Staffordshire County Council

Appendix 3.5

Atkins DfT Compliance Modelling Note, 2009

Project:	Stafford Western Access Road	**To:**	DfT
Subject:	WebTAG Compliance and Proposed Enhancements	**From:**	Craig Shipley
Date:	10/09/09	**cc:**	

1. Introduction

This Technical Note outlines our approach to provide a Major Scheme Business Case (MSBC) to develop the Western Access Road in Stafford, Staffordshire. As part of this the DfT lists key requirements for early engagement at the pre MSBC preparation stage, namely:

- A short description of the scheme and the scheme objectives;
- A plan drawing of the scheme;
- Use of existing models as the main model or upper-tier model and their appropriateness for use in modelling the scheme;
- A description of the model you are using;
- A methodology for modelling the impacts of the scheme;
- Consideration of variable demand modelling;
- Consideration of any existing data sources to be used and additional data collection requirements;
- A timescale for delivery of the modelling and appraisal aspects (this should tie in with a timetable for completing and submitting the complete MSBC) and;
- When feedback from the DfT is expected.

In addition, further information from the model development reports has been supplied in line with the requirements. This is provided in Appendix A.

It is noted that the following existing Model Development reports are also supplied with this technical note. These provide detailed responses to the questions outlined above and hence should be considered in conjunction with the summaries outlined below.

The reports provided are as follows:

- Survey Completion Report;
- Local Model Validation Report; and

2. Stafford Western Access Road

This section discusses the current issues and proposed improvements associated with the Stafford Western Access Road. The location of the scheme is provided in Figure 2.1 and a more detailed plan shown in Figure 2.2.

2.1 Current Issues

The A518 Primary route, which provides a key link between the A5 / M54 at Telford, the M6, and the A50 at Uttoxeter, passes through Stafford Town Centre, resulting in the severance of many critical Town Centre activities, and acting as a restraint on proposals to regenerate a significant number of edge of centre locations. In particular two of the largest car parks for the Town centre are situated immediately adjacent to the A518, resulting in significant pedestrian movements across the traffic flow accessed directly from the A518 and additional traffic volumes are anticipated as a result.

Stafford is also expected to see significant housing and employment growth over the next 15 – 20 years following the review of the West Midlands Regional Spatial Strategy; one of the few sites currently available to accommodate this growth can currently be accessed only from the A518. The proposed solution is to construct a new link to the West of Stafford Town open up the major mixed use regeneration site immediately to the west of the West Coast Main Line, address traffic congestion issues to the west of Stafford, remove traffic from existing streets within the urban core, improving conditions for pedestrians and cyclists, and support the regeneration of other edge of centre sites.

2.2 Proposed Scheme

The objectives of the Stafford Western Access proposals are: removal of through traffic from central Stafford, enhancing conditions for pedestrians; support for continued retail and leisure growth within the Town centre by removing severance and enable the integration of edge of centre sites; provide improved access to Stafford Station by all modes; alleviation of congestion and reduction of accidents in the western sector of Stafford; and to facilitate the regeneration of former industrial sites to the west of the Town Centre.

All land required for Stage 1 of the scheme is in the control of the Council or a Private Sector partner. Land required for Stage 2 is expected to be secured through negotiation, although there may be a need for some compulsory purchase. There are no significant environmental barriers to construction and no difficulty is anticipated with planning permission. It is expected that Stage 1 (Newport Road to Doxey Road) can be funded entirely from private sector contributions, and that Stage 2 (Doxey Road to Foregate Street) will require funding from both private and public sector.

The scheme is realistic, although the land issues associated with Stage 2, which runs from Doxey Road to the A34 Foregate Street / Greyfriars Place, might require compulsory purchase. Land to provide Stage 1 of this scheme is within the ownership of developers promoting a mixed use regeneration scheme.

Figure 2.1 – Western Access Road

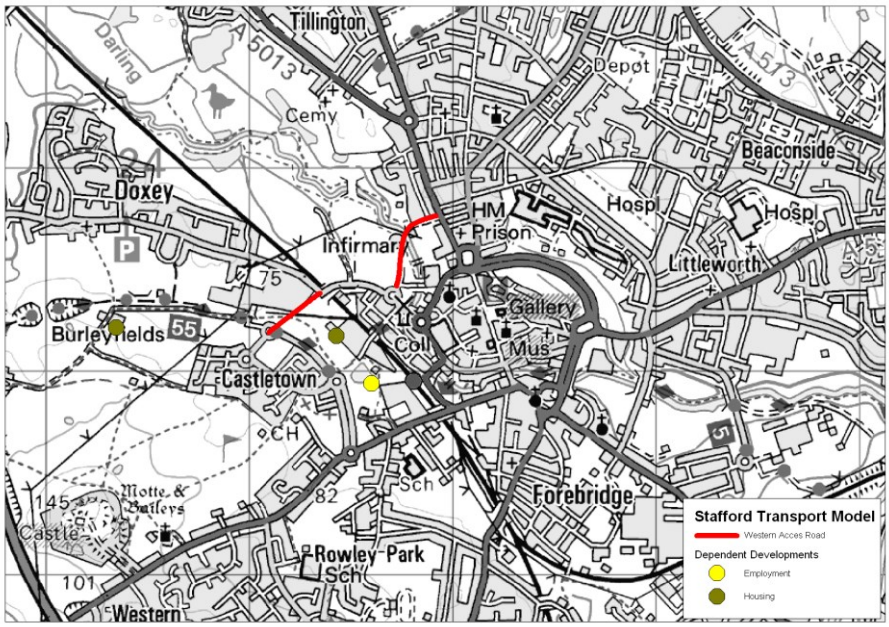
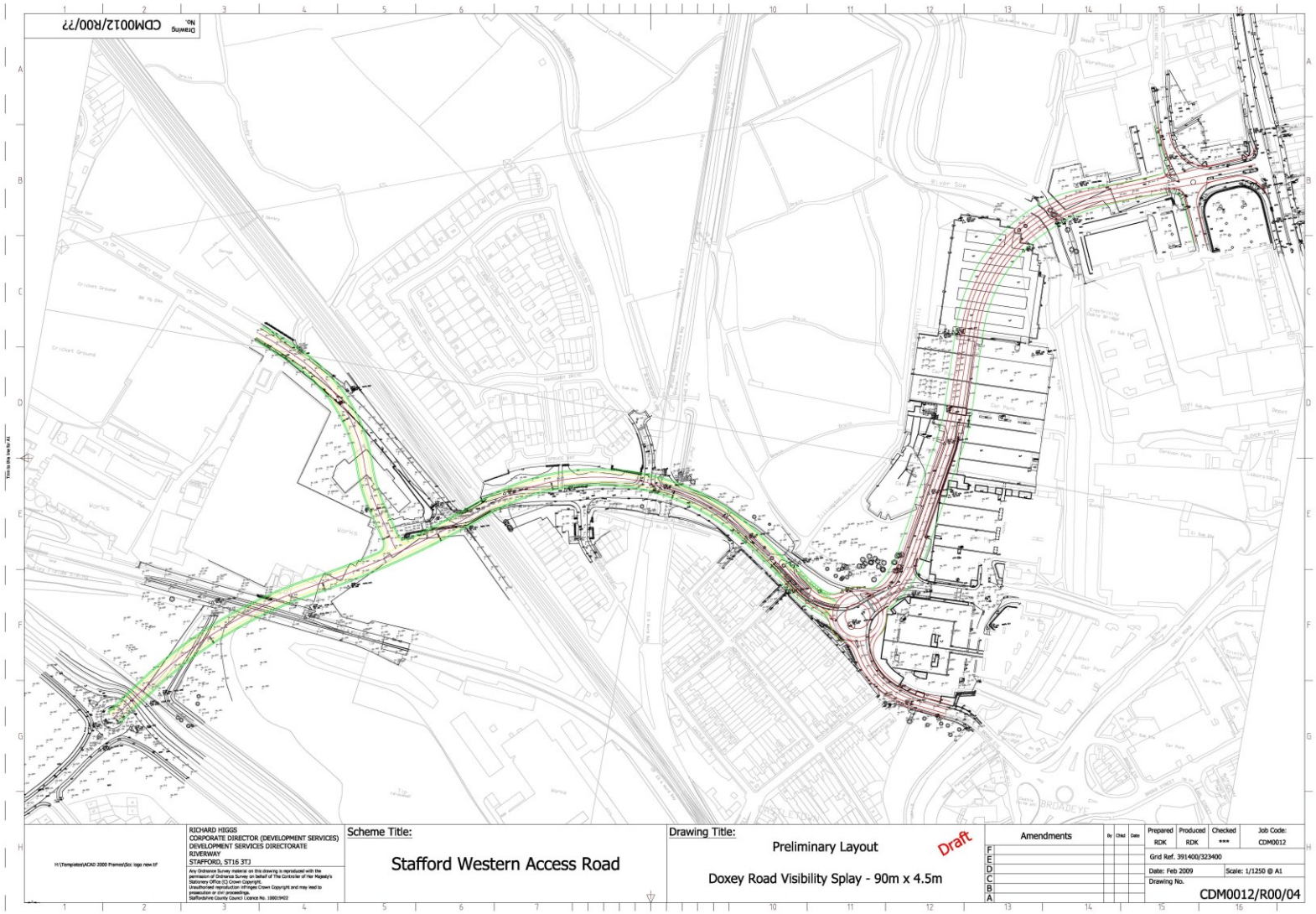


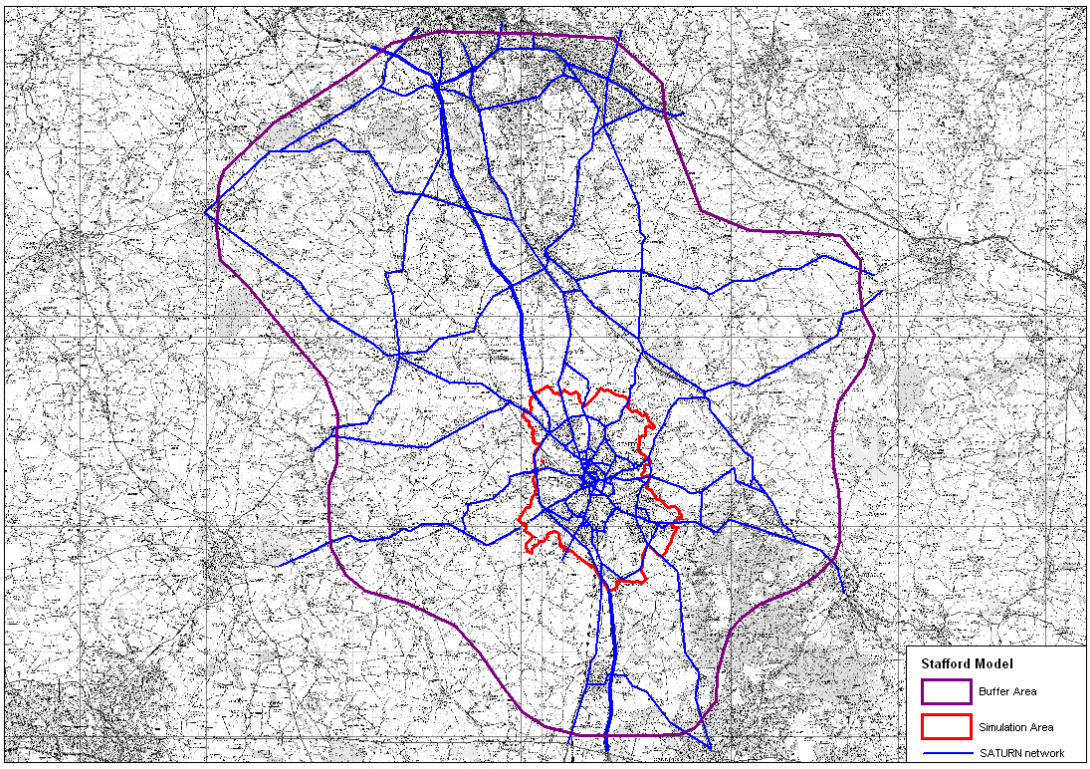
Figure 2.2 – Western Access Road



3. Existing Base Year Model Development

The Stafford model was originally developed in 2007 to assess the impact of future land use scenarios for the proposed Growth Point area around Stafford. The core study area is provided in Figure 3.1 and the full details of the methodology applied in the model development and the calibration/validation of the model is provided in the Local Model Validation Report attached.. The key characteristics of this model are summarised in the following sections.

Figure 3.1 – Study Area



3.1 Survey Data

An audit of existing data was carried out to assess the requirements and locations for surveys. The existing data was primarily Traffic Count Data (automatic and manual, both passing and turning movements) provided by Staffordshire County Council (SCC).

Following this review, additional surveys were undertaken to develop the Stafford Transport Model to a Base Year of 2007; namely:

- Roadside Interviews (RSI);
- Car Park Surveys;
- Journey Time Surveys: and
- Traffic Counts.

In addition, the following secondary data was collated from various sources to assist with the calibration of the model:

- Journey to Work Census data;
- Junction Traffic Signal Timings;
- Junction Layout and Operational Information;

- Speed Limits;
- HGV Bans; and
- On-Street Parking.

Full details of the data used and collected as part of the development of the model is provided in the LMVR attached.

3.2 Model Structure

The existing model structure is as follows:

- AM Peak Hour – 08:00 – 09:00;
- PM Peak Hour – 17:00 – 18:00; and
- 3 user classes – Cars, LGV,HGV.

It is noted that the existing model is highway only and hence does not include a specific calibrated and validated public transport model.

3.3 Model Calibration / Validation

The overall summary of the calibration / validation of the model is summarised in Table 3.1 below, and clearly demonstrates that the Stafford Transport Model provides an accurate reflection of the existing traffic movements through the study area.

Table 3.1 – Stafford Transport Model Calibration and Validation Summary

Criteria	AM Peak	PM Peak
Link Flow Calibration	93%	90%
Screenline Calibration	85%	85%
Turn Flow Calibration	91%	87%
R Squared Stat.	0.983	0.979
Link Flow Validation	92%	86%
Journey Time Validation	91%	91%

More detailed discussion of the calibration and validation of the model is provided in the attached LMVR.

4. Model Suitability for MSBC assessment

Whilst the existing model provides a calibrated and validated platform for the future year assessments it is recognised that its current form does not fully comply with the DfT WebTAG guidance. The key areas of non compliance are outlined in Table 4.1 below. These areas are discussed in more detail in the following sections.

Table 4.1 – Stafford Transport Model – Current Compliance with WebTAG

Area	Guidance Ref	WebTAG Guidance	Current Model approach	Within Guidance
Demand Modelling	WebTAG 3.10.1	Variable Demand Modelling should be applied for any scheme >£5M and where congestion etc may cause changes to travel patterns, OR sensitivity tests demonstrating that a non variable demand approach is viable should be provided.	The model has only applied an elastic approach.	✘
Model Structure	WebTAG 3.1.2	Key peak periods should be modelled including Peak and off peak	Only AM and PM peak modelled.	Partial
	WebTAG 3.10.2	Matrices should be split by journey purpose and vehicle type	At present the model is split by Light and Heavy Vehicles only.	Partial
	WebTAG 3.10.2	Route choice assignment should be based on full time and distance related costs not just time only as required for variable demand modelling.	Route choice assignment is based on time only	✘
	WebTAG 3.11.2	Mode choice modelling should be provided for any key PT scheme assessment + potential Highway schemes which may influence PT patterns	A Public Transport Model has not been specifically developed for this study	✘

4.1 WebTAG Compliance Tests

While there are a number of non-compliances highlighted above a key issue is the compliance with WebTAG 3.10.1:

> *"Variable Demand Modelling should be applied for any scheme >£5M and where congestion etc may cause changes to travel patterns, OR sensitivity tests demonstrating that a non variable demand approach is viable should be provided"*

It is recognised that, at present, the Stafford Transport Model has been used with both a fixed and elastic forecast assignment procedure to assess future year demands and the impacts of land use and infrastructural changes. It is recognised, however that the latest guidance suggest that an elastic approach, whilst acceptable for initial assessments of schemes, may not be suitable for more detailed evaluations.

The guidance does, however, recognise the fact that where the sensitivity of the benefits of a proposed scheme is not significant between a fixed and elastic forecast, then a fixed matrix may be viable. It is for this reason that the 'Compliance with DfT Test' is required; to explore the possibility of using the Stafford Transport Model for a MSBC with a fixed level of demand.

The test required is described within DfT guidance as follows:

> It may be acceptable to limit the assessment of a scheme to a fixed demand assessment if the scheme is quite modest both spatially and in terms of its effect on travel costs. Schemes with a capital cost of less than £5 million can generally be considered as modest.
>
> In order to establish a case for omitting fully specified variable demand modelling for schemes above £5 million, it is strongly recommended that preliminary quantitative estimates of the potential effects of variable demand on both traffic levels and benefit are made.
>
> In assessing whether variable demand modelling is required, the procedures required are:
>
> 1. A fixed trip matrix approach - i.e., simple TEMPRO growth but no suppression or induction.
> 2. A variable demand matrix approach - TEMPRO growth plus elastic suppression/induction.
>
> Note that the do-minimum and do-something matrices in 1 are identical to each other. Also note that the do-minimum for 2 is different from the do-minimum for 1. A robust case for carrying out a fixed-demand assessment is if the difference in scheme benefits between 1 and 2 is less than 10% in the opening year, or 15% in the forecast year (10 to 15 years later).

To assess the possibility of this approach a TUBA analysis has been undertaken to determine the benefit impacts of both fixed and elastic assignments. The test compares the following two assignments:

- Do Minimum – Committed growth constrained to TEMPRO 5.4; and
- Do Something – Committed growth constrained to TEMPRO 5.4 with the Western Access Road included in the network.

Within this scenario the only change is the inclusion of the Western Access Road while the demand level remains the same. This provides a good foundation to understanding the benefit changes seen between a fixed and elastic assignment test. It is noted that at this stage the level of elasticity applied is as follows (in line with WebTAG 3.10.3a):

- Car – Elasticity of -0.21 applied
- LGV – No Elasticity Applied
- HGV – No Elasticity Applied

For the model to pass the test, the elastic benefits must be within 10% of the fixed benefits in the scheme opening year (2016) or within 15% of the fixed benefits in the forecast year (2031). Table 3.2 demonstrates the results.

Table 4.2 - TUBA Results and Eligibility Checks – Lower Elasticity

Test	Year	Elastic PVB	Fixed PVB	% Change
Lower Elasticity	2016	2,093	2,517	**20%**
	2031	2,258	2,509	**11%**
	60 YR PVB	107,982	124,799	**16%**

The results of this test show that the modelled design year elastic benefits of 11% are within the 15% requirement but that the scheme opening year fails to meet the 10% requirement.

Whilst the results do show that the changes in benefits meet the required criteria, as the design year benefits are below the 15% required, it is recognised that, as the opening year does not, hence some enhancements of the model should be undertaken to enable variable demand modelling for this scheme.

4.2 Base Year Model Revisions

As discussed above, the current base year model has been developed for the following:

- Car, LGV and HGV only;
- Time only assignment undertaken;
- AM and PM peak hours only;
- No Public Transport model developed; and

The key issues with these and the proposed approach is discussed below.

4.2.1 Journey Purposes

At present no separate journey purposes for car users has been applied. It is therefore proposed that the existing car matrices will be disaggregated using the observed local purpose splits taken from the existing RSI and Car Park interview surveys undertaken in 2007. This will provide a robust platform for the model development and will be in compliance with the requirements for variable demand modelling.

The journey purposes will be derived for the following:

- Employers Business;
- Commuting; and

- Other.

4.2.2 Time Only Assignment

At present the model has been assigned based on a time only basis. It is recognised however, that this approach would not be viable for a variable demand assessment as a key realism test will be the response of the model to fuel cost changes. As a result, it is proposed that the model will be re calibrated and validated using the current time and distance parameters as outlined in WebTAG for each separate journey purpose. This will be in compliance with the current guidance.

4.2.3 Inter Peak Model

The current guidance states that all of the key time periods should be developed, however the existing Stafford model cover the two core peak hours namely, 08:00 – 09:00 and 17:00 – 18:00. Whilst it is recognised that this approach does not comply, it is considered that for this scheme an interpeak model will not be developed. The key reasons for this are as follows:

- A model does not currently exist for the Inter peak period;
- 2007 Traffic count and journey time data has not been collated for this time period;
- It is expected that the introduction of the IP model would only increase the benefits associated with the scheme.

This third point is a key issue as it is considered that the introduction of the scheme would create additional economic benefits in the inter peak period and hence would only further enhance the viability of the scheme. The reasoning behind this is that the scheme does not introduce any new signalised junctions on the main line routes and hence should not unduly delay existing traffic patterns in the inter peak where congestion is lower.

Following discussions and acceptance of this approach with the DfT it is proposed that an interpeak model is not developed for this scheme and hence the economic benefits derived may be considered conservative.

4.2.4 Public Transport Model

A public transport model has not been developed as part of the original model. In considering the need for such a model, various issues are noted:

- The Stafford Western Access Road is not proposed to be a public transport scheme as the benefits will be extensively highway based;
- The proposed scheme does not include any changes to passenger-transport services in the study area;
- The existing levels of bus use within Stafford are low at just below 5%; and
- Observed patronage levels have reduced over recent years.

As a result it is considered that as the influence of transfer to / from public transport may be low and that the scheme itself should not cause significant benefits or disbenefits to public transport then this will be accounted for within the ‘Frequency’ response used in DIADEM, as discussed later in this note.

4.3 Re-Calibration and Validation of the Updated Base Year Models

The base year models will be re-calibrated and validated in line with the revisions outlined above. Calibration and validation will be undertaken in accordance with the criteria set out in the Design Manual for Roads and Bridges (DMRB). Validation of the model will be based on a combination of traffic count data independent of that used in the calibration process and journey time data.

The work undertaken in re-validating the base year models will be documented in a revised Local Model Validation Report (LMVR).

4.4 Traffic Forecasting and Variable Demand

Following completion of the base year model calibration and validation process, revised traffic forecasts will be produced for the scheme.

The forecasting process will be undertaken in accordance with guidance contained in WebTAG. It is envisaged that this will involve the following stages:

- Development of forecast Do Minimum and Do Something networks. Do Minimum networks build on the base year model networks through inclusion of committed highway improvements. The Do Something networks develop the Do Minimum networks through inclusion of the proposed scheme;
- A review of any committed developments to be included in the forecast matrices;
- Development of forecast matrices in accordance with WebTAG guidance, incorporating background traffic growth using factors derived from TEMPRO, and traffic associated with committed developments; and
- Undertaking variable demand modelling using DIADEM (Dynamic Integrated Assignment and Demand Modelling).

Our proposed approach to undertaking the variable demand modelling is discussed further in the following sections.

4.4.1 Variable Demand Modelling

As discussed above, previous forecasts using the Stafford Model were undertaken using both a fixed matrix and a simple elastic assignment approach. However, simple elasticity techniques are no longer considered suitable for use in forecasting the changes in demand arising from introduction of a transport scheme. Instead, an emphasis is now placed upon producing variable demand models which consider specific demand responses to a change in the cost of travel brought about by a change in network supply.

In reality, changes in demand can be caused by users' responses to changes in the highway network supply side and perceived changes in the generalised costs. Given a change in network conditions, potential variable demand responses include:

- Change route (reassignment);
- Retime journeys to take advantage of the improved conditions;
- Travel to new destinations;
- Modal change e.g. switch from car to other modes such as public transport or vice versa;
- Switch from travelling as a car passenger to driving;
- Increase the frequency of some journeys;
- Make entirely new journeys; and
- A change in the patterns of land use in the longer term, and therefore the associated trip patterns.

In the absence of a specific demand/multimodal model, the DfT's DIADEM software is used to extend highway assignment models to variable demand modelling. Since the Stafford Model is a highway only model, **variable demand modelling will be undertaken using DIADEM.**

Our proposed approach to the form and structure of the variable demand model has been developed in accordance with the guidance in WebTAG. We consider our approach to therefore be appropriate for the scheme in question, which is a relatively simple highway scheme.

The proposed approach also makes best use of the available data, and has sought to avoid unnecessary expenditure on additional data collection.

4.4.2 Form of Variable Demand Model

As recommended in WebTAG, the demand model will take the form of a hierarchical, incremental logit model, where the response most sensitive to changes in cost is placed at the bottom of the hierarchy, with the levels above occupied by responses of decreasing sensitivity.

Since the base year matrices are in Origin-Destination (O-D) form rather than Production-Attraction format, the variable demand modelling will be undertaken on an O-D basis.

4.4.3 Demand Segmentation

Variable demand modelling requires a more disaggregate representation of demand than typically used in traffic assignment. The degree of demand segmentation required for DIADEM needs to be commensurate with the scheme under consideration. As discussed previously, we consider that the following level of demand segmentation is appropriate for the Stafford Western Access Road scheme:

- Car Commuting;
- Car Employer's Business;
- Car Other;
- LGV; and
- OGV.

Note that in DIADEM the LGV and HGV component is treated as being largely unaffected by changes in the network conditions and therefore the matrix is fixed in the variable demand modelling process.

4.4.4 Variable Demand Responses to Be Modelled

WebTAG unit 3.10.3 provides guidance on the four responses (trip frequency, mode choice, trip distribution and time of day choice) that can be represented in a variable demand model. WebTAG notes that it may not be necessary to include all of them in the demand model and that the responses to be included depends upon the circumstances and policy interests of your assessment, and also on the data you have available and the amount of effort which seems justified by the particular application.

For the Stafford Western Access Road variable demand model, we propose to model the following two responses:

- Trip Frequency; and
- Trip Distribution.

We propose to omit the mode choice mechanism from the variable demand modelling. The primary reason for this approach is that the scheme is purely a highway scheme. The proposed scheme also does not include any changes to passenger-transport services in the study area. Accordingly, the scheme is expected to have little or no impact on mode choice in the study area and modal split to public transport is therefore not deemed to be an a key consideration in the demand modelling.

The existing model is also a highway only model, and as such contains no representation of public transport demand. Modelling the mode choice mechanism would require an extensive data collection exercise to facilitate the development of the public transport demand input to the variable demand model. The cost of collecting and processing such data is not inconsiderable and, given the reasons described in the previous paragraph, is not considered to be justified or proportionate for the scheme in question.

Paragraph 1.4.6 of TAG unit 3.10.3 accepts that a few models 'omit the mode choice mechanism altogether because modal transfer is not considered to be important'. In accordance with the guidance, the trip frequency response will be modelled at a greater strength than would be the case if mode choice is included, to act as proxy for trips transferred to the car mode from other modes and vice versa. We consider this to be the most expeditious approach for the Stafford Western Access Road variable demand modelling.

The main issue regarding the trip distribution response of whether the distribution model should be singly or doubly-constrained. In accordance with WebTAG, a doubly-constrained distribution will be used for the commuting purpose, while a singly production-end constrained distribution will be used for the remaining demand segments in the variable demand model.

4.4.5 Realism Testing

WebTAG requires realism testing to be conducted, in order to calibrate the sensitivity of the demand responses and their associated highway distribution 'lambda' parameters. Realism testing will be undertaken in accordance with the guidance set out in WebTAG Unit 3.10.4. This specifies that testing should be undertaken to ascertain the elasticity of demand in the model to changes in car fuel cost and journey time. For the car fuel cost test, WebTAG recommends increasing the fuel component of the distance parameter in the assignment model by 20% and then running the variable demand model to convergence. The aim is to achieve an overall outturn elasticity of -0.3, although the values for individual demand segments can lie within the range of -0.1 to -0.4, with discretionary users having values towards the upper end of the scale, and business users towards the lower end of the range. For the car journey time test, WebTAG specifies a target outturn elasticity of less than -2.00.

Following successful calibration of these parameters, the variable demand model will be used to forecast future year scenarios. This will take into account the growth in traffic demand, but also any demand matrix changes resulting from user's responses to changes in generalised cost arising from introduction of the scheme.

The deliverable from this work will be a Traffic Forecasting Report which will document the work undertaken to produce the forecast traffic models and provide a commentary on the results of the forecasting. The report will contain the following standard sections:

- Study Overview;
- Forecasting Approach;
- Forecast Network Development;
- Forecast Matrix Development;
- Development of Variable Demand Model;
- Forecast Assignment; and
- Presentation of Model Forecasts.

4.4.6 Sensitivity and Uncertainty Tests

In line with WebTAG 3.10.4 and 3.15.5.it is proposed that sensitivity tests on the lambda values used in DIADEM will be undertaken to see the sensitivity of the model to changes in induced

traffic. In addition, in line with the uncertainty testing the impact of low and high traffic growth and any uncertainty in future land use will also be considered.

5. Timescales for Delivery

It is proposed that the MSBC will be issued to the DfT in April 2010 for review and hence the modelling would be undertaken within this timescale. It is noted, however, that we would be very keen to work closely with the DfT to ensure a “no surprise” culture and hence to minimise any issues once submitted.

As a result of the timescale outlined above we would hope to engage with the DfT at their earliest opportunity to ensure that our outline methodology is discussed and agreed.

6. Summary

This note has outlined the current position of the Stafford Western Access Road assessment and detailed the proposed revisions to the model to enable a MSBC to be developed for the scheme.

Appendix A

Summary of Existing Model

In line with the requirements of the DfT's early engagement document, Appendix B has been completed identifying key sections of the LMVR where the details of the existing modelling approach are provided. Where additional information is required please do not hesitate to contact us.

Item		Section/Page	Notes
An Existing Data and Traffic Surveys Report to include:			
	Details of the sources, locations (illustrated on a map), methods of collection, dates, days of week, durations, sample factors, estimation of accuracy, etc.	Survey Completion Report: Map of existing counts - Section 3, figures 3.1-3.2. New surveys outlined in Section 4. Also see Model Development Report Section 2	New surveys include RSIs, Car Park Surveys, Traffic Counts.
	Details of any specialist surveys (e.g. stated preference).	N/A	
	Traffic and passenger flows; including daily, hourly and seasonal profiles, including details by vehicle class where appropriate.		A separate spreadsheet outlining this analysis is provided
	Journey times by mode, including variability if appropriate.	Appendix B of LMVR	
	Details of the pattern and scale of traffic delays and queues.	Appendix B of LMVR	Journey times on key routes defined by key timing points has provided the indications of the key delays
	Desire line diagrams for important parts of the network.	N/A	
	Diagrams of existing traffic flows, both in the immediate corridor and other relevant corridors.	Full details of all available count data is provided in the LMVR validation and calibration tables in Appendix A and B	
An Assignment Model Validation Report to include:			
	Description of the road traffic and public transport passenger assignment model development, including model network and zone plans, details of treatment of congestion on the road system and crowding on the public transport system.	LMVR Section 3. Zone plans are Figures 3.2-3.3 and Network discussed on page 3-18 and Figures 3.4-3.5	PT: Not applicable
	Description of the data used in model building and validation with a clear distinction made for any independent validation data.	Calibration - LMVR Section 4, Validation LMVR Section 5	
	Evidence of the validity of the networks employed, including range checks, link length checks, and route choice evidence.	LMVR Section 4, specifically: Link Length Checks (page 34, paragraph 4.8), Route Choice Evidence (Section 4 p34-37)	
	Details of the segmentation used, including the rationale for that chosen.	LMVR Section 3	It is noted that the segmentation of the model is by vehicle type, ie Cars, LGV's and HGV's only. No journey purpose segmentation has been applied as a full demand model approach has not been adopted..
	Validation of the trip matrices, including estimation of measurement and sample errors.	LMVR Section 4.	
	Details of any 'matrix estimation' techniques used and evidence of the effect of the estimation process on the scale and pattern of the base travel matrices.	LMVR Section 4, p38	
	Validation of the trip assignment, including comparisons of flows (on links and across screenlines/cordons) and, for road traffic models, turning movements at key junctions.	LMVR Section 5 covers the whole validation procedure.	
	Journey time validation, including, for road traffic models, checks on queue pattern and magnitudes of delays/queues.	LMVR Section 5, p50-53. Backed up by Appendix C.	Note that delays/queues are deemed acceptable in paragraph 5.38 and through the graphs in Appendix C
	Detail of the assignment convergence.	LMVR Section 4, p33-34. Specifically Table 4.1.	
	Present year validation if the model is more than 5 years old.	N/A - 2007 Base Year.	
	A diagram of modelled traffic flows, both in the immediate corridor and other relevant corridors.		To be Undertaken

A Demand Model Report to include:			
	Where no Variable Demand Model has been developed evidence should be provided to support this decision (e.g. follow guidance in WebTAG Unit 3.10.1 Variable Demand Modelling - Preliminary Assessment Procedures).	NA	This is discussed in the attached note
	Description of the demand model.	NA	
	Description of the data used in the model building and validation.	NA	
	Details of the segmentation used, including the rationale for that chosen. This should include justification for any segments remaining fixed.	NA	
	Evidence of model calibration and validation and details of any sensitivity tests.	NA	
	Details of any imported model components and rationale for their use.	NA	
	Validation of the supply model sensitivity in cases where the detailed assignment models do not iterate directly with the demand model.	NA	
	Details of the realism testing, including outturn elasticities of demand with respect to fuel cost and public transport fares.	NA	
	Details of the demand/supply convergence.		
A Forecasting Report to include:			
	Description of the methods used in forecasting future traffic demand.		This is discussed in the attached note
	Description of the future year demand assumptions (e.g. land use and economic growth - for the do minimum, core and variant scenarios).		To be Undertaken
	Description of the future year transport supply assumptions (i.e. networks examined for the do minimum, core scenario and variant scenarios).		To be Undertaken
	Description of the travel cost assumptions (e.g. fuel costs, PT fares, parking).		To be Undertaken
	Comparison of the local forecast results to national forecasts, at an overall and sectoral level.		To be Undertaken
	Presentation of the forecast travel demand and conditions for the core scenario and variant scenarios including a diagram of forecast flows for the do-minimum and the scheme options for affected corridors.		To be Undertaken
	If the model includes very slow speeds or high junction delays evidence of their plausibility.		To be Undertaken
	An explanation of any forecasts of flows above capacity, especially for the do-minimum, and an explanation of how these are accounted for in the modelling/appraisal.		To be Undertaken
	Presentation of the sensitivity tests carried out (to include optimistic and pessimistic tests).		To be Undertaken