



VDOT's Project Prioritization Process in Northern Virginia using TRANSIMS and the COG/TPB Travel Model

TPB Travel Forecasting Subcommittee

July 22, 2016

Discussion Outline

- **Legislation and Development Background**
- **Modeling Process**
- **Performance Measures**
- **Rating Results**

Background: Legislation

- **HB 599 was passed by the 2012 VA General Assembly**
 - **Mandated that VDOT evaluate and rate at least 25 significant transportation projects in the NOVA transportation district**
 - **Ratings to be based on the project's ability to reduce congestion and improve mobility during a homeland security emergency**
- **HB 2313 was passed by the 2013 VA General Assembly**
 - **Provided a revenue stream for NVTA to fund projects**
 - **70% of the revenues to fund projects rated by HB599**
 - **Amended in 2015 to require ratings for transit projects**
- **HB 2 was passed by the 2014 VA General Assembly → Smart Scale**
 - **Statewide performance ratings to support the project funding decisions of the Commonwealth Transportation Board (CTB)**

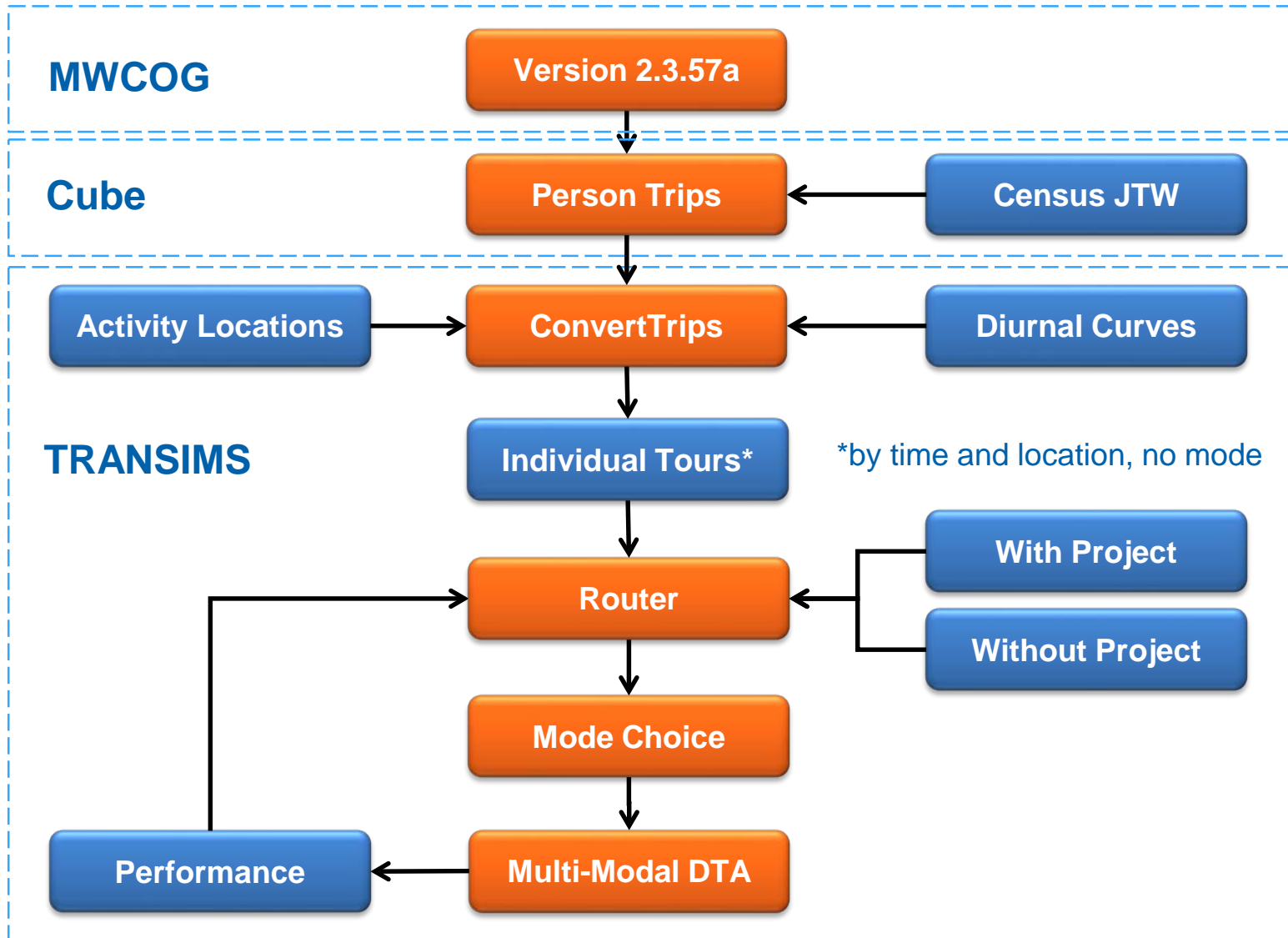
Background: Development

- **In 2013-2014, VDOT and DRPT, with CTB, NVTA and NoVA localities, implemented an evaluation and rating process**
 - **Used detailed transportation demand models to assess the congestion and mobility impacts in 2020 and 2040**
 - **Developed performance measures and weights in cooperation with stakeholders, NVTA and a Peer Review Group**
 - **Rated 37 roadway projects → NVTA FY 15-16 funding**
- **Modified process in 2015 to evaluate and rate transit projects**
 - **Process now evaluates multimodal project with both highway and transit elements**
 - **Rated 24 multi-modal projects → NVTA FY 17 funding**
- **Integrated into NVTA's TransAction 2040 planning process**

Transit-related Process Improvements

- **Transit capacity constraints**
 - Delay added to people attempting to board full transit vehicles
- **Park-n-ride capacity constraints**
 - Delay added to cars attempting to park at full park-n-ride lots
 - Parking duration based on trip purpose and transit travel time
- **Dynamic toll rates**
 - HOT lane tolls set to maintain 45 mph for each 30 minute period
- **Mode choice impacts**
 - Each person given 6 mode options for their round-trip tour
 - SOV, HOV2, HOV3+, walk-to-transit, park-n-ride, kiss-n-ride
 - Considers transit/parking delays, tolls, and congested times
 - Randomly select one of the available modes based on their relative probabilities → Monte Carlo choice

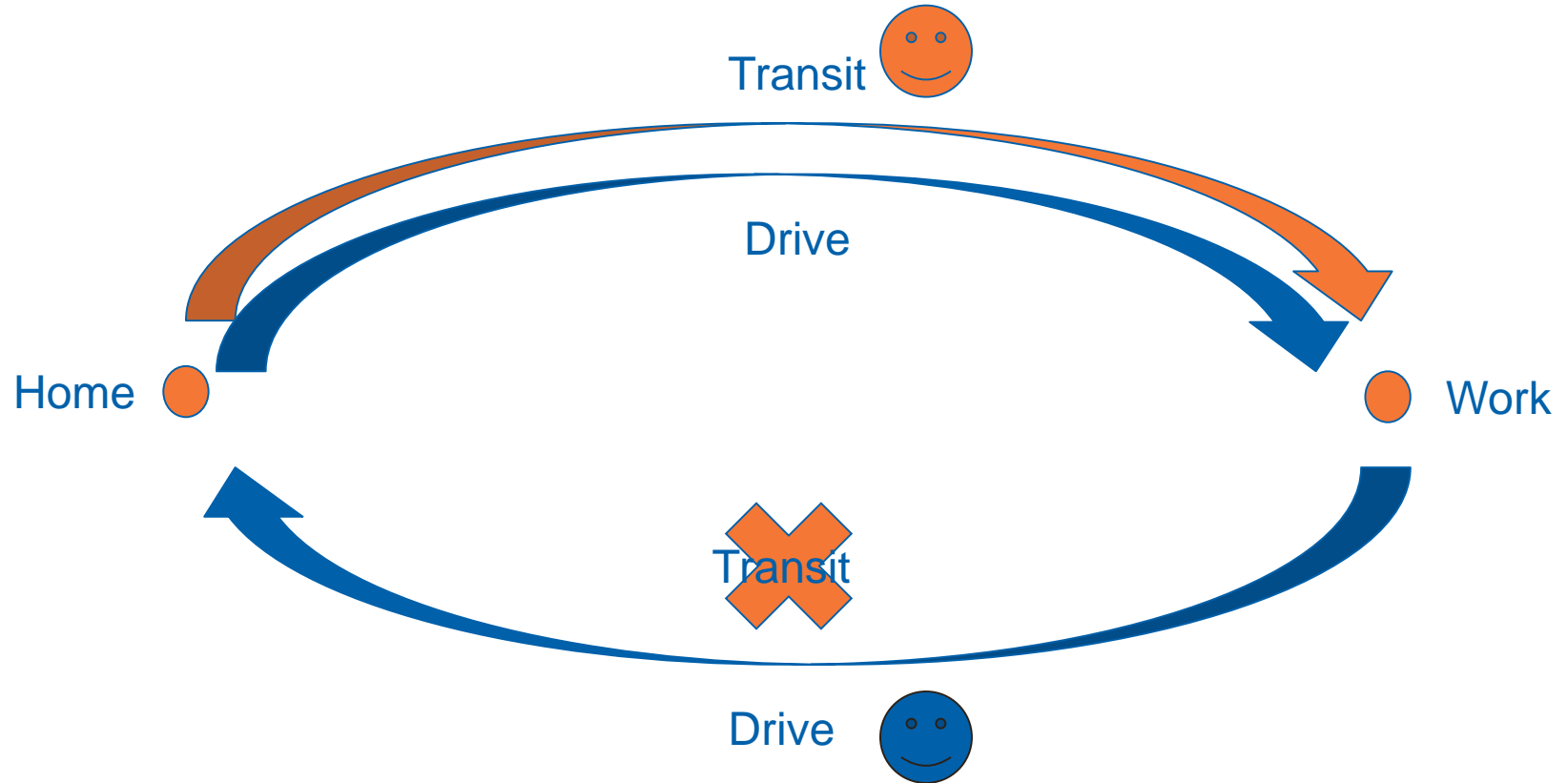
Current Model Structure



Round Trip Tours

- TRANSIMS models individual origin→destination trips by time-of-day and travel mode
- Park-n-ride trips should be modeled as Tours
 - Home → Drive → Park-n-Ride → Transit → Activity (duration)
 - Activity → Transit → Park-n-Ride → Drive → Home
- To avoid illogical mode choice differences for outbound and return trips, all home-based trips were modeled as tours
 - Two P→A trips converted to one O→D→duration→D→O tour
- The sum of the travel times and costs for the outbound and return legs (i.e., total tour time) are used in mode choice
 - The mode must provide round trip service to be considered

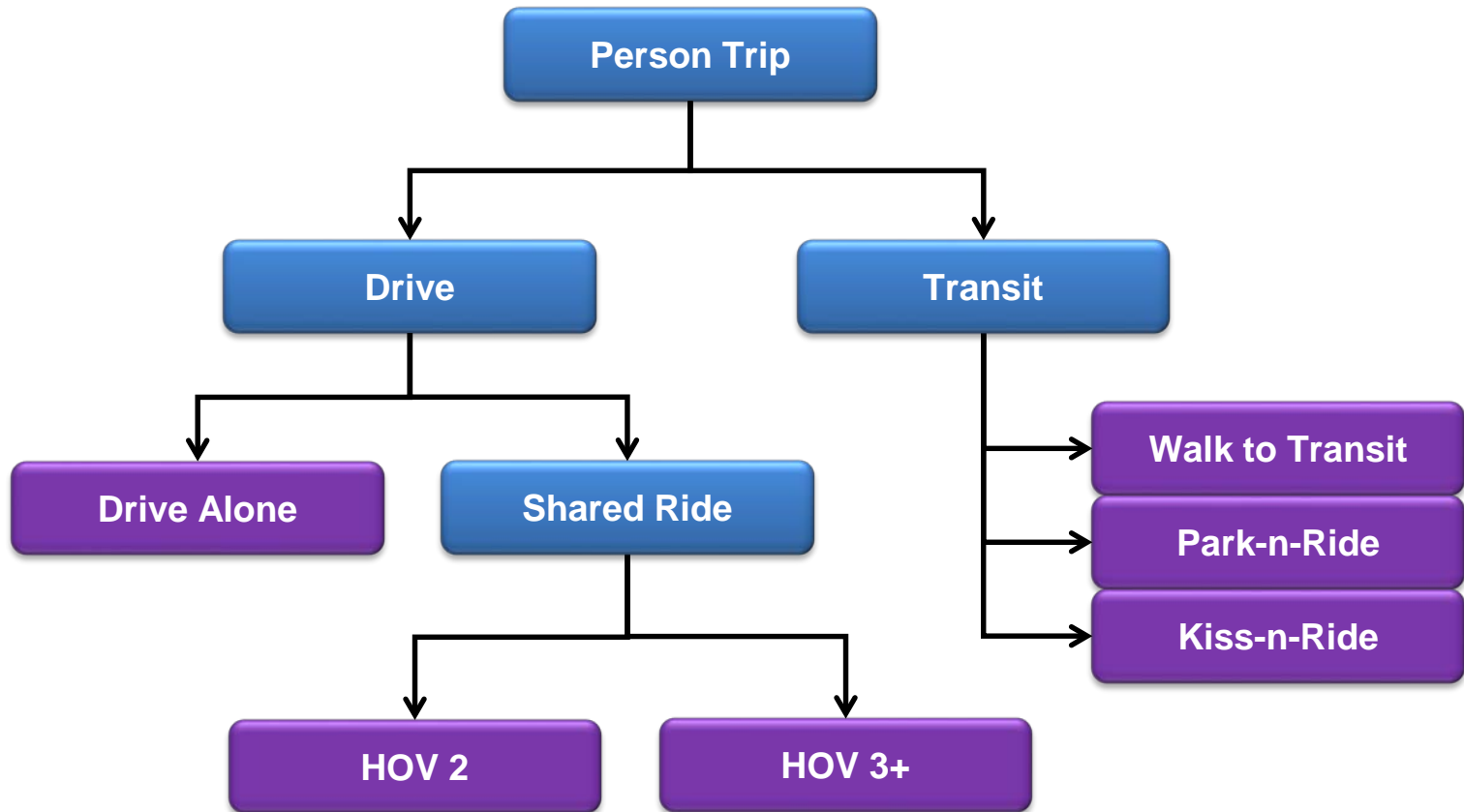
Limit the Choices to Complete Tours



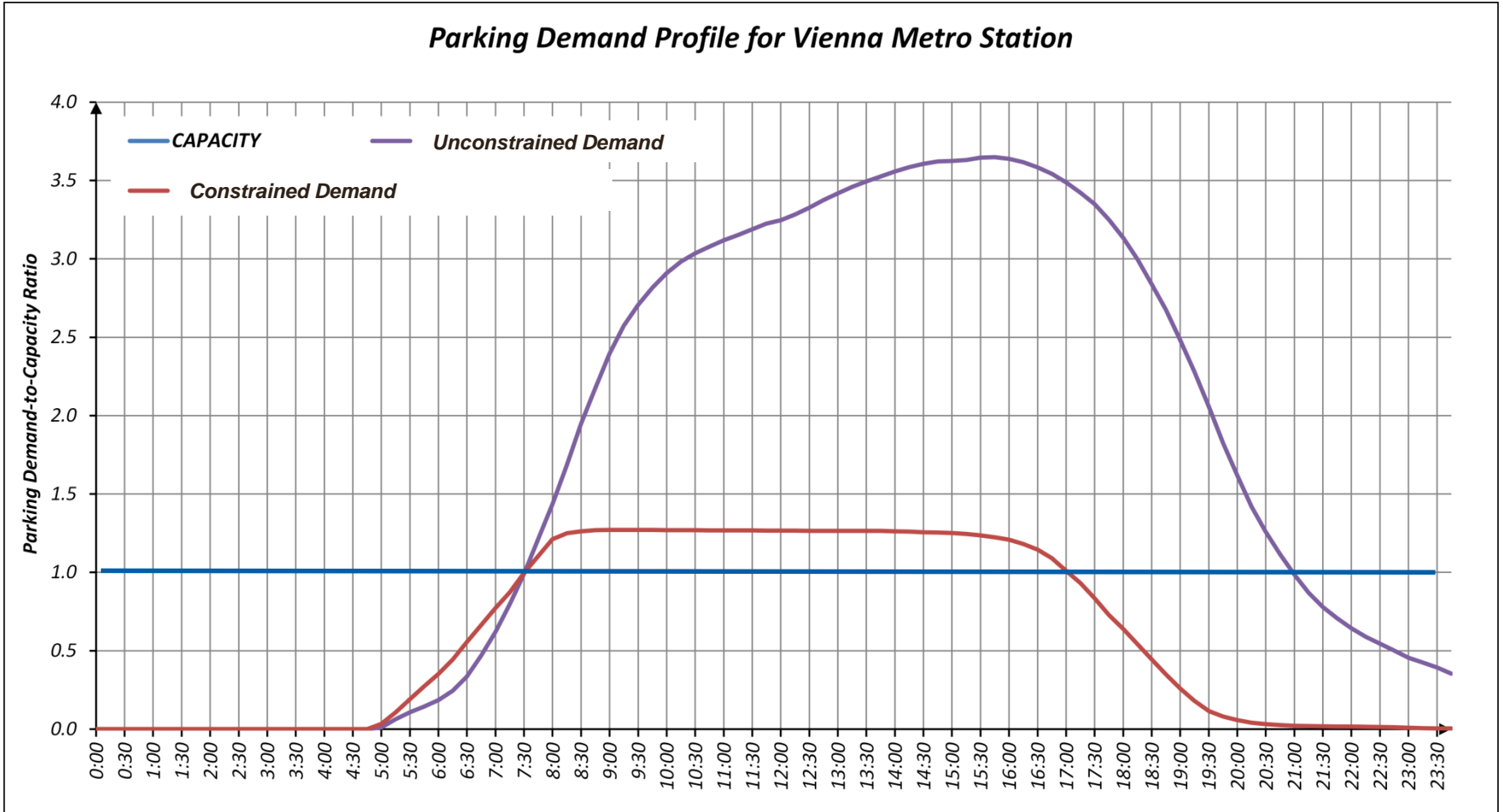
Path Impedance

- **Ensures consistency between path building weights and path weights used in mode choice**
 - **Same coefficients for in-vehicle time, waiting time, walking time, drive access time, number of transfers, cost, etc.**
- **Also considers mode-specific bias and penalty factors**
 - **rail vs. bus, station vs. stop transfers, and park-n-ride capacity constraints and distance penalties, etc.**
- **The coefficients of impedance vary by income to make the relative difference in impedance between modes more important for high income travelers than low income travelers**
 - **Represents an additional “value of time” impact that reduces the mode constants**

Mode Choice Model



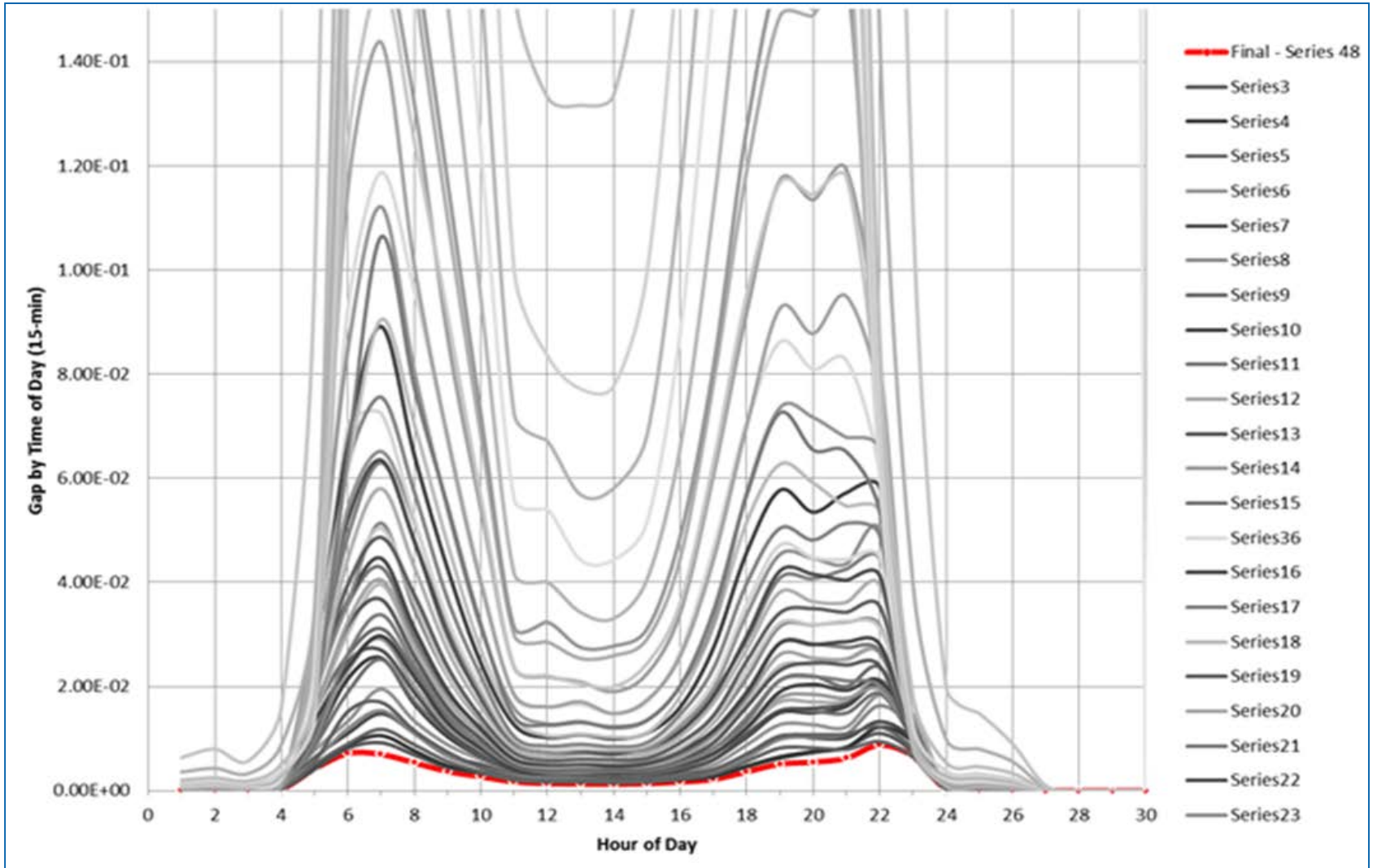
Park-n-Ride Demand – Vienna



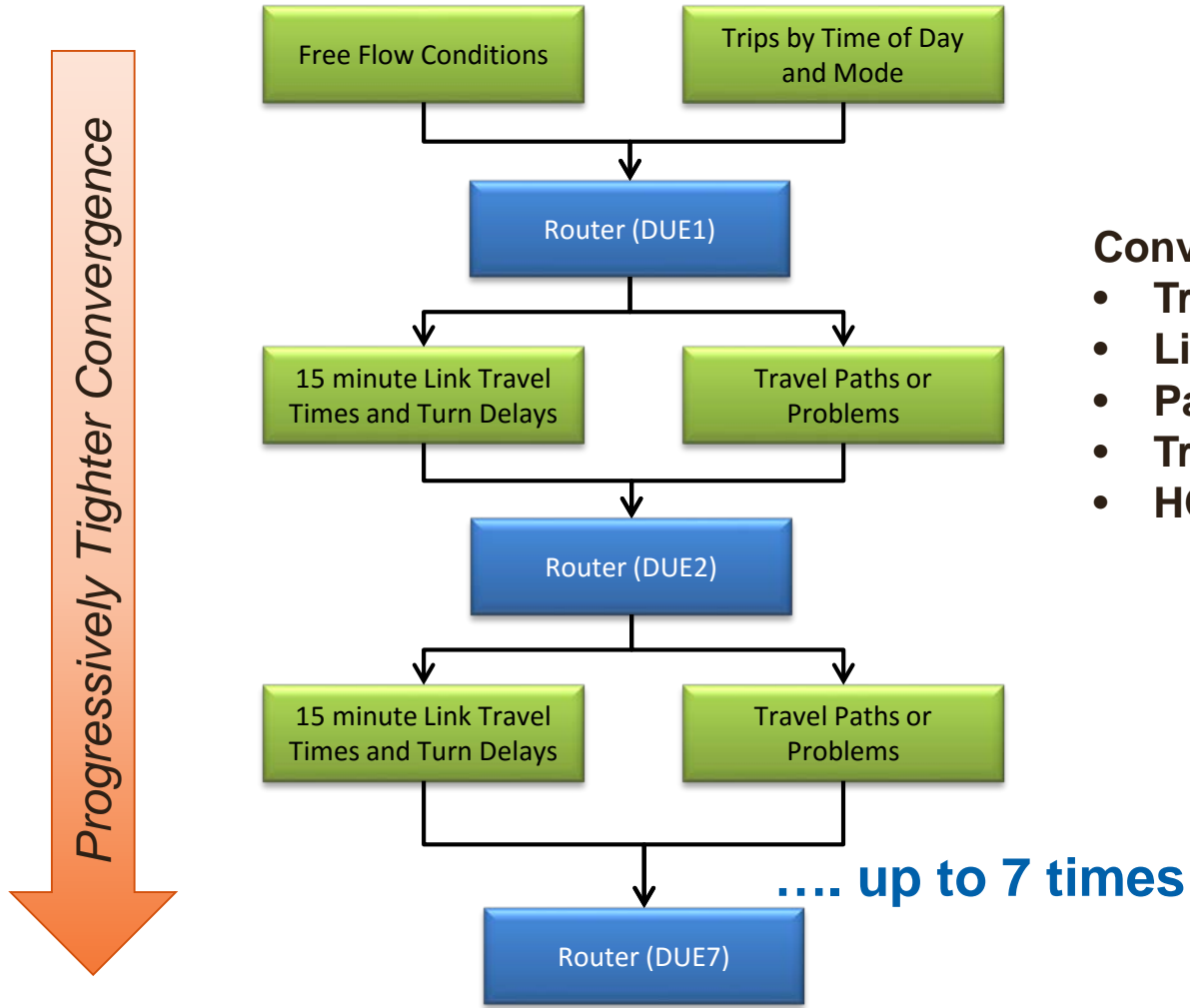
TRANSIMS Dynamic User Equilibrium

- **Build minimum-impedance paths for individual travelers using 15 minute link travel times and turn delays**
- **Dynamically assign trips to the network**
- **Update 15 minute link travel times and turning delays**
- **Compare the current link travel times and trip travel times to previous iteration values**
- **If the difference is significant (link gap and trip gap), select travelers to update**
- **Average travel times between iterations and between time periods to dampen oscillation effects**
- **Re-build paths for selected travelers and combine with re-skimmed existing paths for other travelers**

Trip-Based Gap by Time of Day



Convergence Refinement Iterations



Convergence Criteria

- Trip Travel Time
- Link Travel Time
- Parking Capacity
- Transit Capacity
- HOT Toll/Speeds

Performance Measures

Congestion Reduction Measures

- **Congestion Duration (27.9%)** = reduction in the number of hours of the day auto and transit passengers experience heavily congested travel conditions.
- **Person Hours of Delay (20.3%)** = reduction in the number of person hours of travel time above free flow travel time.
- **Person Hours of Congested Travel in Automobiles (15.4%)** = reduction in the number of person hours of travel in automobiles and trucks on heavily congested facilities.
- **Person Hours of Congested Travel in Transit Vehicles (11.8%)** = reduction in the number of person hours of travel in buses and trains on heavily congested facilities or in crowded vehicles.
- **Transit Crowding (11.5%)** = reduction in the number of transit person miles experiencing crowded conditions (local bus > 1.0; express bus and commuter rail > 0.9; Metrorail > 100 passengers/car).

Mobility Measures

- **Accessibility to Jobs (9.5%)** = increase in the number of jobs that can be reached from each household based on a 45 minute travel time by automobile and a 60 minute travel time by transit.
- **Emergency Mobility (3.6%)** = increase in the person hours of travel time resulting from a 10 percent increase in peak hour trip making.

Project Ratings

- **Project performance score is based on the project that generated the greatest change for a given measure**
 - **The project with the greatest change is awarded 100 points**
 - **All other projects are awarded a performance score by dividing their performance by the greatest performance change**
- **Rating = the performance measure score (0-100) multiplied by the performance measure weight and summed**

FY 15-16 Projects Ratings

| Project Description (* = new facilities) | | Location | Project Rating | | |
|--|--|-----------------|----------------|------|----------|
| | | | 2020 | 2040 | Combined |
| NVTA-7 | Fairfax County Pkwy Improvements | Fairfax | 79.1 | 88.5 | 167.6 |
| NVTA-9 | Loudoun County Parkway extension to US 50* | Loudoun | 55.0 | 30.6 | 85.6 |
| NVTA-32 | Route 28 - Godwin Drive Extension near Manassas* | Manassas/PW | 37.2 | 29.3 | 66.5 |
| CTB-2 | Route 7 Widening from Tysons Corner to Reston | Fairfax | 37.6 | 25.7 | 63.3 |
| NVTA-30 | Route 28 Widening near Centreville | Fairfax | 30.3 | 17.3 | 47.6 |
| CTB-3 | I-395 Southbound Widening | Alexandria | 25.9 | 10.7 | 36.6 |
| NVTA-2 | Rolling Road Widening near Springfield | Fairfax | 23.7 | 12.5 | 36.2 |
| NVTA-22 | Northstar Blvd Extension near Brambleton* | Loudoun | 17.2 | 14.5 | 31.7 |
| NVTA-19 | Glebe Rd Corridor ITS Improvements | Arlington | 19.3 | 8.6 | 27.9 |
| CTB-4 | Fairfax County Pkwy - I-95 to US1 near Ft. Belvoir | Fairfax | 11.7 | 12.6 | 24.2 |
| CTB-5 | Fairfax County Pkwy - I 95 to US 1 near Ft. Belvoir (County Alt) | Fairfax | 11.4 | 12.7 | 24.1 |
| NVTA-11 | US 1 Widening and Relocation - Dumfries | Dumfries | 7.8 | 14.6 | 22.4 |
| NVTA-28 | US 1 Widening near Woodbridge | Prince William | 9.8 | 10.8 | 20.6 |
| NVTA-12 | US 1 Widening near Ft. Belvoir | Fairfax | 7.9 | 12.0 | 19.8 |
| NVTA-4 | Braddock Road Widening near I-495 | Fairfax | 10.6 | 6.8 | 17.4 |
| NVTA-1 | Columbia Pike Multimodal Streets in Arlington | Arlington | 8.0 | 9.2 | 17.2 |
| NVTA-3 | US 29 Widening near Centreville | Fairfax | 6.0 | 9.3 | 15.3 |
| NVTA-10 | Route 7 Bridge Widening near Tysons Corner | Fairfax | 9.0 | 4.6 | 13.7 |
| NVTA-18 | Real-Time Adaptive Traffic Control & Management | Alexandria | 8.1 | 4.6 | 12.7 |
| NVTA-23 | Construct Route 7/690 Interchange near Purcellville | Loudoun | 4.7 | 6.4 | 11.2 |
| NVTA-31 | Route 28 Widening near Manassas | Prince William | 1.0 | 8.7 | 9.7 |
| NVTA-26 | Route 7/Battlefield Pkwy Interchange | Leesburg | 6.7 | 1.8 | 8.5 |
| NVTA-5 | South Van Dorn St & Franconia Rd Interchange | Fairfax | 4.4 | 3.1 | 7.5 |
| NVTA-16 | Frying Pan Road Widening near Herndon | Fairfax | 3.7 | 2.7 | 6.4 |
| NVTA-17 | Kamp Washington Intersection (US 50/29 @ VA236) | City of Fairfax | 2.6 | 3.5 | 6.1 |
| NVTA-8 | Belmont Ridge Rd widening near Broadlands | Loudoun | 3.0 | 3.0 | 6.1 |
| NVTA-13 | Route 15 Bypass/Edwards Ferry Road Interchange | Leesburg | 2.1 | 1.9 | 4.0 |
| CTB-1 | Route 294 (PW Pkwy) Grade Separation near Woodbridge | Prince William | 2.0 | 2.0 | 4.0 |
| NVTA-15 | Jermantown/US 50 Roadway Improvements | City of Fairfax | 2.0 | 1.3 | 3.3 |
| NVTA-6 | Frontier Dr Extension in Springfield* | Fairfax | 0.6 | 2.6 | 3.2 |
| NVTA-20 | Pohick Road Widening near Lorton | Fairfax | 0.8 | 1.8 | 2.7 |
| NVTA-24 | Route 234/Grant Avenue Reconstruction in Manassas | Manassas | 1.1 | 1.5 | 2.6 |
| NVTA-21 | Shirley Gate Road Extension to Fairfax County Parkway* | Fairfax | 1.0 | 0.9 | 1.9 |
| NVTA-29 | Route 15 Widening near Gainesville | Prince William | 0.4 | 0.5 | 0.8 |
| NVTA-14 | Northfax Intersection (US29/50 @ VA123) | City of Fairfax | 0.5 | 0.2 | 0.7 |
| NVTA-27 | East Elden Street Widening in Herndon | Herndon | 0.2 | 0.3 | 0.5 |
| NVTA-25 | Main St & Maple Ave Intersection in Purcellville | Purcellville | 0.2 | 0.0 | 0.2 |

FY 15-16 Cost Effectiveness

| Project Description (* = new facilities) | Location | Project Rating | | | Cost (millions) | Rating / Cost |
|--|--|-----------------|------|----------|-----------------|---------------|
| | | 2020 | 2040 | Combined | | |
| NVTA-19 | Glebe Rd Corridor ITS Improvements | Arlington | 19.3 | 8.6 | 27.9 | \$ 5.9 4.72 |
| NVTA-22 | Northstar Blvd Extension near Brambleton* | Loudoun | 17.2 | 14.5 | 31.7 | \$ 18.2 1.74 |
| NVTA-9 | Loudoun County Parkway extension to US 50* | Loudoun | 55.0 | 30.6 | 85.6 | \$ 49.7 1.72 |
| NVTA-30 | Route 28 Widening near Centreville | Fairfax | 30.3 | 17.3 | 47.6 | \$ 48.2 0.99 |
| NVTA-2 | Rolling Road Widening near Springfield | Fairfax | 23.7 | 12.5 | 36.2 | \$ 41.8 0.86 |
| NVTA-18 | Real-Time Adaptive Traffic Control & Management | Alexandria | 8.1 | 4.6 | 12.7 | \$ 17.4 0.73 |
| NVTA-17 | Kamp Washington Intersection (US 50/29 @ VA236) | City of Fairfax | 2.6 | 3.5 | 6.1 | \$ 11.6 0.53 |
| CTB-3 | I-395 Southbound Widening | Alexandria | 25.9 | 10.7 | 36.6 | \$ 72.2 0.51 |
| NVTA-28 | US 1 Widening near Woodbridge | Prince William | 9.8 | 10.8 | 20.6 | \$ 49.1 0.42 |
| NVTA-7 | Fairfax County Pkwy Improvements | Fairfax | 79.1 | 88.5 | 167.6 | \$ 400.6 0.42 |
| NVTA-10 | Route 7 Bridge Widening near Tysons Corner | Fairfax | 9.0 | 4.6 | 13.7 | \$ 33.7 0.41 |
| NVTA-15 | Jermantown/US 50 Roadway Improvements | City of Fairfax | 2.0 | 1.3 | 3.3 | \$ 8.6 0.38 |
| CTB-5 | Fairfax County Pkwy – I 95 to US 1 near Ft. Belvoir (County Alt) | Fairfax | 11.4 | 12.7 | 24.1 | \$ 65.4 0.37 |
| NVTA-3 | US 29 Widening near Centreville | Fairfax | 6.0 | 9.3 | 15.3 | \$ 46.5 0.33 |
| NVTA-11 | US 1 Widening and Relocation - Dumfries | Dumfries | 7.8 | 14.6 | 22.4 | \$ 70.8 0.32 |
| NVTA-31 | Route 28 Widening near Manassas | Prince William | 1.0 | 8.7 | 9.7 | \$ 33.1 0.29 |
| NVTA-23 | Construct Route 7/690 Interchange near Purcellville | Loudoun | 4.7 | 6.4 | 11.2 | \$ 40.4 0.28 |
| NVTA-4 | Braddock Road Widening near I-495 | Fairfax | 10.6 | 6.8 | 17.4 | \$ 67.1 0.26 |
| NVTA-24 | Route 234/Grant Avenue Reconstruction in Manassas | Manassas | 1.1 | 1.5 | 2.6 | \$ 11.8 0.22 |
| CTB-2 | Route 7 Widening from Tysons Corner to Reston | Fairfax | 37.6 | 25.7 | 63.3 | \$ 309.5 0.20 |
| NVTA-12 | US 1 Widening near Ft. Belvoir | Fairfax | 7.9 | 12.0 | 19.8 | \$ 98.5 0.20 |
| NVTA-1 | Columbia Pike Multimodal Streets in Arlington | Arlington | 8.0 | 9.2 | 17.2 | \$ 93.6 0.18 |
| NVTA-32 | Route 28 - Godwin Drive Extension near Manassas* | Manassas/PW | 37.2 | 29.3 | 66.5 | \$ 370.5 0.18 |
| NVTA-16 | Frying Pan Road Widening near Herndon | Fairfax | 3.7 | 2.7 | 6.4 | \$ 40.7 0.16 |
| NVTA-26 | Route 7/Battlefield Pkwy Interchange | Leesburg | 6.7 | 1.8 | 8.5 | \$ 56.6 0.15 |
| NVTA-8 | Belmont Ridge Rd widening near Broadlands | Loudoun | 3.0 | 3.0 | 6.1 | \$ 41.9 0.15 |
| CTB-4 | Fairfax County Pkwy - I-95 to US1 near Ft. Belvoir | Fairfax | 11.7 | 12.6 | 24.2 | \$ 198.0 0.12 |
| NVTA-20 | Pohick Road Widening near Lorton | Fairfax | 0.8 | 1.8 | 2.7 | \$ 28.9 0.09 |
| NVTA-13 | Route 15 Bypass/Edwards Ferry Road Interchange | Leesburg | 2.1 | 1.9 | 4.0 | \$ 51.0 0.08 |
| NVTA-5 | South Van Dorn St & Franconia Rd Interchange | Fairfax | 4.4 | 3.1 | 7.5 | \$ 134.2 0.06 |
| NVTA-21 | Shirley Gate Road Extension to Fairfax County Parkway* | Fairfax | 1.0 | 0.9 | 1.9 | \$ 47.3 0.04 |
| NVTA-6 | Frontier Dr Extension in Springfield* | Fairfax | 0.6 | 2.6 | 3.2 | \$ 85.4 0.04 |
| NVTA-14 | Northfax Intersection (US29/50 @ VA123) | City of Fairfax | 0.5 | 0.2 | 0.7 | \$ 25.3 0.03 |
| CTB-1 | Route 294 (PW Pkwy) Grade Separation near Woodbridge | Prince William | 2.0 | 2.0 | 4.0 | \$ 163.3 0.02 |
| NVTA-27 | East Elden Street Widening in Herndon | Herndon | 0.2 | 0.3 | 0.5 | \$ 26.3 0.02 |
| NVTA-25 | Main St & Maple Ave Intersection in Purcellville | Purcellville | 0.2 | 0.0 | 0.2 | \$ 10.8 0.01 |
| NVTA-29 | Route 15 Widening near Gainesville | Prince William | 0.4 | 0.5 | 0.8 | \$ 98.0 0.01 |

FY 15-16 HB 599 Rating vs. NVTA Score

| NVTA | Agency | Project Description | NVTA Score | HB 599 Rating |
|------|-----------------|--|------------|---------------|
| 9 | Loudoun | Loudoun County Parkway (VA Route 607) – U.S. 50 to Creighton Rd. | 64.0 | 30.6 |
| 32 | Manassas | Route 28 (Manassas Bypass) Study - Godwin Drive Extension | 55.3 | 29.3 |
| 7 | Fairfax | Fairfax County Parkway Improvements (Study) | 54.3 | 88.5 |
| 19 | Arlington | Glebe Road Corridor Intelligent Transportation System (ITS) Improvements | 53.0 | 8.6 |
| 17 | City of Fairfax | Kamp Washington Intersection Improvements | 52.9 | 3.5 |
| 28 | Prince William | Route 1 Widening from Featherstone Road to Marys Way | 52.1 | 10.8 |
| 14 | City of Fairfax | Northfax - Intersection and drainage improvements at Route 29/50 and Route 123 | 51.7 | 0.2 |
| 1 | Arlington | Route 244 Columbia Pike Street Improvements (S. Gate Road to the Pentagon) | 51.6 | 9.2 |
| 26 | Leesburg | Route 7 (East Market Street)/Battlefield Parkway Interchange | 50.6 | 1.8 |
| 10 | Fairfax | Route 7 Widening – Dulles Toll Road Bridge | 49.9 | 4.6 |
| 31 | Manassas | Route 28 Widening South to the City Limits | 49.7 | 8.7 |
| 8 | Loudoun | Belmont Ridge Road (VA Route 659)- Turo Parish Road to Croson Ln | 49.4 | 3.0 |
| 15 | City of Fairfax | Jermantown / Route 50 Roadway Improvements | 48.8 | 1.3 |
| 33 | Prince William | Route 28 Widening from Route 234 Bypass to Linton Hall Road | 48.0 | 8.7 |
| 11 | Dumfries | Widen Route 1 (Fralely Boulevard) Brady's Hill Road to Route 234 (Dumfries Road) | 45.1 | 14.6 |
| 27 | Herndon | East Elden Street Improvements & Widening Project (UPC 50100) | 41.8 | 0.3 |
| 29 | Prince William | Route 15 Widening (Route 29 to Route 55), including RR Overpass | 40.2 | 0.5 |
| 4 | Fairfax | Braddock Road HOV Widening | 39.0 | 6.8 |
| 13 | Leesburg | Route 15 Bypass at Edwards Ferry Road Interchange | 39.0 | 1.9 |
| 6 | Fairfax | Frontier Drive Extension & Braided Ramps | 38.4 | 0.2 |
| 25 | Purcellville | Main Street and Maple Avenue Intersection Improvements | 38.3 | 0.0 |
| 18 | Alexandria | Real-Time Adaptive Traffic Control and Data Management System | 34.9 | 4.6 |
| 30 | Fairfax | VA Route 28 Widening (Prince William County Line to Route 29) | 34.4 | 17.3 |
| 2 | Fairfax | Rolling Road Widening from Old Keene Mill Road to Franconia Springfield Pkwy | 32.7 | 12.5 |
| 5 | Fairfax | South Van Dorn Street and Franconia Road Interchange | 31.1 | 3.1 |
| 12 | Fairfax | US 1 Richmond Highway (from Mt. Vernon Memorial Highway to Napper Road) | 29.2 | 12.0 |
| 3 | Fairfax | US 29 Lee Highway (from west of Union Mill Road to Buckley's Gate Drive) | 28.3 | 9.3 |
| 16 | Fairfax | Frying Pan Road (VA 28 to Centreville Road) | 25.9 | 2.7 |
| 20 | Fairfax | Pohick Rd - US 1 (Richmond Hwy) to I-95 - 2 to 4 Lanes | 0.0 | 1.8 |
| 21 | Fairfax | Shirley Gate Rd. from Braddock Rd. to Fairfax County Parkway/Popes Head Rd. | 0.0 | 0.9 |
| 22 | Loudoun | Northstar Blvd. (VA Rte. 659 Reloc) – U.S. 50 to Evergreen Mills Rd. (VA Rte. 621) | 0.0 | 14.5 |
| 23 | Loudoun | Route 7 / 690 Interchange | 0.0 | 6.4 |
| 24 | Manassas | Route 234 Grant Avenue Study | 0.0 | 1.5 |

Congestion Ratings of Transit vs. Highway

| 2040 Project Ratings (with Transit Weights) | | | Project Rating |
|--|--|-----------------------|-----------------------|
| Project Name (* = new facilities) | Location | | |
| NVTA-7 | Fairfax County Pkwy Improvements | Fairfax | 77.2 |
| | Metrorail All-Eight Car Trains | NoVA | 54.8 |
| NVTA-9 | Loudoun County Parkway extension to US 50* | Loudoun | 30.4 |
| NVTA-32 | Route 28 - Godwin Drive Extension near Manassas* | Manassas/PW | 29.0 |
| CTB-2 | Route 7 Widening from Tysons Corner to Reston | Fairfax | 24.4 |
| | VRE Extension to Haymarket | Prince William | 17.9 |
| NVTA-30 | Route 28 Widening near Centreville | Fairfax | 17.3 |
| NVTA-11 | US 1 Widening and Relocation - Dumfries | Dumfries | 14.6 |
| NVTA-22 | Northstar Blvd Extension near Brambleton* | Loudoun | 14.5 |
| NVTA-2 | Rolling Road Widening near Springfield | Fairfax | 10.6 |
| | Potomac Yard Station Redevelopment | Alexandria | 10.6 |
| NVTA-3 | US 29 Widening near Centreville | Fairfax | 9.3 |
| NVTA-28 | US 1 Widening near Woodbridge | Prince William | 9.1 |

Technical Concerns and Challenges

- **Accurate transit modeling requires detailed access/egress, time of day and land-use considerations**
 - **Detailed coding is time consuming**
- **Transit modeling is difficult to implement for “impact areas”**
 - **Complete origin-destination paths are needed to realistically model transit trip / tour feasibility and performance**
- **Transit modeling in this region is significantly affected by park-n-ride capacity and Metrorail crowding**
 - **Capacity constrained transit modeling requires many mode choice – assignment iterations**
 - **“Restrained” demand vs “constrained” demand may be more useful for measuring transit crowding ~ “latent demand”**

FY 17 Project Rating Results

| 2020 Project Ranking (4/23/16 Final Draft) | | | | Project Rating |
|--|--------------|--|--------------|----------------|
| ID | Project Name | Location | | |
| 7 | 6T | I-66-Route 28 Interchange Improvements | Fairfax | 77.4 |
| 10 | 3M | Route 28 Widening (PWC Line to Route 29) | Fairfax | 60.9 |
| 24 | 8FF | Metrorail Blue Line Traction Power Upgrade | WMATA | 43.8 |
| 11 | 5D | Fairfax County Pkwy (Route 123 to Route 29) | Fairfax | 42.9 |
| 8 | 8AA | Widening US 1 (Mt. Vernon Hwy to Napper Rd) | Fairfax | 30.1 |
| 4 | 7D | Braddock Road HOV Widening | Fairfax | 29.6 |
| 17 | 8DD | Potomac Yard Metrorail Station | Alexandria | 28.5 |
| 14 | 8BB | Widen Route 1 (Featherstone Rd to Mary's Way) | PWC | 24.3 |
| 20 | 8EE | Widen Route 1 (Brady's Hill Road to Route 234) | Dumfries | 22.3 |
| 9 | 1S | Route 7 Widening (Colvin Forest to Jarrett Valley) | Fairfax | 22.2 |
| 15 | 3N | Widen Route 28 (Route 234 to Linton Hall Rd) | PWC | 14.0 |
| 16 | 8CC | Westend Transitway | Alexandria | 13.4 |
| 1 | 6R | Lee Highway Corridor ITS Enhancements | Arlington | 7.4 |
| 23 | 3Q | VRE Manassas Park Station Parking Expansion | VRE | 7.3 |
| 22 | 1U | Route 7 - Battlefield Parkway Interchange | Leesburg | 6.7 |
| 6 | 8Z | Frontier Drive Extension and Braided Ramps | Fairfax | 5.9 |
| 19 | 3P | Sudley Road Westbound (Godwin Dr to Dorsey) | Manassas | 4.3 |
| 2 | 8Y | Crystal City Streets | Arlington | 4.0 |
| 5 | 9P | Fairfax Connector Bus Purchase and Service | Fairfax | 3.7 |
| 12 | 6U | Seven Corners Ring Road Improvements | Fairfax | 3.6 |
| 13 | 6V | Widen Route 15 (Route 55 to south of RR Tracks) | PWC | 2.6 |
| 3 | 6S | East Falls Church Bikeshare Connections | Arlington | 2.2 |
| 18 | 6W | Bikeshare Connections to Metrorail Stations | Falls Church | 2.2 |
| 21 | 1T | East Elden Street Widening | Herndon | 1.1 |

| 2040 Project Ranking (4/23/16 Final Draft) | | | | Project Rating |
|--|--------------|--|--------------|----------------|
| ID | Project Name | Location | | |
| 7 | 6T | I-66-Route 28 Interchange Improvements | Fairfax | 78.3 |
| 10 | 3M | Route 28 Widening (PWC Line to Route 29) | Fairfax | 56.3 |
| 9 | 1S | Route 7 Widening (Colvin Forest to Jarrett Valley) | Fairfax | 54.6 |
| 24 | 8FF | Metrorail Blue Line Traction Power Upgrade | WMATA | 45.8 |
| 11 | 5D | Fairfax County Pkwy (Route 123 to Route 29) | Fairfax | 42.7 |
| 17 | 8DD | Potomac Yard Metrorail Station | Alexandria | 36.0 |
| 8 | 8AA | Widening US 1 (Mt. Vernon Hwy to Napper Rd) | Fairfax | 35.1 |
| 14 | 8BB | Widen Route 1 (Featherstone Rd to Mary's Way) | PWC | 33.4 |
| 20 | 8EE | Widen Route 1 (Brady's Hill Road to Route 234) | Dumfries | 27.7 |
| 4 | 7D | Braddock Road HOV Widening | Fairfax | 23.6 |
| 15 | 3N | Widen Route 28 (Route 234 to Linton Hall Rd) | PWC | 19.7 |
| 16 | 8CC | Westend Transitway | Alexandria | 16.3 |
| 22 | 1U | Route 7 - Battlefield Parkway Interchange | Leesburg | 14.2 |
| 6 | 8Z | Frontier Drive Extension and Braided Ramps | Fairfax | 9.9 |
| 1 | 6R | Lee Highway Corridor ITS Enhancements | Arlington | 9.8 |
| 12 | 6U | Seven Corners Ring Road Improvements | Fairfax | 9.0 |
| 19 | 3P | Sudley Road Westbound (Godwin Dr to Dorsey) | Manassas | 8.3 |
| 23 | 3Q | VRE Manassas Park Station Parking Expansion | VRE | 7.4 |
| 2 | 8Y | Crystal City Streets | Arlington | 4.6 |
| 5 | 9P | Fairfax Connector Bus Purchase and Service | Fairfax | 4.1 |
| 13 | 6V | Widen Route 15 (Route 55 to south of RR Tracks) | PWC | 3.5 |
| 21 | 1T | East Elden Street Widening | Herndon | 2.5 |
| 3 | 6S | East Falls Church Bikeshare Connections | Arlington | 2.2 |
| 18 | 6W | Bikeshare Connections to Metrorail Stations | Falls Church | 2.2 |

Smart Scale vs. HB 599

- Spreadsheet calculations vs. project impact modeling

| ➤ Smart Scale Measures | <u>NoVA Weights</u> | <u>HB 599</u> |
|-----------------------------------|---------------------|---------------|
| ➤ Safety | 10% | |
| ➤ Congestion Mitigation | 35% | 87% |
| ➤ Person Throughput | 50% | |
| ➤ Person Hours of Delay | 50% = 17.5% | 20.3% |
| ➤ Accessibility | 25% | 13% |
| ➤ Access to Work Destinations | 60% = 15.0% | 9.5% |
| ➤ Access to Non-Work Destinations | 20% | |
| ➤ Access to Multimodal Choices | 20% | |
| ➤ Environmental Quality | 10% | |
| ➤ Economic Development | 10% | |
| ➤ Land Use Co-ordination | 10% | |