



# Evaluation of Transportation Projects in Northern Virginia Transportation District

## HB 599 Study Overview

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NVTA Technical Committee  
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# Presentation Outline

- **Genesis and Context**
- **Statutory Framework**
- **Goals and Objectives**
- **Study Team and Coordination**
- **Tasks and Process**
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- **Selecting Projects to Evaluate**
- **Evaluating Selected Projects (Performance Measures, Ratings)**
- **Overall Modeling Approach**
- **Travel Demand And TRANSIMS Simulation**
- **Next Steps**

# Study Genesis and Context

**2012 VA-GA: HB 599 / SB 531**  
 § 33.1-13.03:1



**Evaluating and Rating at Least 25 Significant Projects**



**Publish Project Ratings**

Informs allocations  
**CTB / Others**

**Governs** allocations (Non-transit capacity adding projects)

**2013 VA-GA: HB 2313**  
 various sections § 15.2.4838.1



**NVTA Fund      Statewide      H R**

**70% Regional      30% Local**

# Statutory Framework For Study

## ➤ CTB establishes priorities for NoVA

*§ 33.1-13.03:1.D: For purposes of this section, the significant transportation projects to be evaluated shall comprise at least 25 such projects selected according to priorities determined by the Commonwealth Transportation Board.*

## ➤ Significant multi-modal projects to be evaluated

*§ 33.1-13.03:1.A: ....shall evaluate all significant transportation projects, including highway, mass transit, and technology projects,....*

## ➤ Projects over wide area

*§ 33.1-13.03:1.A: ...projects, in and near the Northern Virginia Transportation District ..*

## ➤ Project's funding source not considered

*§ 33.1-13.03:1.D: For purposes of this section, ...25 such projects selected ...without regard to the funding source of the project,...*

## ➤ Analytical Evaluation

*§ 33.1-13.03:1.A: ... evaluation shall rely on analytical techniques and transportation modeling, including those that employ computer simulations ...*

## ➤ Quantitative Rating

*§ 33.1-13.03:1.A: ... shall provide an objective, quantitative rating for each project...*

## ➤ Rating Based on Congestion and Mobility Considerations only

*§ 33.1-13.03:1.A: ... rating for each project according to the degree to which the project is expected to reduce congestion and, to the extent feasible, the degree to which the project is expected to improve regional mobility in the event of a homeland security emergency.*

# Study Goals And Objectives

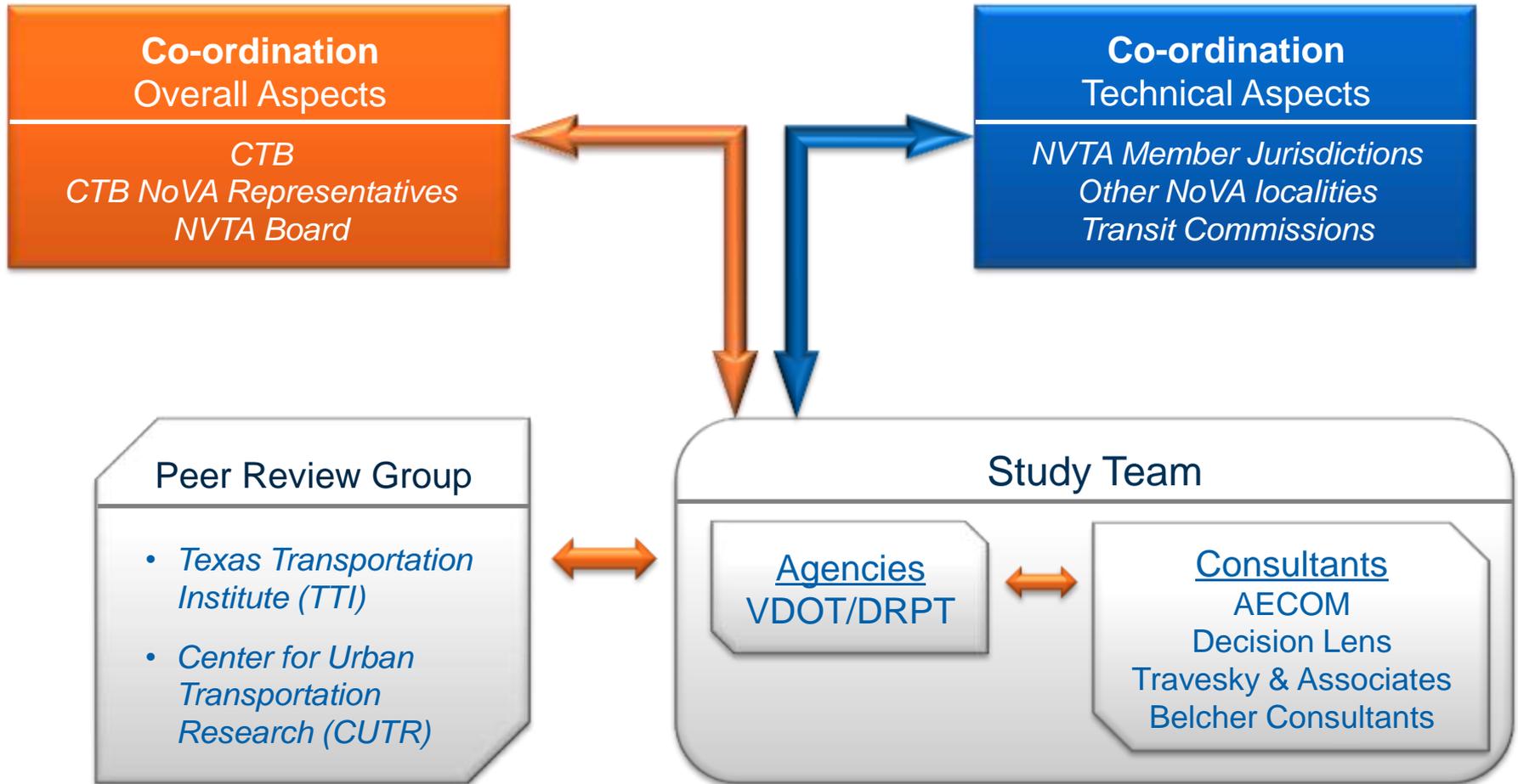
## ➤ Goals

- Evaluate significant highway, mass transit and technology projects in and near Northern Virginia.
- Provide an objective, quantitative rating for each project according to the degree the project is expected to reduce congestion and improve mobility in the event of a homeland security emergency.
- Evaluate and rate at least 25 significant transportation projects.

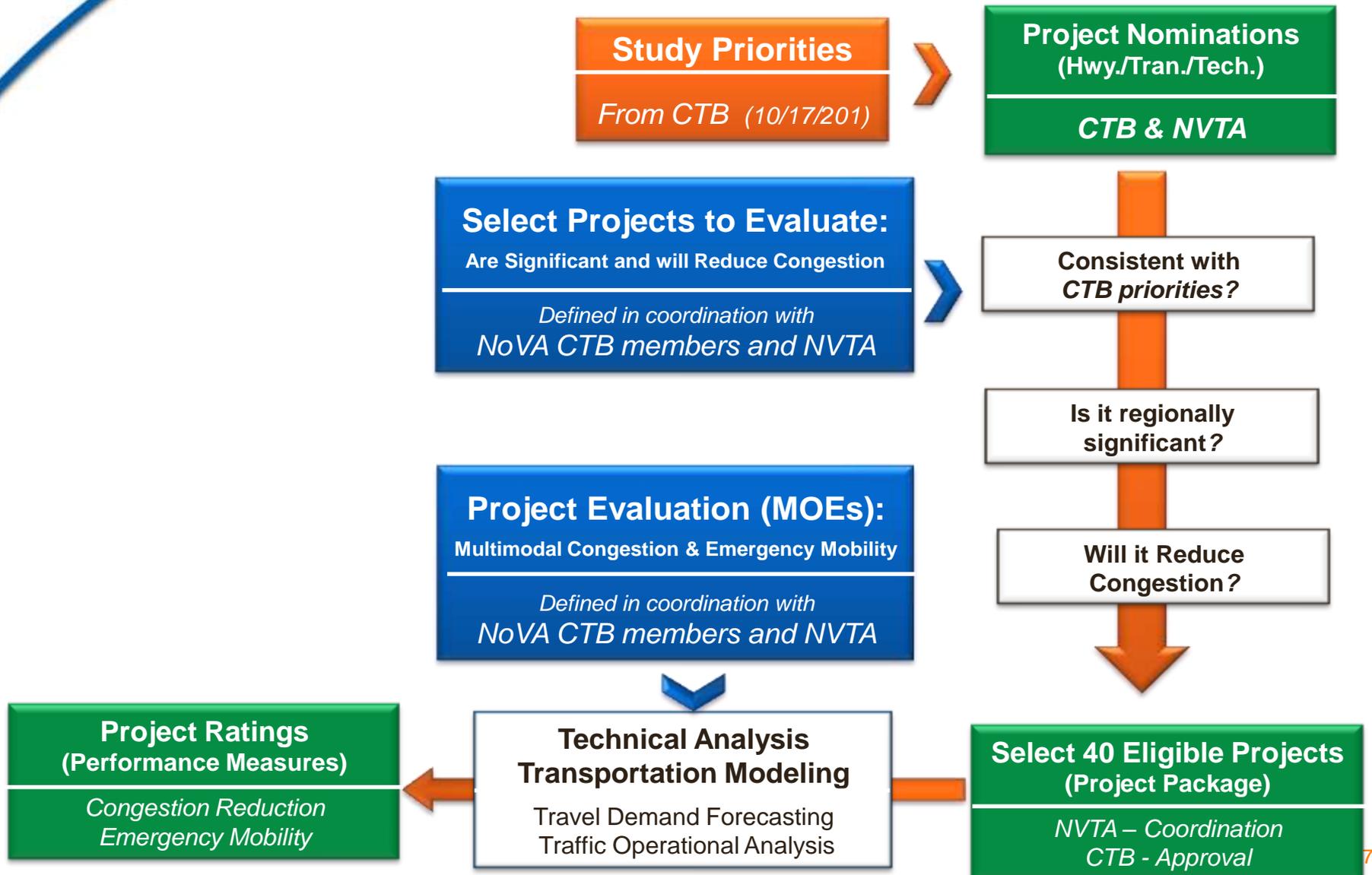
## ➤ Objectives

- Projects evaluated and rated will be consistent with CTB's priorities.
- Projects evaluated and rated will be significant projects that reduce congestion.
- Focus on projects that effectively reduce congestion in the most congested corridors and intersections.
- Evaluation will be based on rigorous analytical techniques and transportation modeling guided by nationally renowned peer review group.

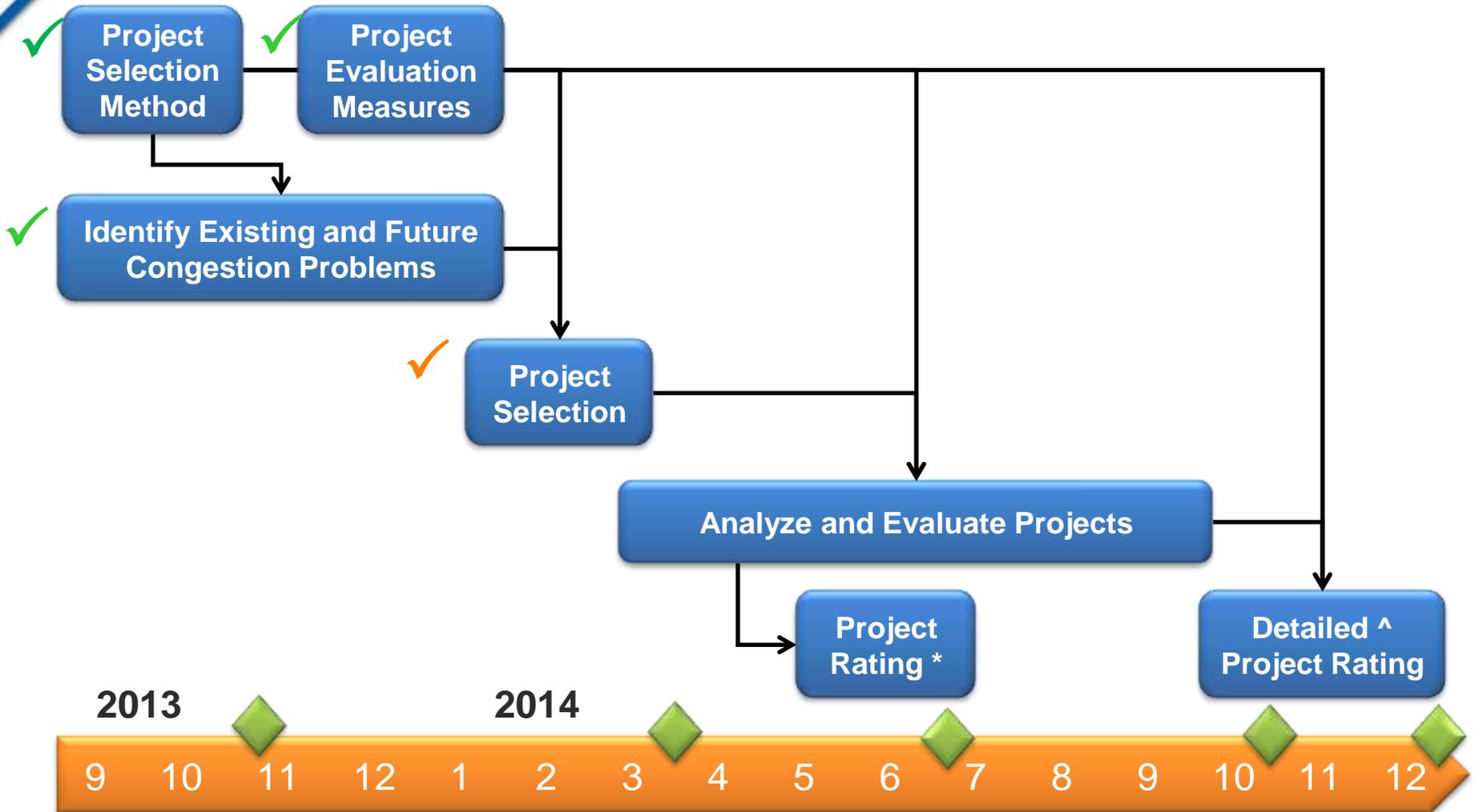
# Study Team And Coordination



# Study Tasks and Process



# Study Schedule



Materials for public outreach

\* Basic modeling (Like TA2040)

^ Demand And Operational modeling

## Project Selection Model

- Designed to screen projects that are not significant or do not have congestion reduction potential from the detailed analysis
- Tier One Screening: Six CTB Priority Principles (Yes / No)
- Tier Two Screening: Three categories of criteria (Quantitative)
  - **A. Project Significance**
    - 5 Attributes – *project type, designated corridors, high travel volume, connects activity centers, connects major facilities*
  - **B. Congestion Reduction Potential**
    - 5 Attributes – *congestion severity, congestion duration, person hours of delay, adds capacity, reduces vehicle trip*
  - **C. Homeland Security Mobility**
    - 1 Attribute – *facility and operational improvements*

## Project Selection - Tier One Screening *CTB Priorities*

- **Assessment = project consistent with at least one of the following priorities (Yes / No)**
  - Preserve and Enhance Statewide Mobility through the Region
  - Increase Coordinated Safety and Security Planning
  - Improve the Interconnectivity of Regions and Activity Centers
  - Reduce the Cost of Congestion to Virginia Residents and Businesses
  - Increase System Performance by Making Operational Improvements
  - Increase Travel Choices to Improve Quality of Life for Virginians

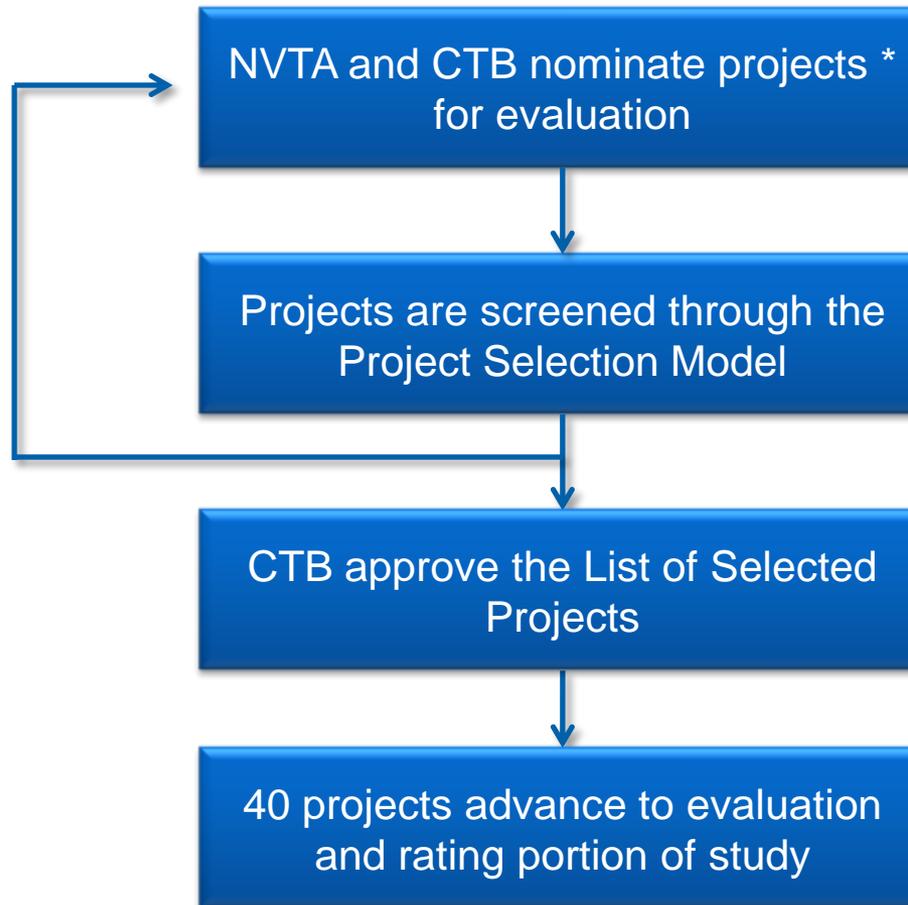
# Project Selection - Tier Two Screening

- **Project significance attributes- looks at location/function of project**
  - Type of project
  - In previously designated corridor
  - In a high volume corridor
  - Connects regional activity centers
  - Connects regional transportation facilities
- **Congestion Reduction Potential- looks at attributes of corridor where project is located (using 2020 baseline model output)**
  - In heavily congested corridor
  - Corridor congested for multiple hours of the day
  - Many experience daily delay in corridor
  - Adds person moving capacity
  - Reduces single occupant vehicles
- **Emergency Mobility**
  - Project adds multimodal capacity to radial routes

# Project Selection - Tier Two Screening: Project Attributes & Stakeholder Weights

Number	Project Attribute	Score Range	Stakeholder Weights	Max. Score
<b>Is the Project Significant?</b>			<b>55.5%</b>	<b>55.5</b>
1	Type of Project (Highway/Transit/Technology)	0 or 100	3.1%	3.1
2	In a Designated Corridor	0 or 100	12.9%	12.9
3	In a High Volume Corridor	0 to 100	15.2%	15.2
4	Connects Regional Activity Centers	25 to 100	16.3%	16.3
5	Connects Regional Transportation Facilities	0 / 50 / 100	8.0%	8.0
<b>Does the Project have the Potential to Reduce Congestion?</b>			<b>36.5%</b>	<b>36.6</b>
6	In a Heavily Congested Corridor	0 to 100	5.7%	5.7
7	Corridor is Congested for Multiple Hours in a Day	25 / 50 / 100	9.3%	9.3
8	Many People Experience Delay Daily	25 / 75 / 100	8.1%	8.1
9	Adds Person Moving Capacity	0 / 50 / 100	8.9%	8.9
10	Reduces Single Occupant Vehicles	25 / 75 / 100	4.6%	4.6
<b>Does the Project have the Potential to Improve Emergency Mobility?</b>			<b>8.0%</b>	<b>8.0</b>
11	Improves Movement / Adds Capacity on Radial Routes	0 / 50 / 100	8.0%	8.0
<b>Total Project Selection Score</b>			<b>100.0%</b>	<b>100.0</b>

# Project Evaluation



\* Project = One or more complementary investments of highway, transit, technology and/or travel demand management improvements and any access components such as pedestrian, bicycle and parking improvements which enhance the project ability to provide a comprehensive solution to an identified congestion problem

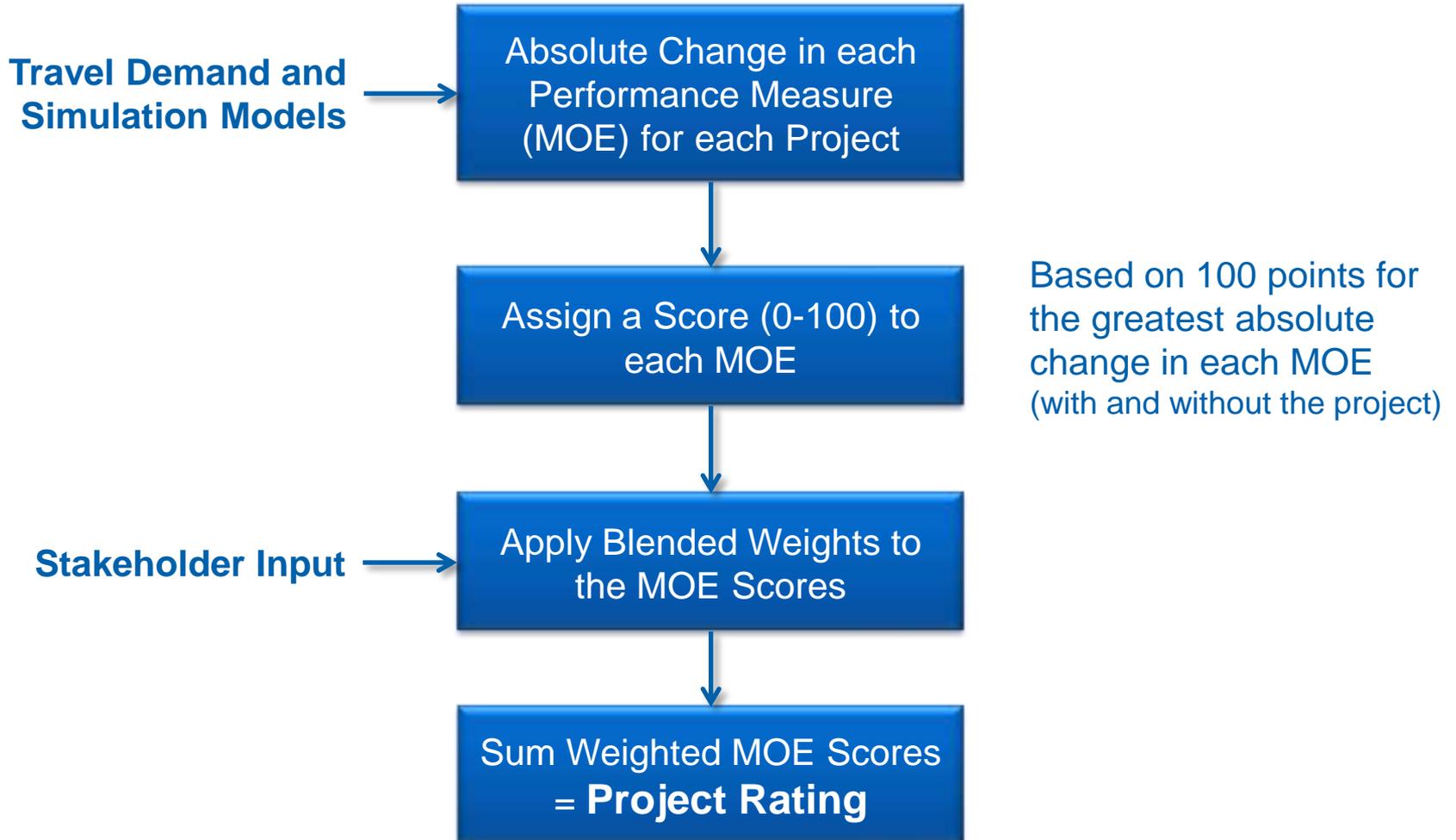
# Project Evaluation Framework

- **Projects will be evaluated and rated based on how well they reduce congestion and improve mobility during emergencies**
  - **The change in performance measures will be calculated for each project using the TPB regional demand model and TRANSIMS simulation software**
- **The performance measure weights developed through the stakeholder engagement process will determine the relative importance of each performance measure**
- **A weighted congestion reduction or mobility improvement score will be assigned to each performance measure for each project**
- **The sum of the weighted score of all of the performance measures will constitute the project's congestion reduction / mobility improvement rating**

## Project Evaluation Performance Measures

- **Congestion Duration** – *Reduction in the number of hours of the day auto and transit passengers experience heavily congested travel conditions*
- **Person Hours of Delay** – *Reduction in the number of person hours of travel time above free flow travel time*
- **Person Hours of Congested Travel in Automobiles** – *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** – *Reduction in the number of person hours of travel in buses and trains on heavily congested facilities or in crowded vehicles*
- **Transit Crowding** – *Reduction in the number of transit route miles experiencing crowded conditions*
- **Accessibility to Jobs** – *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** – *Increase in the person hours of travel time resulting from a 10 percent increase in peak hour trip making*

# Evaluation and Rating Process



# Project Rating Using Performance Measures

MOE	Performance Measure	Score (S) Range	Stakeholder Weights <sup>1</sup>	Evaluation Score	
				2020 <sup>2</sup>	2040 <sup>2</sup>
<b>Impact on Congestion</b>					
1	Congestion Duration	0 to 100	27.9%	27.9% * S21	27.9% * S41
2	Person Hours of Delay	0 to 100	20.3%	20.3% * S22	20.3% * S42
3	Person Hours of Congested Travel in Automobiles	0 to 100	15.4%	15.4% * S23	15.4% * S43
4	Person Hours of Congested Travel in Transit Vehicles	0 to 100	11.8%	11.8% * S24	11.8% * S44
5	Transit Crowding	0 to 100	11.5%	11.5% * S25	11.5% * S45
<b>Impact on Mobility</b>					
6	Accessibility to Jobs	0 to 100	9.5%	9.5% * S26	9.5% * S46
7	Emergency Mobility	0 to 100	3.6%	3.6% * S27	3.6% * S47
<b>Project Rating</b>			<b>100%</b>	<b>2020 Rating</b>	<b>2040 Rating</b>

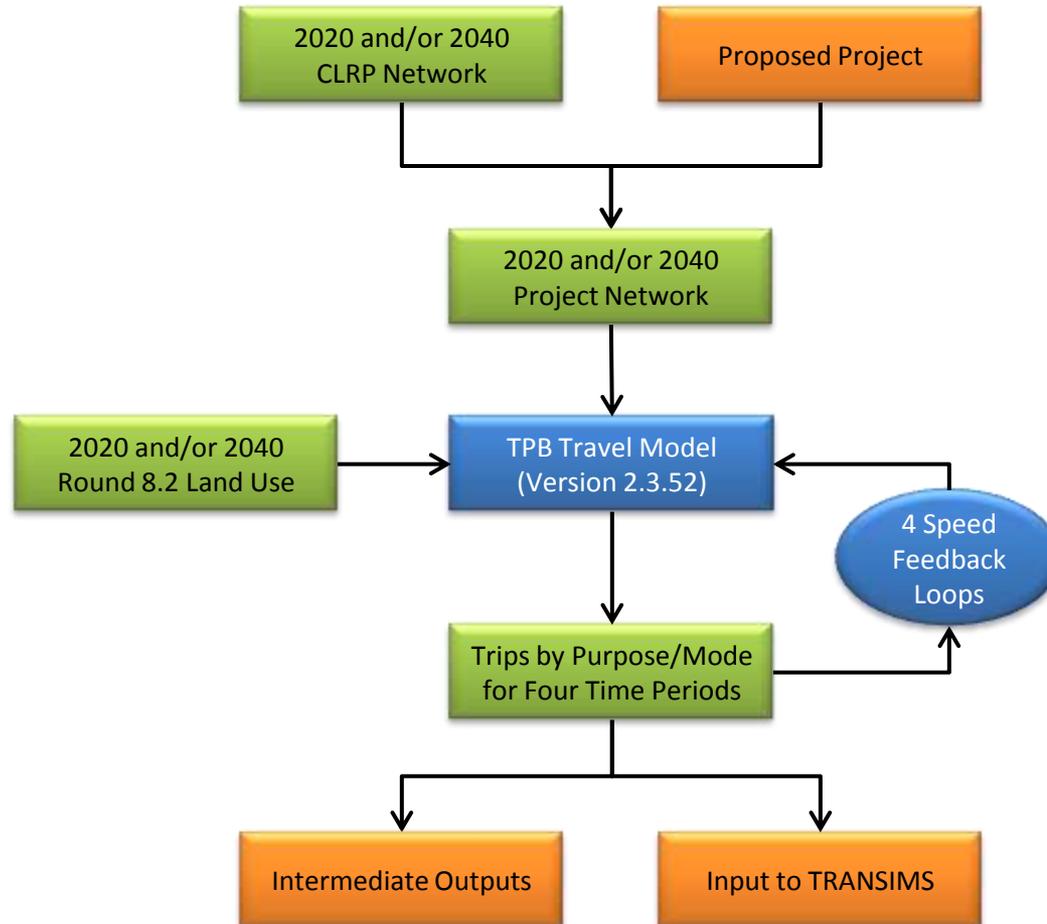
1. Attribute weights determined through the stakeholder consensus building process

2. S21-S47 represent the project performance score from the modeling process

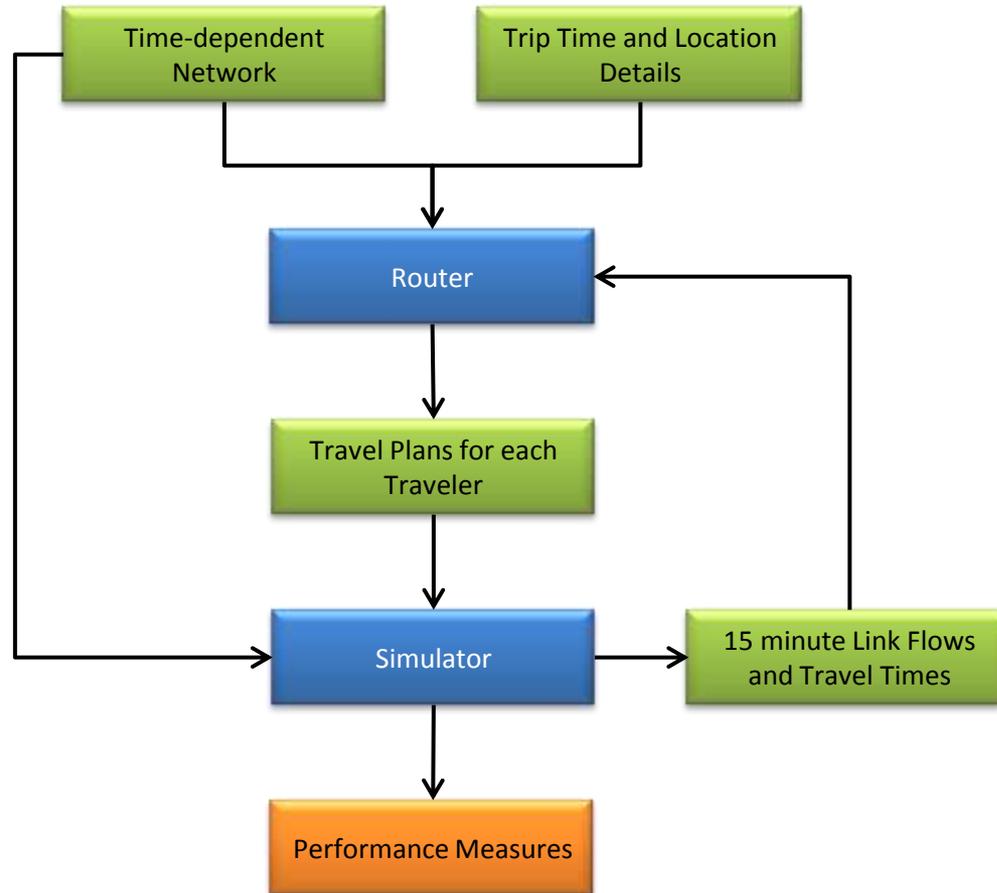
# Overall Modeling Approach

- **Authorizing Legislation**
  - *Use transportation models and computer simulations to provide an objective, quantitative rating of significant transportation projects...*
  - *Projects will be evaluated and rated based on how well they reduce congestion and improve mobility during emergencies*
- **The proposed analytical process combines the TPB regional model with a dynamic travel simulation**
  - **TPB regional model generates zone-to-zone demand in four time periods**
  - **TRANSIMS distributes demand to activity locations and seconds of the day**
  - **Dynamic user equilibrium routing and simulation estimates the congestion impact and calculates performance measures**

# TPB Travel Model → Travel Demand



# TRANSIMS Simulation Convergence



## Next Steps (Planned)

- **January 31**      **NoVA Localities Submit Projects to NVTA for Funding and HB 599 Study**
- **February 7**      **2020 Baseline Congestion Estimates Distributed to Stakeholders**
- **February 20**      **NVTA Meeting**
  - NVTA initial list of project nominations submitted to VDOT/DRPT
  - NVTA review of performance measures and rating system
- **March ??**      **NVTA Meeting / Workshop**
  - Concurrence / approve projects selected for analysis and rating
- **March 19**      **CTB Meeting**
  - Concurrence / approve projects selected for analysis and rating
- **March 21 –**  
**June 20**      **Technical Analysis / Transportation Modeling**
- **June 30**      **Project Ratings**
- **July 1 –**  
**October 30**      **Detailed Technical Analysis / Simulation Modeling**
- **December**      **Final / Detailed Project Ratings and Study Report**



*Questions / Comments*

**THANKS!**

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