AN INTRODUCTION TO THE TPB TRAVEL DEMAND FORECASTING MODEL

Including land use inputs for the Gen2 & Gen3 travel models

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COG Cooperative Forecasting and Data Subcommittee
December 9, 2025

National Capital Region
Transportation Planning Board

Agenda Item #2

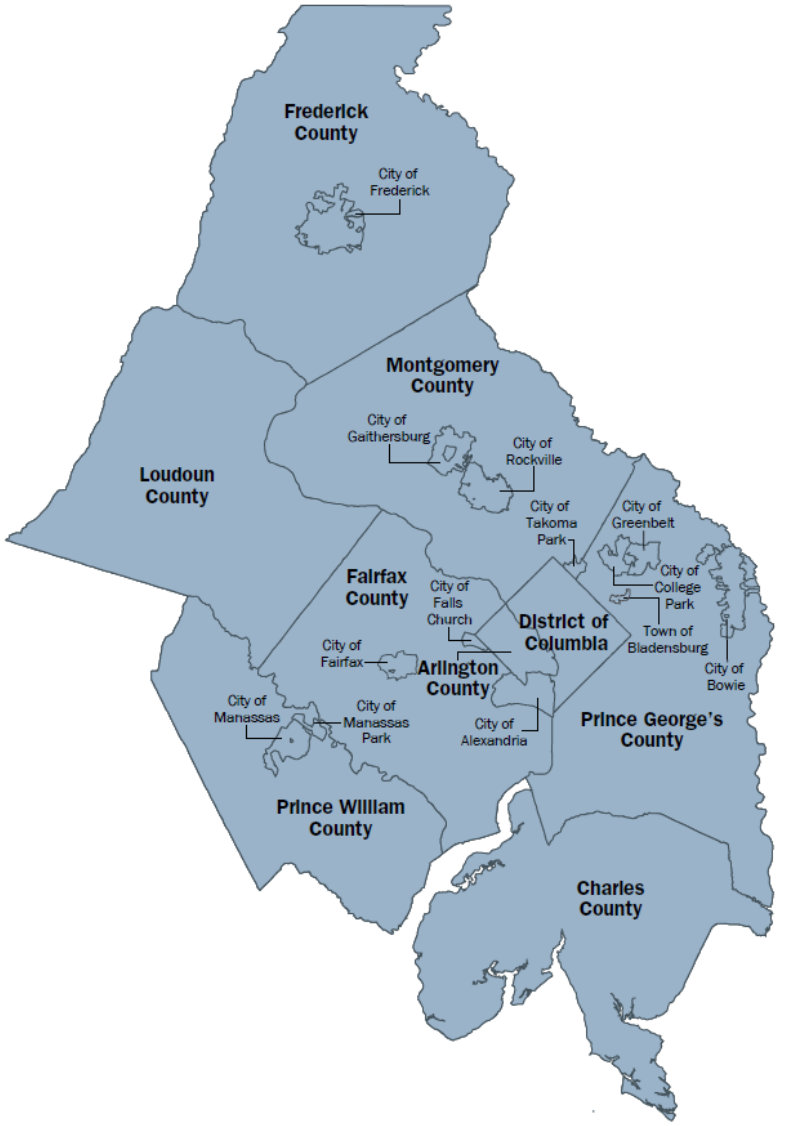
Overview

- Geographies: COG, TPB, Travel Model
- Introduction to travel demand forecasting models (TDFMs)
- Types of TDFMs
  - Aggregate, trip-based models/"four-step" models (TBMs/FSMs)
  - Disaggregate, activity-based models (ABMs)
- Comparison of TBMs & ABMs
- Travel models developed by TPB staff
  - Gen2 Travel Model (aggregate, trip-based)
  - Gen3 Travel Model (disaggregate, activity-based)
- Model inputs: Land use forecasts
  - Employment-based adjustments to land use forecasts
- Model inputs: Transportation networks
- Comparison of the Gen2 & Gen3 models
- Next steps and conclusion

Image credit: Mark Moran

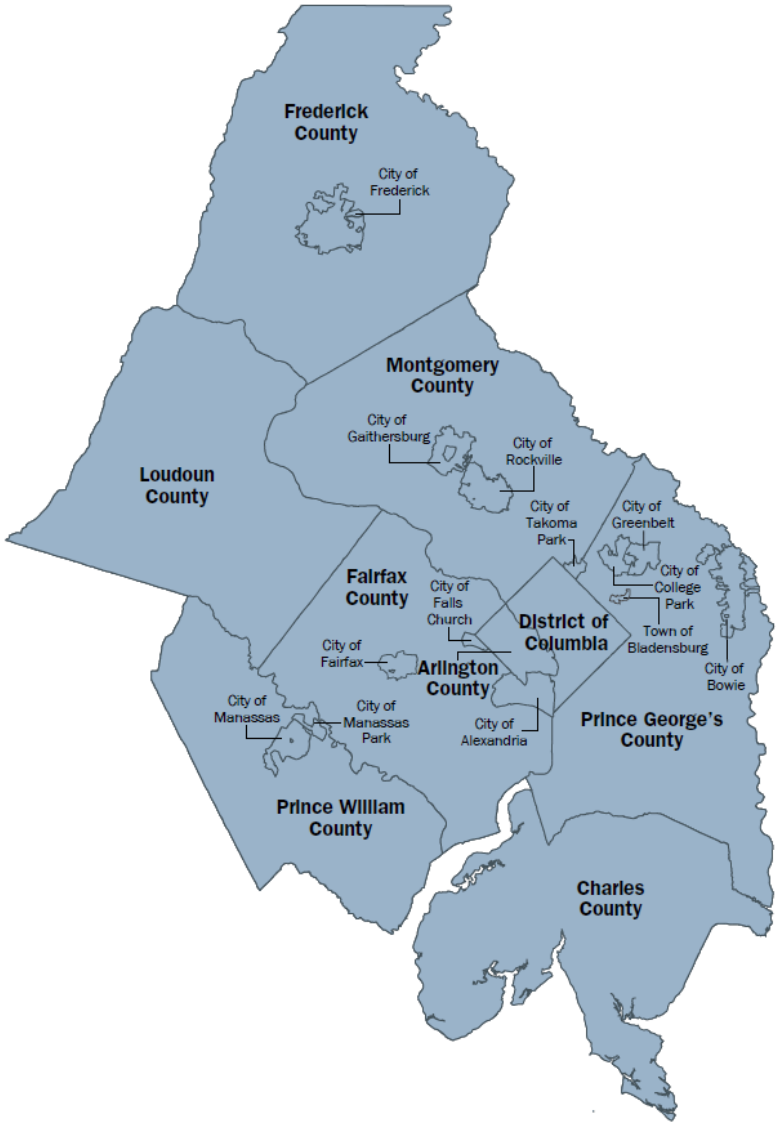
Geography of MWCOG ("COG")

- Founded in 1957, Metropolitan Washington Council of Governments (COG) is an independent, nonprofit association
- Brings area leaders together to address major regional issues in the District of Columbia, suburban Maryland and Northern Virginia
- Membership is comprised of 300 elected officials from 24 local governments, the Maryland and Virginia state legislatures, and U.S. Congress



Geography of NCRTPB ("TPB")

- National Capital Region Transportation Planning Board (TPB) is the federally designated Metropolitan Planning Organization (MPO) for the region.
- Plays an important role as the regional forum for transportation planning.
- Prepares plans and programs that the federal government must approve for federal-aid transportation funds to flow to metropolitan Washington.
- 5M people, 3M jobs, 17M trips per day
- Founded in 1965. Associated with COG in 1966.
- COG is the administrative agent for TPB.



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Geography of the TPB Modeled area

- Modeled area is larger than COG member area, TPB planning area, or MSA
- Size of modeled area influenced by air quality conformity requirements
- 7M people; 4M jobs; 20M trips per day
- 6,800 square miles
- 22 jurisdictions, including DC, suburban Maryland, Northern Va., and one county in W. Va.

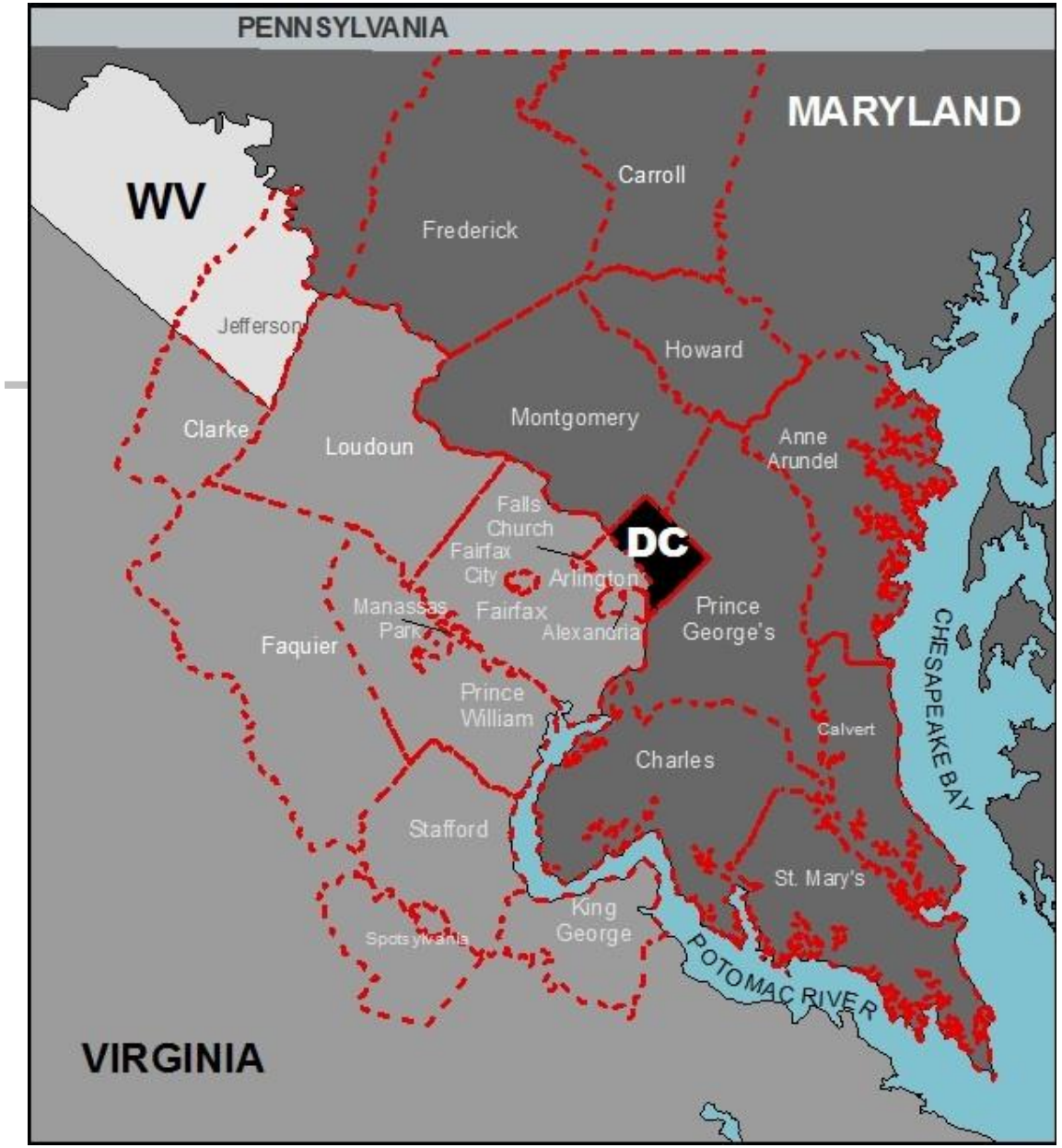

Image credit: Jessica Mirr

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What is a regional travel demand forecasting model (TDFM)?

- Mathematical/computerized representation of both the demand for and supply of transportation on the surface transportation network for a metropolitan area.
- Demand-side model: Can be aggregate (e.g., TAZ level) or disaggregate (e.g., household and/or person level)
- Supply-side model: Can be aggregate (e.g., static traffic assignment) or disaggregate (dynamic traffic assignment or microsimulation of traffic)
- Typical inputs: 1) Land activity forecasts by TAZ; 2) Transportation networks (highway and transit); 3) Transportation policy assumptions.
- Typical outputs: 1) Trips by travel mode; 2) Vehicle trips/volumes on highway network; 3) Person trips/volumes on transit network.
- There is generally an equilibration between demand-side and supply side models (typically via a speed-feedback loop)

Image credit: Mark Moran

Uses of TDFMs

- Forecasting where, when, and how people will travel around a region
- Estimating travel demand in the absence of observed data
- Scenario testing: alternative land uses, networks, policies
- Project planning and corridor studies
- Estimating air pollution from the on-road transportation sector (when paired with a mobile emissions model, such as the EPA's Motor Vehicle Emission Simulator, or MOVES model).

Uses of the TPB TDFM

- Updating and assessing the adequacy of the region's LRTP/MTP
  - Performance analyses of the plan
  - Air quality conformity analyses of the LRTP and TIP, since our region has been designated a non-attainment area for the 2015 ozone National Ambient Air Quality Standards (NAAQS)
  - Studies to measure the impact of the LRTP
- Scenario studies and special regional studies, e.g., CLRP Aspirations Scenario (2013), Long-Range Plan Task Force (LRPTF) Study (2017)
- Project planning studies by TPB members (supporting role)
- Provides a foundation for stakeholder model development efforts, such as NVTA's TransAction Model, M-NCPPC's Montgomery County Travel/4 Model, and Arlington County's tour-based travel model.

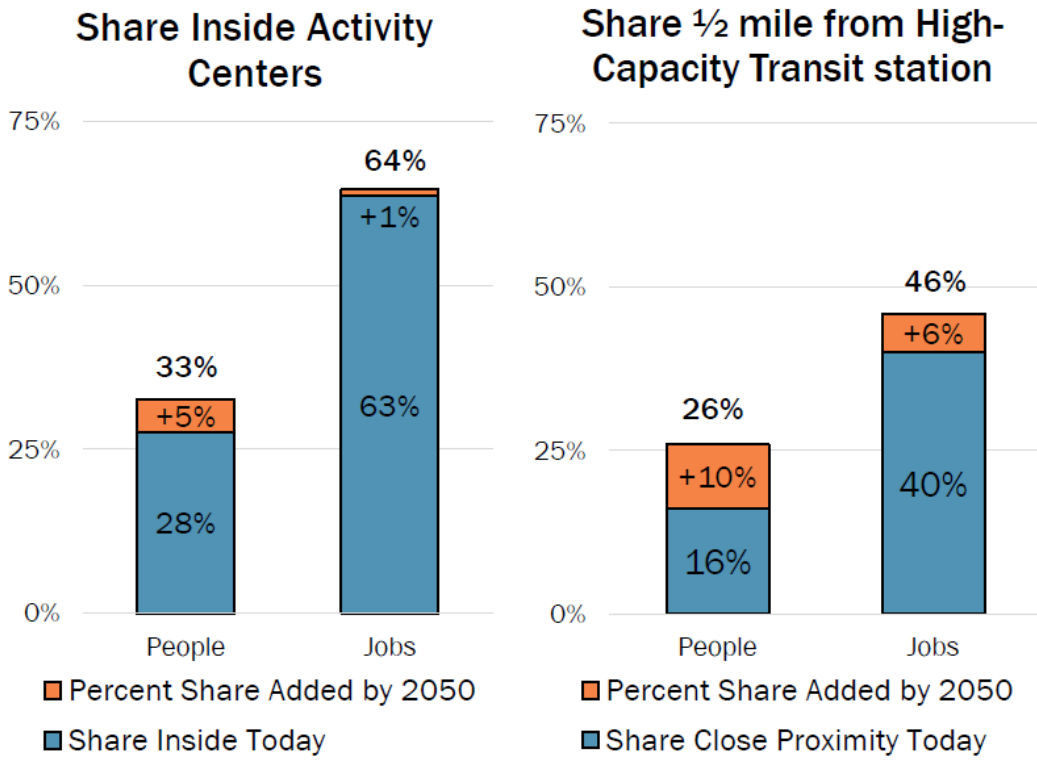
Land use and transportation: Activity Centers

TPB Priority Strategy: Bring Jobs and Housing Closer Together

By 2050, forecasts expect **increase share of People and Jobs inside Regional Activity Centers** and **High-Capacity Transit stations**:

- People
  - 33% of People will live in Regional Activity Centers (5% increase)
  - 26% of People will live close to High-Capacity Transit (10% increase)
- Jobs
  - 64% of Jobs will be in Regional Activity Centers (1% increase)
  - 46% of Jobs will be close to High-Capacity Transit (6% increase)
- I-495 SEL has no current impact on land use forecasts

VISUALIZE 2050
National Capital Region Transportation Plan



Agenda Item 7: Visualize 2050 Draft Analyses
July 16, 2025 | 22

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Source: Finch, Cristina, Rob d'Abadie, and Sergio Ritacco. "Finalization of Project Inputs for Air Quality Conformity Analysis: Visualize 2050 & FY 2026-2029 TIP." Presented at the National Capital Region Transportation Planning Board, held at the Metropolitan Washington Council of Governments, July 16, 2025. https://www.mwcog.org/events/2025/7/16/transportation-planning-board/

Types of TDFMs

- Simplified models, e.g., trend analysis; elasticity-based models
- Strategic planning models that do not make use of a transportation network, such as VisionEval
- Complex, tactical planning models that do make use of transportation networks
  - Demand side
    - Classic aggregate, trip-based, “four-step,” travel demand forecasting model (TBM/FSM)
    - Tour-based travel demand forecasting model (TourBM). Aggregate or disaggregate.
    - Activity-based travel demand forecasting model (ABM). Typically disaggregate.
  - Supply side
    - Highway: Static traffic assignment (24-hour assignment vs. time-of-day assign); Dynamic traffic assignment (DTA); Microsimulation (last two not typically used in regional modeling)
    - Transit: Single best path vs. multi-path

Types of TDFMs: Aggregate, Trip-based Model

- A.K.A. four-step model (FSM)
- Trip generation: Predict the no. of trip ends generated in each zone
- Trip distribution: Predict where trips are going, i.e., connecting trip ends into trips
- Mode choice: Predict the share of trips made by each travel mode
- Trip assignment: Assign vehicle trips and transit person trips to relevant network
- TPB Gen2 Travel Model has six main steps (demographic submodels & time-of-day model)

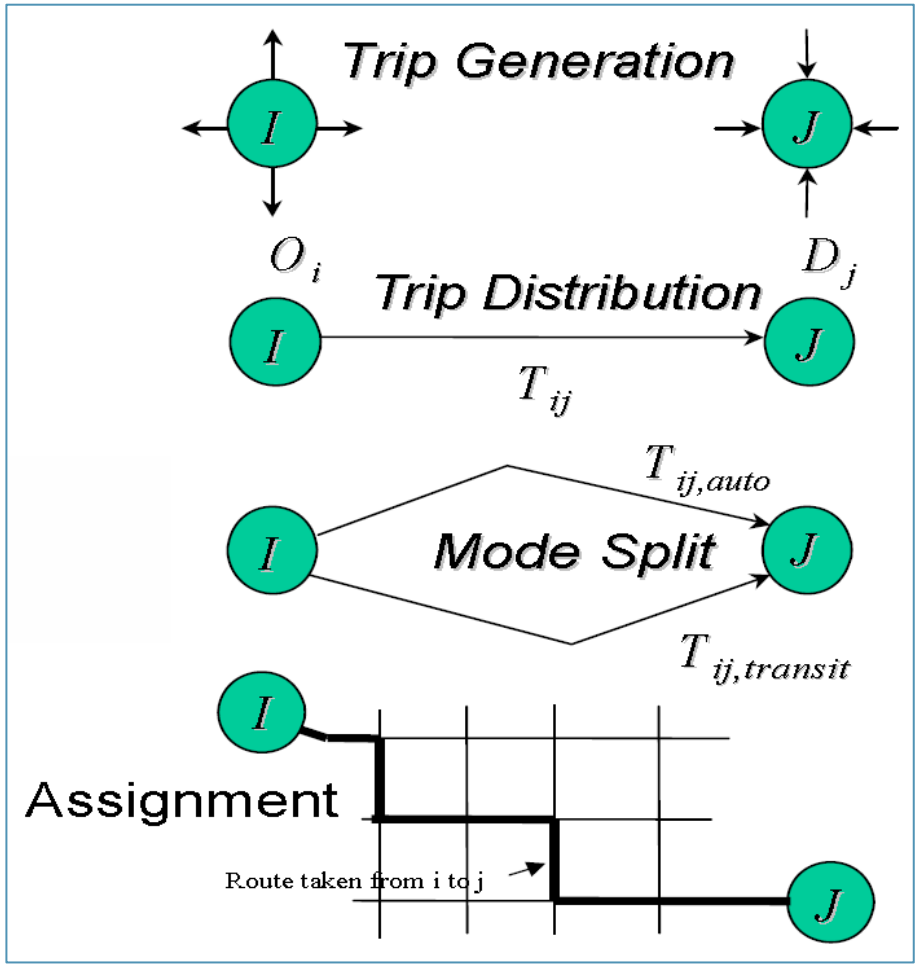


Image credit: Meyer, Michael D., and Eric J. Miller. Urban Transportation Planning: A Decision-Oriented Approach. McGraw-Hill Higher Education, 2001. p. 272.

Types of TDFMs: Disaggregate, Activity-based Model

- ABM closely follows an individual's decision-making process
- Long-term choices, e.g., work and school location, vehicle ownership, and transit pass/subsidy
- Daily activity patterns, e.g., mandatory activities, discretionary activities, and joint travel
- Daily tour choices, e.g., tour frequency, destination, scheduling, mode, and stop frequency
- Daily trip choices, e.g., route, time of day, mode, location, vehicle occupancy, pay/avoid toll, and parking.

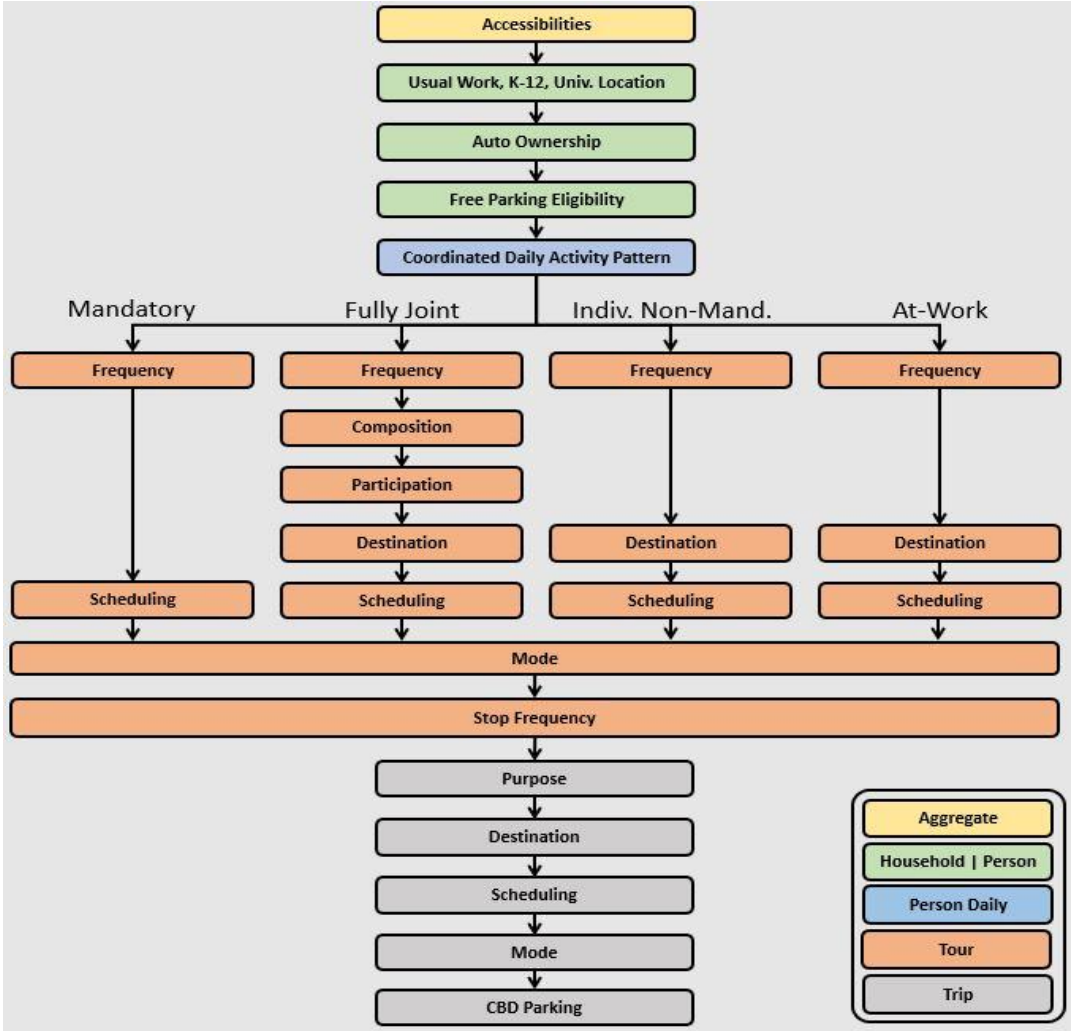


Image credit: ActivitySim

Comparison of TBM/FSMs and ABMs

Trip-Based Model (TBM/FSM)	Activity-Based Model (ABM)
Model focuses on trips	Model focuses on activities, which, in turn, lead to travel (trips)
Trips are generated from zonal aggregations of households	Trips are generated based on the simulation of individual households and persons
Each trip is independent of every other trip	Trips are chained into tours, which allows continuity of information
Timing/direction of trips is not an explicit choice (fixed factors)	Starting and ending time of activities are modeled choices
Geographic scale: TAZ	Geographic scale: Parcel, MAZ, or TAZ

Information based on Outwater, Maren, and Joel Freedman. "Activity-Based Modeling, Session 1: Executive Perspective." Travel Model Improvement Program (TMIP) Webinar Series, February 2, 2012.

Pros & Cons of ABMs Compared to TBMs/FSMs

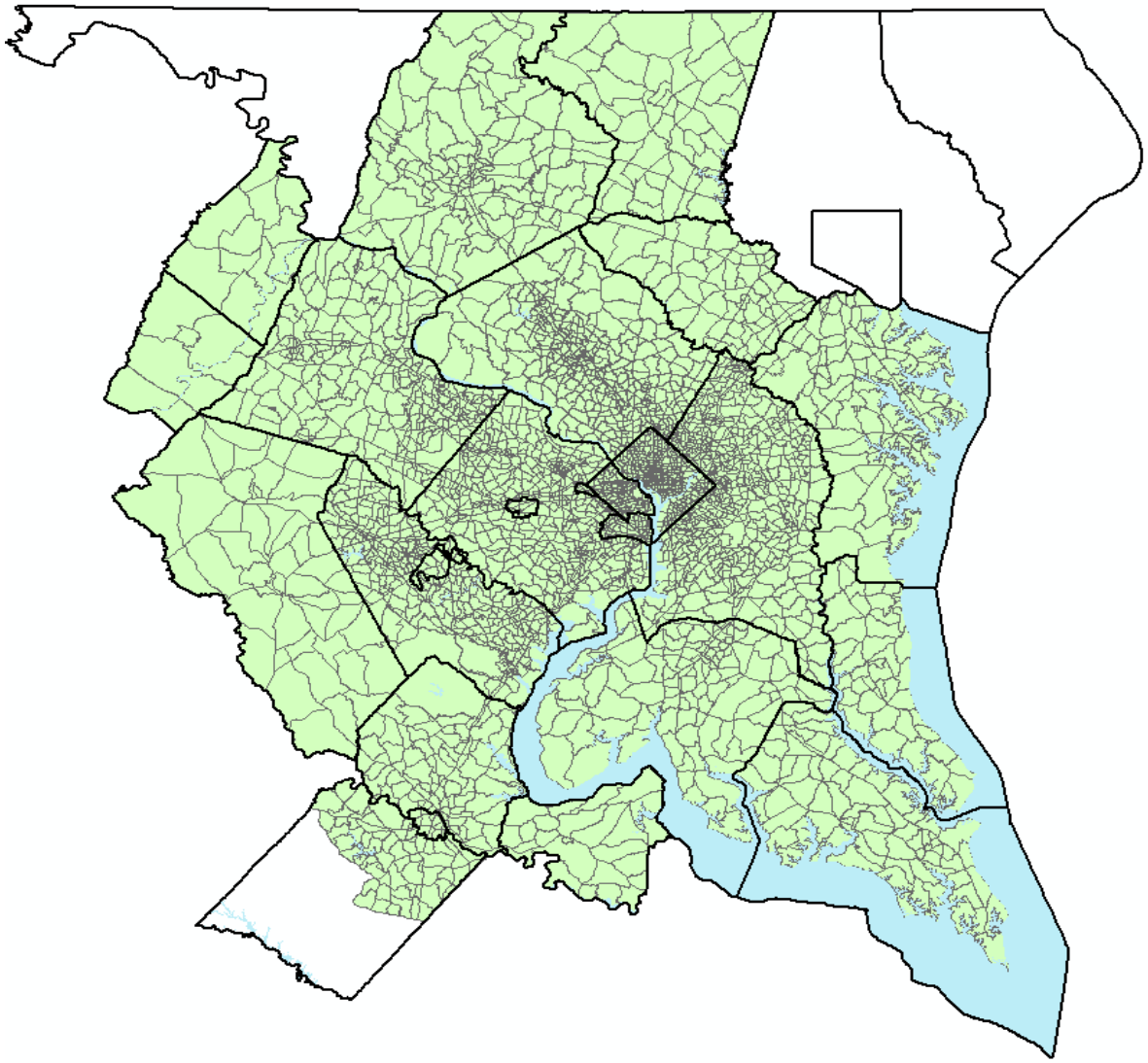
- Pros
  - ABMs are tour-based models, so there is continuity of information across trip chains.
  - ABMs provide disaggregate demand
    - which should make them better suited than FSMs for some analyses, such as pricing & equity studies
    - which could, in the future, be used to feed a disaggregate supply model, such as DTA.
  - ABMs explicitly model certain aspects of travel demand, such as telecommuting, transit subsidy, and vehicle type choices.
- Cons
  - ABMs are more complex.
    - More time to develop (estimate, calibrate, validate)
    - More difficult to debug
  - ABMs require more computing resources & generally take more time to run.
  - ABMs require staff with higher levels of modeling and analysis skills.

TDFMs Developed by TPB staff

- COG/TPB staff develops and maintains, with consultant assistance, a series of regional Travel Demand Forecasting Models (TDFMs) that are used for the regional transportation planning process in the Washington, D.C. area.
- TDFMs are developed under the guidance of the Travel Forecasting Subcommittee (TFS), which reports to the TPB Technical Committee
- At any given time, the COG/TPB staff maintains at least two regional travel demand models: A production-use model and a developmental model.
  - **Production-use model**: Used in planning studies conducted by COG/TPB and made available to outside parties for free: **Gen2/Ver. 2.4.6 Travel Model (trip based)**.
  - **Developmental models**: Under development by COG/TPB staff and are not generally not made available to outside parties since these models are not yet considered a finished product: **Gen3 Travel Model (activity-based)**.

Zone system: Transportation Analysis Zones (TAZs)

- TAZs
  - 3,675 internal zones
  - 47 external stations
  - 3,722 total TAZs
- 6,800 sq. mi.
- 22 jurisdictions
- DC & three states (MD, VA, WVA)



Model inputs: Land use forecasts

- Households & Household population
- Group quarters population & Total population
- Total employment
  - Office employment
  - Retail employment
  - Industrial employment
  - Other employment
- Uses of Cooperative Forecast land use data
  - Calculating area type (Gen2 & Gen3)
  - Gen2
    - Aggregate demographic models
    - Aggregate trip generation
  - Gen3
    - Generates synthetic population data using zonal population data from the Cooperative Forecasts (and other data) as controls
    - Uses zonal employment data from the Cooperative Forecasts as size terms in the workplace location choice model

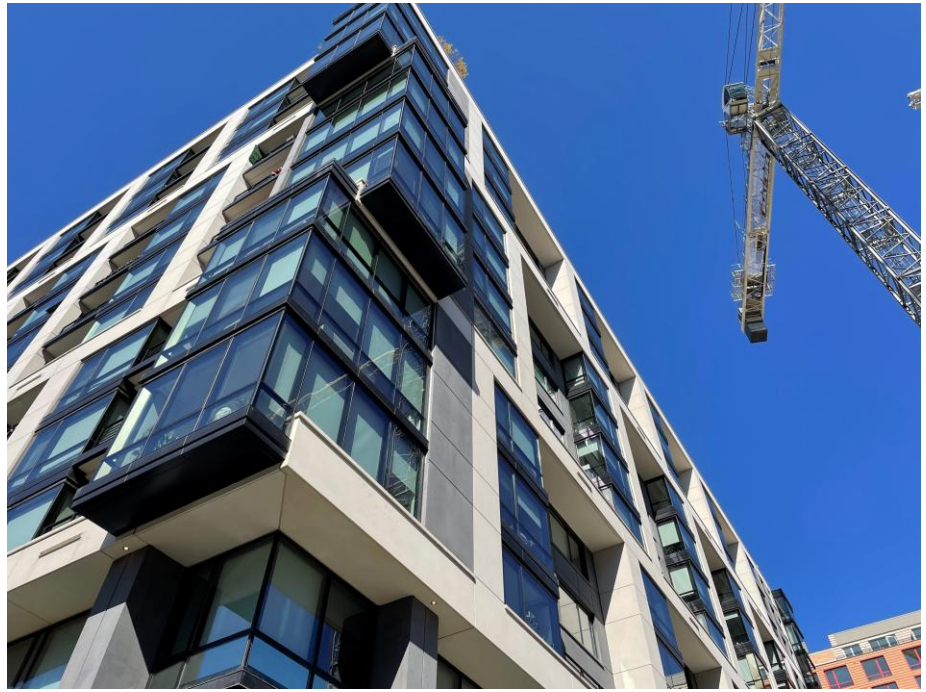


Image credit: Mark Moran

Model inputs: Land use forecasts

- Land use forecasting: Two main techniques:
  - Formal land use model
  - Expert panel/Delphi process
- No one technique prevails across peer MPOs, but land use models tend to be more common in larger urban areas
- In the early 1970s, COG tried using a land use model (EMPIRIC), but staff was not satisfied with its performance
- COG uses an expert panel, known as a "modified Delphi process," which involves reconciling top-down and bottom-up land activity forecasts
- Zone-level land activity forecasts are developed by COG's Cooperative Forecasting Program, via its Cooperative Forecasting and Data Subcommittee

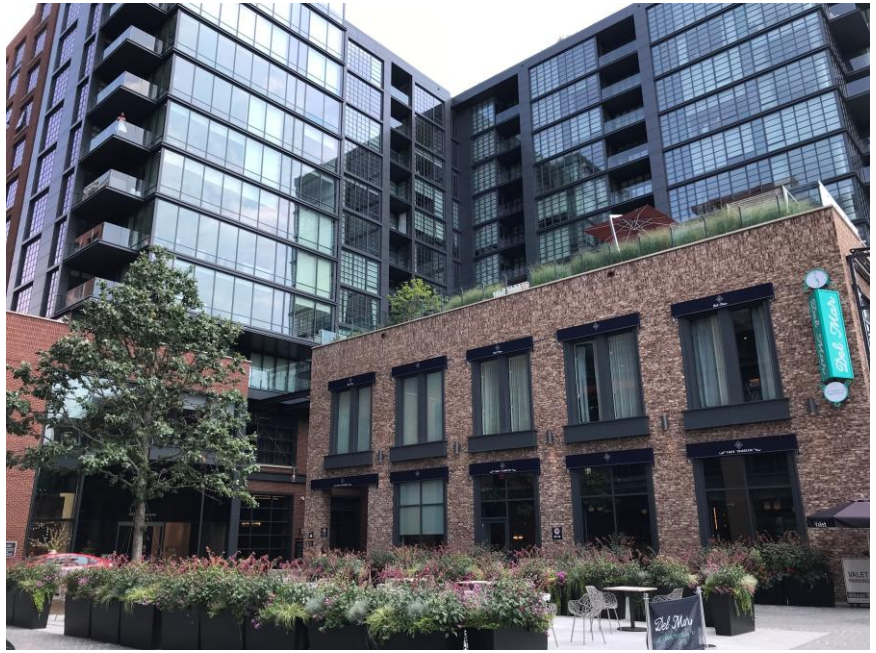


Image credit: Mark Moran

Employment-based adjustments to LU forecasts

- Before the zone-level employment data can be used by the regional travel model, it must undergo a factoring process to ensure that a consistent employment definition is used for all jurisdictions in the modeled area.
- Rationale: Different jurisdictions in the modeled area use different definitions of employment. For example,
  - Baltimore region jurisdictions develop their base-year employment estimates using data from Bureau of Economic Analysis (BEA).
  - By contrast, Washington region jurisdictions develop their base-year employment estimates using data from the Quarterly Census of Employment and Wages (QCEW) collected by the Bureau of Labor Statistics (BLS).

See, for example
- Griffiths, Robert E. Memorandum to TPB Technical Committee. "Travel Model Employment Data Adjustment Factors." May 7, 2004.
- ——. Memorandum to Ronald Milone. "Travel Model Employment Data Adjustment Factors for Round 7.0." August 10, 2005

Employment-based adjustments to LU forecasts

- Current adjustment factors

Jur. Code	Jurisdiction	Adj. Factor, Round 10.0
0	District of Columbia	1.00
1	Montgomery Co., Md.	1.00
2	Prince George's Co., Md.	1.00
3	Arlington Co., Va.	0.95
4	City of Alexandria, Va.	0.96
5	Fairfax Co., Va.	1.00
6	Loudoun Co., Va.	1.00
7	Prince William Co., Va.	0.96
8	(Unused)	
9	Frederick Co., Md.	1.00
10	Howard Co., Md.	1.00
11	Anne Arundel Co., Md.	0.88
12	Charles Co., Md.	1.00
13	(Unused)	
14	Carroll Co., Md.	1.00
15	Calvert Co., Md.	1.00
16	St. Mary's Co., Md.	0.87
17	King George Co., Va.	1.13
18	City of Fredericksburg, Va.	0.90
19	Stafford Co., Va.	1.17
20	Spotsylvania Co., Va.	1.02
21	Fauquier Co., Va.	1.00
22	Clarke Co., Va.	1.00
23	Jefferson Co., WVa.	0.68

Sources:
McCall, Nicole. “Travel Model Employment Definition Adjustment Factors for Round 10.” Memorandum, June 22, 2023.
Ngo, Ray. “Developing Land Use Input Files for the Gen2/Version 2.4.6 Travel Model Using the Draft Round 10.0 Cooperative Forecasts, Dated 3/22/24, and the Latest Employment Definition Adjustment Factors.” Memorandum, January 23, 2025.

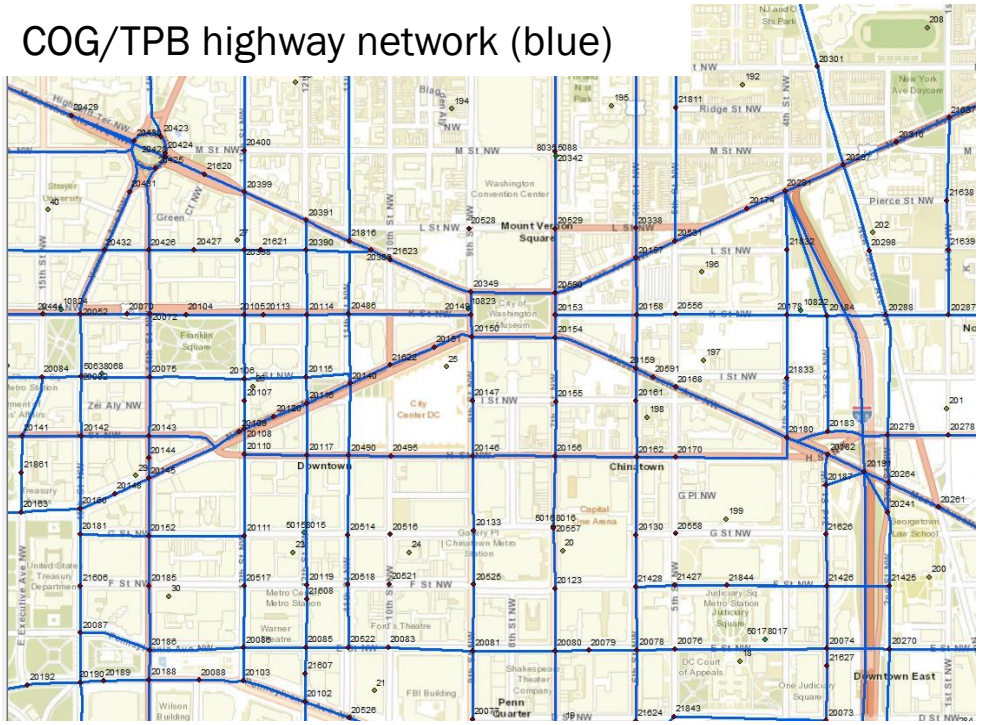
Model inputs: Transportation networks

- Highway network
  - Aggregate-level (not all streets)
  - Coverage: Freeways (all), Arterials (all), Collectors (some), Local (few)
- Transit network
  - Built on top of the highway network, plus additional features:
  - Transit-only infrastructure (stations, rail links, PNR lots, access links)
  - Transit service: Two times of day: Peak period & off-peak period

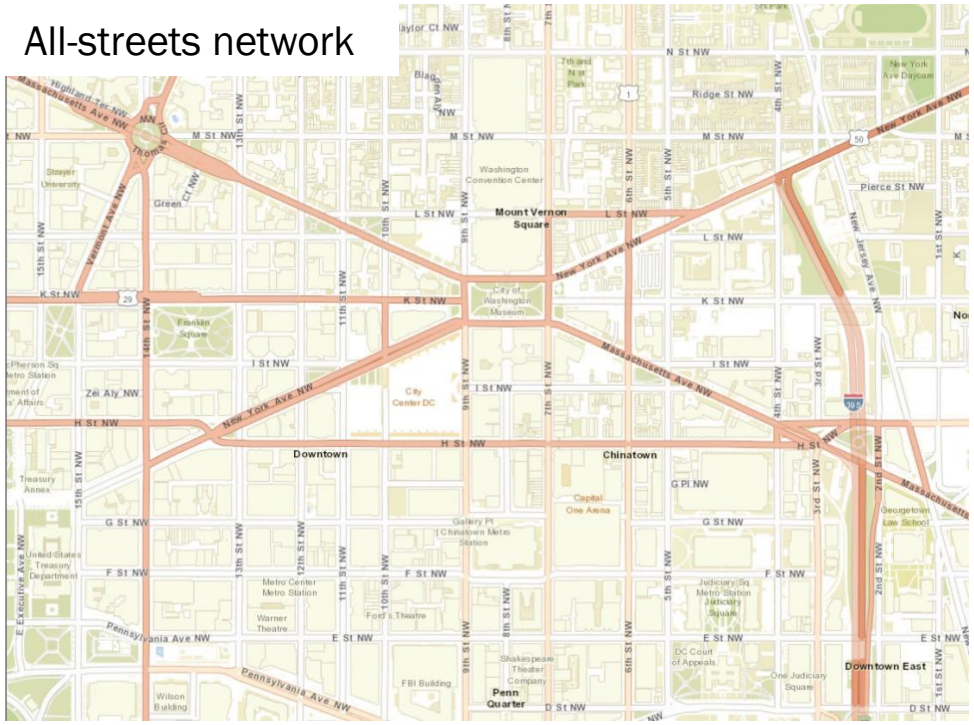
Highway network

- Links represent road segments
- Nodes represent intersections, merge/diverge points, & zone centroids
- Simplistic depiction of roadway connectivity and capacity
- Used to model vehicle flows between (but not within) TAZs

COG/TPB highway network (blue)

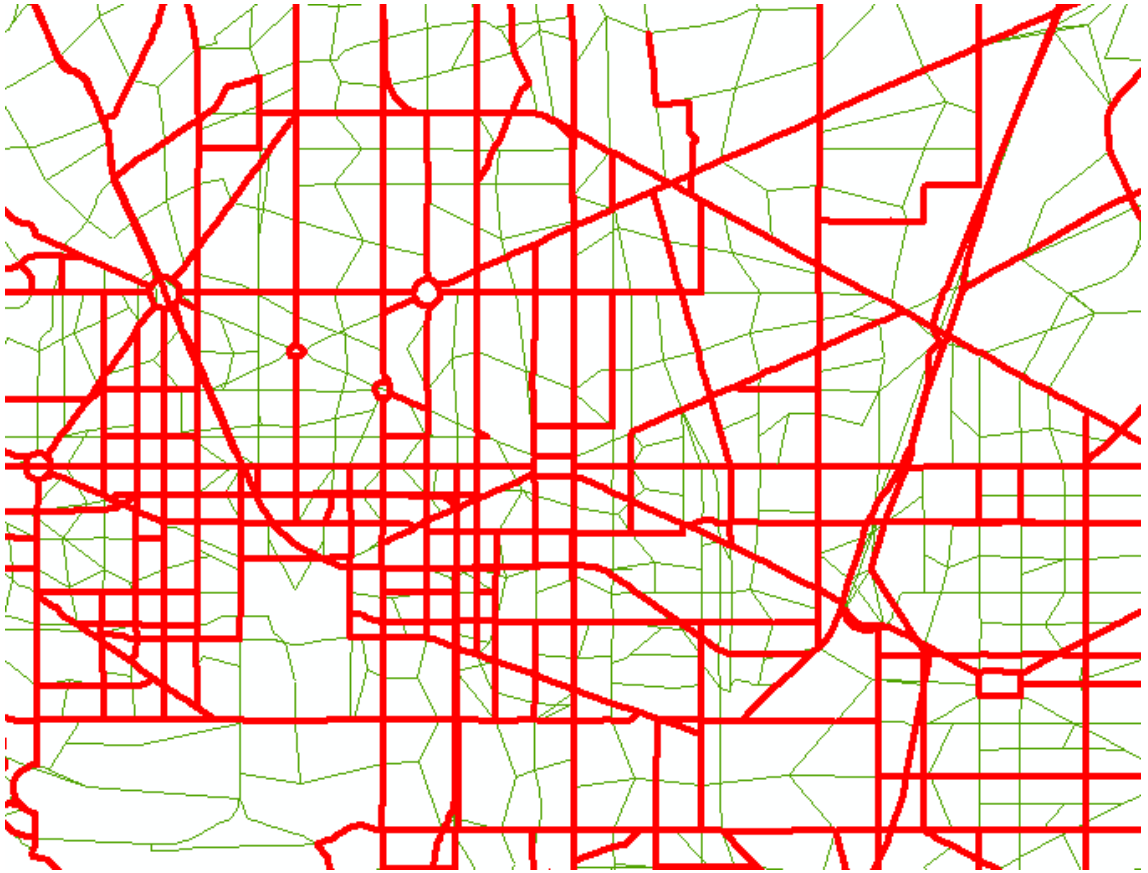


All-streets network



Transit network: Built on top of highway network

- Gen2: Two time periods
  - Peak (AM peak, 7:00 - 7:59 AM)
  - Off Peak (midday, 10:00 AM – 2:59 PM)
- Gen3: Four time periods.
  - AM peak (6:00 AM - 8:59 AM)
  - Midday (9:00 AM – 2:59 PM)
  - PM peak (3:00 PM – 6:59 PM)
  - Nighttime (7:00 PM – 5:59 AM)
- We calculate
  - Avg. headway
  - Avg. run time



Area type, used in both Gen2 & Gen3 models

- A measure of the land use density and mixing
- A function of zonal population density and zonal employment density
  - 1 = Urban; 6 = Exurban
- Both link capacity and free-flow link speeds = f (area type, facility type)

One-Mile "Floating" Population Density (Pop/Sq mi)	One- mile "Floating" Employment Density (Emp/Sq mi)						
	0-100	101-350	351-1,500	1,501-3,550	3,551-13,750	13,751-15,000	15,001+
0-750	6	6	5	3	3	3	2
751-1,500	6	5	5	3	3	3	2
1,501-3,500	6	5	5	3	3	2	2
3,501-6,000	6	4	4	3	2	2	1
6,001-10,000	4	4	4	2	2	2	1
10,001-15,000	4	4	4	2	2	2	1
15,001+	2	2	2	2	2	1	1

Comparison: Gen2 & Gen3 Models: Land use

Feature	Gen2 Travel Model	Gen3 Travel Model
Granularity of demand modeling	Aggregate, trip-based (zone-level totals & averages)	Disaggregate, activity-based (person-level microsimulation)
Land use inputs	Aggregate (TAZ level), COG's Cooperative Forecasts, Round 10	Aggregate (TAZ level), COG's Cooperative Forecasts, Round 10, and other land use data.*
Primary land use input files & format	zone.dbf	land_use.csv
Geographic unit of land use inputs	TAZs (3,722 zones)	TAZs (3,722 zones)
Key land use variables	HH, POP, EMP by category, income index, area type	HH, POP, GQPOP, EMP by category, school enrollment

* "Other land use data" means land use inputs that are not generated as part of Cooperative Forecasts, such as TAZ-level park area and golf course area (acres) and TAZ-level school enrollment data (K-8, 9-12, college/university).

Comparison: Gen2 & Gen3 Models: Trip/tour gen.

Aspect	Gen2 (Ver. 2.4.6)	Gen3 (Ver. 1.0.5)
Modeling approach	Aggregate, trip-based, four-step model	Disaggregate, activity-based microsimulation
Basic unit of analysis	Trips (independent, zone-level)	Tours (linked trips forming daily activity patterns)
Trip/Tour generation process	Computes trip productions and attractions by purpose using zonal land use and rates	Generates daily activity patterns and tours for each person based on long-term choices and constraints
Representation of time	No explicit daily schedule; TOD factors applied after trip gen.	Explicit 24-hour scheduling of activities and trips
Inputs driving generation	Zonal HHs, POP, EMP; aggregate trip rates	Synthetic POP attributes + land use + network travel times (“skims”)
Outputs	Trip tables by purpose and mode for distribution and assignment	Person-level tour and trip files with detailed attributes
Linkage between trips	None; trips treated independently	Trips linked within tours and constrained by daily time budgets

Next Steps

- Staff will continue to distribute the beta version of the Gen3 Model per request.
- Staff will complete post-beta model updates, conduct additional sensitivity tests to confirm reasonableness of model response, and incorporate these updates into a new model version.
- Current Gen3 Model development contract with RSG & BMG expires in Dec. Technical Selection Committee is reviewing proposals regarding a new contract for on-call consultant assistance with COG/TPB's travel forecasting methods.
- Staff plan to continue to support both the trip-based (Gen2) and activity-based (Gen3) models for an indefinite period.
- Depending on the success of the beta release, staff hope to be able to declare the Gen3 Model to be production ready by spring 2026, at which point staff would prepare a new model transmittal package and provide training.
- Staff plan to update the strategic plan for travel forecasting methods in the next year.

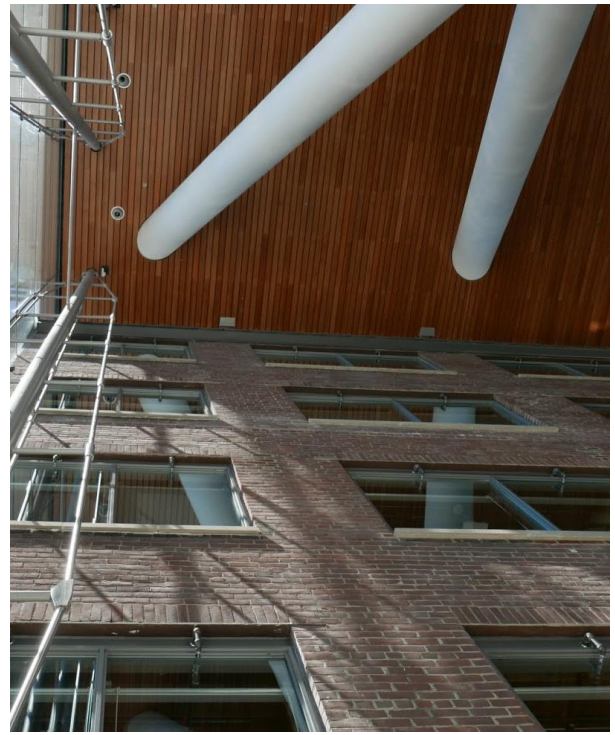


Image credit: Mark Moran

Conclusion

- Your zone-level land activity forecasts are a vital input to the regional travel model -- Thank you!
- Whether the Gen2 or Gen3 Travel Model, we request the same land use forecasts from you (TAZ level).
- We must apply an adjustment to employment data before it can be used by the travel model.
- Gen3 Travel Model should allow us to better represent pricing and equity studies.

Image credit: Mark Moran

Acknowledgements

- Feng Xie, Program Manager, Model Development Group, Travel Forecasting and Emissions Analysis Team
- COG/TPB Travel Forecasting and Emissions Analysis Team who have worked on Gen3 Model or its associated networks, including Ray Ngo, Meseret Seifu, Bahar Shahverdi, Glenn Lang, Dusan Vuksan, Nazneen Ferdous, Jane Posey (retired), Wanda Owens, and Jian (Jim) Yin
- Resource Systems Group, especially Joel Freedman, Binny Paul (now with SH 130 Concession Company), Andrew Rohne (now with Caliper Corp.), Ali Etezady
- Baseline Mobility Group, especially Mushtaqur Rahman

Image credit: Mark Moran

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Appendix: Additional slides with additional details

Production-use model: Gen2/Ver. 2.4.6 Travel Model

- Developed by COG/TPB staff over many years, with consultant assistance.
- Demand model: Aggregate, trip-based model. Time scale: Average weekday, divided into 4 time-of-day (TOD) periods.
- Supply model: Aggregate assignment of both transit person trips (transit assignment) and private motor vehicle trips (highway assignment).
  - Transit assignment includes two time-of-day periods (peak and off-peak) represented in production-attraction (P-A) format.
  - Highway assignment includes four time-of-day periods (AM, midday, PM, and night) represented in origin-destination (O-D) format.
- Gen2 Travel Model was estimated and calibrated to year-2007/2008 conditions, using the 2007/2008 COG/TPB Household Travel Survey and various transit on-board surveys (TOBS) conducted in 2007 and 2008. Gen2 Model has been validated to the following years: 2010, 2014, and 2018 (all pre-Covid)

Primary developmental model: Gen3 Travel Model

- Developed jointly by COG/TPB staff and a consultant team (RSG & Baseline Mobility Group).
- Demand model: Disaggregate, tour-based/activity-based model (ABM). Time scale: Average weekday divided into 30-minute increments.
- Supply model: Aggregate assignment of both transit person trips (transit assignment) and private motor vehicle trips (highway assignment).
  - Transit assignment includes four time-of-day periods (AM, midday, PM, and night) represented in origin-destination (O-D) format.
  - Highway assignment includes four time-of-day periods (AM, midday, PM, and night) represented in origin-destination (O-D) format.
- Gen3 Travel Model was estimated and calibrated to year-2017/2018 conditions, using the 2017/2018 Regional Travel Survey and various transit on-board surveys (TOBS) occurring in 2017 and 2018. Gen3 Model has been validated to only year-2018 conditions (pre-Covid)

Development of the Gen3 Travel Model

- **Phase 1** (FY 20–22; led by the consultant team)
  - Goal: Develop a prototype travel model that was lightly calibrated and could be used for testing by COG/TPB staff. Completed in Feb. 2022 (FY 22).
- **Phase 2** (FY 22–24; led by the consultant team)
  - Goal: Develop a travel model for production use. Completed in March 2024 (FY 24).
- **Phase 3** (FY 24–26; led by COG/TPB staff)
  - Goal: Conduct usability testing of the Gen3 Model to ensure that the model is, in fact, ready for production use, including related programs/processes.
  - Involves running the Gen2 and Gen3 models for the same set of scenarios (e.g., air quality conformity analysis).
  - Conducted the same set of sensitivity tests on both Gen2 and Gen3 models, and compared the model response.
  - Beta release of model (11/7/25)
  - Contract to conclude Dec. 2025 (FY 26)
  - Declare model to be production ready (spring 2026?)

Comparison: Gen2 & Gen3 Models (1)

Feature	Gen2 Travel Model (TBM/FSM)	Gen3 Travel Model (ABM)
Sophistication & representation of travel behavior	Trip-based model: State of the practice; Used by many MPOs	Tour/activity-based model: State of the art; Used by many large MPOs
Demand model	Aggregate, trip-based	Disaggregate, tour-based/activity-based
Demand model time step	Average weekday, divided into 4 TOD periods	Average weekday, divided into 30-min. increments
Supply model for highway travel	User equilibrium, static traffic assignment, 4 TOD periods, O-D assignment*	Same
Supply model for transit travel	Single-best path, 2 TOD periods, P-A assignment,	Multi-path, 4 TOD periods, O-D assignment
Calibration data	2007/2008 Household Travel Survey; 2007 ACS	2017/2018 Regional Travel Survey; 2018 ACS

* O-D = Origin-destination; P-A = Production-attraction

Comparison: Gen2 & Gen3 Models (2)

Feature	Gen2 Travel Model (TBM/FSM)	Gen3 Travel Model (ABM)
User community	Model developed by TPB staff, with consultant assistance, over the decades for TPB and stakeholders. It has been widely used, rigorously checked, and well regarded by the modeling community of this region.	Model developed by TPB staff and consultant (RSG) based on the well-known CT-RAMP ABM, which is one of the most successful ABMs. Model uses ActivitySim software, which is supported by a consortium of 14 public-sector agencies, including COG/TPB.
Example component model: Mode choice	1. Scope: Only trip mode choice. 2. Structure: Nested logit (NL) 3. Non-motorized travel: Walking and biking is included ONLY as an access mode to transit. 4. Excludes taxi, TNC (Uber, Lyft), and CAV 5. Implementation: ModeChoice.exe (proprietary, C++)	1. Scope: Both tour & trip mode choice models; trip mode is consistent with tour mode. 2. Structure: Nested logit (NL) 3. Non-motorized travel: Explicitly considers walk & bike modes in mode choice; No subsequent bike assignment 4. Explicitly considers taxi/TNC modes; CAV is included, but further improvements could be made. 5. Implementation: ActivitySim (open source, Python)

Comparison: Gen2 & Gen3 Models (3)

Feature	Gen2 Travel Model (TBM/FSM)	Gen3 Travel Model (ABM)
Software	Bentley Systems Cube (proprietary) & TRANSIMS ModeChoice (open source)	Bentley Systems Cube (proprietary) and ActivitySim (open source)
Hardware	Typically run on a server, either on premises or in the cloud	Same, but higher specifications (processor, memory, disk space, etc.)*
Model run times	ca. 15 hours	ca. 14-15 hours (but on a higher spec chip)
Size of model outputs	Prior to clean up: 30 GB After clean up: 10 GB	Prior to clean up: 500 GB After clean up: 200 GB (i.e., 20x larger)

* Please refer to Page 16 of RSG, Baseline Mobility Group, and Metropolitan Washington Council of Governments. "User's Guide for the COG/TPB Gen3/Version 1.0.5 Travel Demand Forecasting Model." Draft Report. Washington, D.C.: Metropolitan Washington Council of Governments, National Capital Region Transportation Planning Board, October 28, 2025.