

## INTERIM ADVICE NOTE 106/08

### Guidance Note for Traffic Consultants Employed on Highways Agency Schemes

#### **Summary**

This Interim Advice Note provides guidance for the use of DMRB, WebTAG, CHE Memos and IAN's in the delivery of traffic and economic assessment of schemes in the Highway Agency's promoted schemes in the Programme of Major Schemes

#### **Instructions for Use**

This IAN provides guidance and information for immediate use.

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## 1 Introduction

### 1.1 Background

This document is intended as a guide to consultants undertaking traffic modelling and economic assessment of Highways Agency (HA) promoted highway schemes within the Programme of Major Schemes (PMS), normally costing more than £5M. It will act as a reference tool to aid consultants in the delivery of reports used in the assessment and decision making of Highway Agency schemes. It will also be used by Highways Agency staff, normally from within the HA's Traffic Appraisal, Modelling and Economics (TAME) team in their roles as Appraisal Certification Officers for the schemes.

Traffic models provide a key role in the process of appraising projects in accordance with Treasury Guidance (The Green Book), and are used to inform several elements in the delivery of transport schemes, including the following:

- ◆ Scheme identification and option selection;
- ◆ Scheme development: route standards, junction layouts, weaving lengths;
- ◆ Scheme design: merge and diverge type, junction capacity, pavement design;
- ◆ Economic assessment; and
- ◆ Environmental Assessment: air, noise and water quality calculations.

The requirement to produce data for different audiences underlines why a robust traffic model is critical to the delivery of a successful scheme. This responsibility calls for a schemes traffic team to undertake traffic analysis in accordance with the guidance as specified by both the Department for Transport and the Highways Agency.

The objective of this note is to provide guidance that will identify the stages required in the modelling and appraisal of an individual scheme and provide references to the published documentation.

This note is in the form of guidance only. It is intended to assist consultants in carrying out their contractual obligations effectively rather than imposing additional requirements. Any conflicts between this note and contractual documents should be discussed with the HA Project Leader.

### 1.2 Documents

The traffic modelling and economic appraisal of roads is a complex process which is detailed in a number of key documents published by the Highways Agency and Department for Transport, as follows:

#### Highways Agency Published Documents

Current guidance on the assessment of HA road schemes is based on the Design Manual for Roads and Bridges (DMRB) documentation that was first compiled in the 1980s. The section relating to traffic appraisal is DMRB Volume 12, and is split into two sections as follows:

- ◆ DMRB – Volume 12 Traffic Appraisal of Road Schemes Section 1 Traffic Appraisal Manual – Part 1 The Application of Traffic Appraisal to Trunk Roads Schemes.

This section was first published in 1981 as the Traffic Appraisal Manual it has subsequently been updated in August 1991 and then again in November 1997. The 1997 update incorporated guidance on induced traffic arising from the Standing Advisory Committee for Trunk Road Assessment (SACTRA) 1994 report 'Trunk Roads and the Generation of Traffic'.

- ◆ DMRB – Volume 12 Traffic Appraisal of Road Schemes Section 2 Traffic Appraisal Advice – Part 1 Traffic Appraisal in Urban Areas.

This section was published in May 1996 and incorporated recommendations from the SACTRA 1986 report 'Urban Road Appraisal', and advice based on SACTRA 1994 'Trunk Roads and the Generation of Traffic'. The latter document resulted in a specific section entitled 'Guidance on the Modelling of Induced Traffic' which was used as the main guidance for variable demand modelling, until it was recently withdrawn (in July 2006).

These two sections have formed the major reference source on the guidance for the development of traffic models for the assessment of road schemes for over 20 years.

### **Department for Transport Published Documents**

Since June 2003 the Department for Transport has been developing new guidance for the appraisal of transport schemes seeking central government funding. This is known as Transport Analysis Guidance and is generically referred to as WebTAG. It applies to HA road schemes as well as those promoted by local government and public transport schemes.

WebTAG covers a broad range of issues including traffic and economic assessment. The documents are split into three types; 'Overview', 'Project Manager' and 'Expert' which largely reflect the level of detail and the likely users.

### **Additional Documents**

The HA publishes further advice to address specific issues as they arise, in the following forms:

- ◆ Interim Advice Notes (IANs); and
- ◆ Chief Highways Engineer (CHE) Memos.

Interim Advice Notes are intended to be used as a temporary way of updating the content of DMRB. At the time of writing there are two which relate to traffic modelling and appraisal;

- ◆ IAN 36/01 The Use and Application of Micro-Simulation Traffic Models;
- ◆ IAN 39/01 Before and After Monitoring – Post Opening Evaluation Studies and Traffic Impact Studies – Revised guidance for DMRB Vol 12 Ch 16.

Chief Highways Engineer memos are usually used to introduce IANs or changes to WebTAG, expanding on the advice as necessary to make it applicable to HA schemes. The Memos are for internal HA to use, but the contents are normally made available to consultants and other interested parties. Relevant CHE Memos are referenced in this Guidance Note where appropriate.

In addition, there are several key software suites that have been developed by the Department for Transport for use in the assessment process that have 'User Guides' and 'Guidance Documents' available. The main suites are:

- ◆ TEMPRO – Trip End Forecasts;
- ◆ DIADEM – Variable Demand Modelling;
- ◆ TUBA – Transport User Benefit Appraisal;
- ◆ COBA – DMRB Volume 13 – Economic assessment of highway schemes, primarily used for assessing accident benefits;
- ◆ QUADRO – DMRB Volume 14 – Economic assessment of delays during construction and maintenance
- ◆ INCA – Incident Cost Benefit Analysis.

These documents will also be referenced in the Guidance Note where appropriate.

### 1.3 HA Scheme Overview

**Note: This section may need some amendment to fully reflect the post-Nichols situation.**

Documentation of the traffic assessment, modelling and economic appraisal undertaken in the course of developing a HA road scheme is a key requirement for ensuring decisions are supported by robust assessment and data. The life of a major highway scheme passes through several decision stages where specific documentation is required. These stages are as follows:

- ◆ Public Consultation (PC);
- ◆ Preferred Route Announcement (PRA), usually concurrent with entry to the Programme of Major Schemes;
- ◆ Order Publication Report (OPR);
- ◆ Ministerial Decision to make orders (often following a Public Inquiry); and
- ◆ Commitment to works expenditure stage.

The PC and PRA stages historically occurred after Programme Entry but now PC usually precedes Programme Entry and PRA occurs concurrently with Programme Entry. The assessment reporting requirements are outlined in DMRB Volume 5 Section 1 Part 2 TD37/9 and are summarised as follows:

- ◆ Stage 1 – identify the environmental, engineering, economics and traffic advantages, disadvantages and constraints associated with broadly defined improvement strategies;
- ◆ Stage 2 – identify the factors to be taken into account in choosing alternative routes or improvement schemes and to identify the environmental, engineering, economic and traffic advantages, disadvantages and constraints associated with those routes or schemes; and
- ◆ Stage 3 – identify the advantages and disadvantages, in environmental engineering, economic and traffic terms, of the overseeing department's preferred route or scheme option.

These three stages historically generally corresponded to the following periods in the decision process.

- ◆ Stage 1 prior to TPI Entry;
- ◆ Stage 2 prior to Public Consultation; and
- ◆ Stage 3 prior to publication of orders, but after the selection of a preferred route. As a result of the post Nichols changes, further guidance will be needed on the various Stages.

One aim of the staged assessment reporting process is to convey to the public and statutory bodies the likely impacts of the scheme to enable comments on the proposals. The desired content of the five traffic and economics reports should be expressed without bias and as far as practical in non-technical terms. The reports must be capable of being understood by a lay reader and yet at the same time be capable of withstanding rigorous examination and challenge in a public arena (such as a Public Inquiry or even in the High Court). They should be set out clearly and logically. In particular, all abbreviations and acronyms should be explained in a glossary of terms and adequate references to other quoted documents should be provided.

Guidance in WebTAG Unit 1.3 – Trunk Roads, discusses the staged process used in DMRB and states that the approach is compatible with the New Approach To Appraisal (NATA)

adopted in WebTAG. The WebTAG guidance is concerned with the way in which solutions are identified as well as the way in which they are appraised. In essence, the WebTAG process includes:

- ◆ Identification of the problems to be addressed (and/or the identification of local or project- specific objectives to be met);
- ◆ Identification of a wide range of solutions to be considered; and
- ◆ Distillation of the solutions to identify the preferred solution.

WebTAG Unit 1.3 then outlines the compatibility between the three stages of highway appraisal and WebTAG to be as follows:

- ◆ Problem identification will usually have been completed at Stage 1;
- ◆ Identification of potential solutions will generally span Stages 1 and 2; and
- ◆ Selection and refinement of the preferred solution will be carried out in Stages 2 and 3.

The above may be subject to some revision in the post-Nichols situation.

#### **1.4 Scheme Reporting**

The reporting used to convey the traffic and economic appraisal of a scheme should comprise the following five reports:

- ◆ Work Programme Report
- ◆ Traffic Survey Report;
- ◆ Local Model Validation Report;
- ◆ Forecasting Report; and
- ◆ Economic Assessment Report.

The Work Programme Report outlines the traffic assessment requirements while the four subsequent reports detail the process supporting the traffic and economic assessment. The level of detail in the traffic and economics reports will be revised as the scheme progresses. At Stage 1 traffic modelling and economics may be based on a strategic model or an initial 'Local Area Model'. At the later stages a comprehensive Local Area Model is likely to be developed that incorporates more detailed data, resulting in more refined modelling and economics. Models are also revised in relation to changes in the status of input assumptions, particularly where land use strategies are adopted or new guidance is published affecting the key modelling assumptions. After the Order Publication Report (OPR) stage, there is usually little change in the traffic and economic appraisals, other than updating of the scheme costs, unless the scheme is changed as a result of the Public Inquiry process or because the appraisal methods and/or parameters change.

It is inevitable that during the development of a scheme changes to the model structure, input data or parameters will occur. When such changes are made, it is necessary to consider whether a new edition of the report is necessary. This would ensure that the original details are kept in the first edition, whilst subsequent editions contain the relevant amendments. Following this procedure will allow all parties involved to track changes as the project progresses. The planning stage may span a long time period so having multiple editions of each report to refer to will be a useful tool for those involved in the project.

The traffic and economic reports also inform other reports, including the Environmental Statement, Technical Appraisal Report, Scheme Assessment Report and the Appraisal Summary Tables.

The reporting requirements for four reports detailing the development of the traffic models are outlined in DMRB Volume 12 in terms of general content. However, aspects of the process need to conform to WebTAG guidance.

### **1.5 Economic Assessment Software**

The economic assessment process uses several software suites that have been written specifically for this purpose which use, as input data, output from traffic models. The output from these software suites provide important contributions to the Appraisal Summary Table (AST) and decision concerning scheme progression. Consequently, the outputs require rigorous review. To aid this process, guidance has been developed as follows:

- ◆ TUBA Guidance on checking TUBA Outputs – Feb 2006 – HA by Mott MacDonald;
- ◆ COBA – DMRB Volume 13 Section 1, Part 7 How to Use the COBA Program, Chapter 5 Some Notes on the COBA Output;
- ◆ QUADRO – DMRB Volume 14 Section 1 Part 3 The Application of QUADRO, Chapter 7 Notes on How to Validate a QUADRO Appraisal;
- ◆ DIADEM – Still to be written; and
- ◆ INCA – Still to be written.

The above guidance should be used by the Project Team when compiling results for inclusion in the 'Economic Assessment Report' and its use and any other checks should be evidenced to demonstrate that the results reported are reasonable.

## **2 CONTENTS GUIDES**

A key feature of any guidance note is transparency. However, with the creation of WebTAG alongside DMRB, the assessment process has become less clear and can appear to be more complicated. To improve this situation, this guidance note will focus on the delivery process as defined by the reporting requirements. 'Contents Guides' are therefore provided for each of the five reports that relate the existing guidance to the information required for the reports. Each section of the report is cross referred to DMRB, WebTAG and other guidance sources commonly used in the traffic and economic assessment process.

The use of 'Contents Guides' therefore helps to ensure that the relevant technical guidance has been consulted when preparing each section in the documentation of a scheme's traffic and economic results.

The 'Contents Guides' for each of the five reports are given in tabular form in sections 2.1 to 2.5. Specific references to DMRB Volume 12 and WebTAG are set out in columns 2, 3 and 4 with references to other documents and other freestanding advice being included in the comments column.

## 2.1 – Work Programme Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
<b>Study Overview</b>			Unit 1.2.1, Unit 1.2.2	
Statement of scheme objectives.	2.3.1 to 2.3.5	2.1.1 to 2.1.4	Unit 1.1, Unit 1.2.1, Unit 1.2.2, Unit 1.3, Unit 2.1, Unit 2.2	
Statement of why model is required.	Chapter 2, 11.4.1 and 11.4.4	4.1.1 B1, B2	Unit 3.1.2 Para 3.7	
History of the scheme, usually limit to no more than last 10 years.				
Discussion of how the traffic modelling contributes to the 'Scheme Assessment Reporting' and provide information on what stage the project as reached				DMRB Vol 5 Section 1 Part 2 TD 36/93 'Scheme Assessment Reporting'
Discussion of how the scheme fits in with the HA objectives, route strategies etc.				
Discussion of how the scheme fits in with 'Regional Transport Strategy'.				
<b>Reason for Traffic Model</b>				
Discussion of problems the traffic model will investigate.	1.1.4 to 1.1.7	1.26 to 1.2.9	Unit 1.3 Para 1.1, Unit 1.3 Para 1.2, Unit 1.3 Para 2.1, Unit 1.3 Para 2.2	
Discussion of how the traffic model will aid in the identification of solutions.			Unit 1.3 Para 2.1, Unit 1.3 Para 2.2, Unit 1.3 Para 3.1, Unit 1.3 Para 3.2	
Discussion of the stage the scheme is at in the HA processes from TPI entry to construction.			Unit 1.3 Para 2.2	See discussion in DMRB Vol 5 Section 1 Part 2 TD37/9



## 2.1 (continued) – Work Programme Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
<b>Planning /Policy Issues</b>			Unit 1.3 Para 2.2	
Review of Regional Planning Issues.				
Review of Policy Issue and Instruments that may influence the scheme			Unit 2.3	
Review of Developments that may impact on the scheme.				
Review of Regional Funding Allocation				See draft WebTAG Unit 3.15.1
<b>Model Development Approach</b>				
Review of existing models, including Multi-Model Models, Regional Models, and Local Area Traffic models developed by HA and by other parties such as Local Authorities.			Unit 1.2.2	Discussions with relevant Local Authorities may reveal existing models that could be utilised or enhanced
Identify how existing models can be utilised in the development of the scheme related model.			Unit 1.2.2	
Discussion of the Traffic Model Structure, summarising usage of Land Use Models, Mode choice, Time of Day choice.			Unit 3.11	Unit 3.11 gives various model structures.
Discussion on the choice of software used with reference to how robust it is at representing issues relevant to the traffic modelling requirements				Choice of software can influence the ease of use and the facilities available to investigate traffic problems
Discussion of modelling assumptions including statement on their robust within the context of the study.				
Overview of approach used to represent the supply network, making reference to use of existing models, requirements for data collection.	Chapter 3	Chapter 2, 3, and 4		

## 2.1 (continued) – Work Programme Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
Overview of approach used to represent the demand for travel, making reference to use of existing models and requirements for data collection.	Chapter 6	4.3.1 to 4.3.41		
Overview of calibration process used to developing travel demand, network integrate and assignment routing	Chapter 8			
Overview of assignment process to be used, with discussion of the algorithms and parameters to be employed	Chapter 9 and 10			
Overview of validation including definition of validation criteria to be adopted by study.	Chapter 11	4.3.42 to 4.3.47		
Overview of forecasting approach, with reference to choice of opening and design year	12.3.6 to 12.3.10	5.2.1 to 5.2.3	Unit 3.5.4 Para 4.2	
Overview of the Variable Demand assessment requirements and how this has been given full consideration in the development of the base year and forecast traffic models.	Chapter 5 Chapter 12	Chapter 5	Unit 3.10	
Description of assessment requirements including reference to economic, environmental and operational.	Chapter 13, 14, 15		Unit 3.5.1, Unit 3.5.2, Unit 3.5.3, Unit 3.5.4, Unit 3.5.6, Unit 3.5.8, Unit 3.5.9	Review requirements as specified in DMRB Vol 13 – COBA, DMRB Vol 14 – QUADRO, and TUBA manual.
Description of Risks in the modelling process specific to this scheme.			Unit 3.5.9 Para 3.1 to 3.7	
Description of approach to be adopted for 'Before and After Monitoring'.	Chapter 16 1.1.3			See CHE 102/2001, and Interim Advice Note 39/01

**2.1 (continued) – Work Programme Report**

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
<b>Log of Changes</b>				
Summary of changes to the traffic model since the creation of the Traffic Model Scoping Report, with reasons why the modelling process was modified with a comprehensive list of benefits and dis-benefits.				
Identification of changes in the assessment requirements that impact on the traffic model robustness.				
Summary of key staff responsible for the traffic model, names of project manager, traffic team leader and senior modellers or equivalent.				To enable a discussion of the model if the model is updated subsequently in further studies

## 2.2 – Traffic Survey Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
<b>Study Overview</b>			Unit 1.2.1, Unit 1.2.2	
Statement of scheme objectives.	2.3.1 to 2.3.5	2.1.1 to 2.1.4	Unit 1.1, Unit 1.2.1, Unit 1.2.2, Unit 1.3, Unit 2.1, Unit 2.2	WebTAG sets the current framework as defined by the DfT.
Statement of why data are required.	6.1.1 to 6.1.5	2.10.1, 3.1	Unit 3.1.2 Para 3.7	
<b>Definition of Data Requirements</b>		3.2	Unit 3.1.5	
Statement of context and justification of why the data is required by the study.	5.1.1 to 5.1.6, 6.1.11 to 6.1.14	3.1.1	Unit 2.1 Fig. 2.1, Unit 2.1 Para 1.3.8 to 1.3.9	WebTAG refers to DMRB Volume 12 for general advice on travel demand surveys
Review of existing data sources, with reference to whether the data will be used in the study.	2.4.3	2.10.2 to 2.10.3, 3.1.4, 3.3.1 to 3.3.6,	Unit 3.1.1 Para 1.2.3, Unit 3.11.1 Para 10.1 to 10.3	Existing models need to be reviewed, and travel demand sources identified.
Details of existing location, type and date of surveys, shown on a plan or map.		2.10.2, A6.1		
Summary of why the data is being collected, with reference to usage later in the study.	6.1.12 to 6.1.14	3.1.1, A1.1	Unit 3.1.2 Para 3.7.3	
Details of survey programme highlighting the types of data to be collected.	6.1.15 to 6.1.24	2.10.1, 3.1.4, A1	Unit 3.10.2 Para 1.6.1 to 1.6.27	
Details of any 'Pilot Surveys', including information on how the pilot informed the main surveys.	6.1.25	A6.1		
If a large scale survey programme, a summary description of the types of survey undertaken with supporting plans illustrating the different survey types on a common plan.	6.1.15 to 6.1.16	A1, A6.1	Unit 3.11.2 Para 11	

## 2.2 (continued) – Traffic Survey Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
<b>General Details for Each Survey</b>	6.1	A1		See also IAN 30/01
Plan of survey locations.	6.1.15 to 6.1.16	A1.3, A6.1		
Tabulation of surveys giving date, day of week, duration of survey and location including OSGR.	6.1.16, 6.1.19 to 6.1.20	A1.3, A6.1		
Commentary on survey process.	6.1.23	3.1.4, A1.2	Unit 3.11.2 Para 11	
Commentary on conditions, weather, known accidents, road closures, maintenance works, variable speed limits.				
Statement on accuracy of the data (qualitative and quantitative).	6.1.23, 6.1.27, 6.2.3, 6.2.5, 6.3.6 to 6.3.7, 6.5.3, 6.5.8, 6.6.5, Chapter 10, Appendix D13	3.3.2, A1.2		
Presentation of summary data for each survey type listed as listed below.		A1.2		
Details of any factoring or adjustments applied to data set.	6.10.1 to 6.10.10	A1.3		
Details of data format, file formats, file names, for each survey type as listed below.				Documentation of the data to ensure that it is easily accessible in the future

## 2.2 (continued) – Traffic Survey Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
<b>Traffic Flow Data</b>	6.2 and 6.3	3.2.19	Unit 3.1.5 Para 2.5.1	
Details for each survey the count method, ATC, MCC, Video etc.	6.2 and 6.3	3.2.19 to 3.2.23		Include statement of use made of HATRIS data. See <a href="http://www.trads2.co.uk">www.trads2.co.uk</a> <a href="http://www.transportdirect.info">www.transportdirect.info</a> <a href="http://www.highways.gov.uk/trafficinfo">www.highways.gov.uk/trafficinfo</a> Ensure MCC data collected is deposited in HATRIS
Graphical presentation showing daily flow variation by vehicle type (split by weekday, weekend or average day) for specific survey locations or across cordons / screenlines.		A2.1/Fig.D.1, A6.1		
Graphical presentation of monthly flow variation by vehicle type, either for a specific hour, period or daily (split by weekday, weekend or average day) for specific survey locations or across cordons / screenlines, or along corridors.		A2.1/Fig.D.1, A6.1		
Graphical presentation of yearly flow variation by vehicle type, either for a specific hour, period or daily or month (split by weekday, weekend or average day) for specific survey locations or across cordons / screenlines.		A2.1/Fig.D.1, A6.1		
Diagrams showing turn count data by time period and vehicle type.	Fig.13.7	A2.2/Fig.A.1, A6.1		
Tabulations for multiple surveys showing traffic flows for key hours/periods, suitably grouped into cordons, screenlines or corridors.		A2.1 to A2.2, A6.1		
Plan showing traffic flows at survey locations by key hours/periods.		A2.1		
Details of any factoring to expand data from say 12 hours to 16 hours.	6.10.5 to 6.10.6			

## 2.2 (continued) – Traffic Survey Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
Roadside Interview Data	6.5	3.2.4	Unit 3.1.5 Para 3.1.1 to 3.1.2	
Overview of process including a sample of the questionnaire used.	6.1.6 to 6.1.10, 6.1.17 to 6.1.24, 6.5.1 to 6.5.12, Fig.6.3,	3.2.6, 3.2.8 to 3.2.16, 3.2.20	Unit 3.1.5 Para 2.4.1, Unit 3.1.5 Para 3.1.1 to Para 3.1.2, Unit 3.11.1 Para 10.3	Detailed information on undertaking Roadside Interview surveys is contained in DMRB Volume 5 Section 1 TA11/81 'Traffic Surveys by Roadside Interview'
Plan/Map showing location of Roadside Interview Sites.	6.5.1			
Presentation of sector-to-sector movements (using tabular format and/or desire-line figures, by time of day, vehicle type and journey purpose, if relevant.	Fig.8.1	A3.1/Fig.A.2 /Fig.B.1, A6.1		
Plan of sectors used, on a map base.		A3.1, A6.1		
Tabulations indicating sample sizes and sample factors by each vehicle type and time period at each survey site.	6.11.2	A3.1		
Supporting tables of the codes used to represent vehicle types, purpose codes, time of day (start or end time), occupancy, O/D location - Postcodes/OSGR's.	6.5.4 to 6.5.9, 6.11.2 to 6.11.3	3.4.2, A3.1, A6.1		

## 2.2 (continued) – Traffic Survey Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
<b>Journey Time Data</b>	6.9, 13.3.2	3.2.25, A4		
Overview of process including description of method used – Manual/GPS.	6.9.1 to 6.9.18	3.2.25 to 3.2.29, A4.1		HA can provide data via the HATRIS system. See ( <a href="http://www.trads2.co.uk">www.trads2.co.uk</a> <a href="http://www.transportdirect.info">www.transportdirect.info</a> <a href="http://www.highways.gov.uk/trafficinfo">www.highways.gov.uk/trafficinfo</a> )
Plan/Map showing routes and timing points marked.	Fig.13.1	A6.1		
Presentation of time-distance diagrams, preferably distinguishing between travel time and delay at junctions with timing points marked and road / junction names shown.		A4.1, A6.1, B2		
Tabulations showing the route length, number of survey runs, average run times, accuracy, confidence limits for each route by direction and time period.		3.2.28 to 3.2.29, A4.1		
<b>Queue Length Data</b>	6.9	3.2.30		
Overview of process including information on the associated traffic count process.	6.9.12 to 6.9.17	3.2.30 to 3.2.31, A5.1		
Plans for each junction surveyed showing junction control (signals, priority, roundabout) with different movements identified.	13.5.3, 13.5.10 to 13.5.11	A5.1, A6.1		
Graphical representation of queue length / delay incurred for key movements in the junction, ideally showing maximum and minimum and average queue lengths over key hours.	6.9.12 to 6.9.17	A5.1, A6.1		
Tabulations of queue length / delay by time of day for all movements in the junction.	6.9.12 to 6.9.17, 13.5.5	A5.1, A6.1		Turns may share one or more lanes, this will need to be identified



## 2.2 (continued) – Traffic Survey Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
<b>Registration Plate Survey</b>	6.8	3.2.17 to 3.2.18		
Overview of process including information on associated traffic counts.	6.8.1 to 6.8.3, 6.8.12, 6.9.10	3.2.6, 3.2.17 to 3.2.18		
Plan/Map showing location of survey locations on a cordon, highlighting the locations where traffic may enter/leave the cordon un-surveyed or locations where vehicles may park/stop.	13.4?	A6.1		
Details of the sampling process.	6.8.4 to 6.8.12	A1.3		
Details of analysis, including matching criteria and factoring process.	6.8.13 to 6.8.15	3.2.17 to 3.2.18		
Summary travel patterns, including matrices.		3.2.18		
Summary travel times obtained from matching process, to assess delay through the survey area.	6.9.10 to 6.9.11	3.2.17 to 3.2.18		
<b>Household Surveys</b>	6.6	3.2.4	Unit 3.1.5 Para 3.4	
Overview of process including a sample of the questionnaire used.	6.1.17 to 6.1.24, 6.6.1 to 6.6.6	3.2.6	Unit 3.1.5 Para 3.4.1 to 3.4.2, Unit 3.11.1 Para 10.3	
Plan/Map showing location of surveys by zone/sector, aggregated such that no single survey can be traced to specific zone/sector.		A1.3, A6.1		
Presentation by zone / sector of survey findings, eg mode split, trip rates etc.		A1.2, A6.1		
Plan of zones/sectors used, on a map base.		A1.3, A6.1		
Supporting tabulations indicating sample sizes, with reference to relevant demographic parameter such as population, employment rates, deprivation indices etc.	6.6.13 to 6.6.18	3.2.6, A3.1		
Supporting tables of odes used to represent question responses.	6.6.19	3.4.2, A3.1		

## 2.3 – Local Model Validation Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
<b>Study Overview</b>				
Statement of scheme objectives.	2.3.1 to 2.3.5	2.1.2	Unit 1.1, Unit 1.2.1, Unit 1.2.2, Unit 1.3, Unit 2.1, Unit 2.2	
Explanation of the purpose of the model and the schemes likely to be assessed using the model.	Chapter 2, 11.4.1, 11.4.4.	4.1.1, B1, B2.	Unit 3.1.2 Para 3.7	
<b>Model Description / Specification</b>	Chapter 5	B3.1	Unit 2.4 Para 1.4, Unit 3.1.1, Unit 3.1.2	
Description of the wider modelling system should one exist - e.g. reference to Strategic Models or Multi-Modal Study.	17.1. Fig.17.1, 17.4	B8.1	Unit 2.4 Para 1.1 to 1.3	
Explanation of how the highway model relates to other components of any wider model - Flow chart of key process identifying inputs, outputs and any feedback loops with a description of the convergence criteria.	8.4.1 to 8.4.20, 18.2.	B8.1		
Description of any land use transport interaction models used.			Unit 3.1.3, Unit 3.7.2	
Description of type of highway model (e.g. link or link/junction-based).		B2.1, B3.1	Unit 3.1.2 Para 2.1 to 2.12	
Justification of type of highway model	5.1.1 to 5.1.5	B3.1	Unit 2.4 Para 1.4, Unit 3.1.2 Para 2.6 to 2.9	

### 2.3 (continued) – Local Model Validation Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
Description and plan of geographical model coverage including identification of areas of differing model type (e.g. highlighting areas of junction modelling). Plan should identify road names, road numbers and junction names.		2.4.1, 4.1.13, B3.1, B4.1, B10.1	Unit 2.4 Para 1.4, Unit 3.1.1 Para 1.2, Unit 3.1.2 Para 2, Unit 3.10.2 Para 1.2	
Justification of geographical model coverage.	3.1.1 to 3.1.5	2.4.2 to 2.4.7, 4.1.2, B3.1	Unit 2.4 Para 1.4, Unit 3.1.1 Para 1.2, Unit 3.10.2 Para 1.2, Unit 3.11.1 Para 3.1 to 3.2	Unit 3.11 refer to PT, which may need to be considered
Specification and justification of any demand segmentation within the traffic model (time period, journey purpose, vehicle types, etc.).	2.2.22 to 2.2.24, 8.1.7 to 8.1.15, A17.20	2.5 to 2.7, 4.1.4, B3.1	Unit 2.9.1, Unit 2.9.2, Unit 3.1.2 Para 2, Unit 3.1.1 Para 1.2.6, Unit 3.1.1 Para 1.2.34 to Para 1.2.44, Unit 3.10.2 Para 1.7	
Statement of any software package and version used.	6.11, Appendix 20	2.11, 4.1.8 to 4.1.12, B3.1	Unit 3.1.1 Para 1.3.30 to Para 1.3.33, Unit 3.1.2 Para 2	

### 2.3 (continued) – Local Model Validation Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
<b>Summary of Data Collection</b>	Chapter 6		Unit 3.10.2 Para 1.6	
Outline description of data sources and units - surveys, existing models, national databases, etc.....	A20.1 to A20.6	2.10, A1	Unit 3.1.1 Para 1.3.20 to Para 1.3.29	
References to any relevant Survey Report(s).		B4.1		
Definition of calibration data - type, location, day of week, time of day, duration, age, accuracy.	Chapter 10	3.1, B4.1		
Definition of validation data - type, location, day of week, time of day, duration, age, accuracy.	Chapter 10	3.1, B4.1		
Comparison of comparable data from different sources, where relevant.	A20.1 to A20.6	B4.1		
<b>Model Development – Network</b>	5.4	4.2	Unit 2.4	
Description of network structure, providing information on the extent of the 'Detailed Study Area' and 'Feeder' network, including a plan/map.	9.4	B5.1 to B5.4, B10.1	Unit 3.1.1 Para 1.1 to 1.2, Unit 3.11.2 Para 5.4	
Description of coding process used to determine link length and node locations - Including usage of GIS systems.		B5.2 to B5.3		
Evidence for assessment of speed limits / road types for use in determining network speeds.		B5.4		
Location, value and justification of fixed speeds and/or speed-flow curves used on links, including plans and tables as necessary.	9.3	4.4.14 to 4.4.18, B5.2	Unit 3.1.2 Para 2.8, Unit 3.1.2 Para 4.5.1	COBA

### 2.3 (continued) – Local Model Validation Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
Description of calculation and assumptions behind junction saturation capacities.	13.5.4 to 13.5.5			ARCADY/TRANSYT/PICADY based calculations
Description of any network inventory undertaken, with a plan/list of junction/links surveyed. Can including junction layout survey and link speed limit surveys to identify roads with 30/40/50/60/70 mph speed limits.		B5.2 to B5.3	Unit 3.1.2 Para 2.9	
Description of any junction operation data collected such as signal times (and if daily variation is modelled) and estimates of gaps at roundabouts and priorities.				
Description of modelling assumptions such as values used for queue length per pcu, conversion factors between pcus and vehicles.				
Description of modelling of PT services and bus priorities measures inclusion in the network.	17.2	4.2.1	Unit 3.1.2 Para 2.10, Unit 3.1.2 Para 3.4, Unit 3.11	WebTAG Units for PT Modelling
Description of treatment of Freight Transport			Unit 3.1.4	
Description of network assumptions relating to representation of Tolls, High Occupancy Vehicles Lanes, Active Traffic Management, Variable Speed Limits, etc.		4.2.1		

### 2.3 (continued) – Local Model Validation Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
<b>Model Development – Matrices</b>		4.3, D2	Unit 3.10.2	
Description of zone structure, relating to historical zoning systems and other zones such as wards and district boundaries, including a list of zones with appropriate names and correspondence to other zones/wards/districts systems.	A17.5	B6.2, B10	Unit 3.1.1 Para 1.2.8, Unit 3.1.1 Para 1.2.11 to 1.2.33, Unit 3.1.2 Para 3.1.5 to 3.1.7, Unit 3.11.1 Para 4.1 to 4.3	TEMPRO – Zoning structure
Description of data sources including previous study matrices, new RSI data, synthetic matrices.	A17.6 to A17.7	B6.1	Unit 3.1.1 Para 1.3.20 to 1.3.29, Unit 3.1.2 Para 3.1.9	
Description of any matrix infilling process including the use of synthetic trip matrices / gravity models.	5.6.5, 8.1.4 to 8.1.6, 8.1.15 to 8.2.5, 8.3, 10.4	2.4.6, 4.1.15, 4.3.17, B6.1	Unit 3.1.2 Para 3.1.12 to 3.1.17	
Description of matrix building process including reference to dealing with double counting and substitution of old data with new/more reliable data.	5.5.5 to 5.5.6, 8.1.7 to 8.1.15, 10.4	D2	Unit 3.1.2 Para 3.1, Unit 3.1.2 Para 4.1, Unit 3.11.2 Para 12.2 to Para 12.4	
Description of the matrix estimation process (if used), identifying locations of counts, matrix constraints such as 'frozen cells' or origin and destination constraints.	8.2		Unit 3.1.2 Para 3.1.12, Unit 3.1.2 Para 3.1.19, Unit 3.10.2 Para 1.3, Unit 3.10.3 Para 1.7	

### 2.3 (continued) – Local Model Validation Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
Matrix estimation monitoring - Comparison of before and after: link flows against counts, sector matrices, trip length distributions.	10.4			
<b>Model Development – Assignment Process</b>	5.6.9, Chapter 9, 12.3	4.4	Unit 3.10.2, Unit 3.10.2 Para 1.8, Unit 3.11.2 Para 3, Unit 3.11.2 Para 4	
Description of approach used (all-or-nothing/congestion-restrained, deterministic/stochastic).	5.6.9, 9.5	4.4.1 to 4.4.5, Fig.4.2.	Unit 3.11.2 Para 5.1 to Para 5.3, Unit 3.11.2 Para 5.5, Unit 3.11.2 Para 7	
Description of time slices used and the interaction between time slices.	13.4.4 to 13.4.5	2.5.4 to 2.5.5, 4.4.6 to 4.4.8, D1 to D5	Unit 3.10.2 Para 1.9	
Definition of assignment costs calculation reference to generalised cost and the VOT and VOC including sensitivity test results, including the treatment of different vehicle types and trip purposes.	9.2.4 to 9.2.6, 10.6.4 to 10.6.5	4.4.11 to 4.4.13	Unit 3.5.6, Unit 3.10.2 Para 1.4, Unit 3.10.4 Para 1.7, Unit 3.10.2 Para 1.7.14 to Para 1.7.16, Unit 3.10.2 Para 1.10, Unit 3.11.2 Para 6, Unit 3.11.2 Para 9	

### 2.3 (continued) – Local Model Validation Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
Assignment convergence criteria used including summary of convergence levels set.	9.6	4.4.19 to 4.4.24	Unit 3.10.4 Para 1.4.9, Unit 3.10.4 Para 1.5	
Summary of assignment parameters used by the software, including convergence stopping criteria, level of variation from minimum cost routes is stochastic assignments.	9.6	4.4.1 to 4.4.5	Unit 3.10.4 Para 1.3	
<b>Calibration</b>	11.1	4.4.29, B4.1	Unit 3.10.3 Para 1.10, Unit 3.11.2 Para 10.1.9	
Evidence of checks of network structure to include: <ul style="list-style-type: none"> <li>• Graphical review of network structure to identify missing links;</li> <li>• Checks of modelled link lengths vs crow-fly distance (requires accurate use of coordinate system);</li> <li>• Check model links are two way where appropriate and one-way links are accurately represented including slip roads</li> <li>• Check HGV access restriction are represented</li> </ul>				Review of the network coding should be undertaken throughout the modelling process to identify coding errors.
Evidence of checking that link speeds on the network are realistic.			Unit 3.1.2 Para 2.8	
Evidence of checks to ensure delay calculations at junctions of operating realistically.			Unit 3.1.2 Para 2.9	
Scope of use of matrix estimation - identification of counts used in the process, before and after comparisons of the number of trips (at matrix and sector to sector level) and trip length distribution.		B6.1 to B6.2		



### 2.3 (continued) – Local Model Validation Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
<b>Validation – Network</b>			Unit 3.1.2 Para 3.3, Unit 3.11.2 Para 10, Unit 3.11.2 Para 12	
Analysis of Paths	11.4.6 to 11.4.7	B5.2	Unit 3.11.2 Para 7	
Justification and description of speed flow curves used in. 'post capacity' formulation.	9.3.2, 13.4.8	Fig.B2		
Description of junction coding approach where appropriate.		B5.1		
Description of the coding of other network characteristics where appropriate.	11.4.6	B5.2 to B5.3		
Examination and justification of paths used on preliminary assignments.	11.4.6 to 11.4.9	B5.4	Unit 3.11.2 Para 7	
Evidence of ad-hoc network validation checks.	11.4.7	B5.4, B8.1		
<b>Validation – Matrix</b>	Chapter 8, 11.4.10	4.3.42, B6.1 to B6.3	Unit 3.1.2 Para 3.3, Unit 3.1.2 Para 4.2, Unit 3.10.2 Para 1.6.27, Unit 3.11.2 Para 10	
Zone plan, preferably on a map base.		B6.3, B10.1		
Distinction between those movements observed and those synthesised.		Fig B1, B6	Unit 3.10.2 Para 1.3	
Comparison of modelled zonal demand for key movements against independent data if available.		B6.2		

### 2.3 (continued) – Local Model Validation Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
Comparison of modelled sector to sector demand with any independent screenline counts.		B6.2, Table 4.2		
Plans of zones, sectors and screenlines used in the above comparisons.		Fig B1, B6.3, B10.1		
<b>Validation – Assignment</b>	11.4.21 to 11.4.23	4.4.34, B7.1 to B7.5	Unit 3.1.2 Para 3.3, Unit 3.11.2 Para 10	
List of, and justification for, deviations from any default parameters used in the assignment software.		None	Unit 3.1.2 Para 3.5.6	
Statement/explanation regarding independence of validation data.	11.4.21 to 11.4.22	4.1.7, B8.1		
Tabular comparison of modelled flows with observed site and screenline counts.	11.4.23, 15.2.6 to 15.2.7	B7.2, B10, Table 4.2		
Map-based comparison of modelled flows with observed site and screenline counts.	15.2.2, 15.2.6 to 15.2.7	Fig B4 to B6, B7.2, B10.1		
Tabular comparison of modelled and observed journey times.	11.4.23, 15.2.2, 15.2.6 to 15.2.7	3.2.25, B7.2, B10, Table 4.2		
Diagrammatic comparison of modelled and observed journey times.	Example 11.1, 15.2.6 to 15.2.7	Fig B2 to Fig B3, B7.2, B10.1		
For modelling of multiple (linked) time slices, presentation of the above for the whole time period.		B7.4, D1		

### 2.3 (continued) – Local Model Validation Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
Statement of convergence stability (usually P>90% for 4 consecutive iterations where P = percentage of links with flow change <5%).		B7.5, C5.4, Table 4.1, Appendix H	Unit 3.10.4 Para 1.4.9, Unit 3.10.4 Para 1.5.6	
Statement of convergence proximity (usually $\delta < 1\%$ ).		B7.5, C5.4, Table 4.1, Appendix H	Unit 3.10.4 Para 1.4.9	
Discussion of model validation if in the context of a wider modelling system.		B8.1		
Realism testing to establish robustness of base model in relation to its use as the 'reference pivot' for subsequent variable demand modelling.			Unit 3.10.4 Para 1.6	
<b>Conclusion</b>				
Conclusion on the robustness of the model to be used for forecasting.		4.5.1 to 4.5.2 and B10.1		
Discussion of where the model is less robust with statement on how this impacts on the models performance				
Discussion of where the models representation of traffic and travel could be further improved in the future.				

## 2.4 – Forecasting Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
<b>Study Overview</b>		Chapter 5	Unit 3.1.2, Unit 3.11.1	<i>This section will be updated when new WebTAG unit 3.15.5, 'The Treatment of Uncertainty in Model Forecasting', is finalised. (?)</i>
Statement of scheme objectives.	2.3.1 to 2.3.5	2.1.2	Unit 2.2 Para 1 to Para 2, Unit 1.1 Para 1	
Explanation of the purpose of the model and the schemes likely to be assessed using the model.	Chapter 2, 12.1, 12.3.	5.1, C1, C2.	Unit 2.4 Para 1.4	
<b>Forecasting Approach</b>	12.5			
Overview of forecasting approach, with reference to choice of opening and design year	12.3.6 to 12.3.10	5.2.1 to 5.2.3	Unit 3.5.4 Para 4.2	
Overview of approach with respect to the treatment of variable demand.		5.1 to 5.3, C1 to C2	Unit 3.1.2 Para 2 to Para 5, Unit 3.10.1, Unit 3.11.1	See CHE 174/2006
Flowchart of process, identifying key inputs and outputs.				
Description of model form highlighting links to trip generation, trip distribution, mode choice, time of day model components.	12.3.16 to 12.3.21		Unit 3.11.1 Para 2.1 to Para 2.5, Unit 3.11.1 Para 5	

## 2.4 (continued) – Forecasting Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
<b>Forecast Network Development</b>				<i>This section will be updated when new WebTAG unit 3.15.5, 'The Treatment of Uncertainty in Model Forecasting', is finalised. (?)</i>
Overview of network development process, including discussion of choice of opening and design year.	12.3.6 to 12.3.10	5.3.3, C4.1 to C4.2, C6.1		
Description of Do-Minimum (DM) schemes - plans showing routes with information of road standard and junction forms.		2.4.5, C2.1, C4.1 to C4.2, C5, C6.1		
Justification for inclusion of DM schemes, including reference to sources - HA Committed / Local Plan / Developer schemes with anticipated scheme opening dates.		2.4.5, C3.1, C4.1	Unit 3.10.1 Para 1.2 to Para 1.3	
Description of Do-Something schemes - plans showing routes with information of road standard and junction forms. Alternative Options to be modelled to be discussed and clearly identified.	13.3, 13.5	5.3.6, C2.1, C4.2, C5, C6.1		
Assessment of the effect on base year model validation of any forecast network changes which is not part of the scheme itself but which have been introduced to ensure meaningful modelling of the scheme (e.g. addition of minor side roads in the forecast year to model the impact of junction improvements).		C3, C4.1	Unit 3.1.2 Para 2.12	
Explanation of any sensitivity tests to investigate the impact of certain schemes.	12.3.15, 12.4.11, 12.5.13	C4.1	Unit 3.10.4 Para 1.7	
Description of any changes in routing parameters, based on changes in 'Value of Time' and 'Value of Operating Costs', etc.	12.4.8 to 12.4.10, 12.5.9, 12.5.11	C5.1	Unit 3.5.6 Para 1, Unit 3.1.2 Para 2.12.7 to Para 2.12.14	
Description of how additional costs (such as Tolls and Road User Charging) are applied to the calculation of route costs.	12.5.11		Unit 3.1.2 Para 2.2.2, Unit 3.11.1 Para 7	

## 2.4 (continued) – Forecasting Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
<b>Forecast Network Development - Calibration</b>				
Undertake checks of network structure to include: <ul style="list-style-type: none"> <li>Graphical review of network structure to identify missing links;</li> <li>Checks of modelled link lengths vs crow-fly distance (requires accurate use of coordinate system);</li> <li>Check model links are two way where appropriate and one-way links are accurately represented including slip roads</li> <li>Check HGV access restriction are represented</li> </ul>				Review of the network coding should be undertaken throughout the modelling process to identify coding errors.
Undertake checks that link speeds on the network are realistic.				Identify links where dramatic changes in speed occur and confirm validated of change or correct
Undertake checks to ensure delay calculations at junctions of operating realistically.				Identify junctions where excessive delay is being forecast. Consider the implications on the scheme especially on routeing and travel costs.
Undertake checks that compare network structure between differing scenarios <ul style="list-style-type: none"> <li>Base Year and Do Minimum</li> <li>Base Year and Do Something</li> <li>Do Minimum and Do Something</li> </ul>				Assigned flows, traffic speeds and routeing can all be used to identify coding errors introduced in the forecasting. Eg: comparison of distance matrix i-j pairs can reveal dramatic changes in distance.

## 2.4 (continued) – Forecasting Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
<b>Forecast Matrix Development</b>				
Overview of matrix development process, including justification of chosen forecast years.	12.3.6 to 12.3.10		Unit 3.1.2 Para 2.3	
Overview of forecast matrix development, clearly demonstrating the process involved in moving the base year matrix to forecast year matrix, ideally with flowchart.	12.3.16 to 12.3.21			
Description of how official national/local growth rates are used (i.e. NRTF and TEMPRO).	5.2, 12.3.16 to 12.3.24, 12.4.7, 12.5.4, 12.5.8, Table 1	2.9, 5.4.8, 5.4.10, C3.1	Unit 3.1.2 Para 3.6.2, Unit 3.1.2 Para 5.1.4 to Para 5.1.7, Unit 3.1.5 Para 2	See CHE 84/2000 NRTF 1997 – Published 25 Nov 2005 <a href="http://www.dft.gov.uk/pgr/economics/datasources/nrtf1997/nationalroads/trafficforecasts3014">http://www.dft.gov.uk/pgr/economics/datasources/nrtf1997/nationalroads/trafficforecasts3014</a> TEMPRO – Guidance can be downloaded from: <a href="http://www.tempro.org.uk/Download.aspx">http://www.tempro.org.uk/Download.aspx</a>
Comparison of growth rates based on other sources such as a 'Trip Generation Model' to NRTF and TEMPRO.	12.4.7, 12.5.4 to 12.5.8	2.9, C3.1		
Explanation of how highway growth rates relate to other components of the model system, such as public transport trips	12.3.21			
Explanation of any other growth rates used; such as those resulting from any 'Trip Generation-Distribution' modelling used.	12.5.4 to 12.5.8	C3.1	Unit 3.10.3 Para 1.4	
Description of how specific developments are reflected in the trip matrix, with information of any control methods used to change trip levels for existing trips.		C3.1		
Explanation of how the various sources of growth are reconciled.	12.5	C3.1		
Tabulation of growth rates used		C3.1		
Derivation of daily flow levels, for AADT, AAWT for 12 / 16 / 18 / 24 hours from traffic model flows. E.g. 12 Hour AAWT = (2 * AM Peak) + (8 * Inter Peak) +(2 * PM Peak).	8.1.10 to 8.1.15 Appendix D13	None		

## 2.4 (continued) – Forecasting Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
<b>Forecast Assignments Calibration</b>				
Undertake initial checks of the assignments to confirm robustness of the traffic model prior to main assignments: <ul style="list-style-type: none"> <li>Undertake fixed demand assignments;</li> <li>Compare traffic flows, traffic speeds and travel distances at global level;</li> <li>Compare traffic routing for key movements likely to be of scheme interest, compare travel times and distances;</li> </ul>				Review of the network performance should be undertaken to ensure coding errors are identified.
<b>Forecast Assignments</b>				
Description of Forecasting Approach – including details of approach to Variable Demand Assessment using Elasticities and/or Full VADMA.		D1, G4	Unit 2.9.1, Unit 3.10 (all sections), Unit 3.1.2 Para 2.3, Unit 3.11.1 Para 6.1 to Para 6.3, Unit 3.11.1 Para 9.1 to Para 9.2	See CHE 174/2006
Confirmation that elastic assignment approach used is compatible with base year.		G4.5	Unit 3.10.3	
Overview of Elastic Forecasting Parameters – including any changes to the generalised cost parameters.			Unit 3.10.3 Para 1.11, Unit 3.10.3 Appendix 1, Unit 3.1.2 Para 2.2 to 2.3	
Details of 'Initial Assessment using Elasticities', including information elastic assignment method used and elasticity values assumed.			Unit 3.10.3 Appendix 1	
Initial results on the number of trips suppressed/induced for each option compared to input demand from elastic process.			Unit 3.10.3 Para 1.7	



## 2.4 (continued) – Forecasting Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
Initial results of elastic approach on the economic benefit of the scheme based on 'TUBA' analysis of elastic process.			Unit 3.10.3	
Details of the justification to either undertake VADMA or not undertake VADMA.			Unit 2.9.1, Unit 3.10.3	See CHE 174/2006
Overview of VADMA approach if adopted.			Unit 2.9.1, Unit 3.10.2, Unit 3.10.3, Unit 3.10.4	
Confirmation that VADMA approach used is compatible with base year.			Unit 3.10.3	
Overview of VADMA forecasting parameters - including any changes to the generalised cost parameters.	12.4.9, 12.5.9		Unit 3.10.3 Para 1.11, Unit 3.1.2 Para 2.12	
Results on impact of VADMA on the number of trips suppressed/induced for each option compared to input demand.			Unit 3.10.3	
Results on impact of VADMA on the trip patterns compared to input demand.			Unit 3.10.3	
Results of VADMA on the economic benefit of the scheme based on 'TUBA' analysis			Unit 3.10.3	
List of deviations from any default parameters used in the assignment software.				Refer to DIADEM Manual
Justification of deviations from any default parameters used in the assignment software.				Refer to DIADEM Manual
Comprehensive list of assignments undertaken.				

## 2.4 (continued) – Forecasting Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
Statement of convergence stability (usually P>90% for 4 iterations).		Appendix H	Unit 3.1.2 Para 2.9.3	Higher convergence levels for VADMA?
Statement of convergence proximity (usually $\delta < 1\%$ ).		Appendix H	Unit 3.1.2 Para 2.9.3	
Comparison of convergence with base year equivalent model.		Appendix H		
<b>Presentation of Model Forecasts</b>		C5		
Diagrammatic presentation of forecast flows for DM and DS on key links.	Fig 13.1, Fig 13.3, 13.3.2, 15.2.6 to 15.2.7	Fig C1, C5.1 to C5.2		
Discussion of key changes in traffic flows between the DM and the DS options.	13.3.2			
Summary of total link times and junction delays for DM and DS..	13.5.9	C5.1 to C5.2		
Summary of key changes in delay at junctions, highlighting significant changes in delay between DM and DS, including diagram, if feasible.		C5.3		
Summary of journey times along key corridors impacted by the DM and DS options.	Fig 13.1	C5.1		
Discussion of key changes in delay and journey times between DM and DS options.		C5.1, C5.3		
Presentation of any alternative forecasts (e.g. feeding operational or environmental assessments)		C5.1 to C5.2		
Diagrammatic presentation of key forecast flow differences arising from the scheme	15.1	Fig C1, C5.3, C6.1		
Consider use of select link analyses on key scheme link(s) to compare DM and DS travel patterns		C5.3		

## 2.4 (continued) – Forecasting Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
Discussion of scheme impacts in terms of key link flows and changes in key journey times: A) Comparing Do-Minimum conditions with forecast growth, against base year conditions B) Comparing Do-Something conditions against Do-Minimum conditions		C5.3	Unit 3.8.2 Para 2.2	
Presentation of key non highway changes such is results from mode-choice or time of day modelling.		C5.2		
Details of the provision of traffic data for use in Economic Assessment.		6.2.1 to 6.2.14, 6.3.1 to 6.3.7		
Details of the provision of traffic data for use in Environmental Assessment.		6.4.1 to 6.4.7	Unit 2.11	
Details of the provision of data for the Operational Appraisal of the scheme design.		6.5.1 to 6.5.6		
<b>Summary</b>				
Summarise key traffic flow changes for comparison between DM and alternative DS schemes		C5.1 to C5.3		
Summarise travel time and travel distance changes between DM and alternative DS schemes		C5.1 to C5.3		
Summarise non-highway impacts, primarily those on public transport, but may include findings from other elements of the modelling process.				
Summaries any key assumptions that may influence recommendations, with where possible indications of significance.				

## 2.5 – Economics Assessment Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
<b>Study Overview</b>				
Statement of scheme objectives.	2.3.1 to 2.3.5	2.1.2	Unit 2.2 Para 1 to Para 2, Unit 1.1	
Description of the purpose of the economic assessment process.	13.6.4 to 13.6.6, 14.1 to 14.4	2.12.1 to 2.12.4	Unit 2.8 Para 1, Unit 3.5.8	
Explanation of how the traffic model has been used in assessing the scheme(s).	Chapter 2, 11.4.1, 11.4.4.	4.1.1	Unit 2.4 Para 1.4	
Description of Scheme being assessed, with reference to the 'Forecasting Report'.				Ensure scheme names and descriptions are consistent between the Forecasting and Economics Report
Plan showing schemes being assessed.				
<b>Economic Assessment Approach</b>	Fig 14.1, 13.6.4 to 13.6.6	6.2	Unit 2.8 Para 1, Unit 3.5.4, Unit 3.5.10, Unit 3.5.11, Unit 3.5.12	TUBA Manual DMRB Volume 13 (COBA) DMRB Volume 14 (QUADRO) and INCA Manual to be used as guide to undertaking the assessment.
Description of the economic assessment process - Ref which components of Benefits are estimated using TUBA/COBA, QUADRO and INCA.	14.2 to 14.4, 13.6.4 to 13.6.6	6.2.1	Unit 3.4.1, Unit 3.5.13, Unit 3.11.2 Para 8	
Description of methods used to represent variable demand responses including details of initial assessment using elasticity based calculation and reason for using full VADMA or simple elasticity approach.		6.2.2 to 6.2.5	Unit 3.10.3 Para 1	

**2.5 (continued) – Economics Assessment Report**

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
<b>Estimation of Costs</b>			Unit 2.7.1 Para 1.3, Unit 3.5.4, Unit 3.5.9, Unit 1.4 Para 2.2.3 to Para 2.2.4	
Statement of DS costs (and DM costs) and their source.			Unit 3.8.1 Para 1.1.6	
Implication for tax revenues, grants and subsidies.			Unit 2.7.1 Para 1.4 to Para 1.5, Unit 3.5.3 Para 5	
Details of Risk and Optimism bias.			Unit 1.4 Para 2.8, Unit 2.7.1 Para 1.8, Unit 3.5.9 Para 3, Unit 3.5.9 Para 5.3	HA Guidance likely to be revised, cost range to be used.
Calculation of maintenance costs.			Unit 3.5.9 Para 2.3	DMRB Vol 14 QUADRO for details of assessment process
<b>Estimation of Benefits</b>			Unit 2.7.1 Para 1.3, Unit 3.5.3, Unit 3.5.4	See CHE 144/2005
Explanation of the use of TUBA and/or COBA and with reference to why the software was chosen.	13.5.6, 14.2, 14.4	6.2	Unit 3.10.4 Para 1.5	DMRB Vol 13 COBA and TUBA Manual for details of assessment process
Explanation of Travel Time savings calculation giving assumptions on vehicle-purpose splits used and factoring process etc.	18.4.6, A17.22 to A17.23		Unit 3.5.11 Para 1.6	
Detailed explanation of the derivation of vehicle operating cost savings and identification of where these are occurring.			Unit 3.5.6 Para 1.3, Unit 3.5.9 Para 2.3	

## 2.5 (continued) – Economics Assessment Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
Detailed explanation of the derivation of accident cost savings including description of source and extent of existing accident data, methodology for calculation of local accident rates and location of accident benefits.			Unit 3.4.1, Unit 3.8.2 Para 2.6	DMRB Vol 13 COBA for details of assessment process.
Detailed explanation of the incident savings				INCA Manual for details of assessment process.
Detailed explanation of the derivation of construction and maintenance benefits.		6.3		DMRB Vol 14 QUADRO for details of assessment process.
<b>Economic Assessment Results</b>				
Definition of price base and year to which costs and benefits are discounted.			Unit 2.7.1 Para 1.7, Unit 3.5.4 Para 4.1	
Profile of benefits over the 60 years, to highlight whether the benefits occur earlier in the schemes life.				See CHE 144/2005
Profiles of benefits split by time period to highlight whether the benefits are from the peaks or inter-peak periods.				
Presentation of travel time and vehicle operating results.				DMRB Vol 13 COBA and TUBA
Presentation of accident results including numbers, severity and cost in worksheet.			Unit 3.4.1, Unit 3.8.2 Para 2.6	DMRB Vol 13 COBA
Presentation of delay due to construction and maintenance results.				DMRB Vol 14 QUADRO
Presentation of Incident results				INCA Manual

## 2.5 (continued) – Economics Assessment Report

Content	Guidance Reference			Comments
	DMRB Volume 12.1.1	DMRB Volume 12.2.1	WebTAG	
Presentation of results in a Transport Economic Efficiency (TEE) Table.			Unit 2.5 Para 1.5.9, Unit 2.7.1 Para 1.5, Unit 2.7.1 Para 1.9, Unit 2.7.1 Table 1 Unit 3.5.2, Unit 3.5.9 Para 4, Unit 3.5.9 Para 5, Unit 3.8.1 Para 1.3	See CHE 128/2003
Presentation of results in Public Accounts (PA) Table.			Unit 2.7.1 Para 1.5 , Unit 2.7.1 Table 2 Unit 3.5.1 Para 1.4 Unit 3.5.9	
Presentation of cost/benefit results in Analysis of Monetised Costs and Benefits Table (AMCB). Including the inclusion of environmental benefits (if calculated).			Unit 2.7.1 Para 1.5 & 1.6, Unit 2.7.1 Table 3 Unit 3.5.1 Table 3 Unit 3.5.4 Table 1	See CHE 144/2005
<b>Summary</b>				
Summary of economic assessment process and discussion of results.			Unit 2.5 Para 1.2.12 to Para 1.2.16, Unit 3.5.1 Para 1	
Where alternatives are being considered provide a recommendation on which alternative provides best economic justification, considering the study/scheme objectives.			Unit 3.2	

### 3 Contacts

Queries on this document should be made to :

Malcolm Walker  
SSR Traffic Appraisal, Modelling and Economics  
Tel 0161 930 5634 GTN 4315 5634  
Email [malcolm.walker@highways.gsi.gov.uk](mailto:malcolm.walker@highways.gsi.gov.uk)

or to your local SSR TAME representative.

Interim Advice