TPB TRAVEL FORECASTING SUBCOMMITTEE

HIGHLIGHTS OF THE MAY 19, 2017 MEETING

Meeting time & location: 9:30 AM to 12:00 noon, Metropolitan Washington Council of Governments

MEETING ATTENDEES

MEMBERS, ALTERNATES, AND PARTICIPANTS

- Bill Allen (Citilabs) *
- Robert Berger (BMC)
- Melissa Chow (WMATA)
- John (Jay) Evans (Cambridge Systematics)
- Eric Graye (M-NCPPC, Montgomery Co.)
- Robert Griffiths (COG staff consultant)
- Jaesup Lee (M-NCPPC, Montgomery Co.) *
- Li Li (Whitman, Requardt & Assoc.)

- Feng Liu (Cambridge Systematics)
- Krishna Patnam (AECOM)
- Maggie Qi (Fairfax County DOT) *
- Harun Rashid (NVTA)
- Dan Stevens (Fairfax County DOT) *
- Jiaxin Tong (Kimley-Horn & Assoc.) *
- Lihe Wang (Transurban)
- Jongsun Won (PTV Group) *

COG STAFF

- Anant Choudhary
- Wanda Hamlin
- Charlene Howard
- Ken Joh
- Martha Kile
- Arianna Koudounas

- Ron Milone
- Jessica Mirr
- Abdul Mohammed
- Mark Moran
- Dzung Ngo
- Jinchul (JC) Park

- Jane Posey
- Rich Roisman
- Dusan Vuksan
- Feng Xie
- Jim Yin
- C. Patrick Zilliacus

* Attended the meeting remotely via WebEx/teleconference

This meeting of the Travel Forecasting Subcommittee (TFS) was chaired by Ms. Chow.

1. **INTRODUCTIONS AND APPROVAL OF MEETING HIGHLIGHTS FROM THE MARCH 17 MEETING**

After introductions, the highlights from the March 17, 2017 meeting of the TFS were approved without change.

2. **STATUS REPORT ON CONSULTANT-ASSISTED EFFORT TO IMPROVE THE COG/TPB TRAVEL DEMAND FORECASTING MODEL**

This item comprised three parts, presented by Mr. Moran, Mr. Evans and Mr. Liu, and Mr. Milone.

First, Mr. Moran briefed the subcommittee on the work done by the consultant in FY 15 and FY 16. He highlighted the three phases of the model improvement strategic plan. Regarding Task Order 17.2 (short-term model improvements to the current TPB regional trip-based travel demand model), Mr. Moran recapped the datasets that COG staff had prepared and sent to Cambridge Systematics (CS) in FY 17.

Second, Mr. Evans and Mr. Liu presented the recent activities regarding Task Order 17.2. Mr. Evans presented slides 1 through 21, which provided an overview of Task 17.2 and discussed the status and results of migrating the transit path-building software (from TRNBUILD to Public Transport, or PT). Mr. Evans said that the PT-based application process had been developed, tested, and was ready to be integrated into the existing COG/TPB model. Several comparisons were performed and presented, including comparing skims generated with the PT process versus the TRNBUILD process and comparing the preliminary PT assignment results with the PT path-building results. (Further comparisons are possible to perform once the mode choice model delivery is complete.) No major concerns were identified.

Under TRNBUILD, transit paths are built based on perceived times, but not fares. Under PT, however, transit paths can be built using transit fares, which means that transit fares become an input to the PT skimming process. While the existing special fare programs (MFARE1 and MFARE2) will continue to be used to derive the final skim fare matrices given the chosen best paths of individual O-D pairs, distance-based formula were developed to approximate Metrorail and commuter rail fares in the new PT path-building process. These formulae were discussed with slides 13 to 14. Mr. Milone commented that the Metrorail and commuter rail fare structure changes every few years and noted that these changes could require updates to the fare estimation functions used in path building. He asked whether the process proposed to calculate aggregate transit fares used by path-building could be integrated into the model stream (i.e., automate the development of these functions). Mr. Evans responded that in this delivery, the functions will not be dynamically generated, but that could be a future enhancement. Mr. Moran noted that staff could manually update the functions when the fare structure changes, but they would likely not change much. Mr. Evans added that the documentation discusses the development of the fare functions.

Mr. Milone asked how the hierarchy of mode choices were set up in the enhancements. Mr. Evans said that Metrorail would have priority since it has a lowest boarding penalty. Then the order would be commuter rail, express bus, and local bus. He noted that this hierarchy is for the path building, which helps the transit assignment to decide which transit sub-mode to use between an origin and a destination. Mr. Milone asked whether the developing model would categorize a trip having a Metrorail segment, including bus access to Metrorail, as a Metrorail trip. Mr. Evans replied that, in mode choice, this would simply be represented as a transit trip. Transit sub-modes usage can be

reported based on the results of transit assignment. The probability of choosing a specific transit sub-modes in the transit assignment procedure would depend on the quality of the transit paths available.

Mr. Vuksan asked how BRT or light rail modes would be represented in the new model enhancements. In the new model, transit sub-modes, such as BRT, would be coded in the network and thus represented in both transit path building and transit assignment. The mode choice model, however, would not explicitly consider these sub-modes distinctly. For example, Mr. Liu said that, in the path building and skimming process, CS has developed time penalties for various transit sub-modes, including BRT and light rail. Mr. Xie asked whether the enhancements include separate skims for each transit sub-mode. Mr. Liu said that there are not separate skim files for each transit sub-mode. Instead, the skim files are for total transit but for each of three access modes: walk, PNR, and KNR (for peak and off-peak periods). Thus, the number of separate transit skim files is reduced from the current 22 to 6. Mr. Evans noted that the travel times in the total transit skim represent weighted travel times, so the one transit path incorporates the weighted travel times from the associated transit sub-modes. Thus, the selection of transit sub-mode happens in transit assignment.

Mr. Moran asked whether the path building uses generalized cost, including both time and fare. Mr. Liu said that is correct.

Mr. Tong asked how the enhancements address transit overcrowding. Mr. Evans said that the issue will not be a part of the current work. Mr. Moran noted that a non-capacity-constrained transit assignment is the state-of-practice of transit modeling for most MPOs. Transit capacity constrained modeling is not within the scope of Task Order 17.2. Mr. Moran said that one of the motivations to migrate to PT from TRNBUILD is the capability of PT to model public transport crowding, so, hopefully, that feature can be used in the future.

Next, Mr. Liu presented slides 22 to 48, discussing the status and some findings of the enhancements regarding non-motorized modeling, mode choice modeling, and traffic assignment. Regarding non-motorized model enhancements, Mr. Liu said that CS had conducted the model estimation and would work on the model calibration and validation. Regarding mode choice model enhancements, he said that CS had finished the transit skimming and transit assignment processes and mode choice model estimation. CS was working on the mode choice calibration and validation. Mr. Liu discussed the updated highway assignment process and said that CS would work on highway assignment validation.

Regarding variables found to be significant for non-motorized modeling (slide 27), Mr. Patnam asked whether CS was introducing new input variables that were not already part of the existing model inputs. Mr. Liu said that CS has tested both TAZ-level and Census-Block-level variables, but the final model might use only TAZ-level variables, which could include variables based on the existing model inputs and new input variables. Mr. Evans added that the calculation of the intersection floating density was based on an all-streets network (NAVTEQ/HERE), not the more aggregate highway network used by the model. Mr. Milone noted that the values for these variables would generally be held fixed for a future year, but also noted that they could be revised, if desired.

Mr. Vuksan asked whether the non-motorized trips would be the same among different scenarios of the same future year if their land use inputs were the same. Mr. Liu said that, in general, the non-motorized trips would be the same. However, there could be exceptions. For example, Mr. Moran and Mr. Liu noted that changes in assumed transit service across two or more scenarios, could result in changes in the variable representing the floating density of transit stops, which, in turn, could affect the number of non-motorized trip ends estimated by the model. In this case, one should update the

transit stop floating density. Mr. Evans noted that if a transportation planning project includes non-motorized information in the measures of effectiveness (MOEs), one should re-assess the non-motorized assumptions to change the values of the variables. Mr. Evans said that one could develop a tool to forecast estimated future-year values, such as transit stop floating density, based on population density changes. He also pointed out the challenge of building such a tool since the assumptions for the forecast may be constrained by budgetary issues (i.e., implementing additional pedestrian amenities requires an investment in providing those amenities).

Regarding the non-motorized modeling work, Mr. Zilliacus recommended that the consultant incorporate a variable representing the availability of bike trails. Mr. Liu said that CS had proposed such a variable, but, ultimately, the idea was dropped, since bike trail data was not consistently available across the region.

Mr. Milone asked for confirmation that the transit accessibility, mentioned on slide 37, is a log-sum statistic and generalized measurement in mode choice model, not the number of jobs reachable via transit within a certain time threshold. Mr. Liu confirmed this.

Regarding slide 39, Mr. Patnam asked whether the travel time weights were finalized or still subject to change. Mr. Liu said that they could be changed a little, but the relative relationship among the segments should be the same. Noting that the travel time weight for both local bus and express bus was 1.00, Mr. Patnam asked whether this meant that there was no need to differentiate these two services. Mr. Liu confirmed that the two weights are the same at this point, but also noted that these weights could be updated in the future as part of model calibration/validation.

Regarding the revised volume delay functions (VDFs) in slide 44, Mr. Patnam asked whether conical VDFs were being used for the other (non-freeway and non-expressway) road types. Mr. Liu agreed. Mr. Patnam also asked whether any sort of cap was being used on the speeds in the VDFs. Mr. Liu said that he would need to check on that. Mr. Patnam also asked whether CS has HOT lane data that can be used for the model calibration and validation. Mr. Milone said that we do not have HOT lane count data, even though TPB staff has raised this issue with VDOT several times. Consequently, the volumes on HOT lane facilities and the toll rates coming out of the model would be checked for the reasonableness.

Mr. Vuksan asked whether the purpose of the volume delay function revision is to get better model link speeds. Mr. Liu said that it is correct.

Next, Mr. Evans concluded by noting that the next steps would be to finish the model calibration, model validation, and model documentation.

Finally, Mr. Milone thanked the CS team for their work. Mr. Milone highlighted some key aspects of the model enhancements. He said that after CS delivers the updated model by the end of June, TPB staff would spend a few months checking the code, inputs, and networks, and conducting sensitivity testing. He noted that the run time of the updated model would potentially be longer than that of the current model. Staff might update some components to the new model and explore options to shorten the run time. TPB staff plans to create a revised model user's guide and network documentation for the updated model. He said that the goal is to make sure the model is usable for local jurisdictions and consultants for their planning studies and other projects. Mr. Milone said that goal is to have the new model ready as a production-ready tool by January 2018. TPB staff will focus its attention on attaining this goal in the coming months, before re-bidding a new consultant contract.

Mr. Patnam asked how much longer the new model's run time would be. Mr. Liu said that the traffic assignment process would run longer due to the introduction of value of time (VOT) segmentation,

but CS was still working on the enhancements, so the model run time has not been finalized yet. Mr. Evans noted that the new model's mode choice process written in Cube scripting language would be simpler, but could take more time to run than the current process written in C++.

3. 2017-2018 REGIONAL HOUSEHOLD TRAVEL SURVEY: STATUS REPORT

Dr. Joh announced that the survey pre-test had concluded on April 4. He gave the subcommittee an overview of the pre-test survey results from rMove (the mobile app) and rSurvey (the web-based interface). Dr. Joh reported that the responses included data from 537 households, 1,098 persons, 809 vehicles, and 8,497 trips. The retrieval rate was 32% for rMove and 67% for rSurvey, which averaged to 56%. The total response rate was 3.4%. He said the next step would be to wrap-up the survey pre-test analysis, make necessary revisions to the survey instrument, and prepare for the main survey launch in August 2017. Dr. Joh said that he would report updated findings to the TFS at the July TFS meeting.

Mr. Berger asked how much time is needed to complete Part 1 of the pre-test survey. Dr. Joh said that it would take, on average, 10 minutes to complete. Regarding rSurvey, Ms. Chow asked whether one can move to the next page of the survey without finishing the current page. Dr. Joh said the website requires the completion of a survey page before moving to the next.

Regarding the pre-test survey responses in slide 9, Mr. Evans commented that, since the recruited households were randomly assigned to either segment 1 (smartphone) or segment 2 (web only), the difference between the segments' recruitment rates is random. Mr. Griffiths concurred and that the assignment to each segment was an experimental design, which allocated the sample by Census Block Group to get an equal number of samples for each segment. He noted that the respondent was not offered a choice of which segment to belong to. Mr. Milone asked whether staff received feedback to help explain the higher retrieval rate of rSurvey versus rMove. Dr. Joh said that it was probably because rMove requires significantly more work and involved a longer survey period (seven days) to complete the survey. He noted that the rMove app experiences GPS signal loss when a Metrorail trip goes through an underground segment. This requires users to manually enter and segment the trip information. Mr. Griffiths said that a large number of people who were assigned to the rMove method never downloaded the app. He noted that a household that completes the survey using the rSurvey web-based interface was offered a $10 gift card ($20 gift card for a household with a lower than $50k household income). For a household that completes the survey using the rMove mobile phone app, a $20 incentive per qualifying household member (16+ years of age with a smartphone) was offered.

Mr. Moran asked whether the recruitment rate of 6%, shown in slide 9, is a reasonable number. Dr. Joh said that the rate is within the range of similar surveys. Mr. Griffiths added that the rate of the mail-only segment in the 2007/2008 Household Travel Survey (HTS) was comparable. He noted that the 2007/2008 HTS offered a higher incentive of $50 per household and returned a retrieval rate of 85%. Mr. Griffiths said that the main survey may offer a higher incentive than that of the pre-test to get a better retrieval rate. Mr. Patnam noted that it may be beneficial to show the incentive amount on the survey form.

4. REGIONAL TRANSPORTATION DATA CLEARINGHOUSE (RTDC): RECENT UPDATES

Ms. Howard provided the subcommittee with recent updates on data and application features of the RTDC. She said that the updated data includes traffic counts, VMT, 2015 Washington-Baltimore Regional Air Passenger Survey data, and Metrorail Average Weekday Ridership data. Ms. Howard said that the RTDC added some new data, including 2015 and 2016 DC bike counts, FY 2013 – FY

2017 pedestrian and bicycle counts in Northern Virginia, and aviation data. Regarding the RTDC data viewer, she said that users now could add their own data to the application via an "Add data" option. Mr. Howard listed some upcoming data to be added to the RTDC.

Mr. Rashid asked whether the model that is being developed in Task Order 17.2 uses the latest updated data in the RTDC. Mr. Milone said that most of the available and complete data from RTDC were used for the development.

5. NEXT MEETING DATE AND OTHER BUSINESS

The next scheduled meeting of the TFS is Friday, July 21, 2017 from 9:30 AM to 12:00 noon. There was no other business. The meeting adjourned around noon.

*** The meeting highlights were prepared by Dzung Ngo, Mark Moran, and Ron Milone ***

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