

**Highlights of the TPB Travel Forecasting Subcommittee Meeting  
Held on January 19, 2007**

**Item 1: Approval of November 17, 2006 Meeting Highlights**

The highlights were approved as written.

**Item 2: TPB Version 2.2 Travel Demand Model**

Ron Milone announced the release of TPB's Version 2.2 travel demand model and distributed a draft report entitled, "COG/TPB Travel Forecasting Model, Version 2.2 / Specification, Validation, and User's Guide." The draft report is comprised of five sections: a model overview, a description of the model specification, a model validation section, a user's guide, and a series of technical appendices. He explained that the Version 2.2 model is not a re-estimated model with new survey data, but rather, is an incremental improvement to the TPB's currently adopted travel forecasting model, Version 2.1D #50, released in November of 2004. The model incorporates several refinements that have been under development for the past two years.

A primary enhancement of the Version 2.2 model is the inclusion of an explicit commercial vehicle model. This capability was one of several recommendations resulting from the last expert review of the TPB's modeling practice. The model was developed with the assistance of William Allen using vehicle counts that were collected by TPB staff at 144 locations around the region. The commercial vehicle model consists of an initial trip table that is created using conventional modeling methods. The trip table is subsequently modified with a *fixed* 'delta matrix', which functions to change the initial trips additively on an interchange basis, so that the resulting assigned volumes match the observed counts reasonably well. The calibration of the delta matrix was performed with what is described as an 'adaptable assignment' process. Care was taken in the development of the matrix so that, 1) the range of modification was reasonable, and 2) the adjustments reflected the correction of random error, as opposed to biases that might be attributed to trip-end characteristics (the trip generation model was adjusted as part of the delta matrix calibration). Mr. Allen's modeling approach is not behavioral in nature, but was nonetheless, cost effective, empirically based, and, practical. Commercial trips constitute approximately 6% of the total vehicle travel in the modeled area for the year 2000. Mr. Milone underscored the point that the fixed delta matrix is now an integral component of the commercial vehicle model, along with the trip generation, distribution, and time of day components.

The Version 2.2 model also incorporates a revised set of external and through trips that reflect a reduced traffic growth assumption at external stations. External and through highway trips are basic inputs which are developed for base and forecast years prior to the execution of the travel model. The TPB has historically assumed that traffic at the external stations would grow at an annual growth rate of 3% per year. TPB has more recently revisited this assumption with respect to: 1) the future highway capacity at individual external stations, 2) historical growth trends at individual stations, and 3) socio-economic growth patterns projected to occur between 2000 and 2030. These data have indicated that the 3% annual traffic growth assumption should be moderated over the 30-year planning horizon, to a range of 1.1% to 2.7%, depending on the station location. Further, the process for developing external and through travel files over time has been updated so that traffic growth more closely follows the forecasted employment growth pattern (i.e., the projected traffic growth is not constant, but rather, is faster between 2000 and 2010 and then slower between 2010 and 2030). Mr. Milone pointed out that the revised growth assumptions result in a total external traffic projection of 2.07 million vehicles in the year 2030, in contrast to the previous estimate of 2.95 million vehicles (reflecting a 30% reduction). TPB staff and others applying the model need to maintain consistency between external commuter forecasts, transportation capacity, and the job-household differentials in the Cooperative Forecasts.

Another refinement of the Version 2.2 model is a revised highway assignment methodology, developed to address a limited number of hyper-congested freeway links that were observed with the Version 2.1D model. Revisions to the assignment process now include the use of revised volume-delay functions (VDFs) and the use of a queuing delay function that is applied to freeways and ramps. The revised VDFs now allow congested freeway speeds to decline below the speed 'floor' used in the Version 2.1D#50 model (from 11-13 mph to about 2 mph). The queuing function is a device that imposes *additional* time to the VDF-based speed based on the volume-to-capacity (V/C) ratio. The delay time function is an 'S' curve that ranges from 0.0 minutes, at a V/C of less than or equal to 0.70, to 14.0

minutes, at a V/C of 1.70 or higher. Mr. Milone pointed out that a static assignment is limited in its ability to simulate operational characteristics like queuing delay, but such delay does exist in the Washington region and should be explicitly considered in the model. It is important to understand that adding such time could result in extremely low speeds on links with small distances, and these conditions should be monitored.

Many of the adjustment factors historically used in previous TPB models have been removed in the Version 2.2 model. All time penalties used previously in the trip distribution process have been removed. All of the HBS, HBO, and NHB K-factors have been removed (23 in all). The Version 2.2 model retains just 11 HBW K-factors (down from 29 in Version 2.1D#50), but these are necessary for a region with a large CBD, having substantial transit use, and retaining large numbers of government workers. Finally, most of the geographic factors used to refine mode choice model results at the jurisdiction level have also been removed. These include both transit percentage and car occupancy adjustments. Some of the HBW transit percentage adjustments have been updated but have been minimized as much as possible based on a comparison of simulated and observed CTPP-based summaries.

The performance of the Version 2.2 model is comparable to the Version 2.1D#50 model. For year 2000 validation, both models over-estimate regional daily vehicle-miles-of-travel (VMT) by about 6% (based on a 20% link sample). The screenline-level performance of the Version 2.2 model is similar to that of the Version 2.1D#50 model, but performance was notably better for the Potomac River bridge crossings, with an estimated-to observed ratio of 1.06 compared to 1.16. The Version 2.2 model was executed for 2030, and the resulting VMT was about 8% lower than that of the most recent Version 2.1D#50 model-based forecast (199.5 million versus 216.8 million). The VMT per capita declines from 24.97 in 2000 to 24.19 in 2030. This is attributed to the revised external growth assumptions. In summary, the Version 2.2 model is believed to incorporate many useful refinements and is submitted to the TFS for its review and comment. Sensitivity testing is underway and will be presented at the next TFS meeting.

#### Questions and Comments

Mr. Spielberg asked if the commercial vehicle model was included in the feedback loop. Mr. Milone replied that is the case.

Mr. Graye asked if there were a greater number of overloaded adjusted links in any concentrated portion of the network. Mr. Milone replied that most of the overloaded adjusted links were located primarily at, or near, Potomac River bridge crossings, I-95 at Springfield, and certain segments of Shirley Highway (I-395).

Mr. Mann asked if the screenline 20 (Potomac River Crossing) is over-estimated by 6%, why not apply an adjustment factor to the trip generation model to correct for this. Mr. Hogan commented that because the count sampling rate is relatively low (20%), it may be desirable to obtain a larger count sample before making such an adjustment.

#### **Item 3: Arterial Highway System Performance in the Metropolitan Washington Region**

Daivamani Sivasailam distributed a copy of his slides entitled "Arterial Highway System Performance in the Metropolitan Washington Region FY 2006 Congestion Monitoring and Analysis". He stated that the purpose of the study is to identify the location, severity and extent of congestion on the major arterial highway routes in the region. Forty-three major arterial highway routes, totaling 363 miles, were monitored over a three-year period, starting in FY 2000. Three cars equipped with GPS systems and pocket PCs were used to record travel time and speed data on each route segment during the PM peak period and off-peak period. Speed and travel time monitoring occurred between 1:00 p.m. and 8:00 p.m. on weekdays with good weather and no major incidents. Level of Service (LOS) for the forty-three routes was determined using speed data and 2000 Highway Capacity Manual (HCM) procedures. LOS E and F are considered congested conditions. LOS was determined for the entire route and for the segments between major intersections during the PM peak hour, peak period and off-peak period. The "second year" data collection of the three-year cycle of monitoring is underway, and the "third year" data collection will be completed in FY 2008.

### Questions and Comments

Ms. Sutton asked if there was a reason why the LOS for FY 2006 was better than FY 2000 and FY 2003 for MD 355 between Montrose Road and Western Avenue for the PM peak period. Mr. Sivasailam replied that this was most likely due to signal optimization along that route.

#### **Item 4: Update on 2006 Metro Employment Core Cordon Count**

Patrick Zilliacus distributed a copy of his slides entitled “2006 Metro Employment Core Cordon Count: Update and Preliminary Findings”. He explained that the cordon line is a series of stations around the downtown area of the District of Columbia and Arlington County, Virginia. These one day counts (including the central Potomac River crossings) are collected from 5:00 a.m. to 10:00 a.m. inbound and from 3:00 p.m. to 8:00 p.m. outbound. Metrorail, Metrobus, Downtown Circulator, Fairfax Connector, DASH, ART, MARC, VRE, and commuter bus data are collected as well.

Mr. Zilliacus briefly discussed preliminary findings of the cordon count. They included:

- Continued decline in car-pooling,
- Little change in single-occupant vehicles,
- Slight increase in transit patronage, and
- Little change in vehicular traffic crossing the cordon line.

Staff will present the full draft report to the TPB Technical Committee in February as well as present it to TFS at the March meeting.

### Questions and Comments

Mr. Jamei asked why employment data was not included if the project is entitled “Metro Employment Core Cordon Count”. Mr. Zilliacus replied that there is a different meaning to the term ‘metro core’ and so employment was added to the title to avoid confusion.

#### **Item 5: Proposed FY-2008 UPWP for Network Development, Models Development, Cordon Counts, Congestion Monitoring, Travel Surveys, and Regional Data Clearinghouse**

Jim Hogan, Mike Clifford and Bob Griffiths distributed a copy of the *Preliminary Budget and Outline for FY 2008 Unified Planning Work Program (UPWP)*. Mr. Hogan began the presentation with a brief outline of the proposed network development, models development and cordon counts work programs. The proposed network program activities are the standard set involving updating of base year transit and highway networks, then building forecast year networks for FY2009-2014 TIP and Plan Conformity.

One additional activity proposed is a project to enhance network coding procedures and better manage the myriad of highway and transit networks that need to be developed. Consultant support will be sought to recommend options for improving network coding efficiency and data quality/consistency.

Having completed the development of the commercial vehicle model and having made progress on developing a nested logit mode choice model, the FY 2008 models development effort will focus on completing the nested logit mode choice model, including insertion into the regional model incorporating speed feedback, as well as updating the medium and heavy duty truck models. Staff will continue the following activities as well:

- implementation of the FTA SUMMIT software package employed by the FTA in reviewing transit environmental impact studies;
- consultant assistance to provide technical support on a task order basis for an ongoing assessment of performance of the TPB travel demand models;
- testing of micro-simulation software to aid in the development of more detailed simulations of travel patterns, and communicating this information in a more visual format;
- participating on a national MPO panel established to recommend practices in travel demand modeling;
- development of a more formal airport access demand model, incorporating mode choice; and

- exploration of tour-based and/or activity-based models.

The proposed cordon counts work program activities will be to complete, in fall of 2007, a report documenting the results of the Spring 2007 Regional HOV Monitoring Project.

Mike Clifford discussed the congestion monitoring and analysis work program that will:

- Conduct aerial survey of the region's freeway system during the am and pm peak periods consistent with previous data collection efforts;
- Perform travel time runs on a third of the arterial highways of the national highway system in the region during off-peak and pm peak periods to monitor the congestion and report on the system performance over time; and
- Use the results of the Spring 2007 pilot program to expand the arterial highway congestion monitoring program, develop and implement the program.

Bob Griffiths briefly discussed the regional data collection activities:

- Household Travel Survey (January 2007 - January 2008)
- WMATA Metrorail Passenger Survey (Spring 2007)
- WMATA Metrobus Survey (Fall 2007)
- MTA – Ridership Survey (Planned for 2007)
- VRE – Ridership Survey (2007)
- Regional Air Passenger Survey – BWI, DCA, IAD (Fall 2007)
- Metropolitan HPMS Supplemental Traffic Counts (2007)

#### Questions and Comments

Mr. Mann and Mr. Jamei indicated that VDOT has a highway network with updated centroid connectors as well as subzones. They asked if COG/TPB staff would be interested in this information and expressed concern that the proposed consultant study would increase the calendar time to get to more refined traffic assignments. Mr. Hogan replied that staff welcomes updated data from the STAs and the local jurisdictions. He also commented that zone grain is a modeling issue when talking about dividing current zones. Mr. Griffiths further noted that the Cooperative Forecasting Subcommittee is presently engaged in an effort to arrive as a regional set of finer grain zones. He expects agreement to be worked out in the near future.

Mr. Milone asked Mr. Griffiths if there has been a review of the various survey instruments to ensure cohesiveness among these regional data collection activities. Mr. Griffiths replied that it is reasonable to expect that these surveys will provide good information on origin and destination, trip purpose, and the cost of the trip.

#### **Item 6: Update on Household Travel Survey**

Mr. Griffiths stated that advance letters for the survey had been mailed out. The Household Travel Survey will be conducted over a twelve-month period and will conclude January 2008. Interim data deliveries will be provided on a quarterly basis. Data will be processed, edited and geo-coded as it is collected in order to accelerate the time between collecting the data and having an available data set for models development and other purposes. The final delivery is expected in March 2008, and a "Findings Report" will be available in June 2008.

#### **Item 7: Announcement of New TFS Chair**

Ms. Sutton announced that this was her last meeting as chair and thanked subcommittee members for their support during her term. She introduced Mark Rawlings from DDOT, who has accepted an invitation to serve as chair of the subcommittee during FY-2008. Mr. Rawlings thanked Ms. Sutton for serving as chair of the subcommittee from July 2004 to January 2007 and presented her with a certificate of appreciation.

The next meeting of the TFS is scheduled for March 23, 2007.

COG/TPB Travel Forecasting Subcommittee

Sign-In Sheet

Meeting of January 19, 2007

Name	Agency/Affiliation	Telephone Number	Email
Mona Sutton	MD SHA / TFS	410 545-0368	msutton@sha.state.md.us
Jim Hogan	COG/TPB		
Wanda Hamlin	COG	202 962 3217	whamlin@mwecog.org
JOE DAVIS	COG	202.962.3337	
ROBERT SNEAD	COG/TPB	202.962.3324	RSNEAD@MWCOCG.ORG
JINCHUL(JC) PARK	COG	202.962.3320	jpark@mwecog.org
DUSAN VUKSAN	COG/TPB	202-962-3279	dvuksan@mwecog.org
Hamid Humeida	COG/TPB	202-962-3325	HHUMEIDA@MWCOCG.ORG
David Kline	Fairfax County	703-324-1457	david.kline@fairfaxcounty.gov
MIKE CLIFFORD	COG/TPB	202-962-3312	mclifford@mwecog.org
Jeremy Raw	VDOT/CO	804-786-0998	jeremy.raw@vdot.virginia.gov
Juyin Chen	VDOT/CO	804-275-3564	ju-yin.chen@vdot.virginia.gov
Yuanjun Li	MNCPPC - Montgomery	301-495-4519	yuanjun.li@mncppc-mc.org
FRANK SPIELBERG	VHB	703-847-3071	fspielberg@vhb.com
MARK RAWLINGS	DDOT	202-671-2234	MARK.RAWLINGS@DC.GOV
Clara Reschovsky	COG/TPB	202.962.3332	creschovsky@mwecog.org
Deeb Gwan	SHA / TFS	410.545.5642	dguan@sha.state.md.us
Daniel Seo	Gannett Fleming	410.585.1460	danielseo@dseo@gfnet.com
Meseret Seifu	COG/TPB	202-962-3372	mseife@mwecog.org
BRIAN CASSIDY	COG/TPB	202-962-3255	bcassidy@mwecog.org
Andrew Burke	COG/TPB	202-962-3292	aburke@mwecog.org
Jun Yin	MNCPPC-AGE	301-957-3650	-
Co. Tori GIARDINI	COG/TPB	(202)962-3317	-
JAAK PEDAK	FAIRFAX CO. DOT	703-324-1171	jaak.pedak@fairfaxcounty.gov
Harry Sanders	Action Comm. for Transit	301-587-1323	sandersh@verizon.net
Anant Chandhary	COG/TPB	202-962-3354	achandhary@mwecog.org
Abdul Mohammed	COG/TPB	2-962-3370	Abdul@mwecog.org
John (Jay) Evans	Cambridge Systematics	301-347-0100	jevans@camsys.com
Aapila Chatterjee	FFX DOT	703-324-1437	aachat@fairfaxcounty.gov
Feng Liu	Baker	410-859-3463	fliu@mbakercorp.com
Harold Foster	MNCPPC/PCR	301-952-9177	Harold.Foster@ppd.mncppc.org

