

Somerset County Council
DaSTS Taunton Gateway Study
Modelling Methodology

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1 Introduction

1.1 Introduction

1.1.1 This document sets out details of the modelling methodology required to support the Taunton DaSTS work.

1.1.2 It is intended that this should be a 'live' document which is updated as our investigations of the existing models is completed and as the study progresses.

1.1.3 Discussions have already taken place with the key modelling staff at Somerset County Council and this has helped provide further understanding of the strengths and weakness of the existing models. A meeting is being set up with Atkins, the developers of the existing models, for mid January 2010.

1.1.4 The methodology is based on our Proposal but is updated to reflect our current investigations.

1.2 Appreciation of modelling tools available

1.2.1 The documentation associated with the Taunton and Surrounding Area Road Traffic (TSRT2) Model highlights a number of strengths and weaknesses of the modelling tools available. These are summarised in the following text.

1.2.2 The TSRT2 Model has the following strengths:

- The model has AM, inter peak and PM base models;
- The AM and PM models reflect shoulder congestion;
- A 2026 model is available;
- The geographical coverage of the model includes Taunton, Bridgwater, Wellington and the surrounding hinterland;
- The model includes detailed zone plans in the Taunton, Bridgwater and Wellington; and
- The forecasting model includes public transport and Park and Ride sub models, which alongside elastic assignment procedures can model mode choice and trip suppression.

1.2.3 The TSRT2 Model has the following weaknesses:

- Some of the data about trip pattern in the model is old. The inter-urban trips in the model are based on 2001 prior matrices. The intra-urban trips in Taunton, Bridgwater, Wellington areas have been updated with a variety data including school travel pattern data, car park data, Census Journey to Work data. However, the 2008 LMVR states that the matrix estimation process was allowed to operate on all O-D movements, hence the whole matrix is somewhat synthetic;
- The model extends to, but does not include Ilminster;
- The model does not re-distribute trips, consider trip frequency or time of day;
- The public transport and Park and Ride sub models are based on SATCHMO, which program that is no longer in use,
- The model logit formulation is not incremental; and
- The model is not segmented by car availability, or journey purpose.

2 Proposed modelling methodology

2.1 Introduction

2.1.1 Having considered the weaknesses of the suite of modelling tools available, considerable work will be required to collect data, fully revalidate the existing SATURN model and develop a variable demand model for the area that is fully WebTAG compliant. The modelling methodology proposed provides a balance between the need for modelling tools to underpin the analysis whilst ensuring sufficient resources can be allocated to other parts of the project work.

2.1.2 The proposed modelling methodology includes the following:

- SATURN highway model update;
- Creation of a public transport supply model, and Park and Ride model refinement;
- Development of a high level multi-modal model;
- Develop a modelling interface tool to relate strategic changes to detailed SATURN matrices;
- Test the scenarios in the newly created modelling tools; and
- Data collection.

2.1.3 Having considered the status of the modelling tools currently available and the constraints of time and budget, a methodology has been developed to satisfy the Initial Options Assessment Report by March 2010, and the Final Report by March 2011. This methodology needs to be agreed by DfT, to ensure they will be satisfied by its robustness for this DaSTS work.

2.2 Short term modelling tasks - to March 2010

2.2.1 It is recognised that the methodology set out above could not be completed to inform the initial options assessment report due in March 2010 because firstly, the volume of work required, and secondly the first opportunities to undertaken traffic data collection in a traffic neutral month will be March 2010. Hence, it is suggested that in the shorter term, to *inform the options assessment work* that the current modelling tools be used.

Review of current models

2.2.2 The first stage of the modelling work will be to undertake a review of the existing SATURN models. This will include:

- Checking the highway link count validation at key locations in the model against recent (2007 and onwards) traffic count data that is already available. This will provide confidence that there is the correct volume of traffic in and around the model.
- Checking the highway junction turning count validation at key locations in the model against recent (2007 and onwards) traffic count data that is already

available. This will provide confidence the model has the correct junction behaviour, and delays, which will in turn influence route choice.

- Checking highway modelled journey times along key corridors in the model against site observations, to ensure the route choice on key corridors in the model is correct.
- Check whether the future year development, and transport infrastructure assumptions are in line with current commitments, and plan.

2.2.3 If this review highlights particular issues with the current models that need to be addressed to complete this stage of the work, some intermediate model refinement could be undertaken.

2.2.4 It had been thought the public transport modelling would be undertaken using the existing modelling suite. However, following discussion with Officers it has become apparent that the transit routes and demand in the public transport model are out of date. It is therefore recommended that a public transport supply model is created, supported by a high level mode choice model.

Creation of a public transport supply model

2.2.5 A public transport model is required to inform the mode choice component of the high level multi-modal model. It is suggested that the key inter urban and intra urban public transport corridors are coded into an EMME/3 model.

2.2.6 The creation of a fully functioning detailed public transport model will require extensive data collection. So it is proposed that a model be created representing the strategic public transport choices between the settlements by bus and rail, and these be modelled such that the generalised costs of these journeys can be compared with highway journeys, so that mode switching associated with policies to enhance bus service provision, and changes to congestion to be modelled.

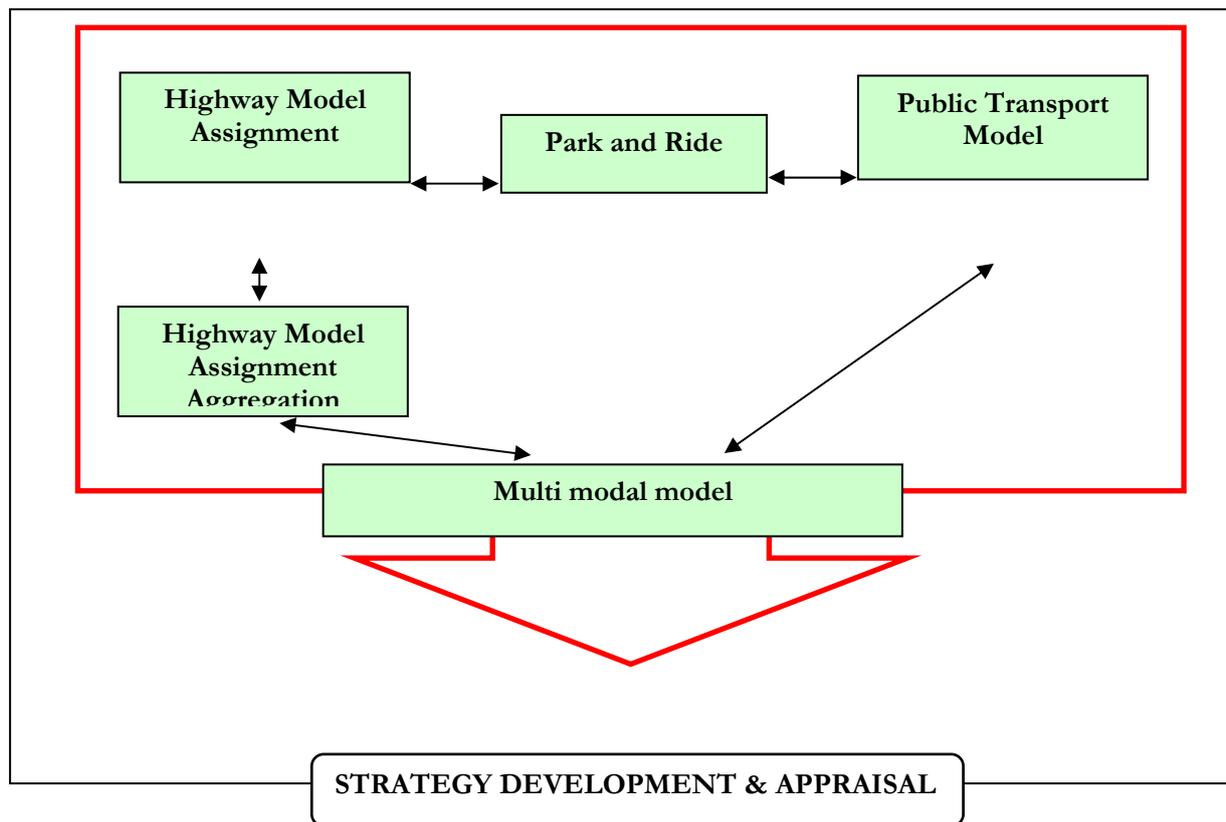
2.2.7 The scope and extend of EMME/3 work will be clarified further, following an initial review of public transport availability and choice in the model area.

Development of a high level multi-modal model

2.2.8 The high level multi-modal model will be developed using EMME macros, and will control using a spreadsheet. This model will interface with the public transport model and the SATURN model.

2.2.9 The proposed model methodology is set out in Figure 1 overleaf.

Figure 1: Proposed Modelling Hierarchy



2.2.10 Some reality tests will be undertaken on the model, prior to scheme testing work.

2.2.11 The current models will be used to undertake *comparative tests between scenarios and an agreed reference case*.

2.2.12 SATURN time, cost and trip skims will be extracted from the models for use in the TUBA model being developed as part of the appraisal work. Again, given the issues of the age of the data in the model, the results of the TUBA work will be used in a comparative sense.

2.3 Longer term modelling tasks - March 2010 – March 2011

2.3.1 To inform the Final Report due in March 2011, modelling tools are to be developed and used to test the scenarios under consideration. This work consists of the following components:

- SATURN highway model update;
- Refinement of the EMME public transport supply model, and Park and Ride model refinement;
- Refinement of the high level multi-modal model;
- Develop a modelling interface tool to relate strategic changes to detailed SATURN matrices;
- Test the scenarios in the newly created modelling tools; and
- Data collection.

SATURN highway model update

- 2.3.2 A review of the existing SATURN model will be made to identify the locations where there is a difference between modelled and actual travel behaviour. This work will also finalise the number of locations that road side interviews be undertaken (this is discussed further in the section on data collection).
- 2.3.3 The origin-destination patterns in the current model at the road side interview locations will be compared to the newly collected road side interview data and comparisons will be made between modelled traffic flows and recent count data. It is envisaged that some matrix manipulation will be undertaken to update the model.
- 2.3.4 The updated model will be aggregated for compatibility with the public transport and high level multi-modal model. A model interface tool will be developed such that matrix changes resulting from the multi-modal model can be disaggregated and fed back into the SATURN model.

Creation of a public transport supply model, and Park and Ride model refinement

- 2.3.5 The public transport model developed as part of the short term modelling tasks will be refined to include more transit lines, and to make use of further public transport surveys.
- 2.3.6 However, it is not recommended that this work will include the creation of a fully functioning detailed public transport model as this would require extensive data collection.
- 2.3.7 The park and ride sub model will be updated to reflect the changes in the public transport and highway models.

Development of a high level multi-modal model

- 2.3.8 The high level multi-modal model developed as part of the short term modelling tasks will be refined in this stage of the work. Reality tests will be undertaken on the model, prior to scheme testing work.

Scenario testing

- 2.3.9 The multi-modal model will be used to test the recommended scenarios to inform the scenario development process.

Data availability and collection

- 2.3.10 The Taunton SATURN model LMVR sets out the locations of the existing road side interview survey sites, and it is evident that some areas of the model lack up to date data. Road Side Interview data will be collected on inter urban routes at locations to compliment the 2004/2006 road side interviews. This data will be used to update the SATURN matrices, and then be used in the multi-modal model.
- 2.3.11 It is proposed that new road side interviews be undertaken at:
- Taunton A38, near Boome Lane; and
 - Taunton A358 between the M5 and Heron Gate.

- 2.3.12 These surveys will be undertaken at the first traffic neutral time of the year (April 2010).
- 2.3.13 In addition to the road side interviews, traffic count, turning count data and journey time data will be required for a variety of locations in the simulation to calibrate and *validate* the model. It is intended that recent traffic data currently held by the Local Authorities (and maybe the Highways Agencies) be used for this.
- 2.3.13 The TTSR2 Baseline Update Report contains data about inter-urban bus usage, and some information about rail use in the area. The report contained derived information about mode splits for the following movements:
- Taunton to Bridgwater;
 - Bridgwater to Taunton;
 - Taunton to Wellington; and
 - Wellington to Taunton.
- 2.3.14 It is intended that this data be used in the public transport model. Some additional information for other movements in the study area will be required, and will be collected by undertaking selective surveys.
- 2.3.15 Information about travel choices and user characteristics (such as car availability) will be ascertained from limited public transport interview surveys, and town centre interviews. This information could then be used to justify the uses of older and/or national data.

3 Programme and Risks

- 3.1 The programme for the proposed modelling tasks is set out in the Study Programme version 7. Modelling tasks are indicated in red on the programme.
- 3.2 Modelling has a number of risks and the most significant for this project have been identified in the Risk Register version 2.
- 3.3 It should be noted that the data collection is currently programmed for April 2010. This is dependent on the date of the General Election and on the receipt of the necessary approvals from the DfT.