

Embark Richmond Highway Advisory Group Meeting #11

October 24, 2016



2. TRANSPORTATION BRIEFING

Transportation Briefing

1. Transportation Analysis Background
2. Existing Transportation Conditions
3. Transportation Funding
4. Utility Relocation



Transportation Objectives

Improve and expand:

- Multi-modal travel on Richmond Highway
- Pedestrian and bicycle access
- Economic success and vitality of the corridor



Transportation Analysis Process

Completed Tasks

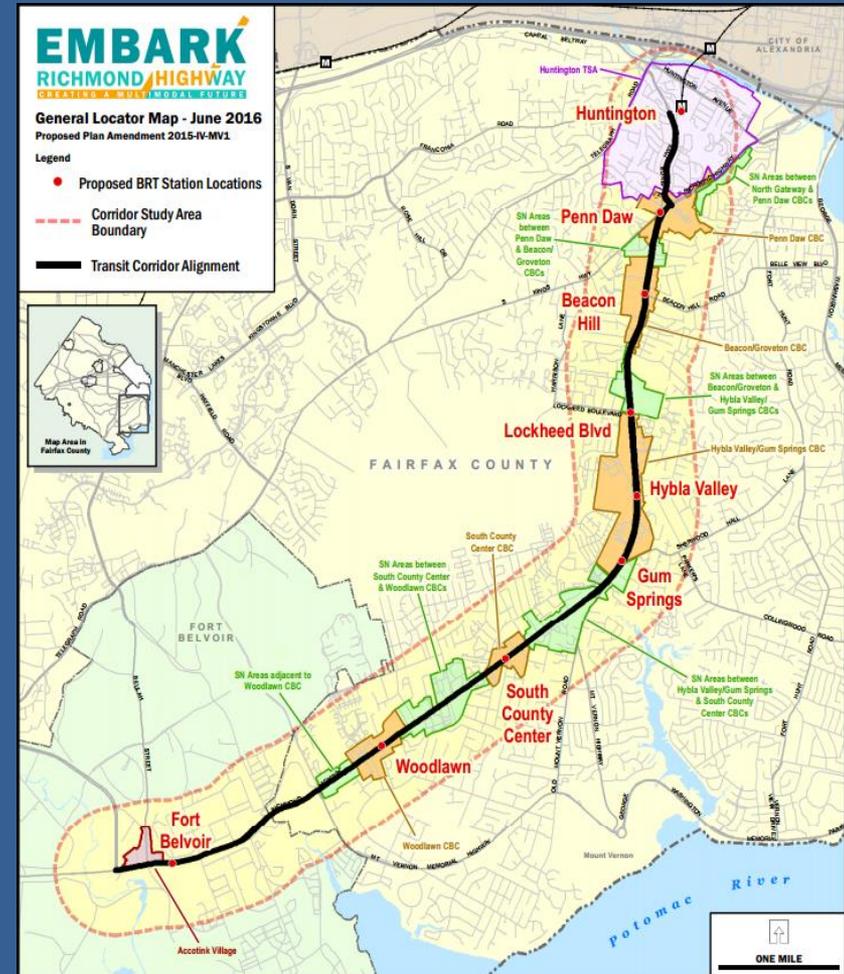
- Establish goals, objectives, measures of effectiveness
- Develop base year, 2015 transportation models
- Establish existing transportation conditions

Ongoing Tasks*

- Refine BRT station locations
- Prepare and analyze 2040 transportation/land use conditions (from MWCOCG and County land use)
- Determine potential problem areas and develop mitigation strategies

Anticipated Outcomes

- Estimated transit ridership and BRT performance
- Intersection levels-of-service, delay, queues
- Need for additional north/south road capacity
- Recommended improvements and mitigation



Study area

Revised Goals, Objectives, Measures of Effectiveness

Goal	Objective	MOEs
Mitigate traffic impacts from land use changes	<ul style="list-style-type: none"> Evaluate north/south road capacity Evaluate proposed grid of streets 	<ul style="list-style-type: none"> Intersection level of service Queue lengths Intersection delay Travel speed Travel time reliability (autos) Local traffic volumes
Provide high-quality, high performance BRT	<ul style="list-style-type: none"> Estimate transit ridership Assess BRT performance Evaluate BRT station locations 	<ul style="list-style-type: none"> BRT frequency Travel time reliability (transit) Travel speed Ridership Safety Affordable transit service
Improve bicycle and pedestrian connectivity, access, attractiveness, and safety	<ul style="list-style-type: none"> Evaluate proposed grid of streets Increase bicycle facilities Increase pedestrian network connectivity 	<ul style="list-style-type: none"> Pedestrian crossing times Corridor crossing opportunities Miles of pedestrian/bicycle facilities Network completeness Access to transit

Understanding Transportation Modeling

- “Model” describes a series of mathematical equations used to represent how people travel
- The 2015 models are calibrated to match existing data and travel behavior is assumed to remain consistent in the future
- Models provide better understanding of:
 - How the corridor will look in the future
 - Travel patterns and operations in the future

Levels of Transportation Modeling

Process consisting of...

- **Travel demand** – produces multimodal travel forecasts based on estimate of land activity projections (households, population, jobs, school enrollment), the future highway and transit system, and planned policy assumptions
- **Traffic operations** – analyze intersections, mitigate deficiencies, and improve signal timing
- **Traffic simulation** – evaluate overall corridor level performance (auto and transit travel speeds and times)



*Screen shot of Penn Daw
PM Peak Hour
Traffic Simulation (VISSIM)*

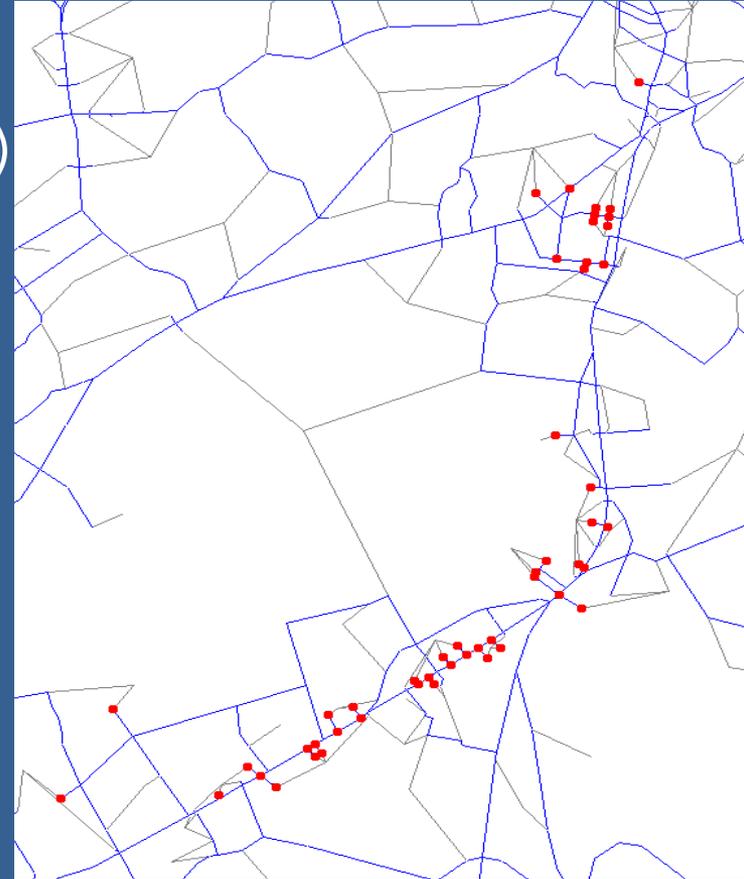
Transportation Data Collection

Model inputs:

- Land use (HH, pop, emp, school)
- Network characteristics (roads, intersections, speeds, capacities)
- Traffic Volumes (including bicycle and pedestrian)
- Travel time and queue length

Modeler's mantra:

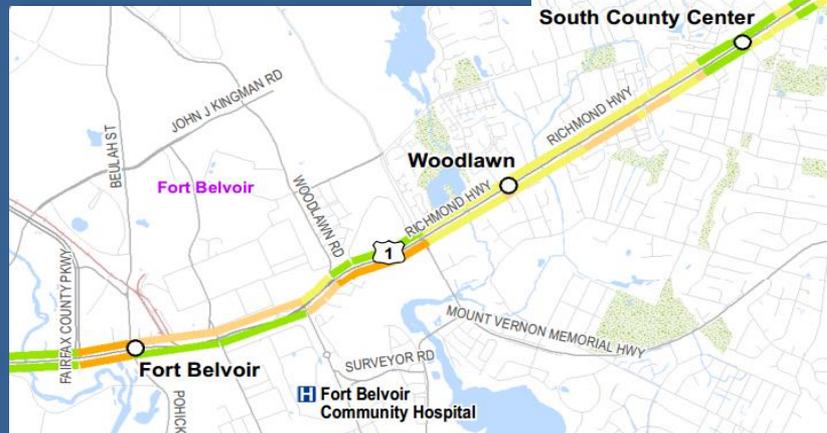
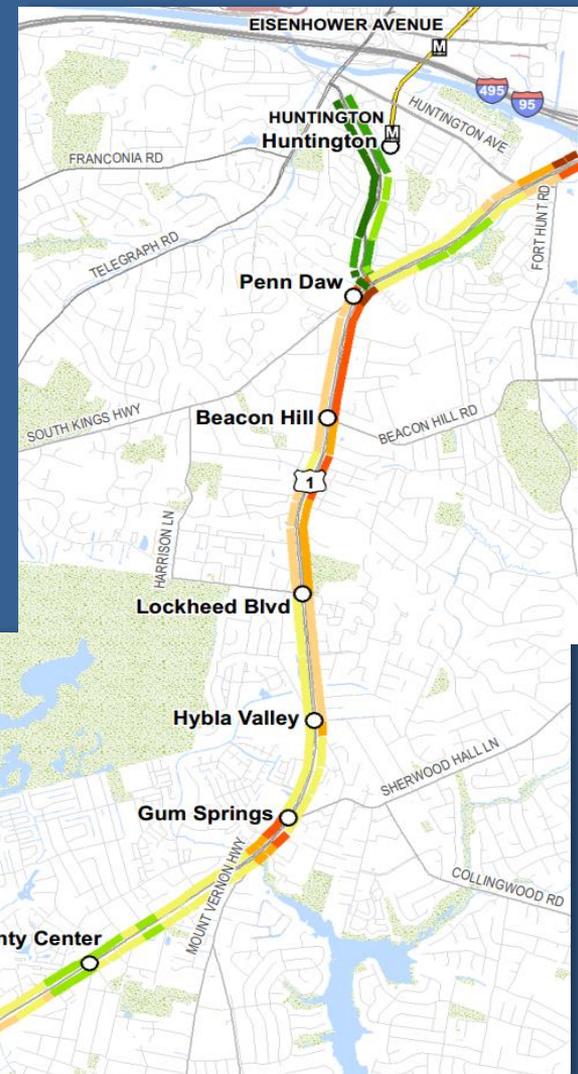
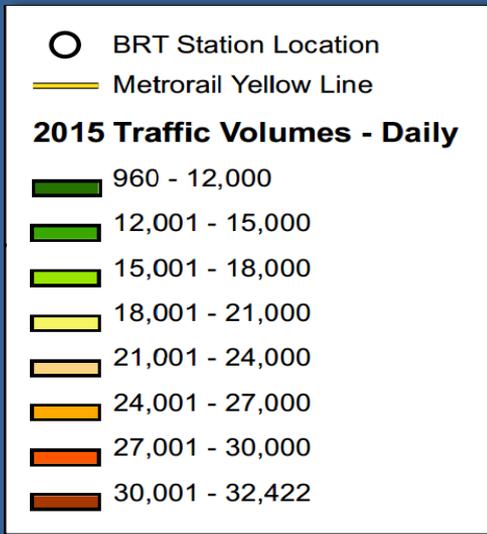
"Good data in = good data out"



*Transportation network from
Fairfax County Travel Demand Model*

Richmond Highway 2015 Average Weekday Volumes

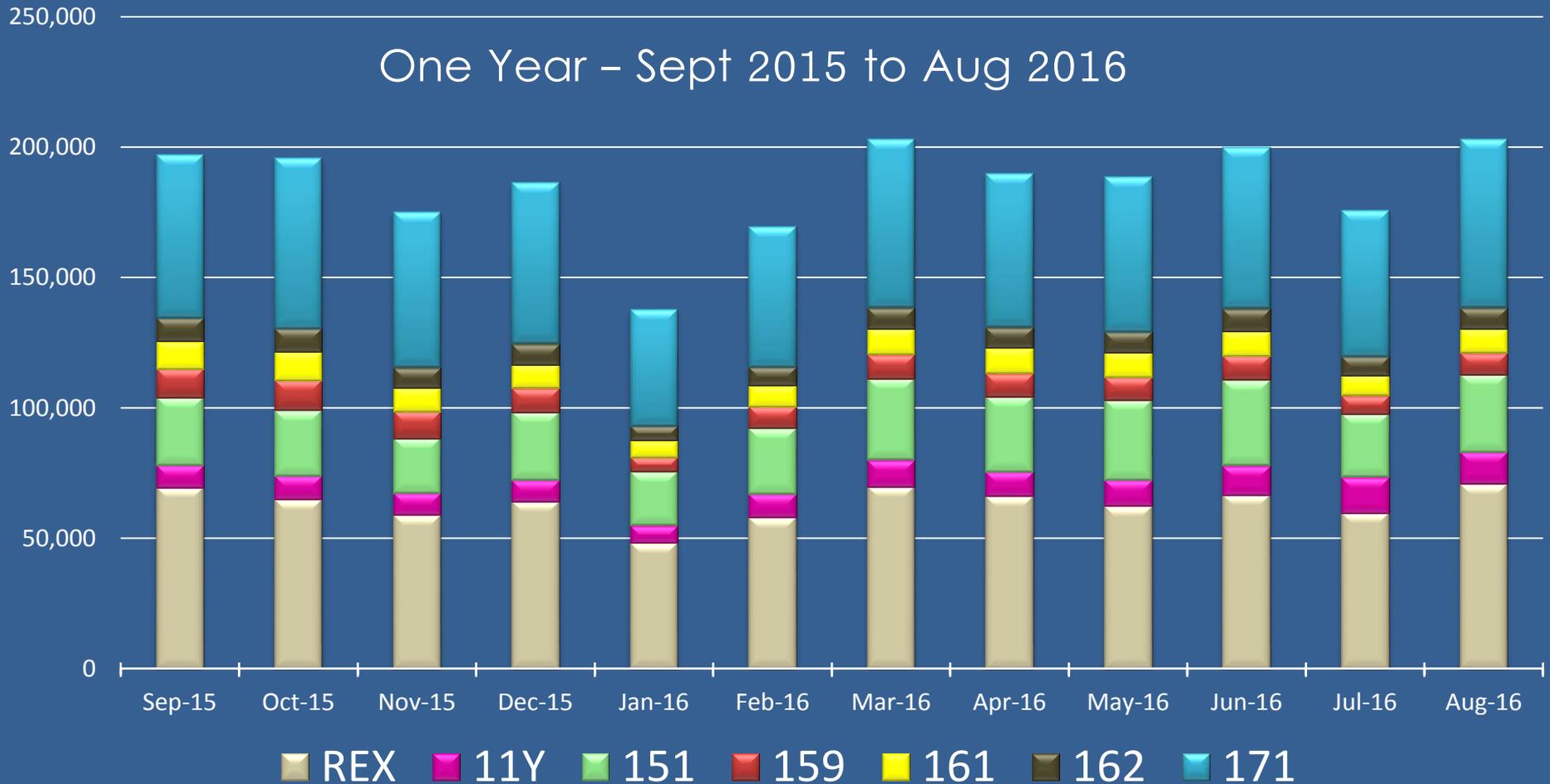
- Quick view of average weekday traffic volumes in both north and southbound directions



** Colors not an indication of level of service*

Existing Weekday Monthly Transit Ridership Routes Servicing Richmond Highway

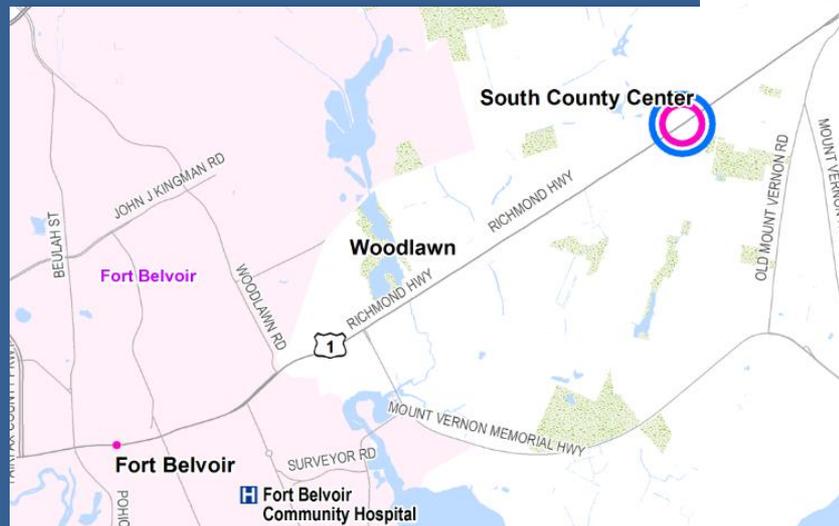
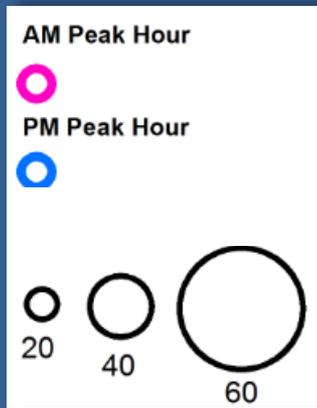
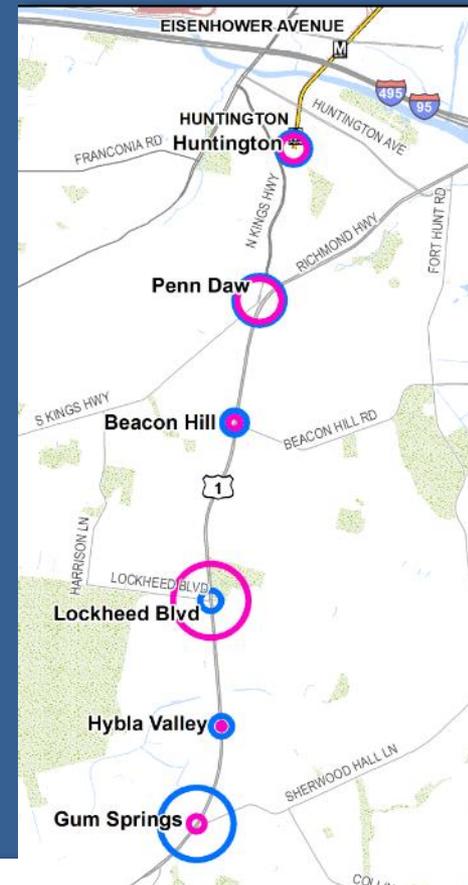
One Year – Sept 2015 to Aug 2016



Source: WMATA and FCDOT Transit

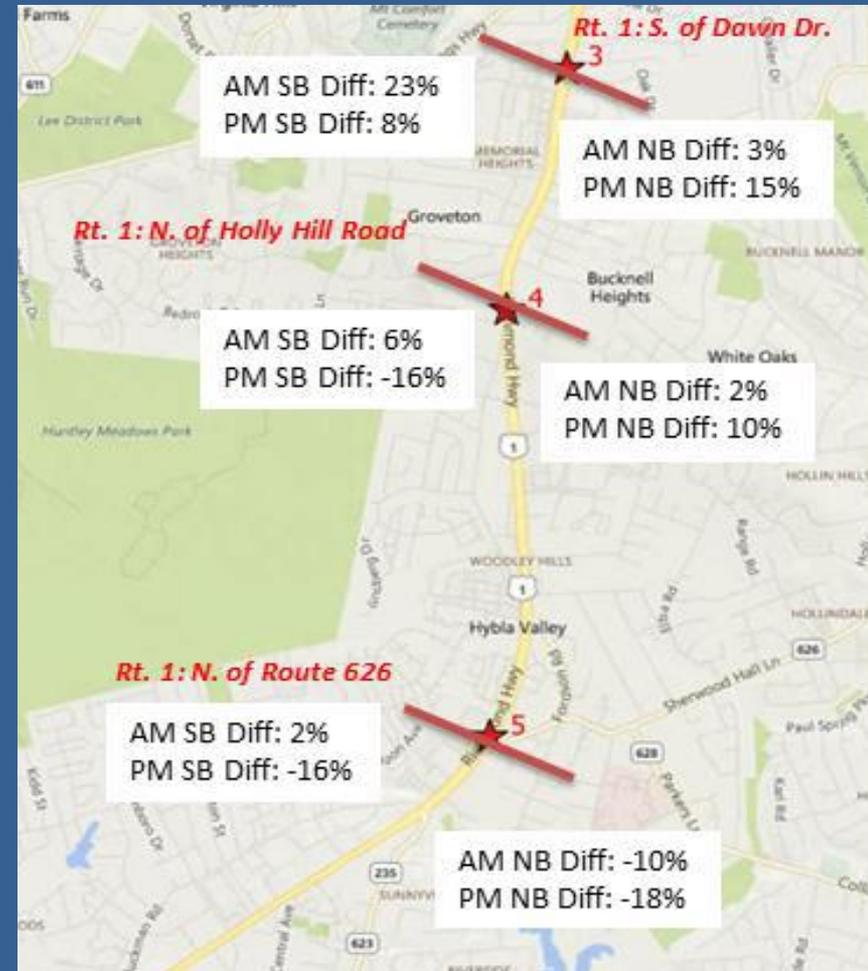
Pedestrian Volumes at Intersections

- Pedestrians counted during AM/PM peak period
- Penn Daw and South County Center – Ped crossings during AM and PM nearly equal
- Gum Springs pedestrian activity peaks in the PM
- Lockheed Blvd AM peak is very active



Existing vs. Forecasted Traffic Volumes

- Forecasted traffic volumes for 2015 were within acceptable thresholds of the observed traffic data
- Differences between modeled and observed volumes meet VDOT standards



Travel demand model calibration

Travel Demand Modeling 2015 Summary

- The travel demand model **predicts** how many vehicles will be on the road and how those vehicles will move throughout the regional roadway network
- The model is **checked** by comparing the model to observed information
- The **2015** travel demand model is performing well

Traffic Operation and Simulation Models

Traffic Operation

- Intersection operations
- Delay
- Traffic queues
- Levels of service
- Roadway capacity

Traffic Simulation

- Station locations
- Transit ridership
- Transit signal priority
- Corridor travel time
- Travel speeds

Level of Service (LOS)

Demonstration of Traffic Flow Basics



“A” and “B”



“C”



“D” and “E”



“F”

LOS Signalized Intersection

A	≤10 sec
B	10–20 sec
C	20–35 sec
D	35–55 sec
E	55–80 sec
F	>80 sec

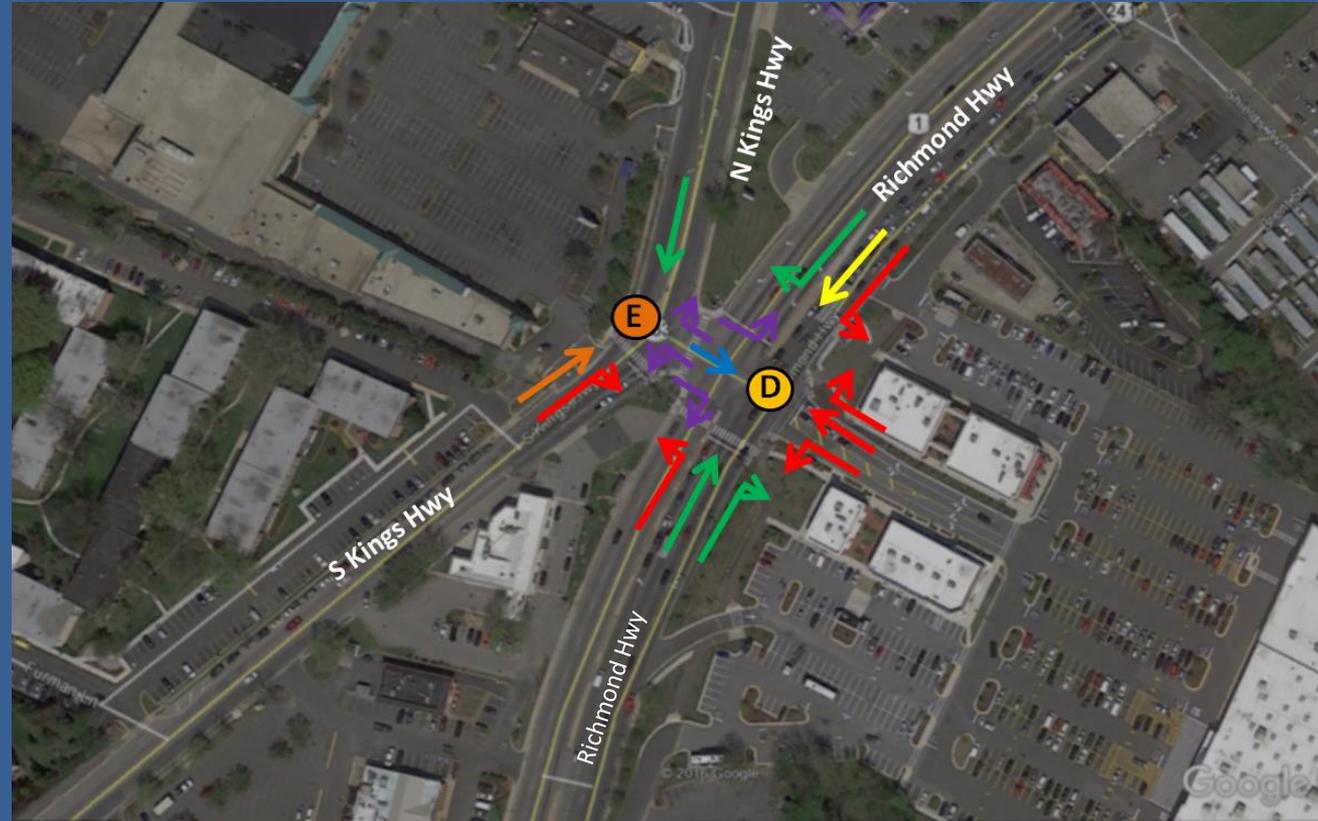
Embark Richmond Highway –
FCDOT Target for acceptable LOS
at intersections is “D”

- Part of National Highway System – requires LOS “D” also
- VDOT to review and approve
- Maintain reasonable traffic flow at intersections

S. Kings Highway and N. Kings Highway/ Richmond Highway Walmart – AM Peak

LOS Signalized Intersection

- A ≤10 sec
- B 10–20 sec
- C 20–35 sec
- D 35–55 sec**
- E 55–80 sec
- F >80 sec



Intersection	Traffic Control	Existing AM		Existing PM	
		LOS	Delay	LOS	Delay
South Kings Hwy & North Kings Highway	Signalized	E	62	D	40
Richmond Hwy & Walmart-Shopping Center	Signalized	D	42	D	53

S. Kings Highway and N. Kings Highway/ Richmond Highway Walmart – PM Peak

LOS Signalized Intersection

- A ≤10 sec
- B 10–20 sec
- C 20–35 sec
- D 35–55 sec**
- E 55–80 sec
- F >80 sec



Intersection	Traffic Control	Existing AM		Existing PM	
		LOS	Delay	LOS	Delay
South Kings Hwy & North Kings Highway	Signalized	E	62	D	40
Richmond Hwy & Walmart-Shopping Center	Signalized	D	42	D	53

Transportation Analysis Summary – Ongoing & Future Work

2040 Base Case (COG LU)

Forecast traffic, evaluate operations and simulation, determine needs

1. Bus Rapid Transit and planned roadway improvements
2. Intersection improvements and planned new street connections
3. New street grids and parallel north/south capacity

2040 “Alternative” Land Use

Adjust traffic forecast for alternative land use, reassess operations and simulation, determine needs, mitigate

4. Bus Rapid Transit ridership and operations
5. Pedestrian accessibility
6. Intersection and street capacity and performance

DISCUSSION / QUESTIONS

TRANSPORTATION FUNDING and UTILITIES

Transportation Funding Overview

- Funding of transportation projects in Fairfax County is a multi-layered puzzle.
- It is important to match projects to appropriate revenue sources.
- Approach to funding projects needs to be strategic.
- Most large projects are funded from multiple sources.
- FCDOOT has a team of people dedicated to securing funding for transportation projects.

Transportation Funding Overview

Richmond Highway BRT and Road Widening

Funding from multiple sources:

- Federal Transit Administration (FTA) Federal Highway Admin
 - Competitive capital investment grants (i.e. TIGER grants)
 - New Starts funding
 - Congestion Mitigation Air Quality (CMAQ) grants
 - Regional Surface Transportation Program (RSTP) grants
- Virginia Smart Scale
- State Formula Transit Assistance
- Northern Virginia Transportation Authority (NVTA)
- Local funding sources:
 - Commercial and industrial property taxes
 - General obligation bonds
 - Developer contributions

Richmond Highway Bus Rapid Transit Huntington Metro to Hybla Valley

Richmond Highway BRT (\$ in Millions)	Need	Available Funding	Request	
Phase 1 Estimate	324.6			Estimate per VA DRPT multi-modal analysis
RSTP & CMAQ		16.7		Allocated by NVTA
VDRPT Grant		4.0		Approx. amount from VA DRPT FY 2016 Grant
Local Revenue		4.0		Approved by BOS September 20, 2016
VA Smart Scale Request			100.0	VA Smart Scale application for FY 2018-23*
Total	324.6	24.7	100.0	
Funding Gap			200.0	Funding Gap Identified for Phase 1

Possible ways to address \$200M gap:

- TIGER grant, FTA New Starts funds, NVTA regional revenues, local revenues, developer contributions
- ~40-50% from New Starts, NVTA regional FY 2018-23



* Funding announced Summer 2017

Richmond Highway Widening

Mount Vernon Memorial Highway to Napper Road

Route 1 Widening (\$ in Millions)	Need	Available Funding	Request
Project Estimate	215.0		Current project estimate
Federal RSTP		17.1	Allocated by NVTA
Revenue Sharing		6.9	Sourced from State Revenue Sharing funds
Regional NVTA		1.0	Sourced from Regional NVTA funds
VA Smart Scale Request			90.0 VA Smart Scale application for FY 2018-23*
Total	215.0	25.0	90.0
Funding Gap			100.0 Funding Gap Identified

Possible ways to address \$100M funding gap:

- Additional revenue sharing requests
- NVTA regional, additional federal RSTP funds, local revenues, and developer contributions



* Funding announced Summer 2017

FTA Transit-Oriented Development (TOD) Pilot Program Grant

- County partnered with SFDC on the application in June 2016 – awarded October 2016
- Total project estimate of \$800,000 (\$400,000 grant and \$400,000 matched by VDRPT and FCDOT)
- Tasks and deliverables identified:
 - Task 1 – Develop station area concept plans (Comp Plan)
 - Deliver BRT station area concepts
 - Task 2 – Create detailed urban design guidelines
 - Deliver design guidelines with TOD principles
 - Task 3 – Refine and analyze conceptual grids of streets network in the CBCs
 - Deliver grids of streets transportation analysis

Funding Next Steps

- 2016 Virginia Smart Scale applications:

- County submitted 7 projects
- Statewide, 436 applications from 148 entities received
 - Approx. \$9B Requested, \$650–\$750M Available, \$67–\$77M NoVA District
 - About \$325M–\$375M goes to Statewide High Priority Grant program
- VDOT review of Revenue Sharing requests
- CTB's decisions will be incorporated into FY2018–23 Six Year Improvement Program in June 2017



- NVTA updating TransAction Plan:

- Draft program Spring/Summer 2017
- Completion anticipated Winter 2017
- NVTA in discussions about transition from long range plan to 6-year funding program
- Call for projects and next funding program after plan adopted, anticipated early 2018; awards Summer/Fall ~2018



Funding Next Steps (Continued)

- Preparation of FTA New Starts funding:
 - Competitive program
 - High quality applications required
 - Significant advanced coordination with FTA needed to be successful
 - Two year time limit to complete once started
- Next round of TIGER grant funding:
 - Not a typical “call for projects” nor is it regularly scheduled
 - USDOT has changed emphasis areas between different solicitations
 - Application TBD

DISCUSSION of UNDERGROUNDING UTILITIES

Utilities Relocation Overview

- Utilities are not just overhead powerlines:
 - Power lines for transmission and distribution
 - Telecommunication lines (telephone, cable, fiber optic*)
 - Water, sewer, stormwater, and gas lines (main trunk lines as well as distribution)
 - Electrical transformers, pull boxes, junction and booster boxes, switches, light and utility poles, traffic signalization, etc.
- Relocation is costly and time consuming:
 - Costs for design, planning, construction
 - Multiple utility companies and owners* involved in design
 - Utilities are complex entities; must be moved in sequence
 - Utility companies control schedule of which County has no control
 - Adjacent property owners and stakeholders for easements (relocation, purchasing and rededication of easements – legal public process, then providing service to properties)

Undergrounding Utilities

- Undergrounding substantially increases the design and construction time, and project budgets.
- “Betterment” of relocating utilities underground not funded by Federal and State monies.
- Design and construction installation needs to address future demands and delivery.
- Implications – improve one corridor, then other areas expect the same.
- Undergrounding:
 - Richmond Highway Widening \$215M, undergrounding costs \$60M (\$16M to relocate)
 - Rolling Road \$60M – undergrounding \$10M
 - Richmond Highway BRT Project – ???

Mount Vernon Memorial Highway to Napper Road Widening Undergrounding Estimates

Project Length (2.91 miles or 15,365 feet)

- Initial estimate for undergrounding is \$60M, based on preliminary estimates done by VDOT for the Route 1 road widening in Prince William County. Could add 2 years.
 - Compare to \$16M to relocate and keep current proposed schedule.
- Costs will include the following items:
 - Undergrounding likely required on both sides plus will need to cross Richmond Highway.
 - If utilities have “prior rights” (which is likely), then the County would need to pay for the utility relocation.
 - There may be cost to acquire additional land for utility easements outside of the right-of-way.

McLean Undergrounding Old Dominion Drive at Chain Bridge Road

Project Length (1900 feet or about 0.4 mile)

- Cost of \$3.4 M – approximately \$1800 per linear foot
 - Includes cost for utility relocation:
 - \$900,000 Dominion
 - \$60,000 Cox
 - \$19,000 Verizon
- Utilities located in permanent easements outside of ROW.
- Easements provided by 19 land owners at no charge to County.
- Project involved mainly moving just two utilities.
- Not paid with transportation funds. Revitalization dollars (general obligation bonds) were used.

Prince William County Experience Utility Undergrounding on Route 1

- Prince William County has widened or is in process of widening several sections of Route 1.
- Based on Neabsco to Featherstone project, their cost to underground was about \$5.3M per mile.
- However, characteristics are somewhat different in Fairfax County.

Prince William County Experience Utility Undergrounding on Route 1

- Prince William County:
 - Used proffers, bonds and other local dollars to pay for the relocation.
 - Board hopes to recover money through higher property taxes; however, this theory is untested.
 - Projects delayed 9 to 12 months to secure funding for undergrounding and due to increasing the complication of project.
- Fairfax County staff is seeking data regarding the value achieved from undergrounding vs. the transportation improvement itself.

Utilities Undergrounding

- Increased budgets for undergrounding would reduce the overall number of improvement projects the County could implement, countywide.
- Adopted Comprehensive Plan for the Richmond Highway Corridor supports placing utilities underground with public and private development projects.
- Decision to underground is not at staff level.
- FCDOT recommendation: no undergrounding of utilities as part of Embark project.
- BOS will need to make final decision.
 - Discussion may involve how many other projects would be impacted – budget and speed at which improvements are completed.
 - Funding sources will need to be identified.

DISCUSSION / QUESTIONS