

NCDOT 2019 BUILD Grant Travel Demand Model Methodology

North Carolina Statewide Travel Demand Model (NCSTM) was the primary tool utilized in estimating Vehicle Hours Traveled (VHT) savings after the implementation of the subject projects. This travel demand model is the primary state-wide traffic simulation and analysis tool used by NCDOT to calculate travel time benefits on a comparative basis throughout North Carolina as part of the Department's project prioritization process.

While the NCSTM is a tool well-suited to analyze trips on a system-wide level, it has limitations capturing short distance intrazonal trips that utilize segments of the interstate between only consecutive interchanges. As such, it was noted that after examining the results of the completed model runs, some segments of Interstate 95 were shown to experience volume to capacity (V/C) ratios lower than actual ratios obtained from comparing recently collected traffic volumes to current roadway capacity. Though the model is calibrated and validated to statewide travel patterns, model performance at any given location within the model boundary may vary.

To account for the observed discrepancy, the model run results were supplemented and adjusted with the results from the implementation of a Model Verification Spreadsheet. This method described below was developed in accordance with accepted professional practices as set forth in NCHRP Report 765¹. To maintain the integrity of the analysis, consensus on the approach was achieved through a coordinated effort of subject matter experts in the fields of travel demand modeling, traffic forecasting, transportation planning, and benefit-cost analysis.²

- Latest AADT from NCDOT Traffic Survey Group along the corridor was collected
- Existing and future roadway capacity along the corridor was estimated based on the NCDOT's "Level of Service D Standards for Systems Level Planning" tables
- Speed along each segment was confirmed for both No-Build and Build Alternatives
- Segment length was determined using GIS and TransCAD road network data
- Vehicle Hours Traveled (VHT) per segment were computed for No-Build and Build Alternatives for Year 2025 and Year 2040
- VHT savings between the No-Build and Build Alternatives were calculated for Year 2025 and Year 2040
- Model VHT and Verification Spreadsheet VHT saving for I-95 were compared and difference established for Year 2025 and Year 2040³
- Statewide Model Network VHT savings for Year 2025 and Year 2040 were adjusted by adding the corrected VHT savings for I-95
- A positive Annual Growth Rate of 3.3% was estimated between Year 2025 and Year 2040 VHT savings

¹ CDM Smith, A. Horowitz, T. Creasey, R. Pendyala, M. Chen. *NCHRP Report 765 Analytical Travel Forecasting Approaches for Project-Level Planning and Design*. Transportation Research Board of the National Academies, Washington, D.C., 2014.

² Ibid. pp. 74-76.

³ Ibid. pp. 101-102.