1993, TRANSPORTATION MODEL DEVELOPMENT STUDY

Executive Summary:

The main product of the **TRANS Transportation Model Development Study** is a travel demand-forecasting model. The model was calibrated for both the a.m. and the p.m. peak periods/peak hours, for the year 1986. It uses the EMME/2 software.

TRANS will use the model "to assist in the planning of transportation facilities in the National Capital Region." The model provides forecasts of auto and transit travel. The resultant peak hour volumes are used to identify capacity deficiencies on the Region's road and transit networks. Therefore, the model provides basic information for, ultimately, policy planning and investment decisions. The forecasts are based upon development scenarios and, in some instances, alternative configurations of the future road and transit networks.

In accordance with TRANS specifications, the model was designed for strategic, system-(Region-) wide planning. The model also provides a framework within which sub-area analysis, corridor or facility planning and, ultimately, operational or route planning could be applied. All principal roads and highways, plus the Transitway and the routes of the regional transit operators, are included in the model, regardless of jurisdiction.

This report documents the development, or *calibration*, of the base year model. It explains the theoretical and technical formulation of each of its parts. The report also describes the data and networks used in the model development. Extensive hands-on training also was provided to TRANS (RMOC) staff.

In addition, the report discusses the *application* of the model to forecasting. Unlike older, more traditional models, the forecasting process is not fixed within specified steps. Rather, the user has explicit input at a number of points, and can vary the process, if need be. Therefore, the discussion focuses upon the types of decisions that the user must make; where in the process these decisions must be made; and, the alternative choices that are available. This is distinct from the *User's Guide*, which accompanies the report. The *Guide* lists the files and outlines the procedures that are used in operating the model.

Technically, the model features the following:

Blend of *demand* modelling – that is, simulation of origin-destination matrices – and supply, or network, modelling. This allows TRANS to distinguish between growth-related (demand) congestion effects, and the congestion effects due to network (supply) constraints. To some extent, the model explicitly incorporates the effects of supply conditions on demand.

Direct modelling of each peak period. Trip generation, trip distribution and modal split are simulated for the two and a half hour peak periods. This avoids the need to use factors, and allows transit to be explicitly in trip distribution. TRANS has the ability, somewhat unique in North America, to compare the effects of projected travel on both peak periods.

Special treatment of the work trip. The work trip dominates peak period travel. Its distribution and mode choice characteristics are different from those of all other purposes. Therefore, a gravity distribution model – based upon auto and transit times – and a logit modal split model were developed for the work trip.

Alternative trip generation and distribution specifications. These allow forecasts to respond more closely to the evolution of land use - socio-economic conditions. They reflect the facts that mobility will change over time, and that sub-regional disparities likely will diminish as the Region continues to evolve as single urban and economic entity.

Tri-nomial modal split process. Auto drivers (i.e., vehicles), auto passengers and transit persons are developed directly in the modal split models. This ensures that the forecasting process responds directly to changes in modal split attributes. It also avoids the need for factoring from auto person matrices. It provides flexibility in future applications.

In sum, the new TRANS model is more than the technical implementation of a sophisticated software package, using new data. The mode's role in the planning process has been broadened to provide a greater *understanding* of a system, in addition to the more traditional role of *analyzing* the system. This allows assumptions to be tested more explicitly, and sensitivity analysis to be more responsive to emerging planning needs and issues. In turn, the reliability of forecasts and the applicability of the model to a broader range of issues are increased significantly.