

Highlights of the TPB Travel Forecasting Subcommittee Meeting Held on July 21, 2006

Item 1: Approval of the May 19, 2006 Meeting Highlights

The highlights were approved as written.

Item 2. Results of TRB's Travel Forecasting State of the Practice Survey

Mr. Shapiro began the presentation with a disclaimer:

“The presentation that follows is based on a survey conducted for the TRB Committee to determine the “State-of-the-Practice” of MPO Travel Forecasting Procedures in 2005. The final report of the TRB Committee has not been published. Therefore, minor details of the data are subject to change but the overall findings are valid.”

The objective of the study was to gather, organize, describe and interpret information on the current state of the practice. The purpose was to obtain travel forecast procedures from a broad sample of MPOs. The survey was designed by BMI-SG and was distributed in late June to 381 MPOs. Mr. Shapiro explained that a majority of the MPOs use the four-step process. A few of them use tour-based methods, many MPOs omit mode choice, and some do no travel forecasting. The gravity model was the dominant methodology and a significant portion of large MPOs use functions combining highway and transit time or other factors. Less than half of reporting MPOs apply some type of adjustment factors. Some MPOs do not use K factors because they do not validate model results. A home-based work mode choice model is used by 94% of large MPOs, 54% of mid-size MPOs, and 21% of small MPOs.

Mr. Spielberg briefly explained the evolution of travel forecasting procedures. Agencies and planning processes were established in 1965 in response to the 1962 Highway Act. Large scale household surveys were conducted in many locations. Networks used average daily speeds and capacities, and regression analysis was used for trip generation. Many agencies had seven or more person trip purposes and trucks, often light and heavy, were other “purposes”, as was taxi. The gravity model was used by advanced studies, and an intervening opportunity model was used in at least two metropolitan areas, while others used Fratar expansions. There was no standard method for transit analysis, and traffic assignment was generally all-or-nothing. Capacity restraint was available as an average of multiple loadings. Land use models were being explored.

Changes in travel forecasting between 1965 and 1975 included:

- Some use of peak and off-peak highway networks
- Different speeds and capacities
- Greater use of category tables to determine link speeds and capacities
- Transit network development and analysis software was available
- Cross-classification was an accepted method for trip generation (productions)
- Trip purposes were reduced to HBW, HBO, NHB and truck
- General use of iterative capacity restraint with some incremental in highway assignment
- Mode choice models

Changes in travel forecasting between 1975 and 1985 included:

- Large scale household travel surveys no longer conducted
- Small scale telephone based surveys became the norm

- Logit models were the accepted form for mode choice
- Feedback of congested times (distribution and mode choice)

Changes in travel forecasting between 1985 and 1995 included:

- Equilibrium became the accepted procedure in highway assignment
- Multi-class assignment applications were also developed
- Non-motorized trips included in trip generation
- Use of work-based purposes in trip generation and distribution
- Nested logit mode choice models used by many agencies

Changes in travel forecasting since 1995 include:

- First MPO applications of tour-based models
- Stated-preference survey finding way into model development
- Sample enumeration and synthetic households to define trip patterns
- Some use of auto ownership models preceding trip generation
- Some use of destination choice models
- Non-motorized trips in some mode choice models
- Post-processing of speeds and volumes for emissions analysis

In conclusion, Mr. Shapiro stated the top best and worst features. The top three worst features were:

- 3) Trip Generation
- 2) Lack of detail/quality of mode choice in model, and
- 1) Land use forecasting

The top three best features were:

- 3) Zone/network details
- 2) Well calibrated and validated
- 1) Ease of use/flexibility

He also pointed out that land use forecasts were included in both the top ten best and worst features categories.

Questions and Comments

Mr. Kline asked what percentage of peaking occurred in the peak hour versus peak period. Mr. Spielberg replied that the percentage was not tabulated, but the data is available.

Mr. Replogle asked if agencies examined external traffic forecasts growth versus the change in external households and jobs. This issue came up in the peer review for the Baltimore Metropolitan Council and MWCOG traffic models. Mr. Spielberg replied that external traffic forecasts growth was not examined.

Item 3: Documentation of FY2006 Activities in Model's Development and Network Development

Bob Snead distributed a draft copy of the FY 2006 Network Development program report. This report documents network development activities completed by COG/TPB staff in accordance with elements identified in the FY-2006 Unified Planning Work Program (UPWP). The transportation networks are currently designed to support the Version 2.1 D #50 travel demand

model. COG/TPB's GIS is used to pre-process and manage network components and link other COG/TPB activities. Network development activities support transportation modeling and Air Quality Conformity determination. These activities include the development of base year highway and transit network files and forecast year networks for air quality conformity analysis of the TIP and CLRP.

Network maintenance activities begin in July, with the preparation of new base year network files that will be used as input to a new TIP and CLRP. As these tasks are being initiated, a conformity analysis cycle for the previous fiscal year is concluding. The conformity cycle begins during winter with a request for project submissions, and concludes in the fall of the next year with TPB review and approval of public comments on the draft CLRP and TIP and adoption of the Air Quality Conformity determination. Since transportation networks that are inputs to this process are developed in one fiscal year and adopted in the next, this and future network development reports will document the TPB's adopted CLRP and TIP. Thus, this report details transportation networks and data files that were inputs to the 2005 CLRP and FY2006-20011 TIP approved by the TPB in October 2005, and activities begun during FY-2006 to develop networks for use in the 2006 CLRP and FY2007-2012 TIP.

Ron Milone distributed a draft copy of the FY-2006 Development Program for TPB Travel Forecasting Models report. He stated that the current TPB forecasting process is the Version 2.1 D #50 model (adopted in November 2004). A new model release is planned for the fall of 2006. The model will be referred to as the Version 2.2 model and will include most of the improvements formulated during FY-2006. He reminded the subcommittee that the Models Development program consists of short- and long- term improvement activities, as well as elements addressing research, data collection and maintenance. Mr. Milone explained the primary motivations behind the FY-2006 activities were to: 1) complete the implementation of recommendations from the last expert model review of the TPB models, 2) improve overall transit modeling capabilities, and 3) update and refine application model. He added that TPB has identified the need to simulate HOT lane alternatives in greater detail, and new software to simulate traffic forecasts at finer levels of geographic resolution was investigated during FY-2006.

One of the key application improvements focused on a reformulation of external/through trip forecasts. Base year external and through trips were readjusted to match updated AAWDT controls at external stations. Additionally, the growth of travel at external stations was also updated. The assumption of a *constant* growth rate over time was modified because it is not borne out by current land use forecasts. Round 7.0 household and job forecasts indicate that annual growth will be highest between 2000 to 2010, and will slow somewhat thereafter. The external growth forecasts were modified on a year-by-year basis to reflect this type of growth pattern.

TPB staff conducted an analysis of the mobile emissions post processor output, which includes hourly volumes and speeds at the link level and noted a small number of excessive link loadings. Several changes were subsequently made to the assignment model to prevent link volume overloading: 1) the external and through trip forecasts were lowered, 2) the freeway volume-delay function (VDF) was updated and the 13-mph speed 'floor' used in the current function was removed, 3) a small number of lane coding errors were discovered and corrected, and 4) a freeway queuing function was added to the modified VDF. These changes, in concert, served to eliminate link overloading.

Mr. Milone stated that the commercial vehicle model development has been delayed because of the TPB's decision to modify its traffic assignment process (the traffic assignment step is a component of the commercial vehicle calibration). Nonetheless, the consultant has demonstrated that the commercial vehicle modeling technique is viable using the existing assignment methodology. The commercial vehicle model will be included as part of the Version 2.2 model.

TPB is also moving ahead with the nested logit model implementation. The software developed by AECOM Consult named AEMS will be used to apply the model. TPB has begun working with AEMS and plans to perform a static calibration during FY-2007, followed by integration of the AEMS model into the regional travel model with feedback. Given the substantial work involved, the AEMS will not be ready in time for the Version 2.2 model release.

Other modeling enhancements included: The update of airport passenger trip forecasts, a re-estimation of demographic models, and the conversion of many existing fortran programs into TP+ scripts. He added that staff has received introductory training in the use of traffic microsimulation software. The study of HOT lane options in Virginia has highlighted the need to better understand access and egress issues associated with these types of facilities. It is hoped that microsimulation software will be useful in that regard.

In conclusion, Mr. Milone asked TFS members to provide questions/comments to the draft network development and models development reports in the next thirty days.

Questions and Comments

Ms. Sutton questioned if the networks included detailed information added for particular studies, i.e., project planning studies. Mr. Snead replied that information provided by consultants is added to the networks on a case by case basis after senior staff review.

Mr. Jamei asked if street names can be displayed on the network. Mr. Snead replied that street names are not included as a link attribute.

Mr. Mann asked if there were certain flags on a link to indicate road improvements. Mr. Snead replied that a 'Project ID' attribute is used to relate network changes to TIP elements for a particular year.

Mr. Replogle asked if staff has looked at how the revision of the external growth assumptions interacts with the changes in jobs and housing. Right now there is a sharper growth in jobs than in housing. He suggested that there should be greater attention to the relationship of job and household forecasts to external traffic forecasts. Mr. Griffiths responded that the latest adopted land use forecast (Round 7.0) was developed, in part, to address the future imbalance of jobs and households observed in the previous Round 6.4a forecasts.

Item 4: Update on Household Travel Survey

Johanna Zmud from NuStats provided an update on the Household Travel Survey. She distributed a hardcopy of her slides entitled "2006/2007 Household Travel Survey" and draft copies of the survey instrument entitled "Household Travel Survey, Personal One-Day Travel Diary" and the household questionnaire. She briefly explained some of the survey challenges which included ensuring coverage of all regional households, averting non-response, measuring under-reporting of travel using GPS, and capturing accurate location data. The survey is address-based and data collection will be done in two stages, telephone recruitment and telephone or internet travel data

retrieval. The survey will also include a trip-based travel diary that will capture trips in segments. Twenty two jurisdictions will be incorporated in the survey, and sampling will be broken down by jurisdiction and level of density. There will be an attempt to sample areas with higher than average use of transit, carpool, walk and bike.

Ms. Zmud explained that the pilot test will assess address list versus RDD as sampling frame. It will also determine the impact of interview method and large incentive on number of trips. The pilot test will offer a \$100 completion incentive to 200 address-list households and 40% of mail-only households. The GPS augment for the test pilot will better estimate vehicle trip rates and VMT for non-home trips and collect route choice data. GPS households will be randomly selected from 800 pilot households. Equipment will be delivered and picked up in-person. The GPS equipment plugs into the cigarette lighter with an antenna on the dash. It has power splitters for other devices. The GPS will capture trip start and end times, origin and destination coordinates, travel distances and paths, speed and trip type (HBW, HBO, NHB). There will be a comparison between the GPS and trip diary. Aggregate household statistics, total trips and VMT, will also be calculated. There will be a non-respondent follow-up survey that will measure size and likely impacts of non-response bias.

The pilot test will be conducted in August and September. The pilot test evaluation and finalization of the survey design will be done in October. The main survey will begin in November with interim deliveries in January 2007 through October 2007. The final delivery will be January 2008.

Questions and Comments

Mr. Milone commented that if you move the survey start date to December, the calendar year will be covered. Mr. Griffiths replied that we may collect thirteen months of data but is more concerned with completing the pilot test as of right now.

Mr. Spielberg asked if the \$100 incentive proves to be effective, can it be done for the overall survey. Mr. Griffiths replied no, that is not the intention of the incentive. Hopefully it will get at least an 80% response rate. If so, it will become the quality control sample.

Mr. Zilliacus questioned whether households were indicating if their vehicles were equipped with navigational systems because this could ultimately have an effect on VMT. Ms. Zmud replied no but that question can be asked during the telephone interview.

Mr. Replogle asked if portable GPS units will be used to investigate the underreporting of non-vehicle travel such as bike and walk. Ms. Zmud replied that portable GPS units were used in the Portland area last fall and one issue was that, more times than not, people forgot them, so there was a problem with missed trips.

The next TFS meeting is scheduled for September 22, 2006.

COG/TPB Travel Forecasting Subcommittee

Sign-In Sheet

Meeting of July 21, 2006

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