Questions and Answers about the Dallas-Fort Worth Regional Travel Model
(Prepared on November 13, 2006)

The North Central Texas Council of Governments' (NCTCOG) Model Development Group is currently developing a report documenting the model validation. This report will be available to users in the spring of 2008. We will try to address most of the model validation questions in that report. Meanwhile, we will organize all validation, calibration, and development questions that we receive in this document.

You can send your questions about the Dallas-Fort Worth Regional Travel Model's (DFWRTM) validation, calibration, and development to Arash Mirzaei at amirzaei@nctcog.org and (817) 695-9261.

Q1. Why is the off-peak period a combination of the mid-day (9:00 a.m. to 3:00 p.m.) and the evening/night (6:30 p.m. to 6:30 a.m.) periods?

A1. During our model development efforts, we grouped the mid-day and evening/night periods into a single period primarily because we did not believe the additional breakdown was worth the extra 4874 x 4874 zone model run time that would be involved. We may consider this particular breakdown in a future round of model improvements.

Q2. Why has car ownership not been used as an explanatory variable in the trip production model for home-based trips?

A2. DFWRTM only estimates motorized trips. Trip rates are calculated to estimate the number of motorized trips from the 1996 household survey and 1994 workplace survey. NCTCOG believes trip generation rates are better explained if categorized by household income groups, rather than by auto ownership groups. However, for purposes of mode choice, we have an auto ownership model in place.

Q3. The method used to estimate employee income for the trip attraction model is questionable as it is based on the incomes of households in the vicinity of the workplace. In the case of inner city areas in particular, high-paid jobs can and often do co-exist with low-income residents.

A3. The current model does not deny such a co-existence. We acknowledge there are better ways of estimating the household income of workers at the workplace. We will consider those on our future model improvements. However, this simple model results in consistent productions and attractions for different HBW income groups, as is shown in the trip generation report balancing factors. Also, the estimate of the income of the household based on the location of the workplace is based on a linear formula and iterative proportional fitting to the regional values. The regression estimates in question provide the seeds, not the absolute values. The regional values come from census data. We encourage DFWRTM users to compare the 1999 HBW modeled data against 2000 Census or other data, to determine if NCTCOG's underlying assumptions have any undesirable consequences. It would be valuable to our future model improvement efforts if you could share with us any of your findings.

Q4. In the trip balancing procedure, the control total is usually set to the most reliable of the attractions or production estimate. In practice, this usually means that the trip attractions are scaled to match the productions, as household data (from which productions are derived) is generally more reliable than employment data (from which attractions are largely derived). An exception is for NHB trips, where the reverse is usually the case. Why does the DFWRTM scale HBW trip productions to match the attractions, and visa-versa for NHB trips, contrary to usual practice?

A4. Like you mentioned, the most reliable number for productions and attractions is used for balancing the trips. For Home-Based Work (HBW) trips, attractions are the most reliable ones. We believe regional HBW trip-making activity should be directly related to the regional number of forecasted jobs, and the only way to do this is to allow the HBW regional productions to be balanced to the HBW regional attractions. We have observed no significant balancing correction in HBW and Home-Based Non-Work (HNW) trips in our demographic forecasts. Non-Home-Based (NHB) attraction trips are balanced to productions and then are set equal to attractions in each zone.

Q5. Can you provide information on the calibration technique used, or more importantly, how well the calibrated model reproduces the observed trip length distributions?

A5. An aggregate look at CTPP 2000 for validation showed no need for the correction of the trip distribution model. Calibration has been done by using the 1996 household survey trips. The calibration technique is described in the TransCAD manual, but it generally consists of many regression estimations and corrections to estimate the gamma function values (used to calculate friction factors) to meet an observed trip length distribution. The friction factors for truck trips were based on local calibration-related adjustments made to the curves available from the Federal Highway Administration's (FHWA) "Quick Response Freight Manual." If you need specific statistics for the calibration process, please let us know.

Q6. The *Dallas-Fort Worth Regional Travel Model: Model Description* document provides the values for all of the conversion factors (e.g. Time of day, Vehicle occupancy, and Proportion of Shared riders who use HOV). Can you explain how they have been derived or, more importantly, provide any indication of their accuracy?

A6. The time-of-day factors for converting weekday Production-Attraction (PA) trips to Origin-Destination (OD) trips were obtained from the 1996 household survey. The purpose-specific "proportion of shared riders who are eligible to use HOV lanes" was part of a Year 1999 calibration process that enabled NCTCOG to find a reasonable balance between observed a.m. peak, p.m. peak, and off-peak HOV counts and the modeled assignment volumes. The vehicle occupancy applied to shared-ride 3+ trips is based on what was observed from the 1996 household survey.

Q7. Do you have any document about the validation of Traffic Assignment in terms of congested speed and volume by screen line?

A7. Estimated traffic volumes have been compared to more than 8,000 traffic counts throughout the roadway network. The overall RMSE was about 35%, which ranged from 15% on freeways to 72% on frontage roads. Speeds were estimated based on

calibrated volumes. Validation checks on freeways showed very reasonable comparisons to independent speed data for 1999 and 2003. Regional travel times across the region have been checked against the travel times on paths in the regional network. Complete documentation of traffic assignment will be part of our validation report.

Q8. Has DFWRTM been subject to a comprehensive and systematic validation process?

A8. Yes. DFWRTM has been validated based on the following:

- *1999 Texas Department of Transportation (TxDOT) traffic saturation counts,*
- *1999 automatic traffic count stations,*
- *1999 Dallas Area Rapid Transit (DART) boarding data,*
- *1999 Fort Worth Transportation Authority (FWTA) boarding data, and*
- *1999 Freeway density, volume, and speed study.*

DFWRTM's internal models have been developed and calibrated based on the following:

- *1994 external stations survey,*
- *1994 workplace survey,*
- *1996 household survey,*
- *1996 FWTA transit onboard survey,*
- *1998 DART onboard survey, and*
- *2001 DFW Airport survey.*