigation to reduce such impacts as far as is reasonably practicable.

8.2. Engineering trains will normally be prepared and teams dispatched from the depot to work on the railway at around midnight each night and return approximately before the closure of the maintenance window, at 0459 Monday to Saturday and at 0759 on Sunday. However, this may vary when responding to incidents and emergencies.

8.3. When in the depot, engineering trains will be maintained almost exclusively within the main workshop shed.

8.4. The main sources of noise are likely to be:

- engineering trains entering and leaving the site;
- trains moving between the stabling yards and the main workshop; and
- the delivery of heavy equipment and infrastructure by rail and lighter equipment by road.

8.5. The site is relatively remote: only a small number of properties have the potential to be affected by the depot's visual impacts or operational noise.

8.6. To reduce the impact on these properties it is proposed to lower the sidings below the level of the surrounding fields, and to construct bunds[2] to the north of the depot to reduce the visible impact and to mitigate the noise.

[2] Earth embankment to mitigate the effects of noise.

8.7. Consideration has been given to reducing light pollution resulting from working at night by:

- keeping the height of external lighting installations as low as possible;
- using automatic lighting control systems with photocells and time clocks to control their operation;
- using LED or low energy lamps; and
- installing low profile lighting and support systems.

8.8. The above descriptions relate to the initial design of the site. More detailed design will be carried out as the scheme progresses, taking into account any changes to the operational regime or maintenance practises between now and opening. This detailed design process will be guided by the same mitigation principles as the initial design.

9. Employment at Calvert IMD and maintenance bases

9.1. It is anticipated that up to 300 people will be employed overall, including staff based at Calvert IMD and at the two maintenance bases. However the majority of staff will be normally working at work sites along the railway line at night and so will be away from the depot for most of their shift.

10. More information

10.1. More detail on the Bill and related documents can be found at: www.gov.uk/HS2