



TPB TRAVEL FORECASTING SUBCOMMITTEE

HIGHLIGHTS OF THE NOVEMBER 19, 2021 MEETING

9:30 AM to 11:45 AM, **Web conferencing ONLY**, due to COVID-19 precautions. There was no on-site meeting.

1. MEETING ATTENDEES

2. MEMBERS, ALTERNATES, AND PARTICIPANTS

- Jonathan Avner (Whitman, Requardt & Assoc.)
- Christine Sherman Baker (Arlington Co. DES)
- Alex Bourgeau (SEMCOG)
- Jilan Chen (SEMCOG)
- Michael Eichler (WMATA)
- Joel Freeman (RSG Inc)
- Dan Goldfarb (MITRE Corporation)
- Eric Graye (M-NCPPC, Montgomery Co.)
- George Kandathil (Tri County Council for Southern Maryland)
- Kyeongsu Kim (Nelson\Nygaard)
- David Kline (Fairfax County DOT)
- Li Li (Whitman, Requardt & Assoc.)
- Yuanjun Li (M-NCPPC, Montgomery Co)
- Krishna Patnam (AECOM)
- Binny Paul (RSG Inc)
- Mark Radovic (Gannet Fleming)
- Guy Rousseau (ARC)
- Elham Shayanfar (MDOT)
- Lisa Shemer (MDOT-SHA)
- Kevin Tracy (SEMCOG)
- Jongsun Won (PTV Group)
- Jim Yang (M-NCPPC, Prince George's Co.)
- Allan Yu (Prince William Co.)
- Yi Zhao (DDOT)

3. COG STAFF

- William Bacon
- Tim Canan
- Anant Choudhary
- Joe Davis
- Nazneen Ferdous
- Charlene Howard
- Ken Joh
- Martha Kile
- Sanghyeon Ko
- Nicole McCall
- Mark Moran
- Ray Ngo
- Wanda Owens
- Jinchul (JC) Park
- Meseret Seifu
- Kanti Srikanth
- Dusan Vuksan
- Feng Xie

* All meeting participants attended the meeting remotely via WebEx.

This meeting of the Travel Forecasting Subcommittee (TFS) was chaired by Mr. Eichler.

1. INTRODUCTIONS AND APPROVAL OF MEETING HIGHLIGHTS FROM THE PREVIOUS MEETING

First, a roll call was conducted. The highlights of the September 24, 2021 meeting of the TFS were approved.

2. TRANSITIONING FROM A TRIP-BASED TRAVEL MODEL TO AN ACTIVITY-BASED TRAVEL MODEL: EXPERIENCES OF THE ATLANTA REGIONAL COMMISSION (ARC)

This item was presented by Mr. Rousseau, who spoke from a set of presentation slides. Mr. Rousseau discussed ARC's transition from its now-retired, trip-based travel demand model to its production-use activity-based travel model (ABM), CT-RAMP. He also discussed the current migration from its production-use ABM to the ActivitySim platform. Lastly, he discussed some of the benefits of and challenges with moving to an ABM.

Regarding slide 11, Mr. Moran asked how frequently ARC conducts its air passenger survey. Mr. Rousseau said that he would like his agency to conduct the survey more frequently, but, on average, ARC conducts the survey every five to ten years.

During the presentation, several questions were asked via the WebEx chat window. At slide 21, Mr. Rousseau answered several of these questions.

In the WebEx chat window, Ms. Chen asked how long ARC maintained their trip-based model, along with the ABM, before retiring the trip-based model. Mr. Rousseau said that the period of overlap lasted only a couple years. He noted that it is important to synchronize model usage with updates of the long-range transportation plan (LRTP). At the time, ARC used both the trip-based model and the ABM to update the LRTP and compared the model results. However, over the long run, ARC decided that it could not afford to maintain both systems, so the trip-based model was retired. Mr. Freedman asked how much was spent on training and outreach regarding the ABM over the years. Mr. Rousseau stated that the training and outreach were hosted at ARC and was free of charge. He noted that ARC did have consultant assistance providing the training, which lasted three to four days, but he did not know the exact cost. Mr. Freedman also asked of ARC budgeted for doing training on an annual basis, given that there is staff turnover. Mr. Rousseau noted that ongoing training is offered to internal staff, but, as for training non-ARC staff, that tends to happen less frequently when there is a major change to the model.

In the chat window, Ms. Yuanjun Li asked whether all local jurisdictions in the ARC region had adopted the ARC ABM model for local planning. Yes, answered Mr. Rousseau, adding that every study in the region starts with the output from the ABM, whether it's a DOT study, a local jurisdiction subarea study, or a corridor study. Ms. Yuanjun Li asked what training has ARC provided to local jurisdictions. Mr. Rousseau said that ARC has provided training to local governments and consultants. First, ARC provided the introductory training, lasting several days. Then, ARC provided continuing education, usually through model user group meetings. He noted that sometimes, ARC provided one-on-one training for new staff, noting that you must be very flexible, open and accommodating in your training.

In the chat window, Mr. Bourgeau asked how many dedicated staff are needed to maintain the ABM. Mr. Rousseau said that we have about six staff members, which includes model development, model applications, GIS and network coders. He added that ARC has another group of six that handles land use modeling. He also said that ARC has dedicated staff to run the EPA MOVES mobile emissions model.

In the chat window, Ms. Yuanjun Li asked, 1) What are the major disadvantages of the ABM? and/or 2) What would you like to improve with the model, especially for answering policy-related questions? Mr. Rousseau said that, in hindsight, we would have liked to have developed a quick-response ABM for project-level evaluation and prioritization. He noted that the ABM takes about a day and a half to run, and, for some studies involving multiple model runs, a 1.5-day model run is not sustainable. So, it would be great to have a quick-response ABM that could run in several hours or a half-day at most.

On slide 23, Mr. Rousseau noted that they had tested regional dynamic traffic assignment (DTA) in the past, but the software and model run times were not sustainable, so the DTA model was not brought into production use. Nonetheless, he noted that he would like to look at DTA again in the future, as the software becomes faster.

At the end of his presentation, Mr. Rousseau responded to more questions. Mr. Xie thanked Mr. Rousseau for presenting to the TFS. Mr. Xie noted that Mr. Rousseau had said, earlier in the presentation, that ABMs are better able to handle certain policy issues, such as peak spreading or equity analyses. Mr. Xie asked if Mr. Rousseau could provide an example where you used the ABM to answer a policy question from your board which you could not otherwise handle with the trip-based model? Mr. Rousseau provided the example of market segmentation related to household income. In the trip-based model, households are pre-segmented into discrete groups (e.g., low, medium, and high), but, in the ABM, each individual and household is represented. In terms of equity analyses, Mr. Rousseau noted that we have excellent examples on our website, which I could share with you later. Mr. Rousseau said that he believed that Puget Sound Regional Council (PSRC, Seattle) is using their ABM to forecast race and ethnicity, which can provide information for equity analyses, though he noted that ARC is not yet doing that. He noted he would be happy to share some examples of work done by ARC, featuring visualizations, which can be found on our website.

Mr. Vuksan asked, given the complexity of the ABM and the fact that consultant assistance is typical requires for model development and sometimes maintenance, how are the local government users of the ARC ABM dealing with using the ABM for their studies? Mr. Rousseau said that the ARC region has both bigger counties, which are well equipped and can do a lot in house, and also smaller counties, which may have only one modeler on staff and may not be staffed to handle the complexity of the ABM. In the case of local governments without the staff to run the ABM, they typically hire a consultant. Mr. Rousseau noted that, whenever we allocate funding for county transportation plans, we make sure there is enough funding to hire a consultant to support model development and application. Nonetheless, Mr. Rousseau added, ARC provides ongoing training. He noted that, as is the case with any skill, if you don't do it daily, you run the risk of slowly losing that skill.

3. COG/TPB GEN3 TRAVEL MODEL: STATUS REPORT

This item was presented by Mr. Freedman, who spoke from a set of presentation slides. Mr. Freedman provided a summary of the goals of the MWCOG Gen3 Model development project and an overview of the Gen3 Model development plan. Mr. Freedman described the process by which the ActivitySim model was selected and the rationale for selection. Next, he described the ActivitySim project including its mission, guiding principles, and the ActivitySim Consortium. In July 2021, MWCOG became the tenth member of the consortium. Mr. Freedman gave some examples of model complexity and noted that ActivitySim is a less complex version of an activity-based model (ABM). Mr. Freedman summarized the Gen3 Model design, recent enhancements to the design, and features currently under development. Finally, Mr. Freedman provided an update on ongoing Gen3 Model development activities including model calibration summaries and next steps.

On slide 18, Mr. Freedman discussed a flowchart showing the model components that make up the ActivitySim modeling platform. He also discussed the differences in how an aggregate, trip-based model treats parking pricing (everyone experiences an average price) versus the treatment in an

ABM (each person experiences a specific parking price). Regarding using average values versus individual-specific values, Mr. Eichler stated that WMATA often struggles with this issue regarding transit subsidies. For example, he said that one of the WMATA findings is that the highest income rail riders are the most subsidized. So, there is often an equity bias. Regarding that topic, Mr. Freedman noted that the four green boxes in the upper right-hand corner of the flowchart on slide 18 (“work from home,” “transit pass subsidy,” “transit pass ownership,” and “telecommute frequency”), are model components that have been added to the ActivitySim model platform following the beginning of RSG’s work on the Gen3 Model.

In the WebEx chat window, regarding slide 18, Mr. Graye asked, what are some of the key features/characteristics of advanced and enhanced ABMs that distinguish these tools from a more standard ABM? Mr. Freedman stated that CT-RAMP2 is an example of a more complicated ABM. One of the things that CT-RAMP does but that ActivitySim does not do, is that CT-RAMP models more types of joint travel episodes. For example, ActivitySim models tours that are “fully joint,” i.e., where two or more household members participate in the entire tour together. So, they leave home together and they come back home together, and they participate on every activity on the tour. Fully joint tours account for about half of the inter-household ridesharing in survey data. But the other half of joint tours are partially joint tours, such as parents and caregivers driving kids to/from school. Partially joint tours are not modeled explicitly. So, a missing component in ActivitySim would be a school pick-up/drop-off model. Unfortunately, school pick-up/drop-off is pretty complicated to model. Similarly, ActivitySim does not have a vehicle allocation model, which could track vehicles at both the household level and the travel episode level.

Mr. Freedman finished his presentation by discussing: 1) Models that are currently under development for the ActivitySim Consortium, such as a vehicle type model and several software tools, 2) Future ActivitySim enhancements for the next year; and 3) Next steps for the Gen3 Model development. There were no further questions. Mr. Freedman encouraged staff to reach out to him or COG staff if they have thoughts about future training.

4. DEVELOPMENT OF AN AVERAGE ANNUAL WEEKDAY TRAFFIC FACTOR FOR 2020

This item was presented by Ms. Kile who spoke from a set of presentation slides. Ms. Kile discussed the development of an average annual weekday traffic factor for 2020. TPB staff uses daily-to-weekday factors to estimate Average Annual Weekday Traffic (AAWDT) from Average Annual Daily Traffic (AADT) when only AADT is available. AAWDT is used in travel demand model validation and both AADT and AAWDT are populated in and shared via the Regional Transportation Data Clearinghouse (RTDC). The daily-to-weekday factor is also used to estimate average weekday Vehicle Miles Traveled (VMT) from average daily VMT reported in the Regional VMT Trends Table. The table is updated annually and used in network development and for setting safety targets.

In 2005, TPB staff performed an analysis of continuous count stations in Maryland and arrived at a daily-to-weekday factor of 1.05. At that time, VDOT and DDOT both provided AADT, so it was not necessary to derive AAWDT on the network links in Virginia or the District. For the traffic data that will be used to validate the Gen3 Travel Model, TPB staff derived AAWDT from AADT for the District and Jefferson County, WV. MDOT SHA and VDOT now provide both AADT and AAWDT so it was not necessary to derive AAWDT for Maryland or Virginia. To estimate 2018 AAWDT for network links in the District, TPB staff analyzed continuous counts from 2017 to 2019 in the District. There were no operational permanent count stations in Jefferson County, so TPB staff calculated the average AADT-to-AAWDT factor on network links in counties near Jefferson County including Fauquier and Loudoun counties in Virginia and Frederick County in Maryland. The average factor of 1.05 was confirmed for the 2018 data.

Because travel patterns changed during the pandemic, TPB staff made the decision to do a special analysis of 2020 data to determine if a special factor should be used. A daily-to-weekday factor exclusive of holidays was calculated for each operational continuous count station within the TPB modeled region. These factors were averaged for all stations to calculate a daily-to-weekday factor, which turned out to be 1.05. The factors for all stations were then averaged by month and the monthly average factors were averaged to produce a daily to weekday factor of 1.05.

It was somewhat surprising that the 2020 factor did not change from previous years, so the 2020 continuous count station data was compared with the data from the same stations in 2019. Factors calculated by sub-regional ring and by roadway functional classification were very similar for each sub-category for both years. The factors calculated for each month, however, varied between the two years. The early pandemic months of March and April showed higher factors than 2019 at 1.08 and 1.09 vs 1.06 and 1.04. As recreational activities began to open back up in the summer months, the factors were relatively equal between the two years, but in September through November, when people went back to working and learning from home, the 2020 factors were lower than those of 2019 at 1.02, 1.04, and 1.06 vs 1.04, 1.06, and 1.08. While the monthly factors between the two years vary widely, the average of the monthly factors works out to be a consistent 1.05.

TBP staff will continue to use 1.05 as the daily-to-weekday factor through 2020. TPB staff will plan to analyze the 2021 continuous count station data to see if a special factor should be used as travel behavior continues to be affected by the pandemic. In the future, TBP staff will plan to analyze subsequent years' data and gradually move towards a three-year cycle for continuous count station factor development.

Mr. Xie asked to clarify that a higher factor indicated more weekday traffic relative to weekend traffic. Ms. Kile confirmed that a higher factor means more weekday traffic. She explained that in the beginning of the pandemic, weekend activities stopped abruptly, but there were still people who needed to travel to their jobs. By the fall, people had figured out how to congregate outdoors, socially distant, so that recreational activities came back even when people were still not traveling to their jobs or school during the weekdays. Mr. Xie mentioned that, at first, it seems counterintuitive that the daily to weekday factor does not change between 2019 and 2020, but when it is broken down by month, it makes more sense. Mr. Eichler asked what this factor goes into and how it affects model outputs. Mr. Moran answered that the factor is not used in the travel model per se, it is used make the observed and modeled traffic counts consistent. The model represents AAWDT, so we factor observed AADT to AAWDT so that when we validate the model, we are comparing average weekday counts with what the model is producing. There was a question in the chat window from Ms. Chen asking how the 2020 counts are used in the model, Mr. Moran referred to his previous answer and said that are used for model validation for traffic assignment.

5. ANNOUNCEMENT OF NEW CHAIR FOR 2022

The chair of the COG/TPB Travel Forecasting Subcommittee rotates on a calendar-year basis between four entities: the District of Columbia, Maryland (state or local agency), Virginia (state or local agency), and a transit or regional agency (e.g. WMATA, VRE, MARC, and/or a regional or sub-regional agency). Based on the recent rotation order, the upcoming chair should be a representative from Maryland.

Before Mr. Moran introduced the new chair for 2022, he thanked the outgoing chair, Mr. Eichler, WMATA. Mr. Eichler's tenure as TFS chair goes through the end of December, but, since the TFS meets every other month, the November meeting is normally the last one of the calendar year. Mr. Moran thanked Mr. Eichler's leadership of this subcommittee, during the Covid-19 pandemic, which has been a challenging year for many people and agencies. Mr. Moran presented Mr. Eichler with a



certificate of appreciation, which had been signed by the chair of the TPB, DC Council Member Charles Allen.

Next, Mr. Moran presented the new chair of the TFS, whose one-year term will begin on Jan. 1, 2022: Ms. Lisa Shemer. Ms. Shemer leads the Travel Forecasting and Analysis Division (TFAD) at the Maryland Department of Transportation, State Highway Administration (MDOT SHA). The division is responsible for producing existing and future traffic volumes and analysis as well as performing operational modeling for projects and studies at SHA. The division also manages programs in Freeway and Arterial Congestion Management, produces the annual Maryland State Highway Mobility Report, supports Transportation Systems Management and Operations (TSMO) efforts through dynamic traffic simulation modeling, and maintains the Maryland Statewide Transportation Model. Ms. Shemer is a P.E. and a graduate of Virginia Tech. She has been a member of the TFS for several years and, in September 2019, she and her staff made a presentation to the TFS entitled, "Travel Demand Modeling Activities at MDOT-SHA."

Mr. Moran and the subcommittee then welcomed Ms. Shemer as the 2022 chair and Ms. Shemer made some brief remarks.

6. ROUNDTABLE DISCUSSION OF CURRENT MODELING EFFORTS AROUND THE REGION

Mr. Moran stated that the Northern Virginia Transportation Authority (NVTA) has been working to update their travel modeling capability. On November 4, the NVTA's TransAction Model Working Group met and their consultant, Cambridge Systematics, Inc., presented plans for NVTA's next travel demand model. This meeting was attended by two COG staff and many modeling stakeholders in the region. NVTA is planning to move to a new model that will include dynamic traffic assignment (DTA).

Mr. Yu stated that Prince William County is currently checking and verifying a 2019 travel model update, with a focus on checking signalization and intersection modeling. Mr. Moran asked whether this was a county model with extra detail in the county and less detail outside the county. Yes, said Mr. Yu. Prince William County hired consultant Bill Allen to do the work. Mr. Allen basically incorporated components from the regional model and refined those components within the county. The new model is implemented in Bentley Cube software.

7. OTHER BUSINESS

A. Snapshots of efforts of COVID-19 on travel, available on COG website

Ms. Kile reported that COG/TPB staff continue to develop snapshots to illustrate how the COVID-19 pandemic is impacting travel in the metropolitan Washington region. The charts show changes in roadway traffic and boardings on commercial aircraft ("enplanements") compared with pre-pandemic levels. The snapshot is available on the COG website (<https://www.mwcog.org/documents/2021/07/16/covid-19-travel-monitoring-snapshot-traffic-monitoring/>). The next snapshot will be available shortly and will show traffic data through September 2021. Ms. Kile noted that roadways experienced a notable rebound over the summer with July 2021 roadway traffic levels down only 5% from July 2019 levels region-wide while roadway traffic volumes in August and September were down 7% from 2019 levels.

B. Planned guest presentations at upcoming TFS meetings

Mr. Moran noted that, at the Jan. 28 TFS meeting, there are currently two planned/invited guest presentations: 1) Modeling public transport in the Arlington Co. Travel Model, by Bentley Systems, Inc., Mr. Bill Allen; and 2) Transitioning from a trip-based travel model to an activity-based travel model: Experiences of the Oregon Department of Transportation (ODOT), Mr. Alex Bettinardi.

For the March 25 TFS meeting, Mr. Moran is working with Northeast Maglev to give a presentation on modeling work done for the proposed Baltimore-to-Washington Magnetic Levitation train service.

C. Next scheduled meeting

Planned for Friday, January 28, 2022, 9:30 A.M. to 12 noon.

8. ADJOURN

The meeting adjourned at about 11:55 A.M.