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# Gen3 Model Development Project

## Travel Forecasting Subcommittee Meeting

January 15, 2021

IN PARTNERSHIP WITH

BASELINE MOBILITY

Metropolitan Washington Council of Governments

# Discussion Topics

- Gen3 Model Status
- Planned Treatment of External Transit
- WMATA SmarTrip Card Data
- Phase 1 Next Steps
- Gen3 Model Transit Networks

# Gen3 Model Status

# Phase 1 Development (Task Order 3) Status

- Population Synthesis (85%)
  - Delivered PopulationSim setup with documentation
  - Responding to MWCOG comments
- Data Development (40%)
  - COG leading reweighting of combined RTS and MTS data after excluding no-school days
  - Configured Survey Processing Application and Visualizer tool for RTS
  - Processing MARC, VRE, and Metrorail on-board surveys. Analyzing SmarTrip data.
- ActivitySim Deployment (10%)
  - Updating transit skimming to generate drive egress skims
  - Starting with SEMCOG ActivitySim code and settings

# Planned Treatment of External Transit

# Background

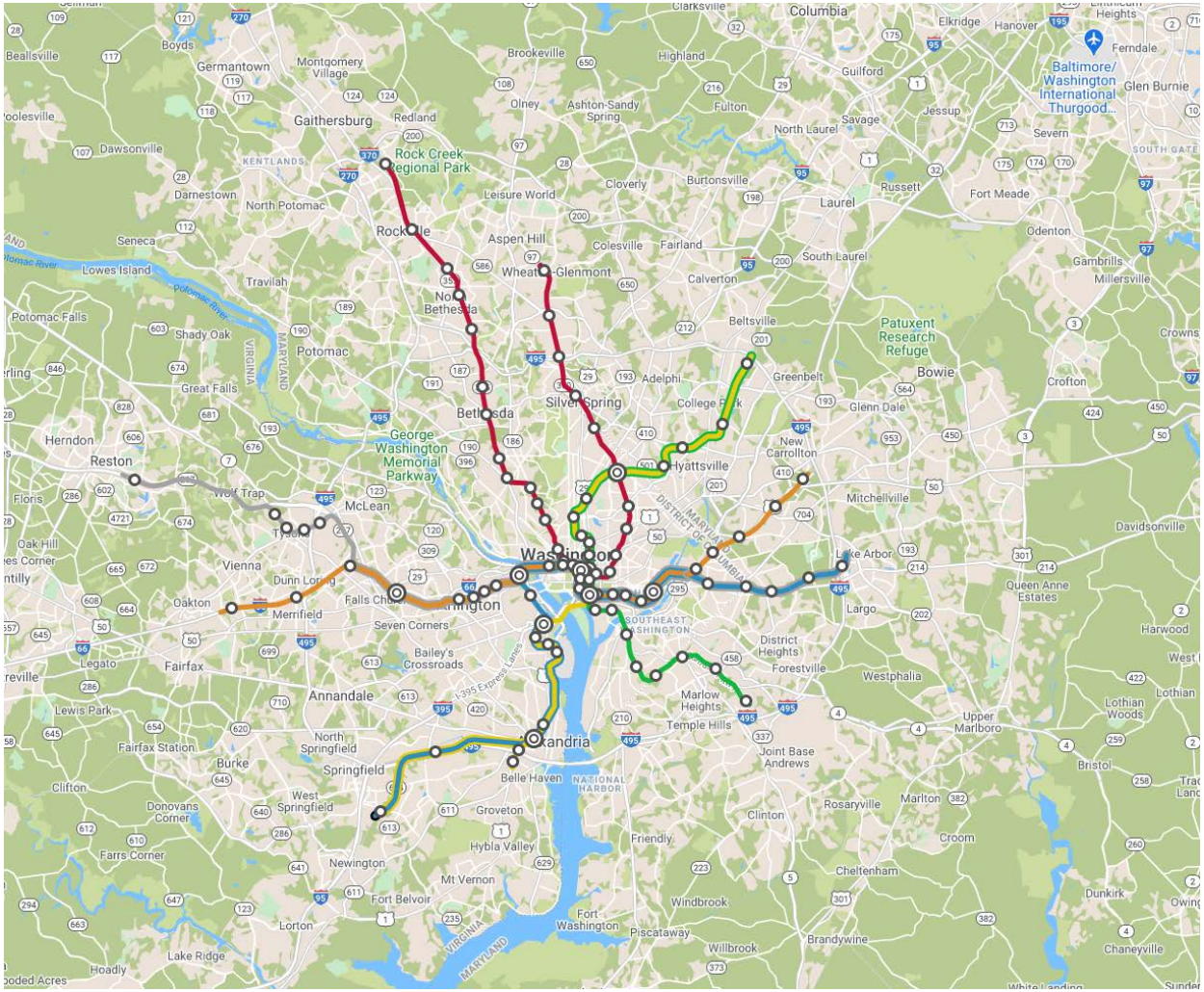
- Most travel models in the U.S. do not account for internal-external (IX/XI) transit demand
- External transit travel important for MWCOG region
  - Model may not match observed transit boardings, especially for some stations (e.g., Union Station, Reagan National Airport)
- We are working on addressing this in the Gen3 Model
  - Generate base-year IX/XI OD tables from transit on-board surveys (MARC, VRE, Metrorail)
  - Assign those trip tables to (modified) transit network along with internal-internal demand
  - Inter-regional transit trips will not be modeled (e.g., Amtrak trains and intercity buses)

# VRE System Map

Stations are within region, but external riders can access stations, especially end-of-line stations, by driving or taking a bus

# Metrorail System Map

Here too, stations are within region, but external riders can access stations, especially end-of-line stations, by driving or taking a bus



# MARC System Map

# Types of IX/XI trips

- All IX/XI trips – either origin or destination is outside the model boundary.
- Two possibilities for boarding/alighting stop:
  - Within the model boundary (MARC, VRE, Metrorail)
  - Outside the model boundary (MARC)

# OBS Processing Steps

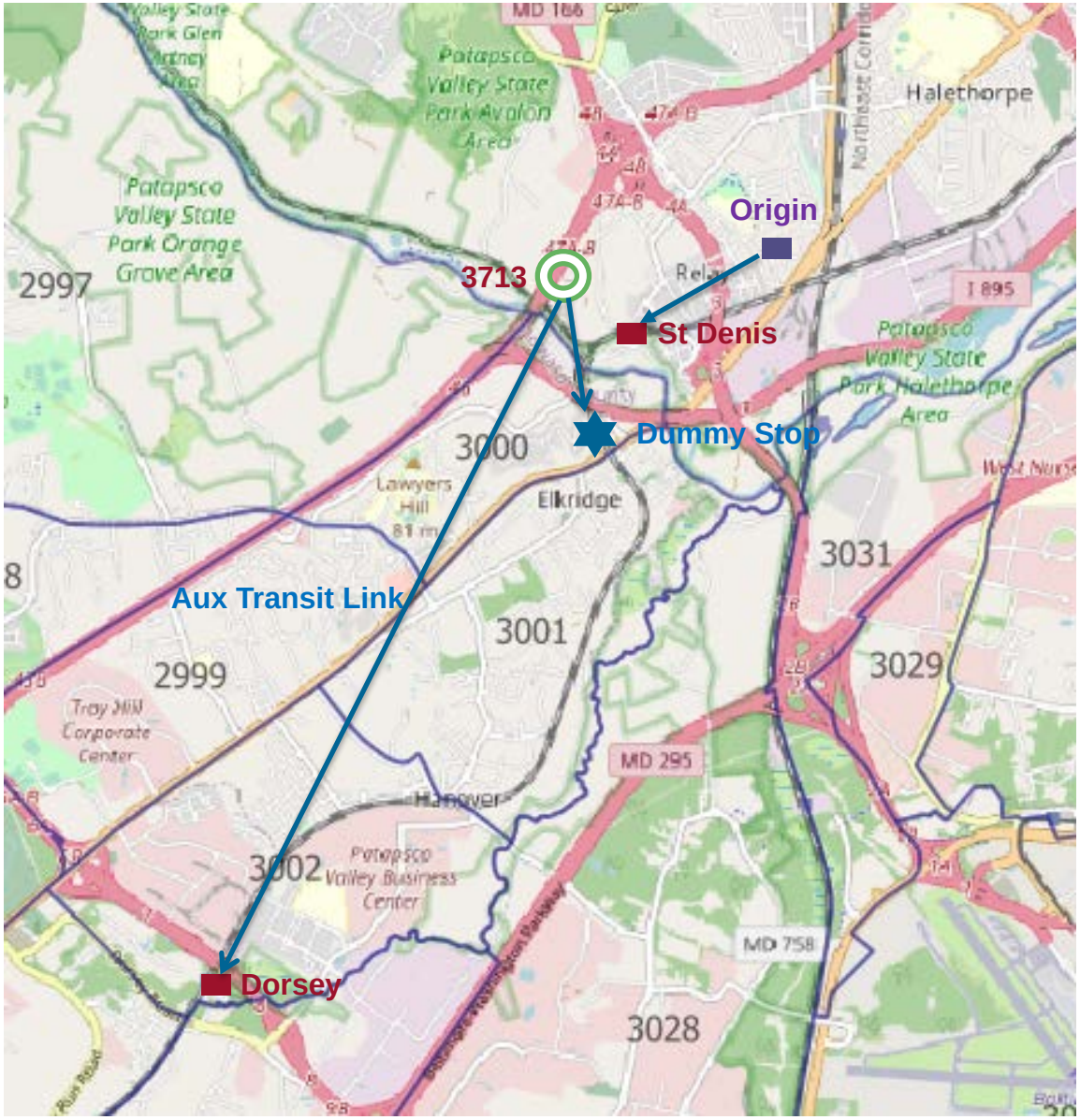
1. IX/XI trip identification
   - Trips starting or ending outside model boundary
2. Geocode origin and destination TAZ
   - VRE & Metrorail: External trip end will be tagged to the TAZ of the end-of-line stop
   - MARC: External trip end will be tagged to the nearest external station zone
3. Compute weights
   - Account for missing OD information
   - Re-expand to 2018 base-year
4. Generate OD tables
   - time-of-day and access mode segmentation

# Network Processing Steps

- MARC
  - Add a dummy stop to account for external boardings/alightings
  - Add access link between external station zone and dummy stop
  - Add access links between external station zone and internal stops

# Network Processing

Add auxiliary transit links based on observed trips which can be used to handle external trips boarding at internal stops



# Planned Approach

- Developed by RSG for the Gen3 Model
- Metrorail & VRE
  - Tag external end to the TAZ of the last stop

- MARC
  - Tag external end to the closest external traffic station
  - Add dummy stop to represent boardings/alightings outside the model boundary
  - Add auxiliary links from external TAZs to internal stops to allow external trips to board/alight at internal stops

# WMATA SmarTrip Card Data

# Data Processing and Planned Usage

- Station-to-station matrix geocoded to TAZ level
- Generated OD tables using October data for Gen3 Model time-of-day periods
  - October is a typical fall month with fewer holidays
- Next steps
  - Assign transit OD tables to time-of-day transit networks
  - Finetune pathfinding parameters in existing transit assignment
  - Investigate cases with no transit path
  - Test transit crowding functionality

# Phase 1 Model Development

## Next steps

# Phase 1: Next Steps

- PopulationSim
  - Address COG's comments and resolve technical issues
- Data Development
  - Process the MARC, VRE and Metrorail OBS and generate external transit trip tables
  - Transit assignment and crowding testing
  - Process reweighted RTS/MTS dataset in ActivitySim format
- ActivitySim Deployment
  - Update transit skimming to generate drive-egress skims
  - Transfer SEMCOG ActivitySim model

# GEN3 MODEL: TRANSIT NETWORKS

## Treatment of time of day

Jane Posey
TPB Transportation Engineer

TPB Travel Forecasting Subcommittee
January 15, 2021

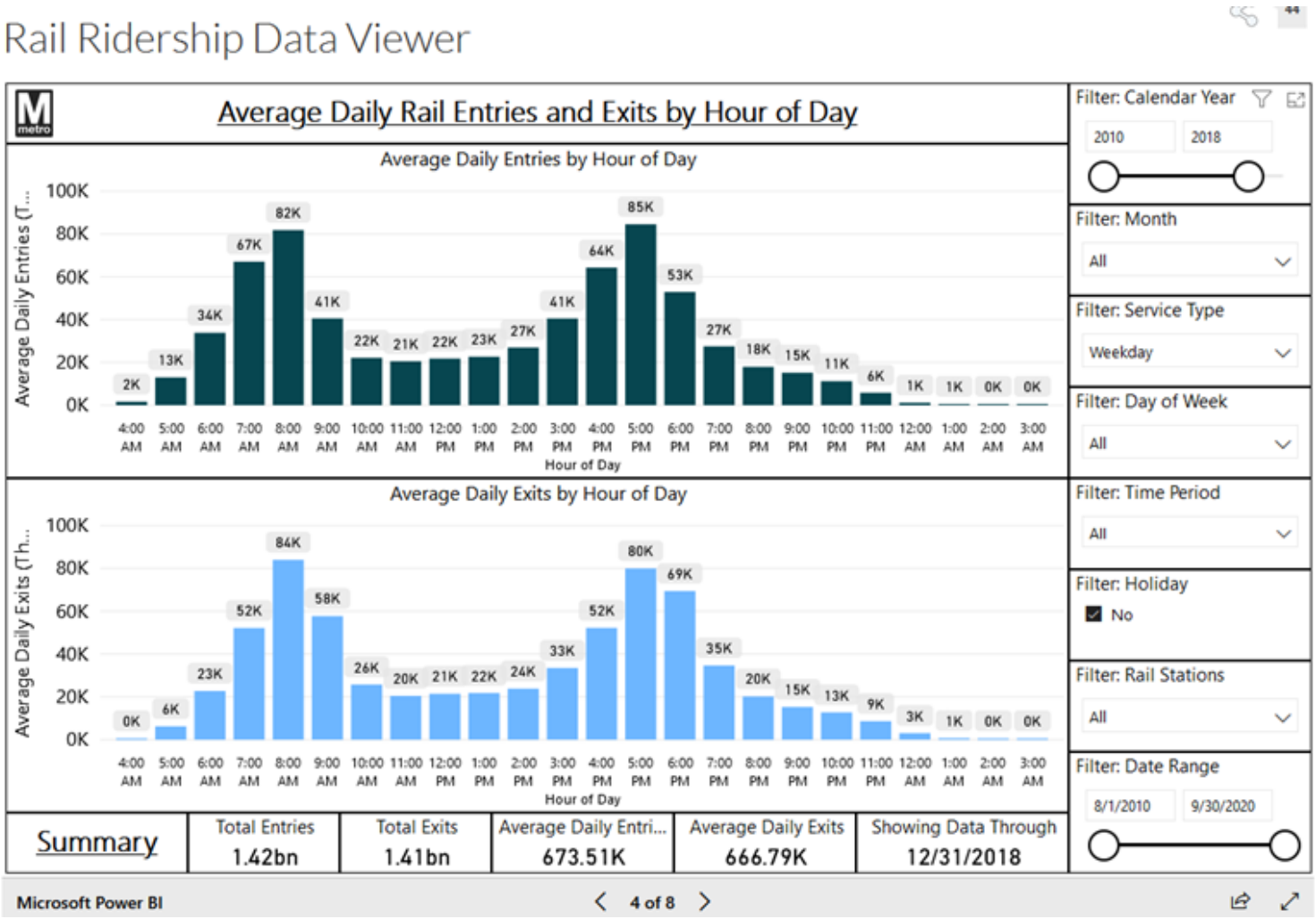
Agenda Item #4

National Capital Region
**Transportation Planning Board**

# GEN3 MODEL: TRANSIT NETWORKS

- Gen2/Ver. 2.3 Travel Model
  - Transit assignment: P-A format
  - 2 Transit Time-of-Day Periods
    - Peak period and off-peak period
- Gen3 Travel Model (proposed)
  - Transit assignment: O-D format
  - 4 Transit Time-of-Day Periods
    - AM peak, midday, PM peak, night-time

# GEN3 MODEL: TRANSIT NETWORKS



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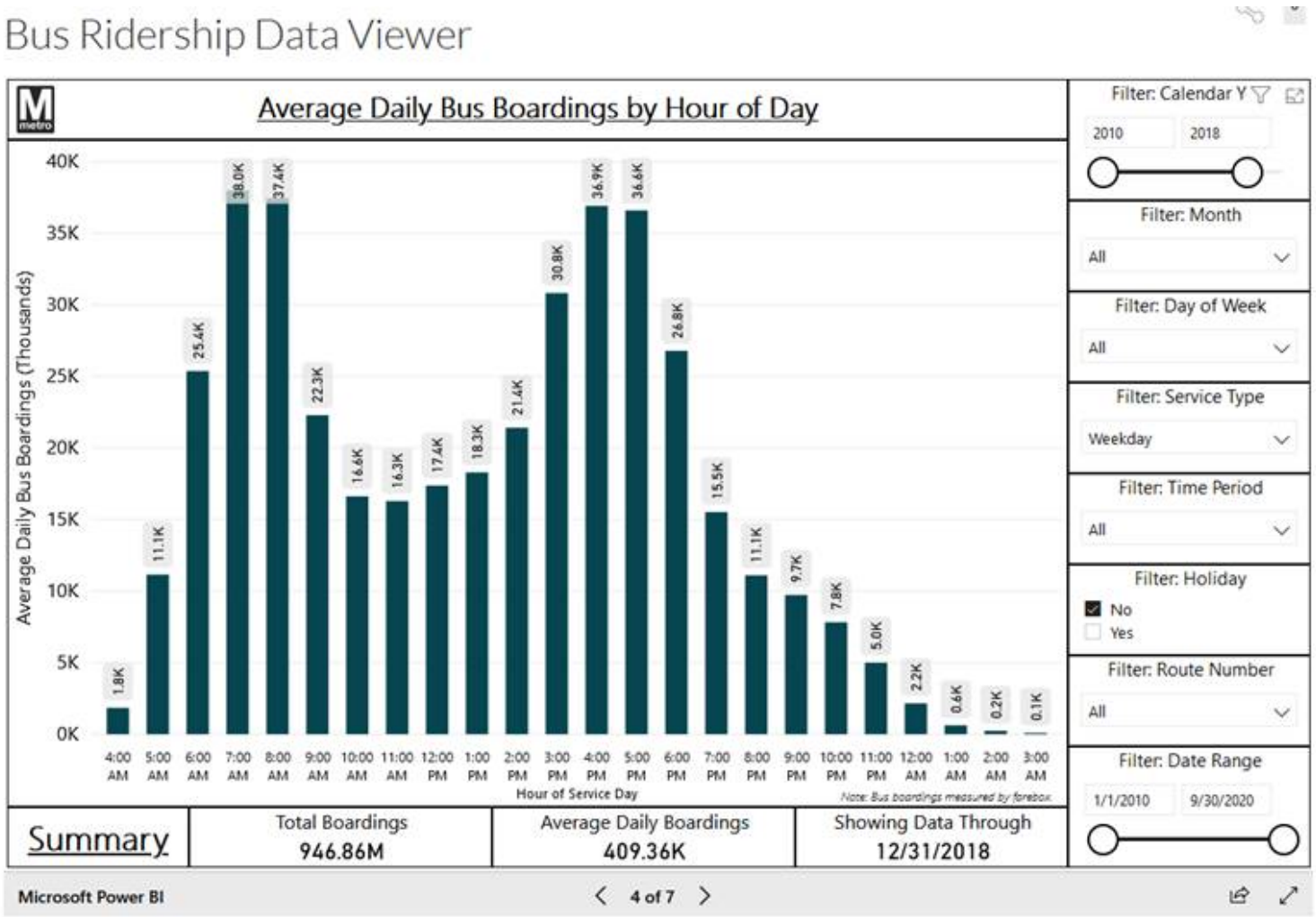

# GEN3 MODEL: TRANSIT NETWORKS

## Proposed network coding: transit service headway hours

| | Time Period | Definition | Duration (hours) | Time period for calculation of average headway and run time | |
|---|---|---|---|---|---|
| | | | | Most transit service | Exception for outer counties |
| | AM Peak | 6:00 AM - 8:59 AM | 3 | 7:00 AM - 7:59 AM (1 hour) | 6:00 AM - 6:59 AM |
| | Midday | 9:00 AM - 2:59 PM | 6 | 10:00 AM - 2:59 PM (5 hours) | N/A |
| NEW | PM Peak | 3:00 PM - 6:59 PM | 4 | 5:00 PM - 5:59 PM (1 hour) | 4:00 PM - 4:59 PM |
| NEW | Night-Time | 7:00 PM - 5:59 AM | 11 | 7:00 PM - 11:59 PM (5 hours) | N/A |
| | | | 24 | | |

# GEN3 MODEL: TRANSIT NETWORKS

- TPB staff will provide a 2018 base-year transit network with 4 time-of-day periods in Public Transport (PT) format to RSG in spring 2021
- TPB staff will provide a 2045 forecast-year transit network with 4 time-of-day periods in Public Transport (PT) format to RSG in fall 2021


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