

January 7, 2020

NVTA FY2024-25 Six Year Program Update – Modeling Activities

Congestion Reduction Analysis

The congestion reduction relative to cost measure used by NVTA to evaluate and select projects for FY2024-25 funding requires two inputs from the TransAction modeling process. These are the change in Person Hours of Delay associated with each project for the years 2025 and 2040. The 2025 and 2040 model runs were made using a slightly modified version of the 2040 TransAction Baseline network and the travel demand generated by the MWCOG Round 9.0 planning forecasts for 2025 and 2040. In this approach, each project submitted for FY2024-25 funding is coded into the 2040 TransAction Baseline network and used as input to the 2040 and 2025 model runs.

The 2040 TransAction Baseline network and model were developed for evaluating the 2040 TransAction Plan. The model uses person trip tables and highway and transit networks originally extracted from the MWCOG regional modeling process for the 2016 Constrained Long Range Plan. The 2040 TransAction Baseline network is an enhanced version of the MWCOG highway and transit networks in Northern Virginia based on facilities with committed funding as of 2016. The modeling process disaggregates MWCOG person trips by time of day and location and applies a dynamic assignment process to estimate volumes, speeds and transit ridership at 15-minute time increments for a typical week day. These data are then used to generate travel time and cost estimates for each trip and travel mode included in a disaggregate mode choice model. The highway and transit trips generated by the mode choice model are input into another application of the dynamic assignment process. The differences in the highway and transit person hours of delay for each 15-minute time increment between the 2040 TransAction Baseline run and the project-specific run were used to identify the project impact area and the delay summary.

AECOM developed network changes for each project based on the project descriptions that were submitted to NVTA. AECOM worked with NVTA to clarify the project details. Many of the proposed projects included roadway and intersection improvements that increased link capacities and speeds. Interchanges were coded with grade separations and ramp connections. Transit improvements typically include reduced travel times or headways. Station access improvements and most bike and pedestrian improvements were modeled using adjustments to the Pedestrian Environment Factor (PEF) used in the mode choice model. PEF factors at the origin and destination of a trip are used to approximate the quality of non-highway accessibility in a traffic analysis zone.

TransAction Project Ratings

Project ratings were generated for each project included in the 2040 TransAction Plan based on the “method 5” approach accepted by VDOT. This method uses changes in grid bin values for 15 performance measures to calculate the relative rating for each project in the 2040 TransAction Plan. The project rating assigned to each project submitted for FY2024-25 funding was generated in the same way. This involved an application of TransAction modeling process that included all 41 projects submitted for FY2024-25 funding. The performance of the combined run was distributed to the 86,297 1/8th mile grids



in Northern Virginia in the vicinity of each link, transit line or activity location. The grid value for each performance measure was assigned to one of 10 bins based on natural breaks in the grid performance. The difference in the grid bin values for each performance measure between the combined project application and the 2040 TransAction Baseline defined the benefit of the combined projects.

Individual project ratings are based on summing all scores for all grids within a half mile of the project. The performance total is divided by the number of project grids to create the project score. The performance scores were normalized to a value between 0 and 100. The weighted sum of the performance scores was used to calculate the project rating.