Statement of Requirements

Introduction

This document should normally cover two main topics: an appreciation of the adequacy and shortcomings of the existing model and a specification of the anticipated future requirements for the model, in terms of the capabilities sought and the uses to which it is intended to be put.

Examples are given in Figures 1-3, which drive from the Wellington city model, while the objectives for the Auckland model are attached at the end of this text.

Issues Concerning the Current Model

An example of a list of key issues, and areas where model improvement is sought, is given in Figure 1. This would normally draw on an independent review of the existing model and comments made by stakeholders orally, in writing or at a formal workshop.

Future Modelling Needs

A workshop with stakeholders would usually provide an outline of the modelling needs, in terms of what the model is to be used for and should be capable of responding to. An example is given in Figure 2.

Functional Design Issues

These two outcomes are then summarised in Figure 3, which relates the above requirements to each module of the model, thus identifying the issues which the functional specification of the model must respond.

Often, these lists are long and may be not be realistic. In which case it would be sensible to seek to identify the main agree priorities in the list of issues.

Figure 1 Examples of a List of Issues Relating to the Current Model

Lack of precision in public transport travel patterns

Reliability of demographic forecasts

Reasonableness of forecast growth rates

Representational detail (such as the road network, intersections and related delays)

Car ownership model and forecasts

Commercial and freight modelling

Stronger representation of the underlying drivers of shopping and recreational travel (reflected in the higher interpeak and weekend travel growth rates)

Formal consistent interfaces between strategic and project models

Study area should be reviewed

Fit to road screenlines and individual routes

Peak spreading model and forecasts

Adequacy of the model for the range of intended applications

Figure 2 An Example of Modelling Needs: Policies and Scenario Priorities

Land Use/Demographics:
-       land use mix and distribution
-       retail patterns (large centres)
-       re-structuring of businesses
-       changing work structures and workforce
-       evolving family structures

Roads:
-       infrastructure/corridor studies
-       tolling and other road charges
-       car pooling
-       tidal flow
-       HOV lanes
-       strategic traffic management

Parking supply policies (price and capacity):
-       commuting/long term
-       business and leisure/shopping/short term

Non-Motorised Modes
-       access to central station

Public Transport
-       fares
-       services/headways
-       rail network extensions
-       bus priorities
-       weekend services
-       funding
-       local CBD services
-       infrastructure project appraisals
-       park-&-ride
-       quality improvements (eg railway stock)
-       interchanges/hubs
-       light rail

Commercial and freight traffic:
-       business cars and commercial vehicles
-       ports and airport
-       interpeak importance

Other

Travel demand management

Figure 3 Required Extensions to Model Functionality

Issues	Policy and Scenario Priorities
General Interfaces with project models Study area Representational detail Peak spreading model and forecasts Adequacy for intended range of applications	
Segmentation Commercial and freight traffic	Business cars and commercial vehicles Ports and airport Interpeak importance
Land Use/Demographics Reliability of demographic forecasts Reasonableness of forecast growth rates	
Car Ownership Review car ownership growth projection Reasonableness of forecast growth rates	Evolving family structures Changing work structures and workforce
Trip Ends Reasonableness of forecast growth rates	Land use mix and distribution Retail patterns Re-structuring of businesses Changing work structures and workforce Evolving family structures Shopping travel 'drivers'
Mode Choice/Distribution Lack of precision in public transport travel patterns Fit to road screenlines	Car pooling
Road Assignment/Networks Fit to individual routes Representation of road network, intersections and related delays	Infrastructure Tolling and road charges Tidal flow HOV lanes Strategic traffic management Parking supply and pricing Travel demand management
Public Transport Networks and Assignment	fares services/headways bus priorities funding local CBD services infrastructure project appraisals park-&-ride quality improvements (eg railway stock) interchanges/hubs access to central station light rail

The Auckland Model Objectives

The following contractual list of requirements was based on a series of client sponsored workshops.

a) That the two models (ASP3, the land use model, and ART3, the transport model) provide the analytical framework within which to evaluate complex interactions and plan Auckland's transport system with confidence up to 2046.

b) That the ASP3 model be sensitive to:

- Changes in the region' demographic, economic and social structures

- Changes in the location, nature and quantity of land use activities in the region

- Changes in land use and activity location in response to changes in the transportation system as developed in ART3

c) That the ART3 model be sensitive to:

- Regional growth scenarios representing changes in the region's demographic and employment composition, location and density, as represented by the ASP model

- The possible addition of regionally significant transport infrastructure

- Effects of congestion on trip making (trip generation/suppression)

- Changes in the distribution of trips (trip distribution / redistribution)

- Changes in motorised and walking and cycling modes of transport (mode split)

- Changes in the routes of travel (trip assignment and route choice)

- Changes in the timing of trips (peak spreading and suppressed demand)

e) That the ASP3 model allow the investigation and evaluation of the following sorts of regional policies and issues:

- The Regional Growth Strategy and other strategic growth options for th region, including:

    o Land zoning policies

    o Land pricing policies

    o Policies related to the location of major activities

    o Mixed land uses

    o Densification and urban sprawl

e) That the ART3 model allow the investigation and evaluation of the following sorts of regional policies and issues:

- The addition of major transport infrastructure, including major public transport infrastructure and plans

- The management and expansion of the region's public transport system

- The allocation of scarce capital between competing transport investments

- Taxation or charging policies aimed at specific parts of the transport system

- Non-pricing demand management measures
- Policies to reduce the energy consumption of the region
- Policies to reduce emissions of pollutants
- Policies to improve the health and safety transport system users
- Policies to improve walking and cycling

f) The ATM2 project will provide essential tools for developing and evaluating policies and projects that are aligned with the goals and objectives and statutory requirements of the Land Transport Management Act 2003, the Local Government (Auckland) Amendment Act 2004, the New Zealand Transport Strategy the Regional Growth Strategy, the Regional Policy Statement and the Regional Land Transport Strategy.

g) That the models provide information in a format that is compatible with the needs of the Auckland Passenger Transport (APT) and sub-regional project assignment models.

h) That the models be sound, robust, reliable, have sound theoretical bases reflecting international best practice and at the minimum meet Land Transport NZ PEM recognised standards for model calibration, validation and forecasting.

i) To ensure the satisfactory calibration of the ART3 and ASP3 models to base year conditions.

j) To ensure that the model development and calibration receives approval from a Peer Reviewer appointed by Land Transport NZ and the ARC.

k) That the models be fully explained to those involved in transport planning in Auckland during their development, so that they can be used with confidence by them on completion. This will involve the production of technical documentation including manuals explaining the use of the models as well as four workshops of approximately one day each. The workshop will be associated with following phases:
- Model specifications
- Specifications of data requirements
- Results of data analysis
- Calibration, validation and testing

l) That the model software should be considered and in doing so the following aspects need to be taken into account:
- Well established and recognised international track record to minimise the risk to the ARC of being a "guinea pig" for new or recently developed software;
- Compatibility with transport and land use modelling software used by regional modelling stakeholders
- Appropriateness to the model goals and required outputs
- A seamless interface between the ASP3 and ART3 model software to enable information exchange
- Widely distributed international support and user groups

- Compatibility with GIS systems at the ARC and its regional partners. Note that the ARC currently use the ESRI suite of GIS products including ArcGIS Desktop, ArcView, ArcIMS, ArcSDE

- Quality of graphical outputs for presentation and graphical analysis purposes

- Recognised international best practice standards

k) That within the constraints of other objectives, the models be easy to use, responsive and enable the timely evaluation of varied alternatives.

l) That the data collected for the ATM2 Project be made available to interested parties as a database for further analysis or information. This database will contain much useful data and should be used as widely as possible.

m) That the models meet recognised international best practice standards in respect of their development, structure, theoretical bases, forecasting and calibration standards.