PROPOSED CHILTERN RAILWAYS (BICESTER TO OXFORD IMPROVEMENTS) ORDER

CHILTERN RAILWAYS' REBUTTAL PROOF OF EVIDENCE

IN RELATION TO THE OBJECTION AND EVIDENCE OF ROBERT HOPE

1 Introduction

1.1 This rebuttal proof of evidence has been prepared on behalf of the Chiltern Railway Company Limited (Chiltern Railways) to respond to further aspects of the objection and evidence of Robert Hope raised in his further Statement of Evidence [**OBJ179/2**] dated 5 November 2010.

2 Defined Terms

2.1 The following defined terms are referred to throughout this rebuttal proof:

"the Objector"	means Robert Hope;
"the Objector's evidence"	means the Statement of Evidence 5 November 2010 attached as Appendix A to this rebuttal;
"the Order application"	means the application for the proposed Order submitted on 6 January 2010 and the Proposed Modification dated 9 September 2010; and
"the proposed Order"	means the proposed Chiltern Railways (Bicester to Oxford Improvements) Order.

3 Chiltern Railways' Rebuttal of the Objector's Evidence

Context

3.1 The Objector lives at 84 Ulfgar Road, Wolvercote which is some 18 metres from the railway line. The Objector has raised further questions of clarification since the submission of the rebuttal to his evidence [**CRCL/R/OBJ/179**].

Accuracy and Reliability of Demand Forecasts, Leo Eyles

3.2 The Objector is seeking clarification on the issue of lack of statistical data on model fit, citing regression models as examples where this is commonplace.

3.3 The models which underpin the Chiltern Railways forecasts are not regression models but specific forecasting models commonly employed for the purpose of estimating demand for rail services. However, statistical robustness has been applied to the derivation of the techniques and parameters included in the Passenger Demand Forecasting Handbook, from which the models developed draw parameter values. The MOIRA model, for example, forms part of the Department for Transport (DfT)'s WebTAG guidance for the conduct of transport studies in England. As such it *"should be seen as a requirement for all projects/studies that require government approval"* (WebTAG 3.15.4) and forms a common basis for Government investment decisions in Transport. Inquiry document INQ/22 gives more detail on model robustness for the scheme and is attached as Appendix B to this rebuttal.

Relevant Scope and Limitations of Demand Forecasts, Leo Eyles

3.4 The Objector states concerns that no primary data has been collected to model transport choices given competing alternative travel choices. He also questions whether stated choice methods should be used.

3.5 The MOIRA model is a direct demand approach which relies on a very substantial set of evidence, as detailed in the Passenger Demand Forecasting Handbook, which predicts how rail service changes (frequency, journey times, convenience, access/egress times, fares) will alter rail demand. This evidence draws on both revealed preference and stated preference/choice studies to underpin model parameters.

3.6 The Objector is correct in saying that no data describing other modes has been included in the forecasting of demand between this area and London. Where there is a relatively mature rail market and the change is incremental the guidance (WebTAG 3.15.4 and hence PDFH) is to use an elasticity approach based on the existing rail market.

3.7 WebTAG module 3.15.4 states:

Unfortunately [multi-modal] models are not used more widely for planning our railways due to a number of key weaknesses when used to forecast the demand for rail travel. These can be broken down into practical and theoretical considerations. In practice there are three inter-related issues:

- *The expertise, model inputs and processing requirements required to run multi-stage demand models mean they are generally expensive to build, maintain and use.*
- *Even with the most generously funded projects, obtaining sufficiently comprehensive and detailed data to achieve an accurate calibration can be difficult. The burden of obtaining a sufficiently large sample of rail users and trips from household surveys is significant. In addition, for longer distance travel (where rail is often more competitive), data on car travel is relatively weak and difficult to collect.*
- *Possibly as a consequence of relatively small sample sizes, existing multistage models are less accurate when forecasting demand for minority modes such as rail e.g. rail constitutes between two and three per cent of all journeys within Great Britain.*

3.8 It is worth noting that the primary data approach outlined by the objector is similar to that used for estimating demand on non-London flows where the service change is more significant and there is a relatively small (or no) existing rail market. In this case the revealed preference data was extracted from Census Journey to Work data and rail and competing modal alternatives (car, bus) were characterised in terms of journey time, cost and frequency.

3.9 A bespoke Stated Preference approach is normally employed to estimate parameters that cannot easily be measured by observation (ie Revealed Preference data). This might be where a new mode of travel is introduced, such as light rail transit. This is not the case for the Scheme being considered.

Cost Benefit Analysis, Leo Eyles

3.10 The Objector argues there is a significant omission in the CBA in not applying the recommended use of 'switching values' (Green Book, p32) which shows how much a variable would have to fall/rise to generate a cost-benefit ratio of one.

3.11 Without the formal use of switching values, Mr Eyles's evidence [**CRCL/P/5/A**] does indicate (paragraph 4.34) the impact of including much lower (50%) demand growth on the BCR, falling from 3.8:1 to 3.1:1.

3.12 Further analysis demonstrates that:

- for the BCR to fall to 1:1 just 17% of user/non-user benefits would need to be realised
- if user and non-user benefits fell by 50% then the BCR would be 2.1:1
- it would take a 355% increase in capital costs to reduce the BCR to 1:1.

3.13 This analysis demonstrates that the scheme appraisal (Benefit:Cost Ratio) is extremely robust and can be relied upon to deliver net social and economic benefits.

4 Conclusion

4.1 This rebuttal proof responds to the additional questions raised by the Objector.

4.2 The demand assessment detailed in Mr Eyles Proof of Evidence [**CRCL/P/5/A**] and the methodology set out in Demand and Revenue Forecasting for Evergreen 3 Bicester-Oxford Scheme [**CD2/30**] is consistent with standard industry practice.

Appendix A

CRCL/INQ/22

CRCL/INQ/22

PROPOSED CHILTERN RAILWAYS (BICESTER TO OXFORD IMPROVEMENTS) ORDER

NOTE TO THE INSPECTOR ON

EVIDENCE OF THE ROBUSTNESS OF THE BUSINESS CASE MODEL

1 Introduction

1.1 This note has been drafted in response to the Inspector's request for evidence that the models used by Leo Eyles in his evidence [**CRCL/P/5/A**] are robust. Specifically, evidence is required in three areas:

- Evidence of the suitability of MOIRA as an appropriate model for rail demand forecasting;
- Evidence that the catchment model is robust, using out-turn data if possible; and
- References to specific WebTAG modules followed

2 The Models

MOIRA

2.1 WebTAG sets out the Department for Transport (DfT)'s guidance for the conduct of transport studies in England. As such it *"should be seen as a requirement for all projects/studies that require government approval"* and forms a common basis for Government investment decisions in Transport.

2.2 DfT guidance on rail demand forecasting is summarised in WebTAG unit 3.15.4. "*The purpose of this unit is to describe the approach to demand forecasting required by the DfT for estimating future rail patronage."* This unit (in both its existing version and the draft version which is currently out to consultation) endorses many of the methodologies set out in different versions of the Passenger Demand Forecasting Handbook (PDFH).

2.3 The recommendations include the current PDFH (v5) guidance on the Generalised Journey Time (GJT) approach to estimating the impact of timetable changes on rail demand. This approach is generally undertaken using the MOIRA software (as also described in Unit 3.15.4), which is little more than a calculation device for implementing the recommended GJT approach.

2.4 PDFH has been regularly updated to encapsulate all recent research. This research includes comparisons of outturn and forecast demand changes, although usually in an aggregate form together with other variables (such as GDP) in an econometric analysis. DfT have also regularly updated their Guidance for the use of PDFH, as described above. We consider that this endorsement, which has taken place in the knowledge of the use of MOIRA, means that the use of GJT and MOIRA is the most appropriate method for modelling the impact of incremental timetable changes on rail demand in England.

The Catchment Model

2.5 Appendix LAE2 to Leo Eyles's evidence [**CRCL**/**P**/**5**/**B**] gives the background to the development of this method and refers to recent examples of its use, including for stations which have since been built. In addition it refers to the recent 'Station Usage and Demand Forecasting for Newly Opened Railway Lines and Stations' study carried out by Steer Davies Gleave for DfT and Transport Scotland (TS). This study has been completed, although not yet published, and DfT and TS have not yet expressed a formal view on the study's findings.

2.6 The aim of this study on new stations was to investigate whether or not actual demand at new stations is significantly different from forecast, and if so, why.

2.7 The study included a review of the forecasts for 23 new stations, using a variety of different approaches. A view was taken that a reasonable level of accuracy for the forecasts was +/- 20%, and 9 (approximately 40%) of the forecasts were within this benchmark, while a number were outside the +/- 50% range. To help improve the accuracy of forecasts for new station openings, the study included some guidance for the preparation of demand forecasts for new stations, and a checklist for factors that should be taken into account.

2.8 Recommendations were not made on the methodology that should be adopted (aside from what the methodology should cover), although the feasibility of adopting a single standard approach was tested. This involved applying a "station catchment" based method to five case studies. This method incorporated the key influences on station forecasts identified from the analysis and included on the station forecast checklist.

2.9 *Table 1* shows the results of the four case studies involving producer (origin) stations, the first three of the forecasts were within +/- 6% of the outturn demand and the fourth within 21%. The latter's poorer performance was attributed to the use of parameters derived in the South East of England. In practice more local parameters would have been derived for a more detailed forecasting exercise. Also, it is likely that part of the reason for the slight overestimation of demand in the middle two cases was that demand was still ramping up to its full potential in 2008/09.

Table 1: Comparison of Standard Catchment Forecasts of Station and Outturn Demand

Station	Opening Date	Forecast Demand (08/09)	Outturn Demand (08/09)	% Difference
Chandlers Ford	Dec 2004	223,115	236,102	-6%
Mitcham Eastfields	June 2008	210,778	199,132	6%
Newbridge	Feb 2008	122,462	115,676	6%
Larkhall – Chatelherault	Dec 2005	602,394	474,902	21%

2.10 The station catchment method used for forecasting demand at Water Eaton Parkway and Bicester Town for travel to London, is consistent with this method.

WebTAG

2.11 Aside from WebTAG unit 3.15.4 described in the MOIRA section above, the other area in which WebTAG guidance has been followed is in the development of the economic assessment. The specific units which have been followed are:

- 3.5.4, which outlines in full the Cost Benefit Analysis approach
- 3.5.6, which describes Values of Time
- 3.5.9, on the treatment of costs, and in particular optimism bias
- 3.5.14, on Wider Economic Benefits
- 3.13.2, which sets out the approach for estimating highway benefits due to rail improvements