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By email: paulthornton@doctors.org.uk

10 July 2015

Dear Dr Thornton

FOI15-1329

Thank you for your recent information request dated 12 June 2015 in relation to the document *HS2 Guide to Tunnelling Costs*. Your request has been considered under the Environmental Information Regulations (EIR) 2004.

I can confirm that we hold some information in relation to your request. The answers to your questions are provided below:

1. **"This document provides cost estimates under various category headings. Please provide information showing all the subordinate calculations that have been used to generate each of those published estimated values, so that the sub-components used are itemised. Some relevant sub components are listed under several of the categories."**

HS2 Ltd has, at the request of the Common Select Committee, made available a guide to tunnel costs to assist petitioners arguing the case for more tunnelling. The level of detail in the guide was carefully considered to provide assistance, but without compromising HS2 Ltd's commercial position.

HS2 Ltd considers that the release of further estimating detail could compromise the delivery team's ability to secure good value in their future discussions with contractors by creating market expectations in key rates and allowances. We therefore consider that Regulation 12(5)(e) of the EIR applies because the information relates to confidentiality of commercial or industrial information, which is excepted from disclosure subject to the Public Interest Test (PIT). The exception is set out in full in Annex A which is attached to this letter.

In applying the PIT we need to consider whether *"in all circumstances of the case, the public interest in maintaining the exception outweighs the public interest in disclosing the information"*. We have weighed up the benefits to the public of releasing the information against the factors for not releasing it. We consider that the factors for not releasing the information outweigh that for disclosure. Please see Annex B for full details of our consideration.

2. **"Paragraph 1.4 advises that "HS2's designs and associated cost estimates are at an early stage of development and are therefore based on many assumptions". For each sub-component, please provide a. the reference or source for each value incorporated into the calculation. b. any assumption(s) applied in providing each value."**

The design and estimating assumptions that support the guide come from HS2 Ltd's in-house experts and its engineering, construction and cost consultants. The guide does not refer to a specific proposed

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tunnel and sets out generic assumptions including those regarding the tunnel size, method, design speed, lining thickness, productivity, rate coverage and exclusions.

3. **"Paragraph 1.1. of the document confirms that the indicative costs "sit within a range of potential outcomes", and that those ranges have been omitted for "ease of use". Where a selected value was drawn from a range, please provide the range of values for that component and subcomponent of the estimate."**

This phrase in the guide seeks to convey to the uncertainty associated with cost estimates early in the design process. HS2 Ltd has not calculated minimum and maximum values for each component in the guide. However, the Infrastructure UK graph in the guide suggests a range of £20m - £40m per km has been experienced for tunnels of a similar size to those proposed by HS2 Ltd.

4. **"Several components of the tunnelling costs described are time determined. Several of the components are distance determined. The relative and absolute components of each are dependent on the rate of progress of the tunnel boring machines. At paragraph 2.2 it is confirmed that, for the purposes of this guide, a "long" average tunnel construction rate of 80m per week has been assumed. This has the effect of increasing the estimated costs. Please provide the information held by HS2 Ltd to clarify what is meant by a "long" average, and how the figure was derived. Please provide the information held by HS2 in respect of the mean and median tunnelling rate for TBM's of the size described, and of each type, in each of the geological types that they might reasonably be used."**

The 'long average' is the overall length of the tunnel divided by the overall duration of the drive, expressed in metres/week. The long term average is from the day the tunnel boring machine (TBM) starts mining to the day it stops mining. It includes weekends, public holidays and Christmas shut-downs, shaft traverse, cable and pipe extensions and all planned and unforeseen stoppages.

HS2 Ltd relies on the openly published production figures and uses trade and specialist publications, conference papers and information sources such as the website of the British Tunnelling Society (www.britishtunnelling.org.uk).

(Please note that there was no question 5 in your request.)

6. **"The guide includes the cost of two new tunnelling machines for each tunnelled length of route. Please provide the information held by HS2 Ltd in respect of the estimated cost of a. turning a TBM around at the reception end of a tunnel so that it can create the twin tunnel to that which it has already created, back in the other direction. b. moving a TBM further along the line of the route, in the same direction so that the same machine can dig a second tunnel.**

"I understand both of these manoeuvres have been undertaken in the construction of Crossrail."

The costs of re-using a TBM are dependent upon a number of factors including, but not limited to, the following:

- condition of the machine at the end of the existing drive;
- work that has to be undertaken to strip the machine for transportation back to the second bore;
- distance and suitability of transportation routes; and
- programme restraints.

HS2 Ltd estimates that the cost of reusing a TBM in either of the ways described in question 6 would be in the order of £2m (estimating base date, coverage, exclusions etc commensurate with the guide).

7. **"Please provide the most up to date geological analyses held by HS2 in respect of the section of the planned route between Stoneleigh and Packington that clarifies the geological features through which the line will need to be tunnelled and/or excavated."**

The detailed geology for each area can be found in Section 8: Land Quality of the appropriate Environmental Statement Volume 2 Community Forum Area reports for the HS2 Proposed Scheme. The reports are available online via the following link:

<https://www.gov.uk/government/publications/hs2-phase-one-environmental-statement-volume-2-community-forum-area-reports-and-map-books>.

8. **"Please provide any information held by HS2 Ltd in respect of externally validated comparative tunnel cost information updated since the Infrastructure UK cost review from Infrastructure UK that is cited."**

HS2 Ltd does not hold any externally validated comparative tunnel cost information updated since the Infrastructure UK cost review. HS2 Ltd's engineering and estimating advisors are engaged in other projects with tunnelling elements at more advanced stages. Knowledge gained from these projects helps to inform their advice.

9. **"I note that this guide is based upon 2011 values. What information does HS2 hold in respect of increased costs due to inflation and reduced costs through the efficiency improvements of new technology in respect of a. tunnelling schemes and b. general surface major civil engineering costs since 2011, and future projections?"**

HS2 Ltd does not hold project specific estimates that include increased cost beyond the project base date of 2nd quarter 2011. However, HS2 Ltd is monitoring published information in this area and working with colleagues in the Department for Transport and HM Treasury to understand the estimated impact of updating the estimate to more a current base date.

HS2 Ltd understands that recent developments in tunnelling technology have focused more on prevention of settlement than improvement in production rates.

"Please provide all calculation information in the Excel spread sheet format, including the full Excel file that generated the table in appendix A of the guide."

A copy of Appendix A from the report, in 'Excel' format, is attached at Annex C.

If you are unhappy with the way we have handled your request or with the decisions made in relation to your request, you may complain in writing to HS2 Ltd at the above address. Please also see attached details of HS2 Ltd's complaints procedure and your right to complain to the Information Commissioner.

Please remember to quote reference number **FOI15-1329** in any future communication relating to this request.

Yours sincerely

Jane Ivey
Freedom of Information Manager
High Speed Two (HS2) Limited

Your right to complain to HS2 Ltd and the Information Commissioner

You have the right to complain to HS2 Ltd within two calendar months of the date of this letter about the way in which your request for information was handled and/or about the decision not to disclose all or part of the information requested.

Your complaint will be acknowledged and you will be advised of a target date by which to expect a response. Initially your complaint will be re-considered by the official who dealt with your request for information. If, after careful consideration, that official decides that his/her decision was correct, your complaint will automatically be referred to a senior independent official who will conduct a further review. You will be advised of the outcome of your complaint and if a decision is taken to disclose information originally withheld this will be done as soon as possible.

If you are not content with the outcome of the internal review, you have the right to apply directly to the Information Commissioner for a decision. The Information Commissioner can be contacted at:

Information Commissioner's Office
Wycliffe House
Water Lane
Wilmslow
Cheshire
SK9 5AF