Route 1 Multimodal Alternatives Analysis

Technical Advisory Committee

September 10, 2014

Route 1 Multimodal Alternatives Analysis

DRPT Virginia Department of Rail and Public Transportation

Office of INTERMODAL Planning and Investment

VDOT

Agenda

1. Study Schedule

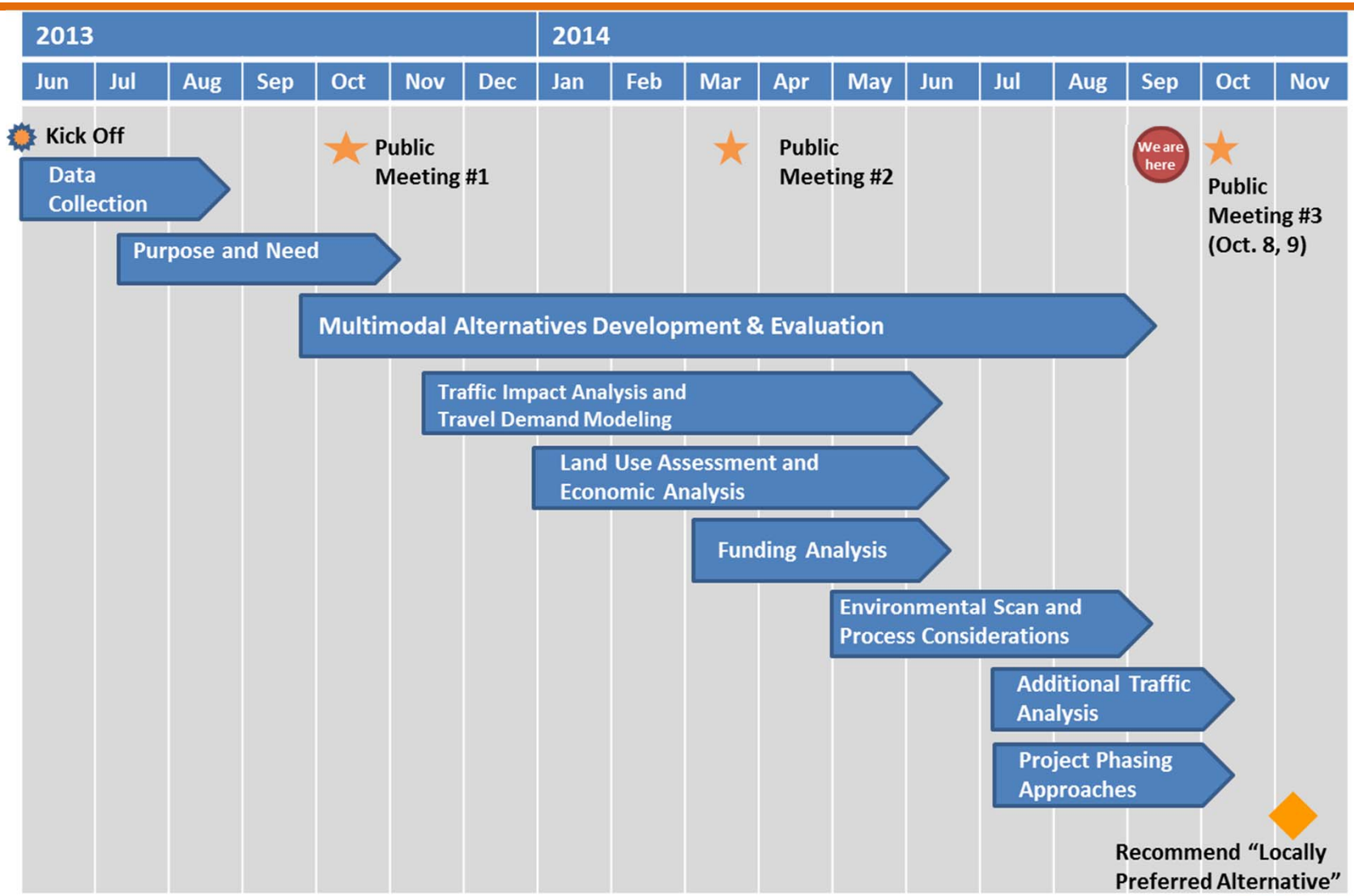
2. Review of AA process and status

3. Evaluation of alternatives
   - Ability to address goals and objectives

4. Key considerations for implementation
   - Potential project impacts
   - Population & employment growth
   - Traffic and roadway capacity to accommodate future growth
   - Implementation and financial feasibility

5. Next Steps
   - Adopt recommendations into local and regional plans
   - Begin NEPA process and concept engineering
   - Refine cost estimates and funding plans

1. Study Schedule: Major Activities



Current Meeting Schedule

Meeting	Details
Technical Advisory Committee	September 10, 2:00 – 3:30 pm South County Center
Community Involvement Committee	October 1, 4:00- 5:30 pm South County Center
Executive Steering Committee	October 2, 9:00 – 10:30 am Mount Vernon Government Center
★ **Public Meeting #3 - Prince William County**	**October 8, 6:00- 8:00 pm** (Presentation at 7:00) **Belmont Elementary**
★ **Public Meeting #3 - Fairfax County**	**October 9, 6:00- 8:00 pm** (Presentation at 6:30) **South County Center**

Other community group and committee meetings:

- Mount Vernon Council of Citizens Assoc, Transportation Committee (9/8)
- Montebello Condo Association (9/10)
- Fairfax County Transportation Advisory Commission (9/16)
- Southeast Fairfax Development Corporation Board (9/17)

2. Review of study process and status

Purpose and Need

Purpose: Provide improved performance for transit, bicycle and pedestrian, and vehicular conditions and facilities along the Route 1 corridor that support long-term growth and economic development.

Needs:

- Attractive and competitive transit service
- Safe and accessible pedestrian and bicycle access
- Appropriate level of vehicle accommodation
- Support and accommodate more robust economic development

Goals:

GOAL 1: Expand attractive multimodal travel options to improve local and regional mobility

GOAL 2: Improve safety; increase accessibility

GOAL 3: Increase economic viability and vitality of the corridor

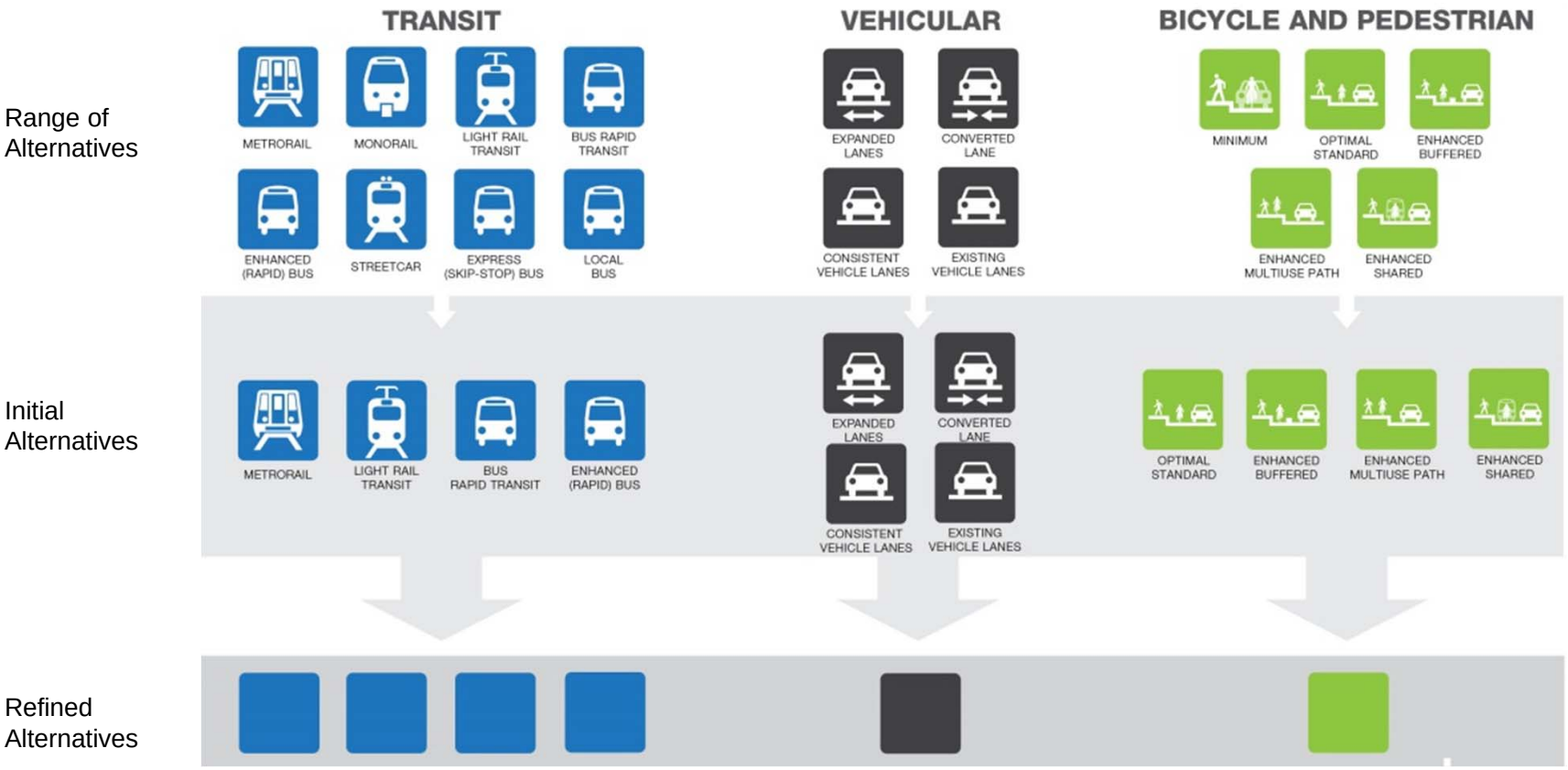
GOAL 4: Support community health and minimize impacts on community resources

Alternatives Analysis Study Outcomes

- Recommend a program of multimodal transportation improvements for adoption by Fairfax County and Prince William County
- Define transit, roadway, and supporting bicycle/pedestrian investments that could be advanced for implementation. The recommended projects would:
  - *Respond to County and State transportation and land use plans and policies*
  - *Respond to population and employment growth projections*
  - *Be financially feasible and potentially competitive for federal funding*

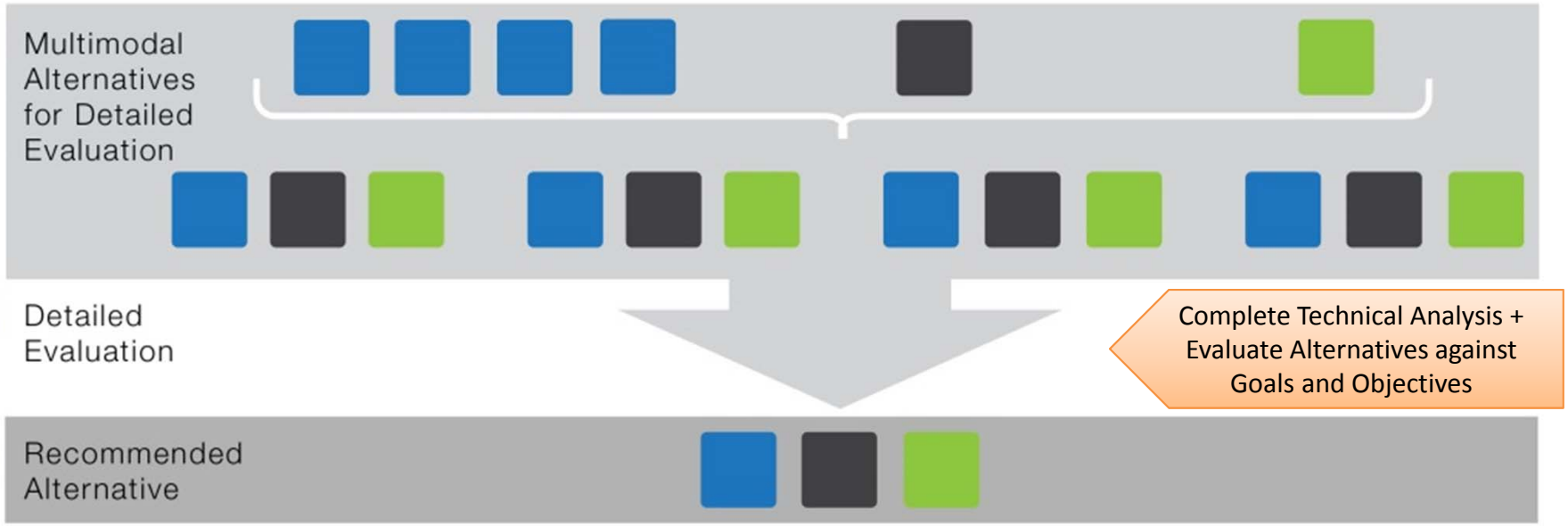
2. Review of AA process and status

Step 1: Identify the best transportation options



Review of AA process and status

Step 2: Combine options into multimodal alternatives



3. Evaluation of Alternatives:

Ability to address goals and objectives

Alternatives Under Evaluation

1. Identified a preferred bike/ped facility design: ***10-foot shared use path on both sides of street***

2. Identified number of vehicular lanes (2035): ***3 general purpose travel lanes in each direction***

3. Identified 4 refined transit configurations to study in detail; each assumed 10-foot multiuse path and 6 vehicular travel lanes

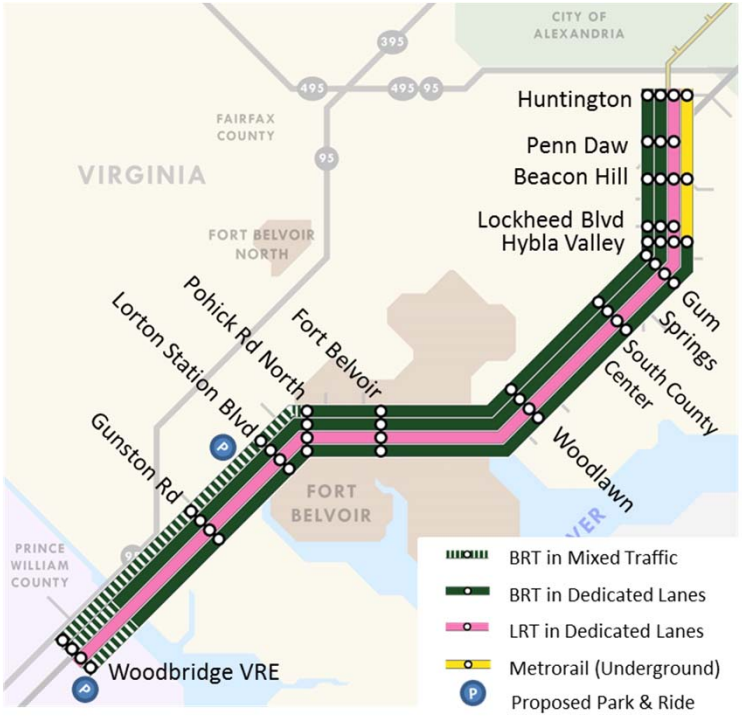
<u>Four Transit Alternatives (which include recommendations from above):</u>

Alternative 1:
Bus Rapid Transit 1- Curbside

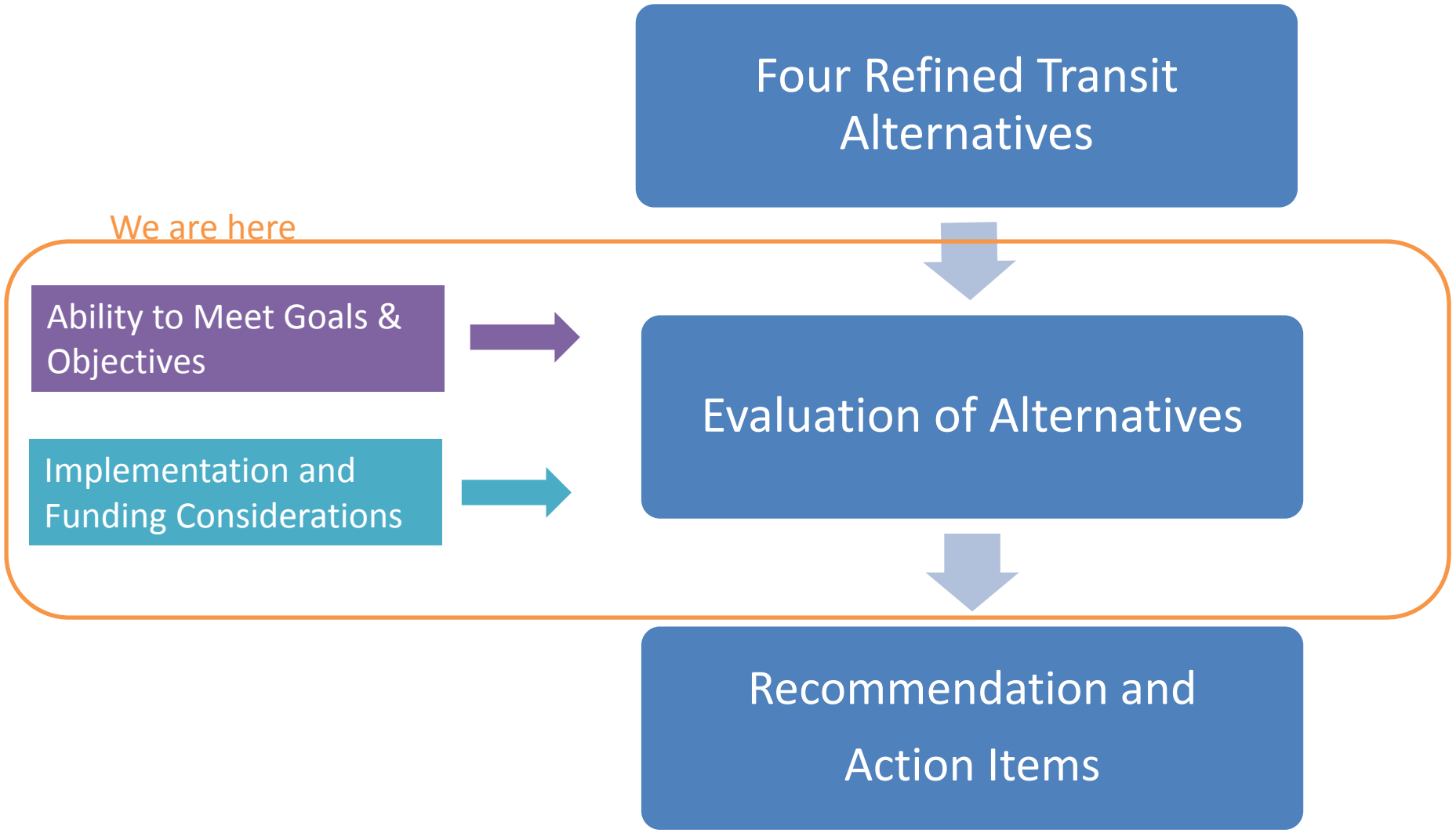
Alternative 2:
Bus Rapid Transit 2- Median

Alternative 3:
Light Rail Transit

Alternative 4:
Metrorail- BRT Hybrid



Evaluation of Alternatives: Process



Summary of Key Indicators

Based on Scenario 1 Land Use (COG 2035 Forecast)

	Alt 1: BRT- Curb	Alt 2: BRT- Median	Alt 3: LRT	Alt 4: Metro/BRT Hybrid
Average Weekday Ridership (2035)	15,200	16,600	18,400	26,500[3] (BRT 10,600; Metro 22,900)
Conceptual Capital Cost[1,2]	$832 M ($10M Ft Belvoir Shuttle)	$1.01 B ($10M Ft Belvoir Shuttle)	$1.56 B ($10M Ft Belvoir Shuttle)	$2.46 B (Metro $1.46B; BRT $1 B; Ft Belvoir Shuttle $10M)
Annual O&M Cost[2]	$18 M (BRT $13M; Ft Belvoir Shuttle $5M)	$17 M (BRT $12M; Ft Belvoir Shuttle $5M)	$24 M (LRT $19M; Ft Belvoir Shuttle $5M)	$31 M (Metro $17M; BRT $8M; Ft Belvoir Shuttle $5M)
Cost Per Rider[4]	$21	$22	$30	$30 (Metrorail: $26; BRT: $32)
Total ROW required (acres) and preliminary ROW cost estimate (Based on GIS analysis not survey data)	20-30 acres ($30 - $40 M)	30-40 acres ($50 - $60 M)	35-45 acres ($55 - $65 M)	30-40 acres ($50 - $60 M)
Impacts of Transit Configuration on Route 1 Auto Operations	Minor[5]	Minor[5]	Minor[6]	Minor[6]

1. Capital cost estimates include transit, roadway, and bike/ped facilities and assume ROW costs.
2. Fort Belvoir shuttle: $5m per year O&M cost, and $10 million in capital cost for each alternative. Note that the alternatives replace existing REX service between Alexandria and Fort Belvoir, approximate annual cost of $6.5 million.
3. Corridor ridership, excluding transfers between Metrorail and BRT portions.
4. Annualized capital cost and operating cost divided by average of 2015 and 2035 ridership.
5. Traffic operations impacts were tested using 2035 growth projections that were applied consistently across alternatives and did not account for additional growth that may be associated with implementation of the alternatives.
6. Traffic assessment for Land Use Scenario 3 (Metrorail) is in progress.

Evaluation of Alternatives: Findings

Evaluation results suggest that implementing a median running **Bus Rapid Transit System** in the **near-term** would improve corridor mobility and provide a cost effective transportation solution, while a **Metrorail extension** to Hybla Valley in the **long-term** would provide a higher level of local and regional mobility and best support corridor economic development.

Evaluation Criteria	ALT 1- BRT CURB	ALT 2 BRT – MED	ALT 3 LRT	ALT 4 HYBRID
Goal 1: Local and regional mobility	0.7	0.8	0.8	**1.0**
Goal 2: Safety and accessibility	0.7	**0.8**	**0.8**	**0.8**
Goal 3A: Economic Development	0.6	0.6	0.6	**0.7**
Goal 3B: Cost Effectiveness	**1.0**	0.9	0.7	0.5
Goal 4: Community health and resources	0.7	0.7	0.7	**0.8**
Ability to Meet Project Goals Average	***0.7***	***0.8***	***0.7***	***0.8***

Evaluation of Alternatives

Goals	Measures	ALT 1- BRT CURB	ALT 2 BRT – MED	ALT 3 LRT	ALT 4 HYBRID
Goal 1: Local and regional mobility	• ***Project ridership*** • ***Number of transit dependent riders*** • **Transit Travel Time Savings** • **Provides connection to existing transit network** • New transit riders • Person throughput • Number of riders who walked to access transit • Provides improved bicycle and pedestrian facilities	0.7	0.8	0.8	1.0
Goal 2: Safety and accessibility	• ***Auto Network Delay*** • **Pedestrian access to stops** • **Pedestrian crossing time** • Auto travel time • Impacts due to turns • Preserves flexibility for bike lane	0.7	0.8	0.8	0.8
Goal 3A: Economic Development	• ***Potential to begin transit within 10 years - 3x*** • **Tendency to encourage additional development** • **Jobs within 60 minutes** • Per passenger O&M cost savings with growth • Tendency to accelerate development	0.6	0.6	0.6	0.7
Goal 3B: Cost Effectiveness	• ***Cost per rider - 3x*** • **Estimated Capital Cost** • **Estimated Annual O&M cost**	1.0	0.9	0.7	0.5
Goal 4: Community health and resources	• **Change in VMT** • **Total ROW** • Trips diverted from I-95 • Temporary Construction impacts • Environmental Benefits	0.7	0.7	0.7	0.8
Ability to Meet Project Goals Average		***0.7***	***0.8***	***0.7***	***0.8***

Evaluation: Key Considerations

- **Weighting of measures reflect project goals and community input, and form the basis for recommendation**

- **Other factors influence the ability to implement the alternatives:**
  1. Feasible funding plan
  2. Anticipated levels and pace of population and employment growth
  3. Roadway infrastructure to support increased population and employment growth

4. Key Considerations for Implementation

Potential project impacts

Phasing and funding of multimodal improvements

Population and employment growth

Traffic capacity

Environmental Scan: Findings

Most relevant resource areas:

- **Environmental Justice:** minority and low-income populations are present along the corridor
- **Property/ROW impacts:** all alternatives would require additional right-of-way and may lead to direct impacts on existing properties and buildings
- **Water resources:** two major creeks and one major waterbody are present along the corridor, and wetlands have been identified near these environmentally sensitive areas
- **Historic and cultural resources:** historic properties and archeologically sensitive sites are present along the corridor, particularly near Fort Belvoir

Other analyzed resource areas:

- Neighborhoods and community facilities
- Parklands
- Air quality
- Noise and vibration
- Protected species and critical habitats
- Potentially contaminated sites
- Construction impacts
- Stormwater
- Preliminary ROW analysis

Environmental Scan: Next Steps

- After recommending and adopting a multimodal alternative, the project team will identify a project sponsor, and conduct environmental documentation and conceptual engineering

- Proposed project funding plan will lead to determination of the lead federal agency

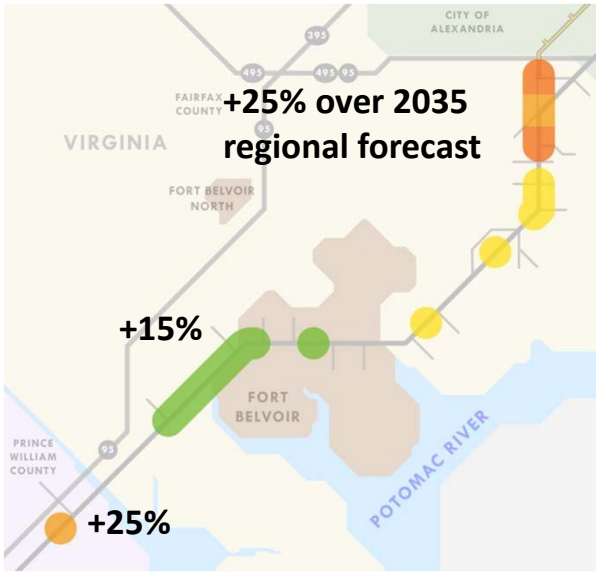
- The lead and participating federal agencies will recommend an appropriate NEPA Class of Action (level of environmental documentation) based on:

  - Context and intensity of the impacts to key resources
  - Scale (size and cost)
  - Potential areas for and magnitude of public discussion/controversy

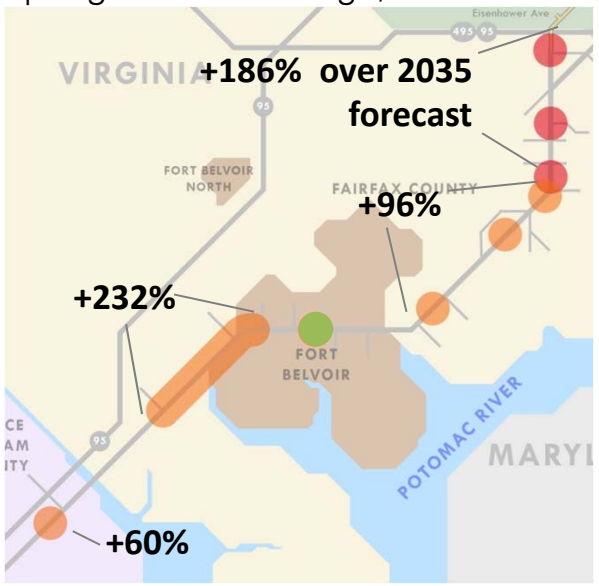
Population and Employment Growth Scenarios

Scenario 1:
"Base Land Use Scenario" = 2035 MWCOG regional forecast

Scenario 2:
What is a reasonable growth expectation for a corridor that invests in high-quality transit (BRT or LRT)?



Scenario 3:
How much do population and employment need to increase to achieve density levels typically supportive of Metrorail (Huntington to Hybla Valley) and BRT (Gum Springs to Woodbridge)?

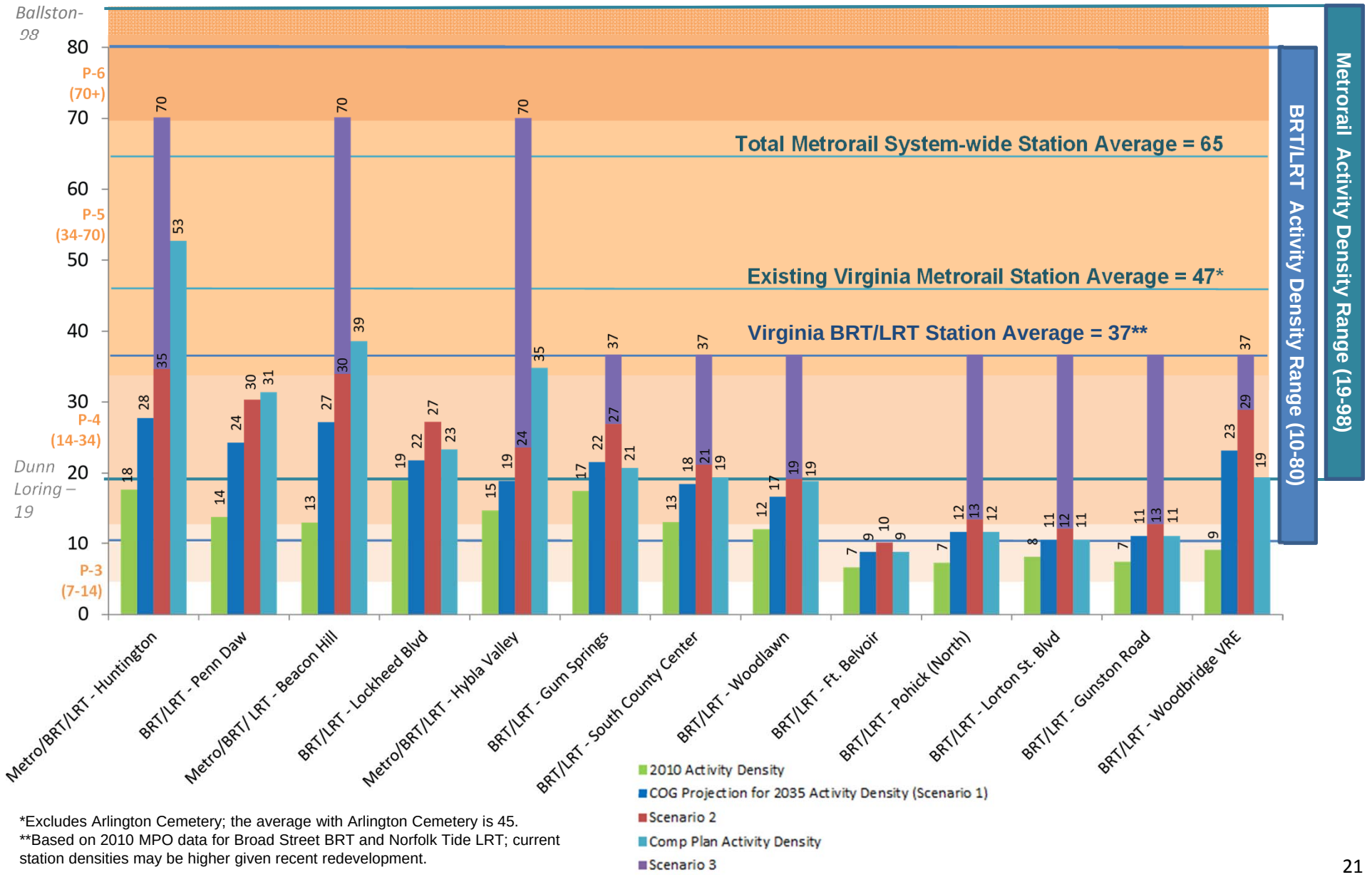


- Urban Core (Rail)
- Urban Center (BRT/ LRT)
- Large Town/Suburban Center (Express Bus)
- Medium Town/Suburban Center (Fixed Route Bus)

Source: DRPT Multimodal Design Guidelines (2013)

Station Activity Density Levels: Existing and Planned

Activity Density =
Population + employment/acre
(within a ½ mile radius of a station)



*Excludes Arlington Cemetery; the average with Arlington Cemetery is 45.
**Based on 2010 MPO data for Broad Street BRT and Norfolk Tide LRT; current station densities may be higher given recent redevelopment.

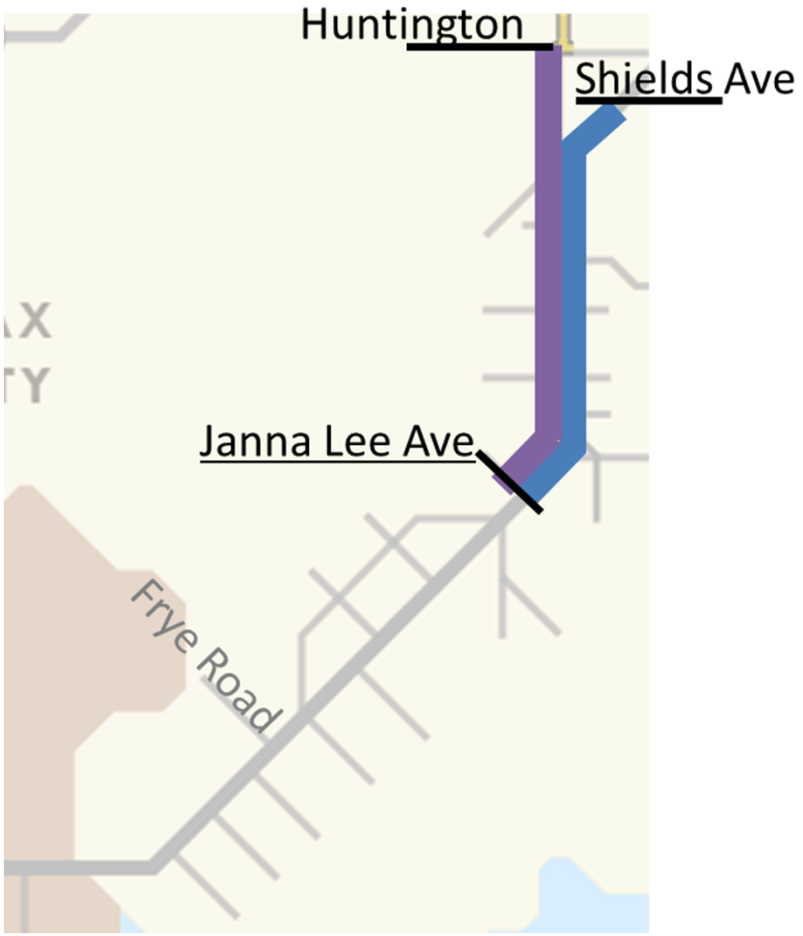
Traffic Capacity

Assessment of population and employment growth scenarios

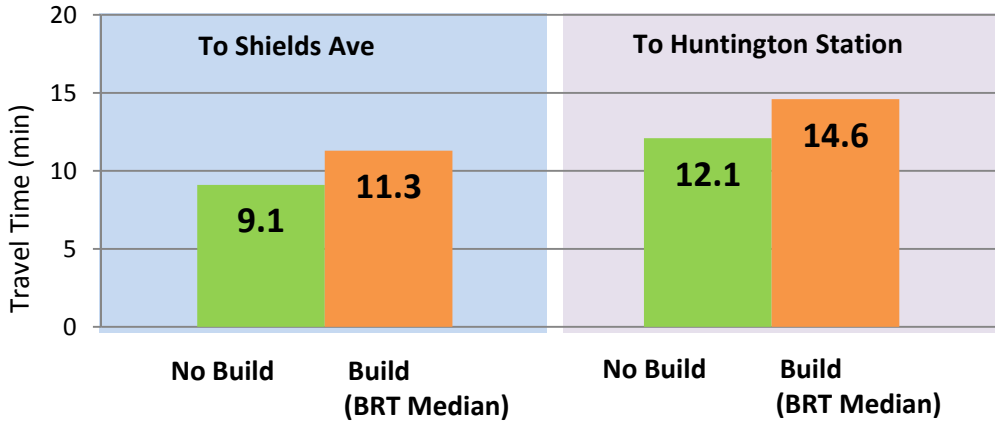
Scenario 1: VISIM Model Development

- Purpose:
  - Assess median BRT Build scenario transit and traffic operations for north segment of corridor
- Measures:
  - Intersection/Approach Level of Service (LOS) at Critical Intersections
  - Total Auto Network Delay
  - Corridor Auto and Transit Travel Time

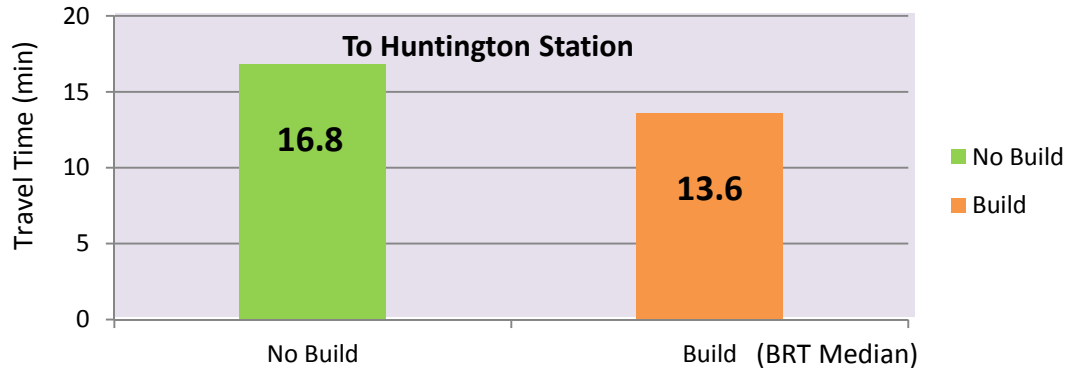
Traffic Assessment for Growth Scenario 1: Travel Time



Peak Direction **Automobile** Travel Time

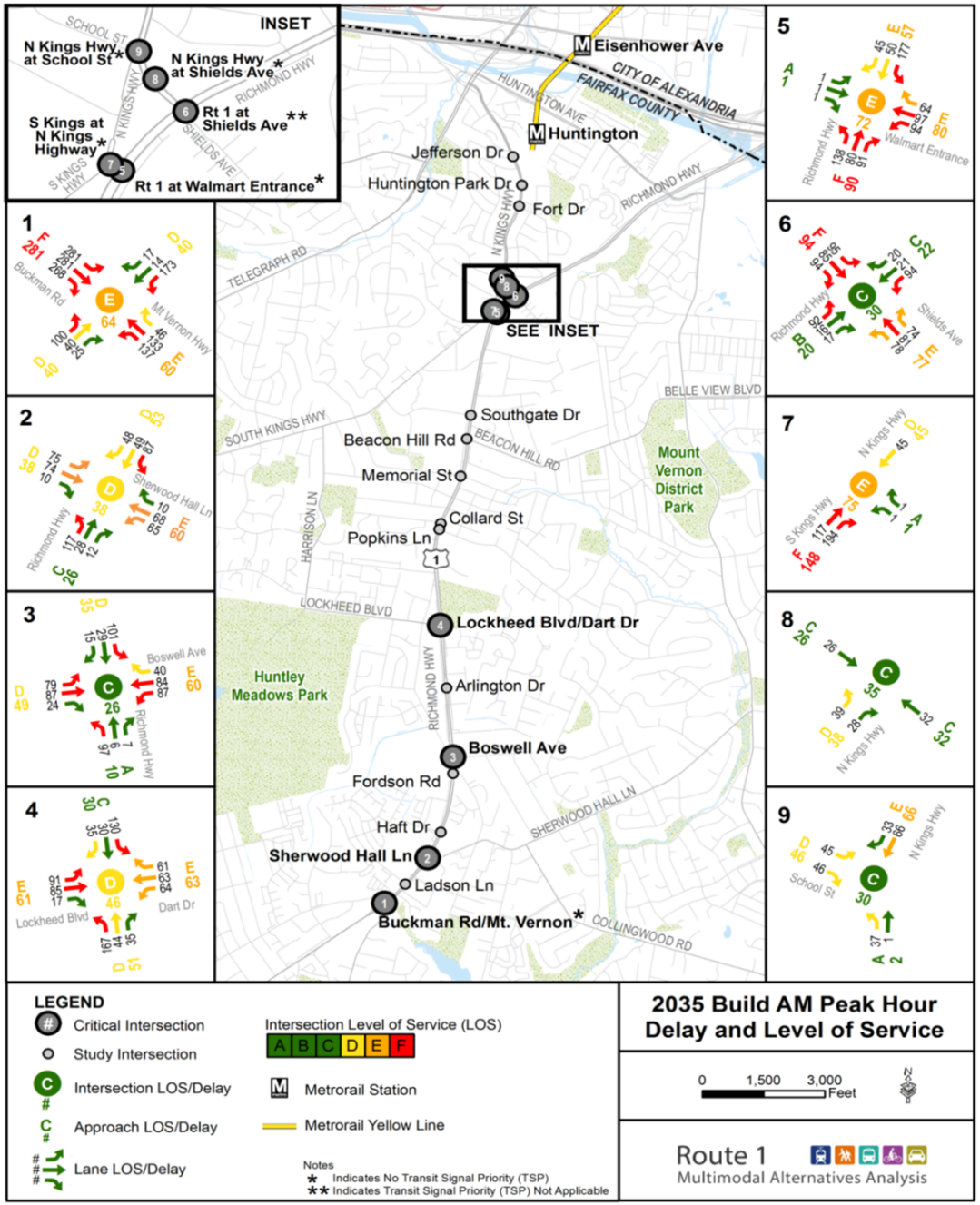


Peak Direction **Transit** Travel Time



Scenario 1, AM Peak Hour VISSIM Results (LOS)

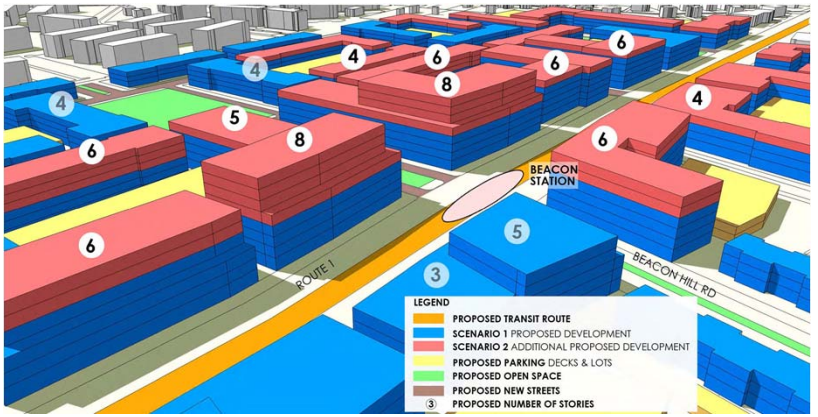
	2035 No Build	2035 Build
Buckman Rd.	E	E
Sherwood Hall Ln.	C	D
Boswell Ave.	C	C
Lockheed Blvd.	C	D



2035 No Build	2035 Build	
E	E	N. Kings Walmart
C	C	N. Kings Hwy.
E	E	Rt. 1 Shields Ave.
C	C	N. Kings Shields Ave.
C	C	School St.

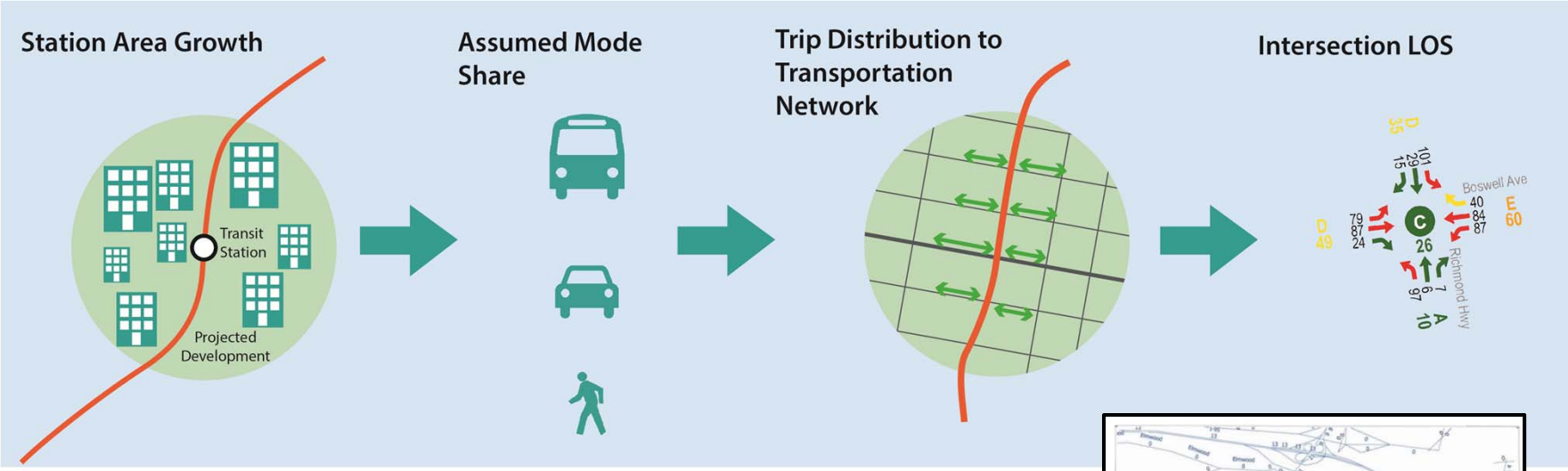
Scenarios 2 and 3: Assessing Traffic Impacts of Alternative Growth Scenarios

- Purpose:
  - Assess potential "worst case" traffic impacts and define need for additional roadway and intersection capacity
  - Four representative station areas



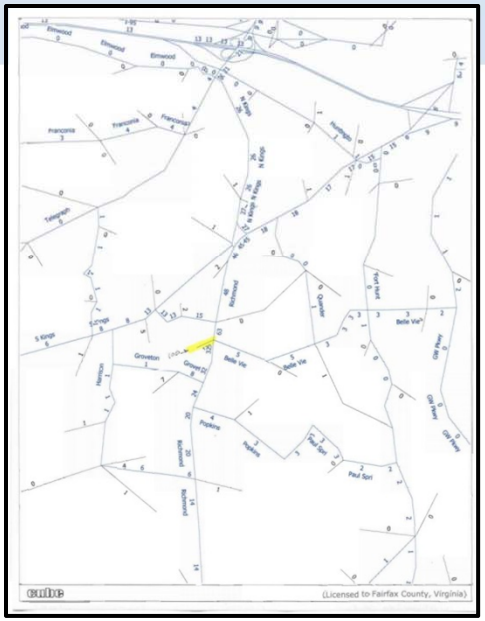
- Measures:
  - Intersection Level of Service (LOS) at selected intersections
  - Theoretical additional Route 1 capacity needed
  - Theoretical local street capacity + increased transit share + internal capture

Scenarios 2 & 3: Trip Distribution Methodology



Traffic volumes are the sum of three components:

1. No Build (Scenario 1) volumes on Route 1 and other streets
2. Additional growth scenario trips associated with focus TOD
3. Additional "through trips" associated with other corridor TODs



Scenarios 2 & 3 Analysis Summary

	Penn Daw			Beacon			Hybla Valley			Woodbridge		
Scenarios	*1*	*2*	*3*	*1*	*2*	*3*	*1*	*2*	*3*	*1*	*2*	*3*
Station area growth with no new roadway capacity												
Significant transit mode share	10%	15%	29%	10%	15%	29%	10%	15%	29%	10%	15%	15%
Significant walk trips	5%	5%	11%	5%	5%	11%	5%	5%	11%	5%	5%	5%
"Worst case" intersection LOS (6-lane Route 1 section)	**D**	**F**	**F**	**E**	**F**	**F**	**E**	**F**	**F**	**D**	**E**	**F**
Planned Route 1 through lanes	7	7	7	7	7	7	6	6	6	6	6	6
Solution A: Expand capacity of Route 1												
Theoretical through lanes for "acceptable" capacity (v/c = 0.85)	7 (+0)	8 (+1)	10 (+3)	7 (+0)	8 (+1)	10 (+3)	6 (+0)	8 (+2)	12 (+6)	6 (+0)	6 (+0)	8 (+2)
Solution B: Enhance mode share and expand local street capacity												
Enhanced transit mode share	10%	18%	35%	10%	18%	35%	10%	18%	35%	10%	18%	18%
Enhanced walk trips	5%	7%	15%	5%	7%	15%	5%	7%	15%	5%	7%	7%
Resulting Route 1 intersection LOS	**D**	**E**	**E**	**E**	**E**	**E**	**E**	**E**	**E**	**D**	**E**	**E**
Theoretical parallel, local street lanes	0	2	2	0	2	6	0	2	6	0	0	Left Turn Pocket

Planned Route 1 Section

How many additional lanes would you need?

What happens if you boost transit mode share and add local streets?

Financial Feasibility

Implementation and Funding Analysis

Two Preliminary Implementation Approaches

- **Approach A:** BRT Median Running Implementation (2032)
- **Approach B:** BRT and Metrorail Implementation (2040)

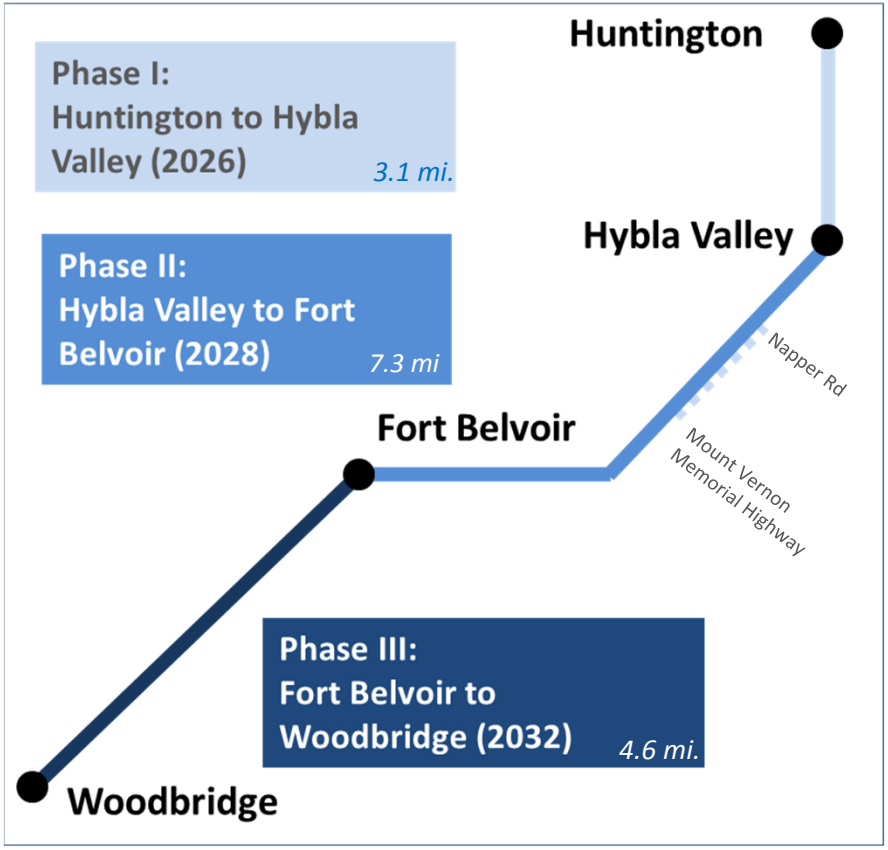
- Both approaches implement a median running **BRT** system with supporting bicycle/pedestrian improvements in three phases (north to south):
  - Phase I: Huntington to Hybla Valley (2026)
  - Phase II: Hybla Valley to Fort Belvoir(2028)
  - Phase III: Fort Belvoir to Woodbridge (2032)

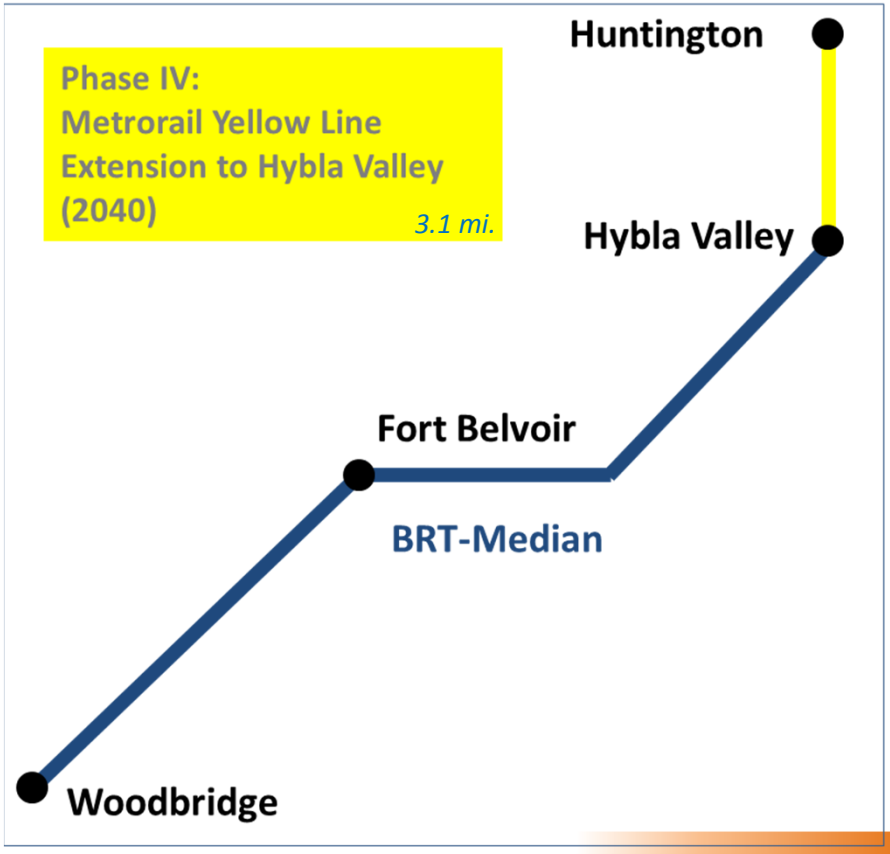
- Primary difference in phases: **Approach B assumes a Metrorail extension (Phase IV)** operational by 2040

Phasing and Implementation Approaches

Phase I-III: Implement Multimodal Improvements and BRT (Median Running)

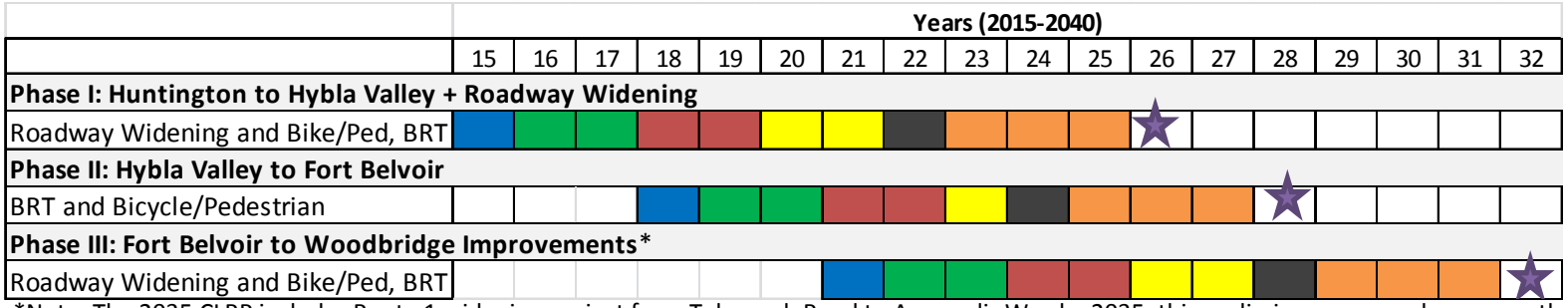
Phase IV: Extend Metrorail to Hybla Valley





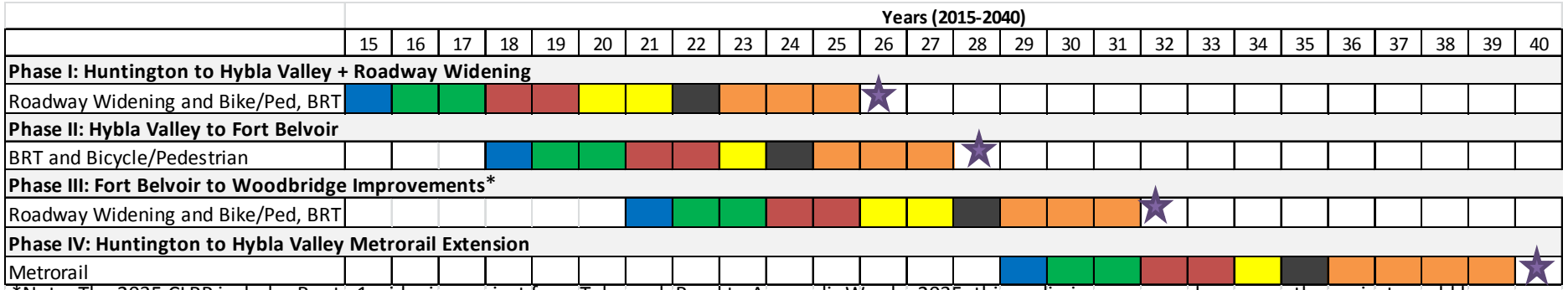
Implementation Timelines

Approach A: BRT Implementation (2032)



*Note: The 2035 CLRP includes Route 1 widening project from Telegraph Road to Annapolis Way by 2035; this preliminary approach assumes the project would be expedited by three years (2032). The project team is coordinating with VDOT to confirm this assumption.

Approach B: BRT and Long-Term Metrorail Implementation (2040)



*Note: The 2035 CLRP includes Route 1 widening project from Telegraph Road to Annapolis Way by 2035; this preliminary approach assumes the project would be expedited by three years (2032). The project team is coordinating with VDOT to confirm this assumption.

Legend

Planning	Scoping/ NEPA PE	Final Design	Right of Way	Utilities Relocation	Construction	Operation
						★

Phasing Components

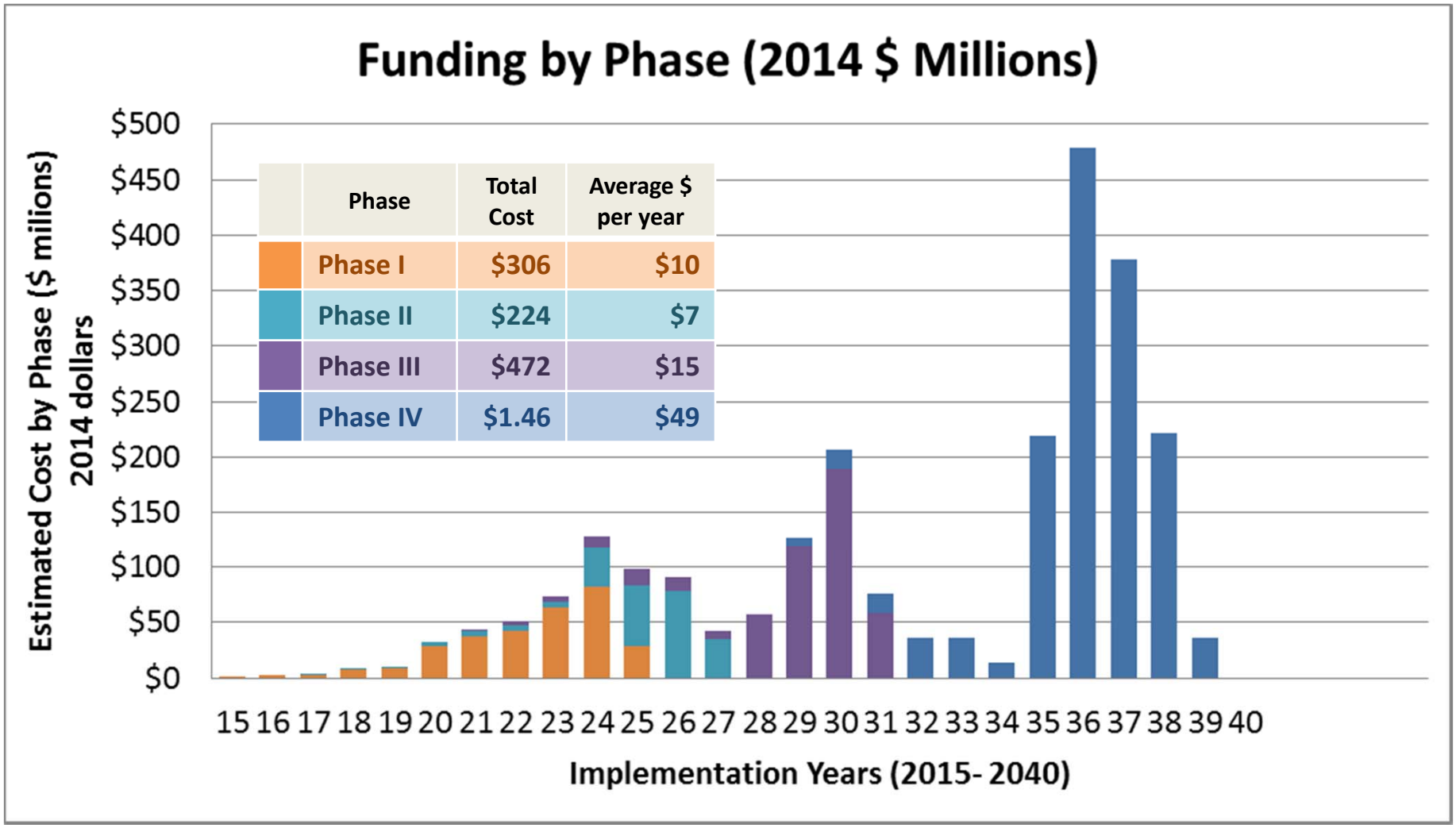
For each phase:

- Capital costs for roadway, bike/ped, and transit improvements
- Implementation timelines
- Funding assumptions by mode
- Assessed potential competitiveness of transit project for FTA New Starts funding

For each project type (roadway, bike/ped, transit):

- Developed spending profiles (Allocated costs over years from engineering to operations)
- Funding assumptions based on a mix of sources

Funding by Phase (DRAFT)



5. Next Steps

Next Steps: Address Key Considerations

Factors that influence the ability to implement the roadway and transit recommendations:

- Feasible funding plan
- Anticipated levels and pace of population and employment growth
- Transportation infrastructure to support increased population and employment growth

Future actions to confirm feasibility:

- Amend Comprehensive Plans to support higher density along the corridor
- Conduct a Market Absorption Study to understand the rate of growth
- Develop cost estimates for additional supporting grid network

Next Steps: Adopt Study Findings and Continue Toward Implementation

Process Overview

Study team completes Alternatives Analysis

Local and state officials adopt findings and recommendations

Project team completes environmental documentation and concept engineering

Project team refines cost estimates and funding plans

Continued coordination with public stakeholders and state and federal agencies

Join us and help spread the word!

Public Meeting #3

October 9

South County Center 6-8 pm

If you can't make October 9, an additional meeting will be held in Prince William County at Belmont Elementary on October 8.