High Speed Two Ltd.

HS2 model development: study specification

Version 2

Tender reference: HS2/008

20 April 2011

Contents

1. Introduction

1.1. High Speed 2 Ltd (HS2 Ltd) was established in January 2009 to investigate the feasibility and credibility of building new high-speed rail lines between London and Scotland.

1.2. The first stage of work was the design of a new line between London and the West Midlands, providing a connection to London Heathrow airport. Following delivery of the first stage of work to government during 2009 HS2 Ltd was commissioned to start work on detailed design work of routes north of Birmingham to form a 'Y' network. This work is expected to be completed during 2011. HS2 Ltd was also commissioned to design and deliver the current public consultation on the route between London and the West Midlands as well as manage any discretionary purchase schemes for properties affected.

1.3. HS2 Ltd. is a non-departmental public body of the Department for Transport (DfT) and is entirely funded by central government.

1.4. Further information on HS2 and out work can be found on our website:

www.hs2.org.uk

Field Code Changed

1.5. Information on the high speed rail and earlier work can be found at the DfT website at:

http://www.dft.gov.uk/pgr/rail/pi/highspeedrail/

2. Background

2.1. During 2009, HS2 Ltd developed its modelling framework for the assessment of HS2 options. Given the time available this model had to be based on an existing set of models. The PLANET suite was chosen by HS2 Ltd as the most suitable set of models to address the questions faced by HS2 Ltd.

2.2. The core component of this model is PLANET long-distance (PLD), an updated version of the PLANET Strategic Model (PSM) developed for the Strategic Rail Authority (SRA) in 2001-3 as part of their work on high speed rail. This model is a multi-modal all day model (rail, car and domestic point to point aviation) focusing on long distance (greater than 50 miles) demand. The model itself is an incremental model, forecasting the change in demand as a result of an intervention from an exogenously defined future year do minimum matrix.

2.3. The 2009 update revised the base matrices to 2008 and two forecast years (2021, and – in the current central case – 2043).

2.4. Four further models were added to this model of long distance demand to support the assessment of particular parts of the proposed schemes. These are:

- PLANET South – A model of rail demand in the South (in the weekday morning peak period). This allows analysis of the potential for re-use of released capacity on the West Coast Mainline, as well as to consider the impacts on other rail lines in London and the South;

- PLANET Midlands – Is similar in structure to PLANET South, but covers a much smaller area, as the cordon used for this exercise is much tighter, only covering services that are local to Birmingham itself. Again it is a morning peak rail-only model.

- Station Choice Model (SCM) – Technically a sub-model of PLD, the model supports the allocation of demand between potential high speed stations within London and within the West Midlands; and,

- Heathrow Airport Demand Model (ADM) – a multi-modal model of demand to access Heathrow from areas in the Midlands and North. Its focus is on trips to connect to onward international flights from Heathrow (not domestic point to point trips which are handled in PLD), and was developed to address the potential for HS2 to serve Heathrow.

2.5. Technical documentation on all of these models is available as listed in Section 15.

2.6. The HS2 Ltd. models have been subject to external challenge and review to date. The SCM in particular has been developed and improved following external review for both the modelling of HS2 between London and the West Midlands and the wider wide 'Y' network. HS2 Ltd. judge the models and appraisal results are robust for the purposes they are currently used, however, we now wish to review whether there are any worthwhile improvements that should be considered prior to a Hybrid Bill.

3. Objective

3.1. This project is a scoping study that aims to provide by the end of July 2011 a detailed independent study of the modelling suite developed by HS2 Ltd. to assess the case for a new high speed rail line from London

to the West Midlands. The purpose is to identify and to recommend priority areas for development or enhancement of the HS2 model and evidence base for use in the next stage of work leading to preparation of a hybrid bill should the government decide to proceed with a high-speed rail network. The model development recommended must be completed between September 2011 and the end of December 2012.

3.2. The successful bidder will lead a study to provide recommendations of what developments are necessary, their importance and priority, and a work programme for a second stage of work illustrating how these might be best achieved in the time available. Any (stage two) work to develop the model would be let by separate competitive tender(s) for which the successful stage one contractor could not help to formulate a bid - because of the potential for conflict of interest – although this need not rule out the stage one contractor from being a sub-contractor of any stage two contractor(s). However, bidders for stage one should cost a contract option to allow HS2 Ltd to retain their services to provide ongoing challenge and advice on the stage two programme of work (e.g. as part of the stage two project steering group) subject to an ongoing option not creating a further conflict of interest.

3.3. The scoping study covered by this specification is to be completed within eight weeks of project initiation (i.e. by end July 2011 at the latest) and all recommended work in the second model development stage would be undertaken from September 2011 and must be completed by the end of December 2012.

3.4. HS2 Ltd. is expected to seek approval for construction of this scheme through a Hybrid Bill process in the second half of 2013 (subject to the outcome of the current HS2 London – West Midlands public consultation). The final model developed and the resulting evidence base must be robust to this process. The Crossrail and High Speed 1 (Channel Tunnel Rail Link) hybrid bill processes serve as reference cases for the technical criteria required for HS2 modelling at the hybrid bill stage. However, we also expect the reviewer to ensure the model would be robust to a Public Inquiry standard (where the technical criteria may differ).

4. Scope of work

4.1. The aim of this (stage one) project is to identify any areas of strengthening and improvement in the existing HS2 (London – West Midlands) modelling approach and propose a potential (stage two) work programme to deliver these tasks to ensure the model and forecasts would be fit for the purpose of a hybrid bill. In identifying the work involved in stage two, the scoping study should consider the likely cost,

practicality, deliverability and priority of completing the necessary development work before the end of December 2012.

4.2. The stage one contractor will undertake a review (i.e., a scoping study) of the theoretical grounds for modelling and not a model audit. It should cover both the theoretical approach and the evidence base used for modelling and forecasting HS2 between London and the West Midlands. The contractor will draw on evidence including technical documentation of the model (referenced in paragraph 2.5), existing model outputs, and the views of members of the project steering group. This will also take account of on going development of Y model.

4.3. HS2 Ltd will consider any necessary access to the London – West Midlands model and model runs. Requirements on access and model runs should be identified in the proposal. We envisage the time frame for stage one will limit time to commission new model runs, and therefore may feed into the recommended stage two work programme.

4.4. The stage two programme of work, which would be implemented by separate contract(s), is expected to include primary research, model development and innovation.

5. Implementation and deliverables

5.1. The contractor must set out recommendations for priority areas for the HS2 London – West Midlands modelling suite: to maintain and improve existing strengths of the model; and, to develop or enhance the model so that it would meet the necessary criteria for expert challenge at the hybrid bill stage. Advice should be provided in a technical report for HS2 Ltd.. It should recommend enhancement options and how they might be achieved and implemented in the model.

5.2. The study should be viewed as an independent study and as such has freedom to consider any appropriate aspects of the modelling framework and forecasts of HS2 Ltd. However, the final recommendations must include, but should not be limited to consideration of the following (5.2.2-5.2.8). Other areas of work should be identified and agreed with the steering group by the interim report stage.

5.2.2. Alternative transport models that are currently available or in development – including DfT's Long Distance Model (LDM). Is there learning or evidence that could be drawn from these models? HS2 Ltd. does not rule out the principle of moving from PLANET to using another model, although the implications for cost and time would have to be weighed against the potential benefits of such a change. Is an elasticity-based approach suitable for this kind of modelling?

5.2.3. Base year data

- Should the base year be updated from 2008 to a later year?
- Questions raised by the coverage of the base year demand matrices, particularly the car matrix?

5.2.4. Future year demand

- The evidence of growth in the overall long distance travel market.
- Evidence for saturation in demand in the long term.
- The impact of using external uni-modal forecasts to derive the HS2 base case (i.e. air, rail and car base forecasts are derived from separate sources).
- The exogenous growth in demand for each mode.
- The use of unconstrained demand forecasts: should these be constrained in the HS2 Ltd model (or elsewhere), both in terms of capacity constraints and capping of long term demand.

5.2.5. Mode choice

- The demand model itself in terms of the functional form of the Logit equations, the parameters, hierarchy and the use of mode constants.
- The approach taken to modelling high-speed rail (HSR), and whether this is best represented as part of the classic rail mode or as a new mode (and the evidence base behind this choice).
- Behavioural parameters (e.g. mode constants, behavioural values of time) and resulting implied elasticities from model output.
- Should new evidence be collected through market research or otherwise?

5.2.6. Model structure

- The potential for (and desirability of) adding trip frequency and destination choice into the structure of the model.
- Station choice issues (including methods of calculating generalised costs when new stations are added and the evidence base used in modelling).

5.2.7. Fares

- The most suitable approach to modelling fares for HS2, in particular the impact of different approaches such as pricing HS2 as a premium product and the use of yield management.

5.2.8. Competitive responses

- Are non-modelling approaches (such as separate market analysis) needed? For example, to address different competitive responses in different markets.

5.3. The contractor is not limited by this list or classification of issues, although recommendations should be subject to the stated timing constraints.

5.4. The contractor should propose the format and contents of the interim report which will be agreed at the inception meeting. It should include an outline of the final report to be agreed at the interim report acceptance stage.

5.5. The final report must include project conclusions that:

- identify the areas for development in model and how these could be achieved;
- take account of the likely cost, practicality, deliverability and priority of completing the recommended development work before the end of December 2012;
- include an overall work programme for stage two to achieve the stage one recommendations;
- are written for a technical readership; and,
- are summarised in an executive summary written for a more general readership.

5.6. The following shall be delivered during this assignment:

- a complete project within about eight weeks from the inception meeting;
- an interim and final report. The final report should be a self-contained complete record of the project. It should be written for a technical readership, and include an executive summary;
- all documents should to be delivered in electronic format;
- a final study report to be published on the HS2 Ltd website; and,
- a presentation of results to the Analytical Challenge Panel.

6. Duration and milestones

6.1. The study is expected to commence on 27 May 2011 and must be completed by the end of July 2011. The key milestones are as follows:-

Week ending	Milestone
15 April	Issue ITT
13 May	Deadline for receipt of proposals at midday 10th May
13 May	Evaluation of proposals
20 May	Issue contract
27 May	Inception meeting (week 1)
10 June	Interim report and steering group meeting (week 3)
1 July	Draft final report (week 6)

8 July	Steering group meeting (week 7)
15 July	Receipt of final report (week 8)
July-September	Meeting with Analytical Challenge Panel

7. Experience and competence of project team

7.1. HS2 Ltd is seeking to contract with one or more individuals (or organisations) with internationally recognised leading theoretical (or academic) experience of transport model development to deliver this specification. Prior familiarity with passenger rail modelling is essential.

7.2. HS2 Ltd is willing to consider innovative contractual proposals that might deliver this specification. For example, you may be asked to work with others in the delivery of a final report. Individuals may wish to form a consortium with other individuals or transport consultancy companies to submit a proposal, however, we emphasise that stage one contractors will be unable to help to formulate bids for any stage two work. This need not rule out the stage one contractor being a sub-contractor to a stage two contractor(s) given satisfactory arrangements are in place to guard against the potential for conflict of interest.

8. Points of contact

Procurement Contact	Name	[redacted]
	Tel	[redacted]
	e-mail	[redacted]
	Address (from 18th April 2011)	High Speed Two (HS2) Limited, 2nd Floor, Eland House Bressenden Place, London, SW1E 5DU
Project Lead	Name	[redacted] Analysis and Economics Branch Project Sponsorship Division High Speed Two (HS2) Limited,
	Tel	[redacted]
	e-mail	[redacted]

All queries should be sent to the procurement contact.

9. Progress reporting and contract management

9.1. The project will be overseen by a steering group including;

- Head of analysis and economics, HS2 Ltd
- Head of rail analysis division, DfT,
- one or members of HS2 Ltd's Analytical Challenge Panel, and,
- any other experts deemed appropriate.

9.2. The successful bidder will present and justify their recommendations to the full Analytical Challenge Panel of independent external experts during this process. The Panel members are;

- Robert Cochrane
- Stephen Glaister,
- Peter Mackie,
- Henry Overman.
- David Simmons, and,
- Roger Vickerman

10. Tender evaluation criteria

- Initial proposals on delivering the specification (30%)
- Bidder's expertise: relevant of outstanding/world-class experience in the areas covered by the specification (20%)
- Bidder's evidence of similar contracts and the results achieved (10%)
- Availability and commitment to the project (10%)
- Fee proposal (30%)
- Conflicts of interest (pass or fail)

10. Proposals

10.1. The proposal should include:

- initial proposals on delivering the specification (we suggest 2 pages maximum length). Any additional evidence included in appendices should support core text but note that these may not be read in full by the tender evaluation panel;
- details of the bidder's expertise and evidence of similar contracts, including qualifications, relevant experience, where they will be based (we suggest a 2 page CV per member of the bid);

- details availability and commitment of project leadership in multi member teams;

- fee proposal (prices to be quoted exclusive of VAT):
    - a firm fixed-price bid for this (stage one) specification is required. This should include an allowance for four meetings/presentations either at HS2 Ltd offices or via telephone/video-conference if this is more cost effective;
    - an indicative fee proposal on a time and materials basis for delivering on going challenge and advice on the Stage two programme of work;

- travel, subsistence and any other costs – to be consistent with "HS2 Contract Expense Reimbursement";

- acceptance of HS2 Ltd Terms and Conditions of Contract (sole traders should agree with any variation to the insurance conditions, section 16);

- confirmation that if appointed a stage one contractor would not then assist others formulate bids for any stage two work.

10.2. The tender should be valid for a minimum of 60 days.

11. Payment

11.1. Invoices: 50% on acceptance by the steering group of the interim report, 50% an acceptance by the steering group of the final report.

11.2. The contractor should submit invoices in arrears to:

HS2 Accounts Payable
HS2 Limited
2nd Floor, Eland House
Bressenden Place,
London, SW1E 5DU
T: 020 7944 6074

or HS2accountspayable@hs2.gsi.gov.uk

12. Procurement arrangements

12.1. HS2's standard terms and conditions shall apply, these are attached.

12.2. One soft copy of responses shall be submitted electronically by midday, on Tuesday the 10th of May 2011, addressed to the procurement contact,

Nick Seaward. Please contact the project lead for further clarification regarding administrative arrangements if required.

13. Contract management arrangements

13.1. The consultant should nominate a project manager who should act as a single point of contact with responsibility for the effective delivery of all aspects of the service of this contract.

14. Other work

14.1. Conflicts of interest must be avoided. Please detail any work for which there could be a possible conflict of interest (e.g. membership of DfT PLANET panel) or a perception of this and how you propose this would be managed, for example, at stage two. HS2 retains the right to take its own view.

15. References

Technical documentation on all of these models is available as listed below:

- Six reports providing technical documentation of the model, were published in March 2010 and can be found at the following address. Of these six reports the "Model Development Report" is the most significant.

http://webarchive.nationalarchives.gov.uk/20110131042819/http://www.dft.gov.uk/pgr/rail/pi/highspeedrail/hs2ltd/appraisalmaterial/

- The March 2010 London - West Midlands demand and appraisal report is at :

http://webarchive.nationalarchives.gov.uk/20110131042819/http://www.dft.gov.uk/pgr/rail/pi/highspeedrail/hs2ltd/demandandappraisal/

- Presentation slides for HS2 technical seminars that provide an overview of the demand information and the modelling approach can be found at:

http://www.hs2.org.uk/publications/HS2-Ltd-Technical-Seminars-61736

- HS2 Ltd is currently updating the model's technical documentation to reflect the modelling undertaken for the current London - West Midlands consultation. These reports will be published during April and May 2011 at

http://www.hs2.org.uk/supporting-documents-temp