Route 1 Multimodal Alternatives Analysis

Public Meeting #2

March 26, 2014

Route 1 Multimodal Alternatives Analysis

DRPT Virginia Department of Rail and Public Transportation

Office of INTERMODAL Planning and Investment

VDOT

Agenda

Welcome	**6:00 – 6:15 pm**
Presentation, Q&A	**6:15 – 7:00 pm**
Share your ideas	**7:00 – 8:00 pm**

1. What is the Route 1 Multimodal Alternatives Analysis?

Multimodal Alternatives Analysis

An **alternatives analysis** is a study that examines different options to address a transportation problem.

Multimodal means that a range of different transportation types will be evaluated.

Purpose and Need

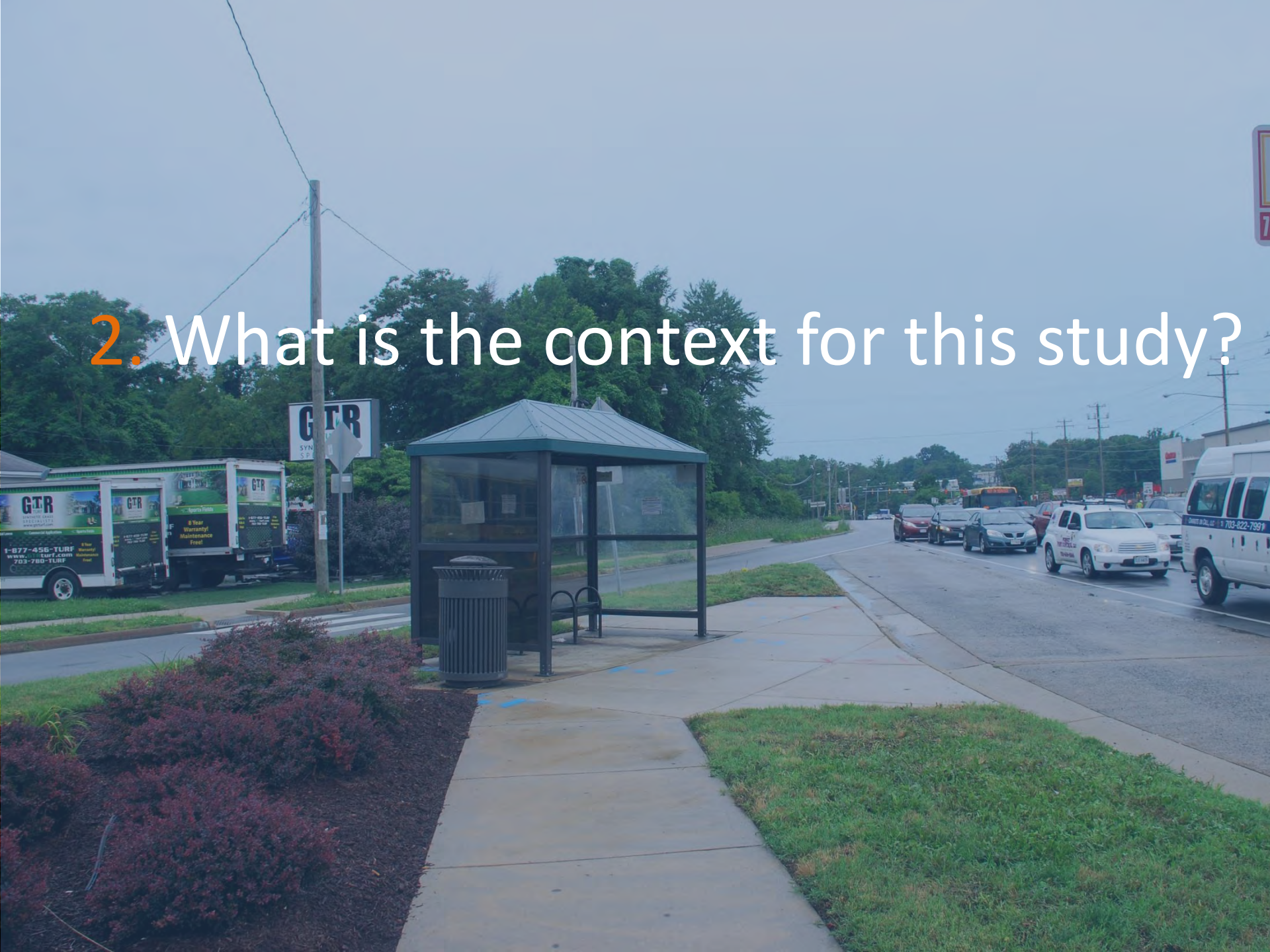
Purpose:
Provide improved performance for transit, bicycle and pedestrian, and vehicular conditions and facilities along the Route 1 corridor that support long-term growth and economic development.

Needs:

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

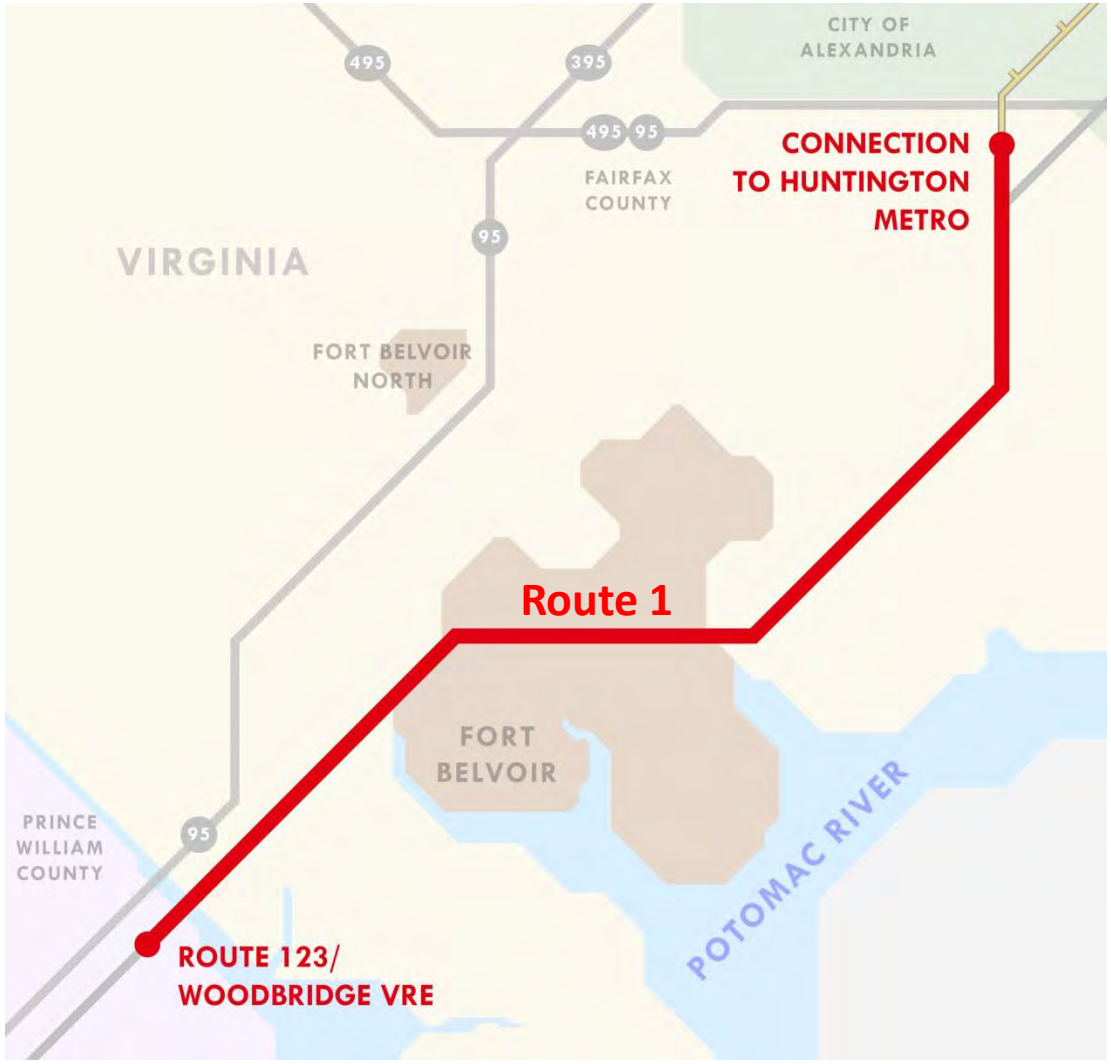
Project goals

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

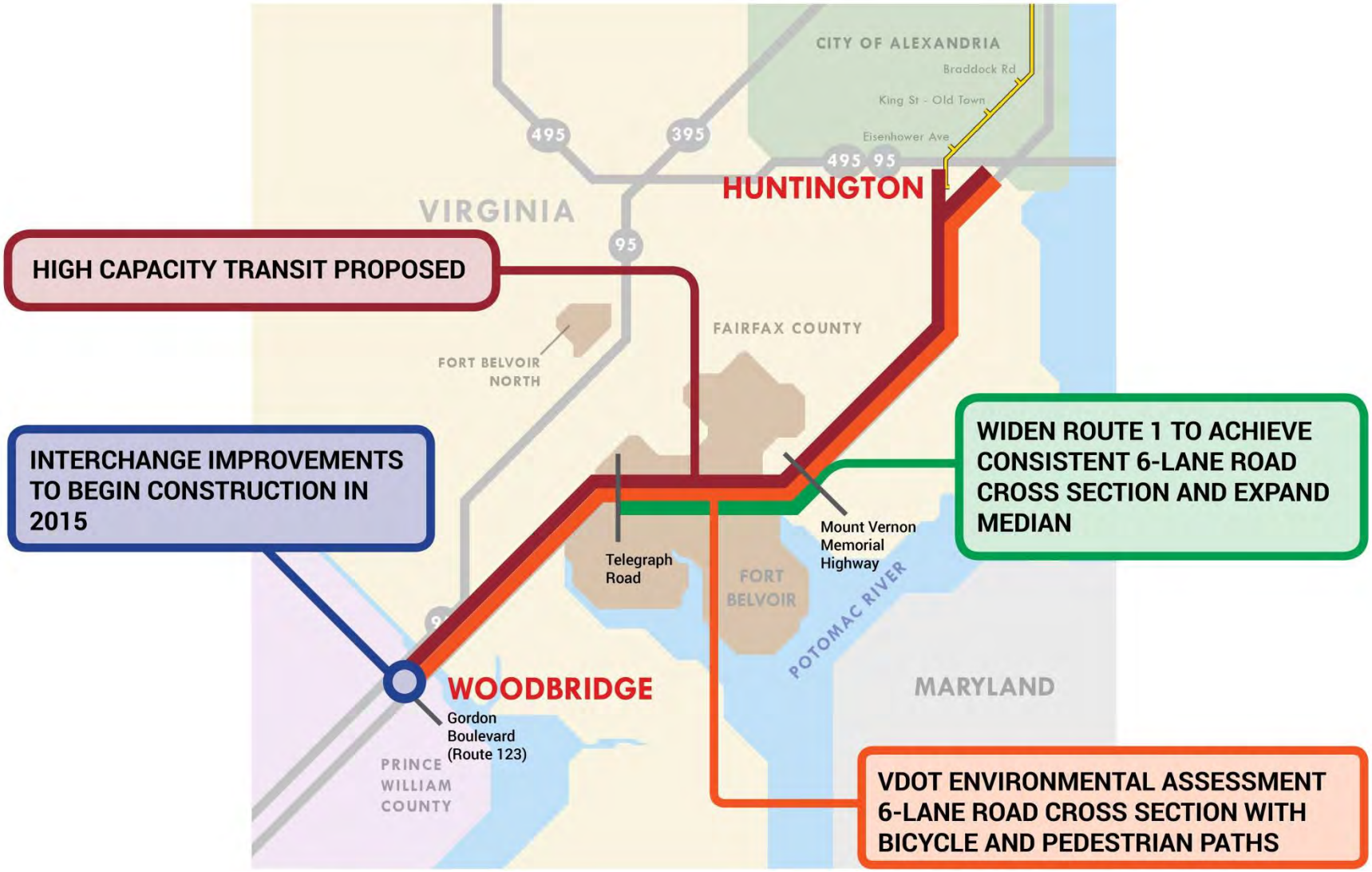


2. What is the context for this study?

Project Corridor



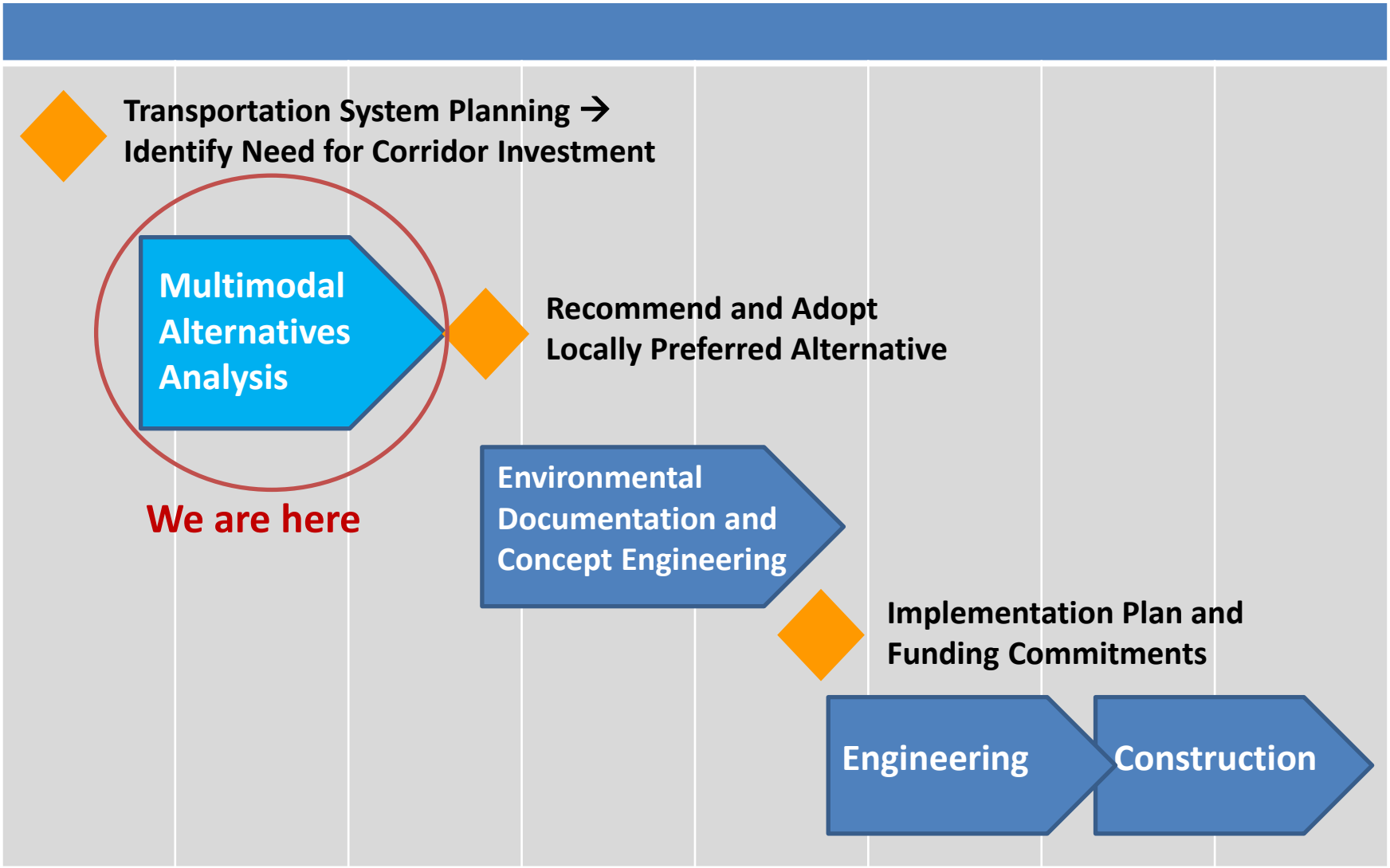
Planned Improvements



Other Related Studies

- **2035 & 2040 Constrained Long Range Plan** (TPB, 2013)
- **Fairfax County Transit Network Plan** (Fairfax, ongoing)
- **Momentum** (Metro, 2013)
- **Regional Transit System Plan** (Metro, 2014)
- **Fort Belvoir Master Plan** (DOD, ongoing)
- **Route 1 Transit Centers Plan** (Fairfax, ongoing)

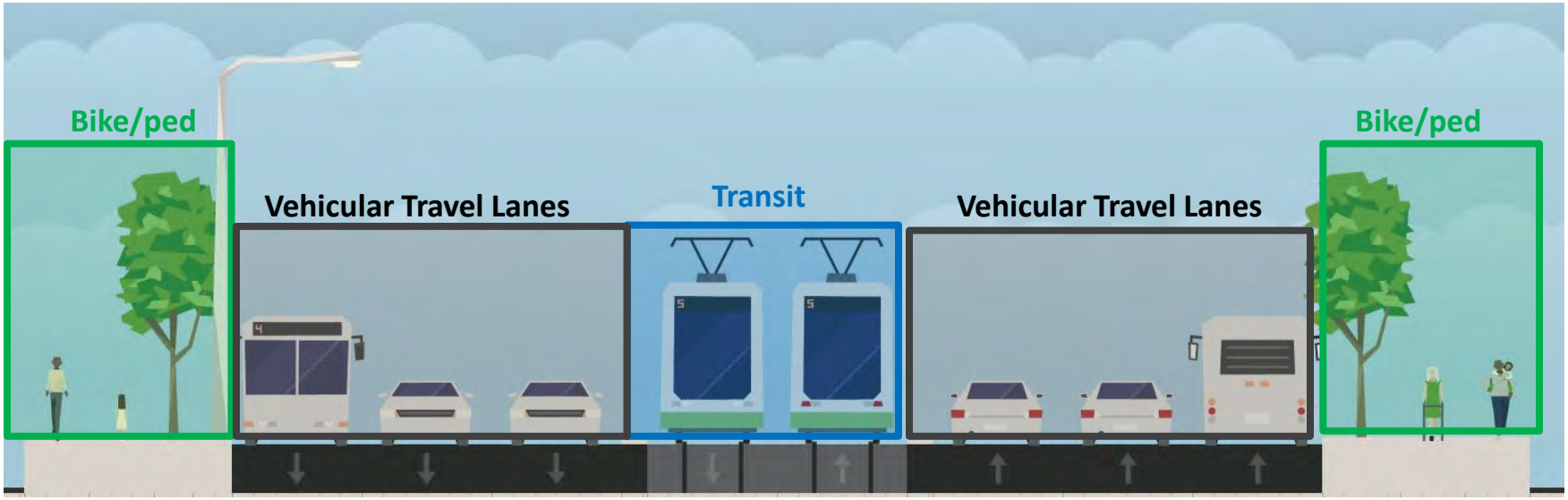
The Life of a Corridor Transportation Plan



Outcome of the Current Study

- A recommended multimodal transportation plan for implementation in the Route 1 corridor

- The recommended plan will have three elements:
  - **Transit**: Mode and alignment
  - **Vehicular**: Number of automobile travel lanes
  - **Bike/ Ped**: Facilities and location



3. What have we learned from you to date?

What We've Learned From You: Survey

- The most important transportation needs on Route 1 are **public transit** and **improved traffic flow**

- The most important improvements to **encourage walking** on Route 1:
  - More sidewalks
  - More destinations within walking distance
  - Marked crosswalks on busy streets

- The most important improvements to **encourage biking** on Route 1:
  - Bike paths separated from car traffic (#1 rating)
  - Bike lanes on Route 1 (#2 rating)
  - More destinations in my neighborhood

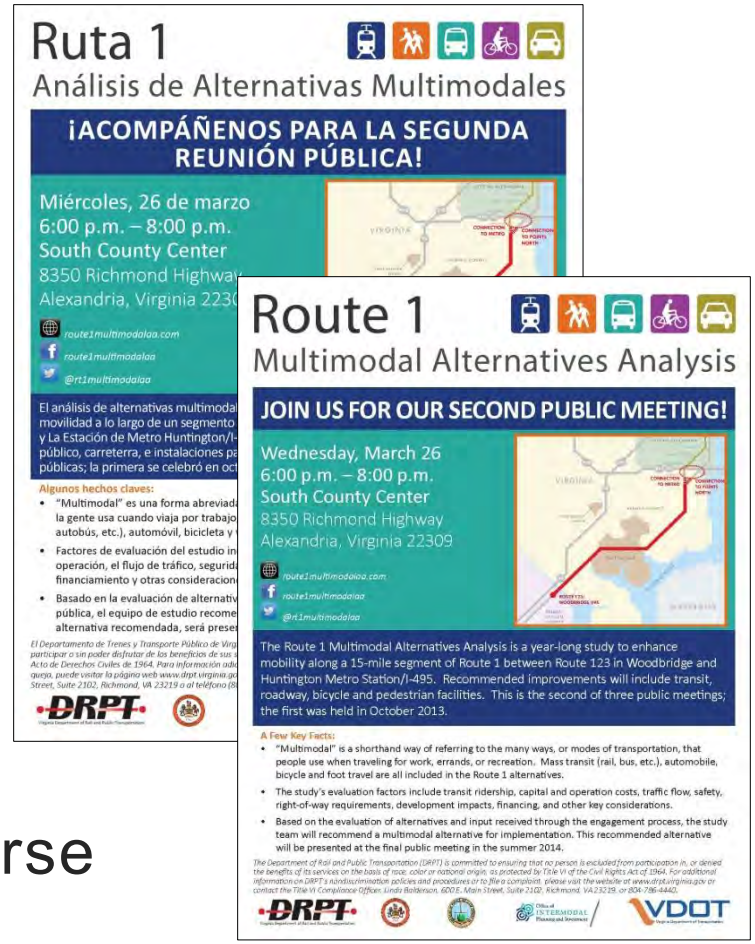
What We've Learned From You: Meeting #1

Key Themes:

- **Create destinations** on Route 1, not a throughway
- Understand how the Route 1 transit service **connects to the region,** not just destinations on the corridor
- Ensure that **Fort Belvoir is a key participant** as we look to the future. The travel impacts from Ft. Belvoir are very significant
- Create **safe pedestrian and bicycle conditions**, also ADA compliance
- Factor in stream protection and **environmental quality**

Outreach Methods

- Committee Meetings (technical, elected, community)
- Public Meetings
- Social Media
- News Ads and Press Release
- Flyers and Fact Sheets
- Metro Station and Bus Stop Outreach and Posters
- Community Event Booths
- Bilingual
- On-Line and On-Corridor
- Targeted Efforts to Engage Diverse Populations



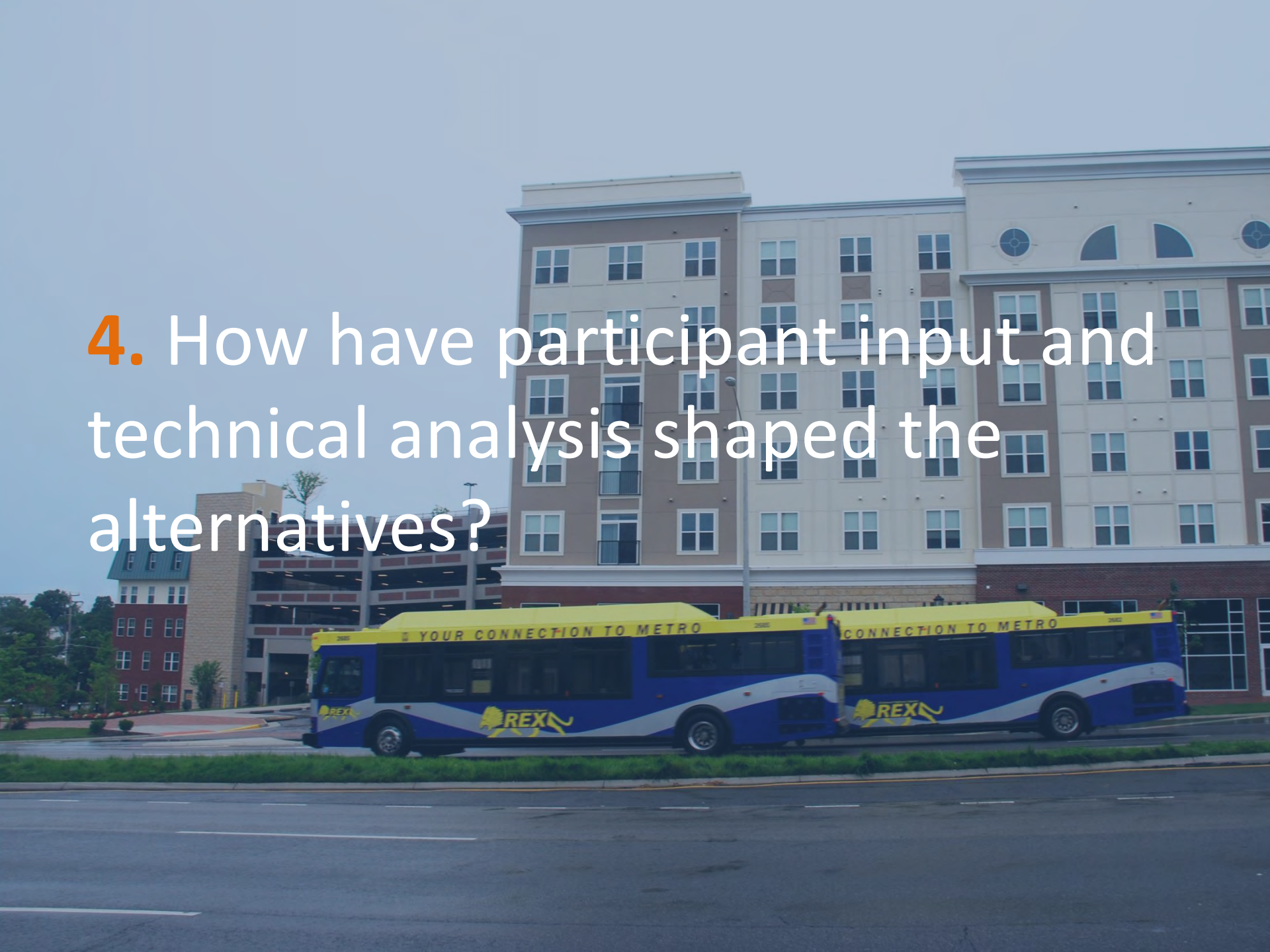
Goals of Today's Meeting

Key takeaways:

- Alternatives to be evaluated
- Land use and transportation planning for the corridor are linked
- Potential implementation sequence for corridor improvements

We want to feedback from you on:

- The alternatives
- Most important evaluation factors

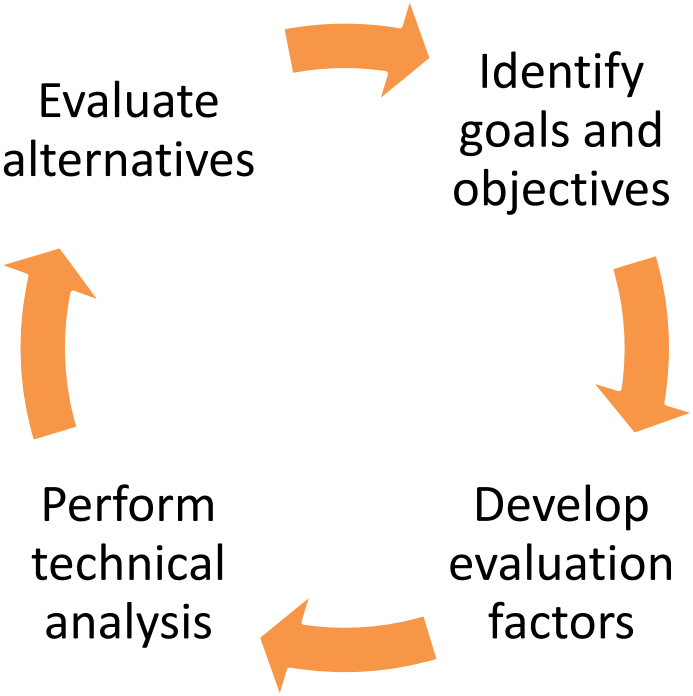


4. How have participant input and technical analysis shaped the alternatives?

Arriving at Recommended Multimodal Alternative: How do we choose one?

Key Evaluation Factors:

- Transit system performance
- Bicycle and pedestrian network improvements
- Traffic operations
- Implementation/ ability to phase project
- Financial feasibility
- Capacity to meet current and future needs
- Right-of-Way and impacts on community resources

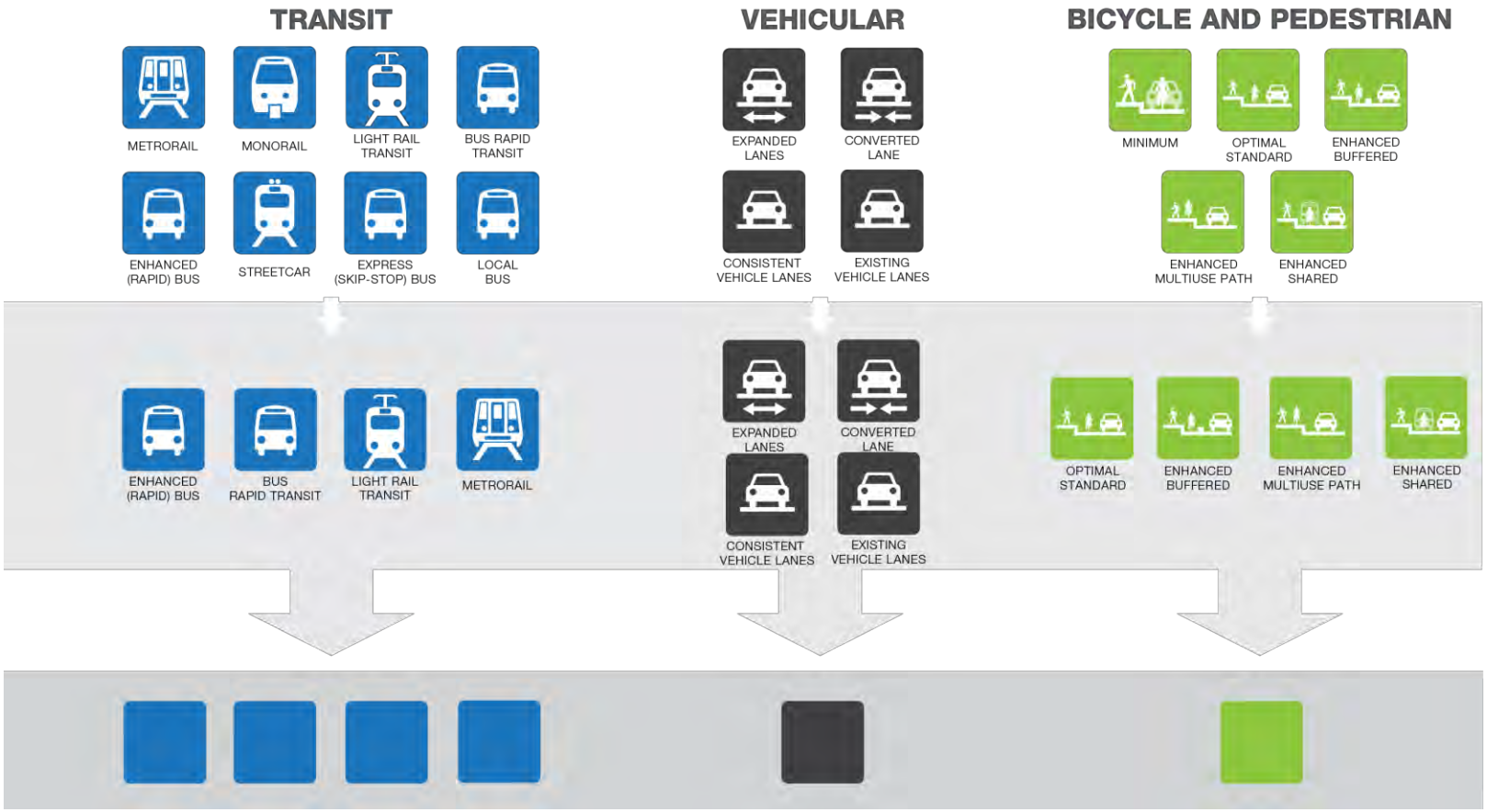


Step 1: Identify the best transportation options

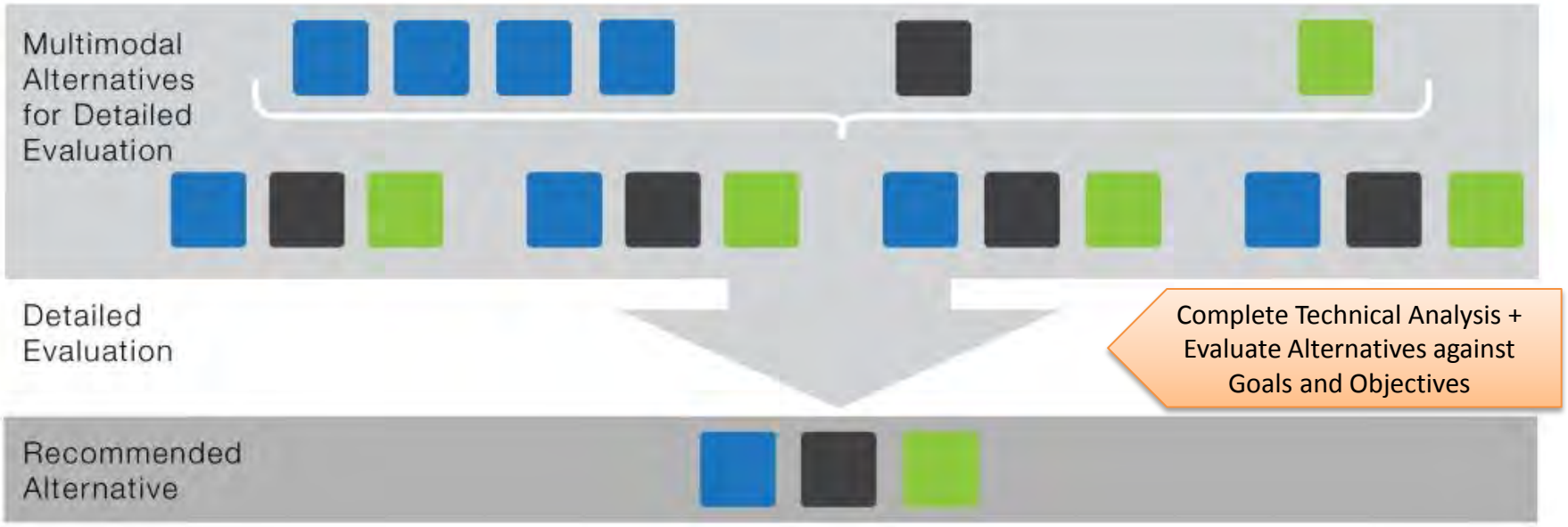
Range of Alternatives

Initial Alternatives

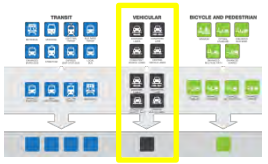
Refined Alternatives



Step 2: Combine options into multimodal alternatives



Vehicular Travel Lanes Alternatives



Existing Lanes

Expanded Lanes:

Three or four lanes, depending on location along the corridor

Converted Lanes

Consistent Lanes

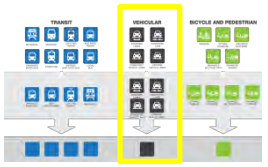
Key Evaluation factors:

- Level of Service (LOS)
- Volume-to-Capacity (V/C)
- Right of Way (ROW) impacts

Other, qualitative factors:

- Maintaining existing speeds
- Minimizing lane transitions
- Reducing pedestrian crossing distance/time

Vehicular Lanes Recommendation



Consistent, 6 vehicular lanes along the entire corridor

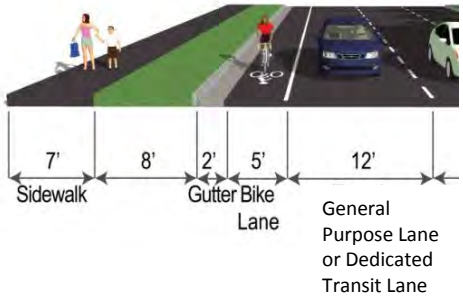
1. **Recommendation from prior studies and plans**
   (VDOT and Fairfax County Comprehensive Plan)

2. **Technical evaluation based on traffic and right-of-way analysis**

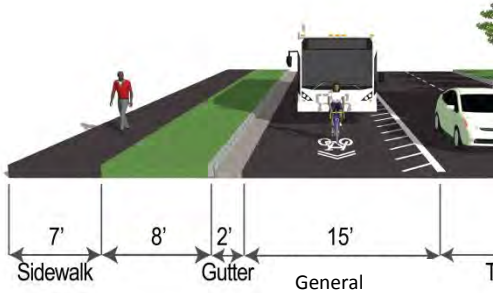
3. **Confirmed findings with VDOT**

Bicycle and Pedestrian Alternatives

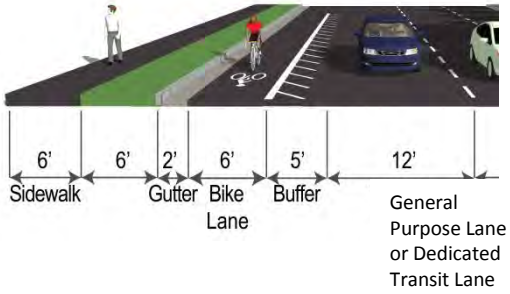
Sidewalk + bike lane



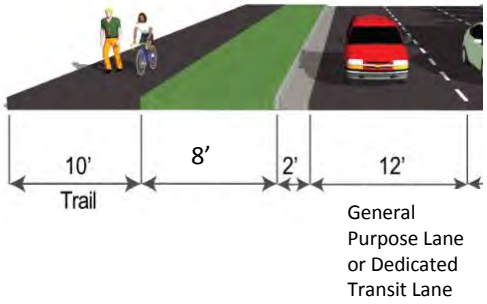
Sidewalk + bus/bike lane



Sidewalk + buffered bike lane



Multiuse path (bike and ped)



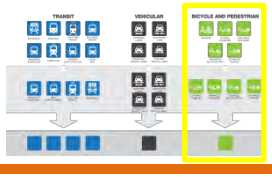
Key Evaluation factors:

- Safety and comfort for cyclists of all abilities
- ROW impacts

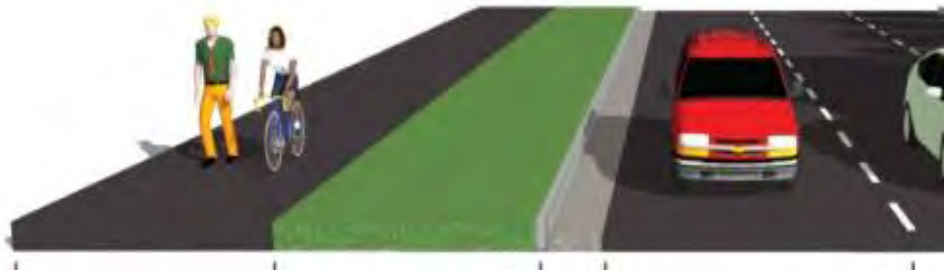
Measures and factors:

- Bicycle compatibility index and Bicycle Level of Service
- Possible to implement incrementally / flexible over time

Bicycle and Pedestrian Recommendation



10-foot Multiuse Path (both sides of street)



1. **Technical evaluation based on trade-offs among accessibility, safety, and required right-of-way**

2. **Note: implementation of recommended section varies along corridor**

Transit Evaluation: Overview

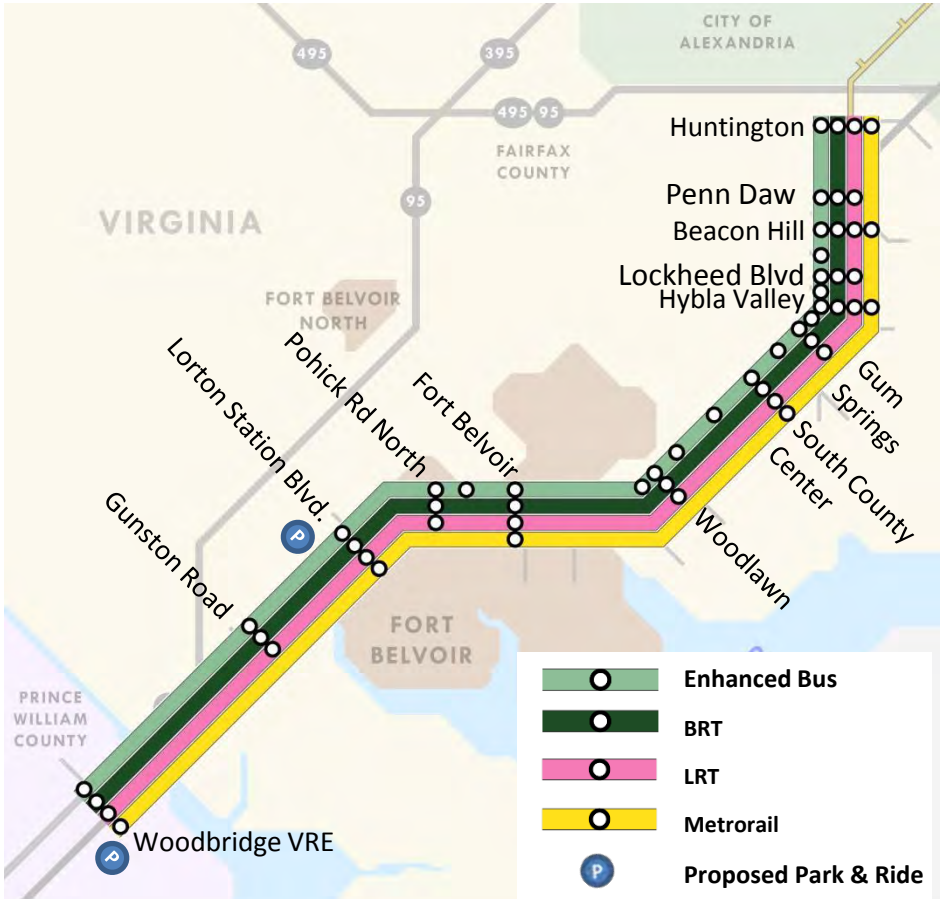
1. **Screened a wide range of transit alternatives** based on basic project requirements to arrive at four initial alternatives

2. Analyzed **four transit alternatives** to identify the most promising for further evaluation

Initial Alternatives

Four Initial Transit Alternatives:

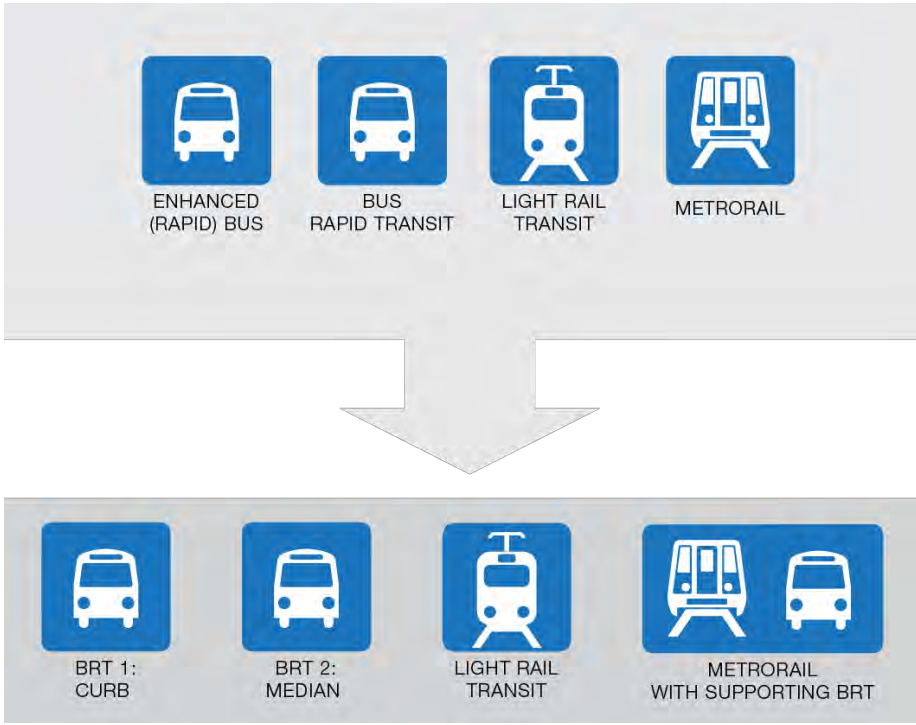
- Enhanced Bus
- Bus Rapid Transit (BRT)
- Light Rail Transit (LRT)
- Metrorail



How do we refine the initial alternatives for further evaluation?

1. Quantitative Key Indicators:
   - Ridership
   - Estimated Capital Cost
   - Estimated O&M Cost
   - Cost per Rider

2. Land Use Analysis



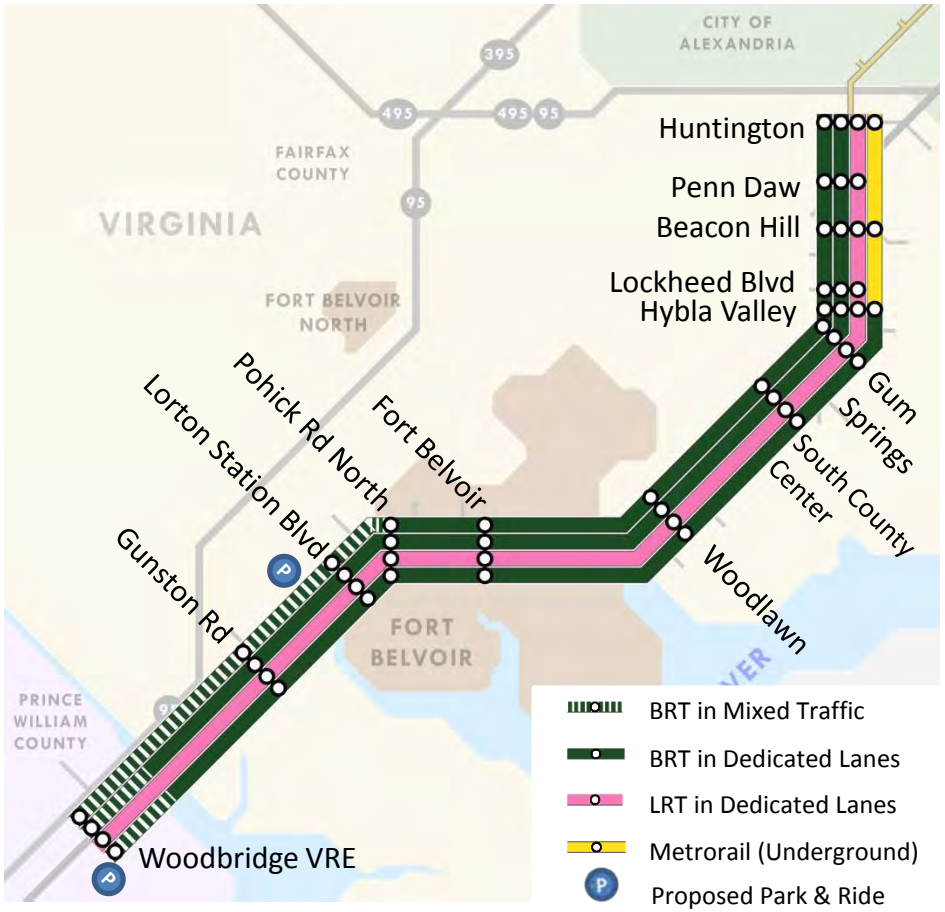
Four Refined Alternatives for Further Evaluation

Alternative 1:
Bus Rapid Transit 1- Curbside

Alternative 2:
Bus Rapid Transit 2- Median

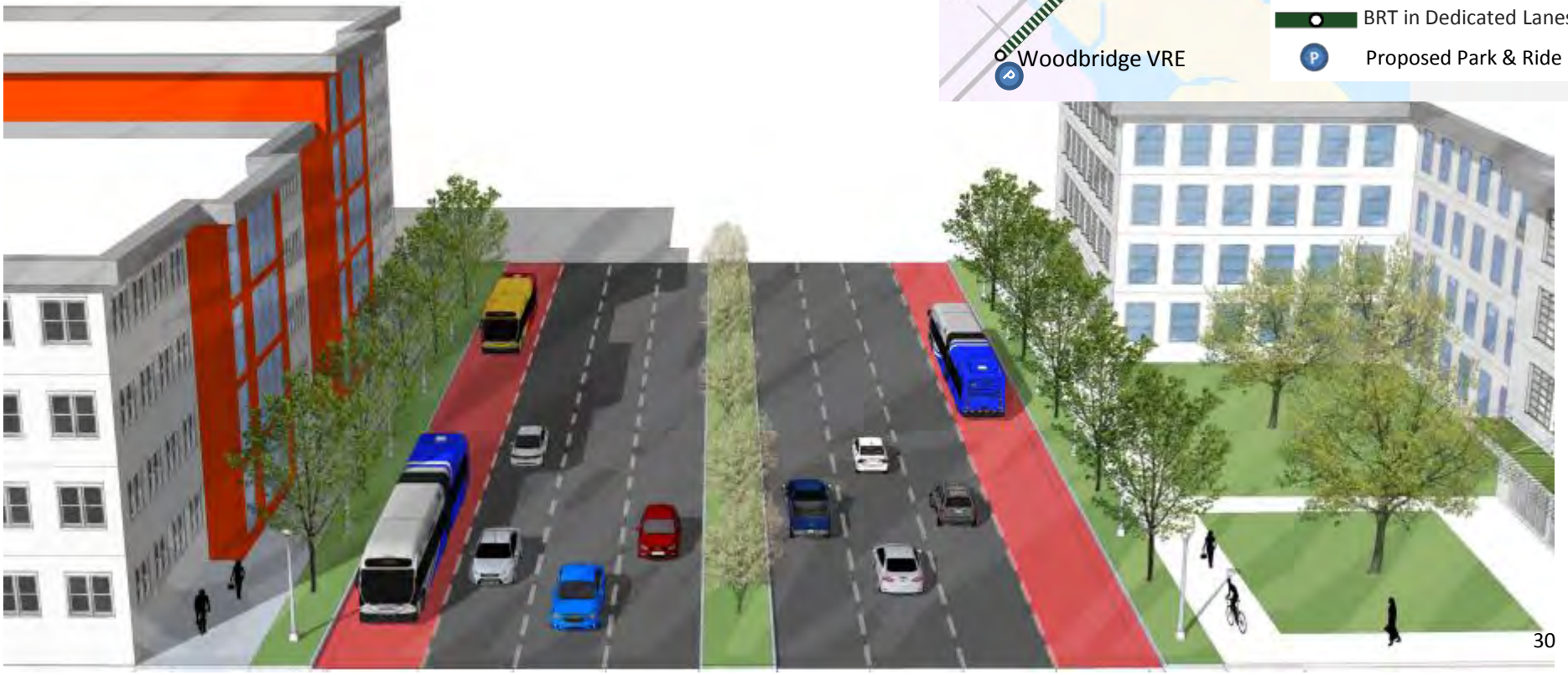
Alternative 3:
Light Rail Transit

Alternative 4:
Metrorail- BRT Hybrid



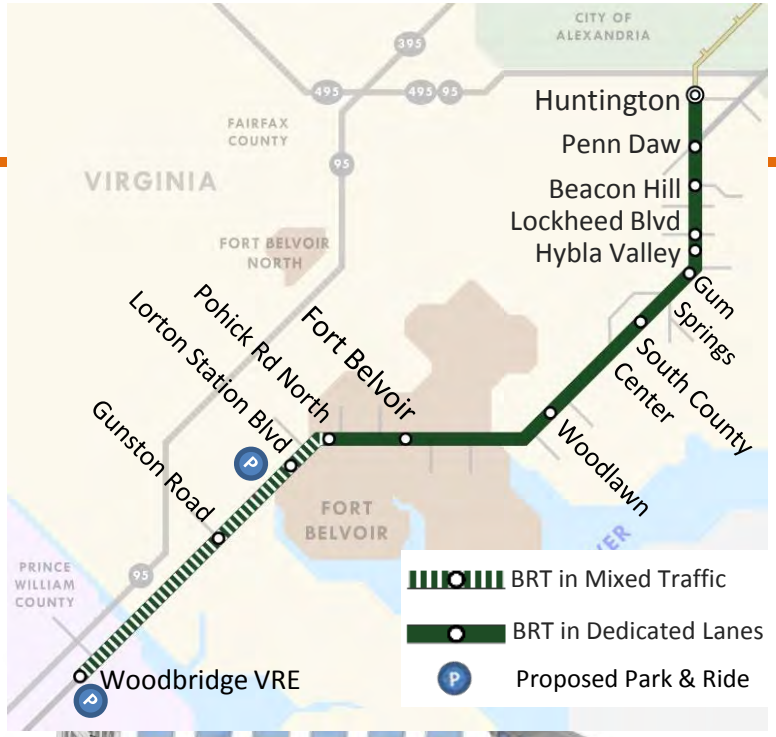
Alternative 1:
Bus Rapid Transit 1 – Curbside

BRT operates in dedicated curbside lanes from Huntington to Pohick Road North



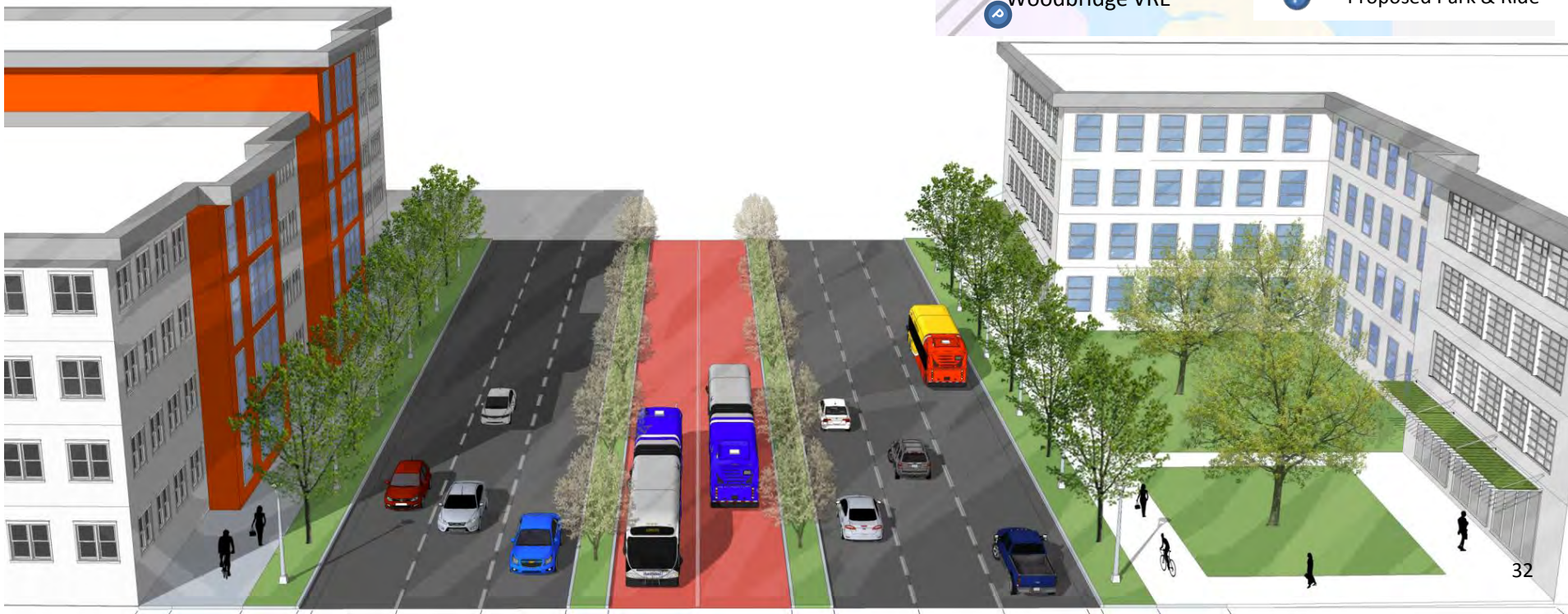
Alternative 1:
Bus Rapid Transit 1 – Curbside

BRT operates in mixed traffic between Pohick Road North and Woodbridge



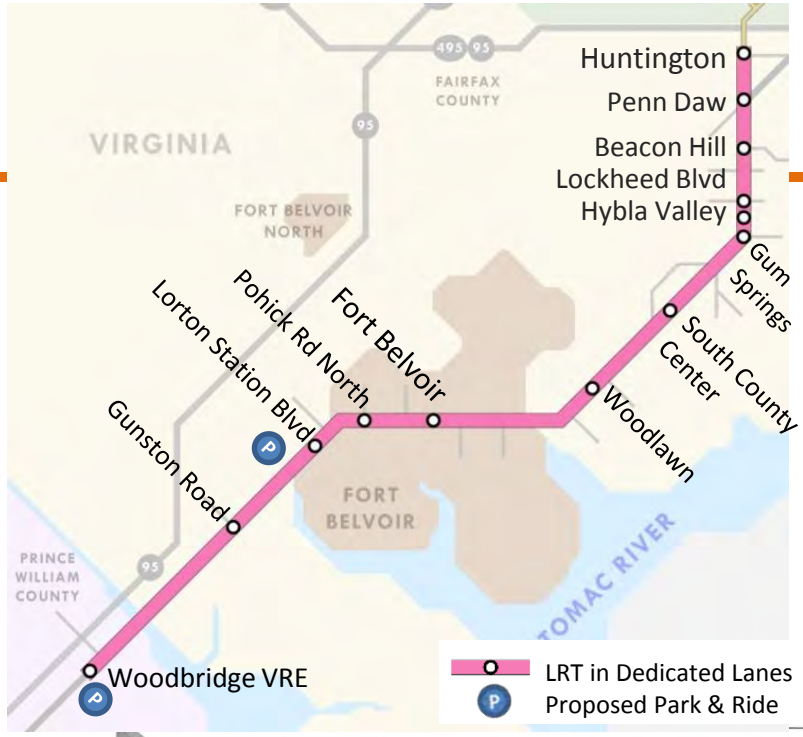
Alternative 2:
Bus Rapid Transit 2 - Median

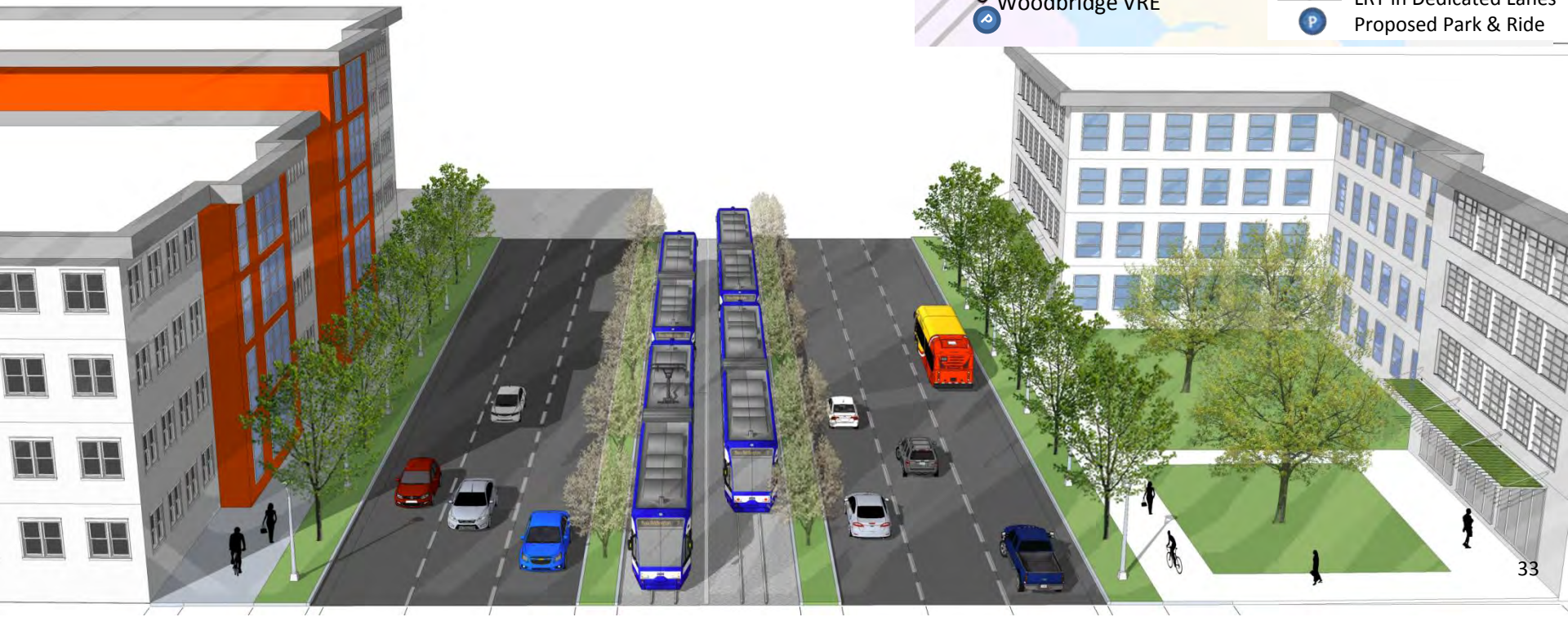
BRT operates in median in dedicated lanes in Fairfax County; transitions to mixed traffic in Prince William County



Alternative 3: Light Rail Transit (Median)

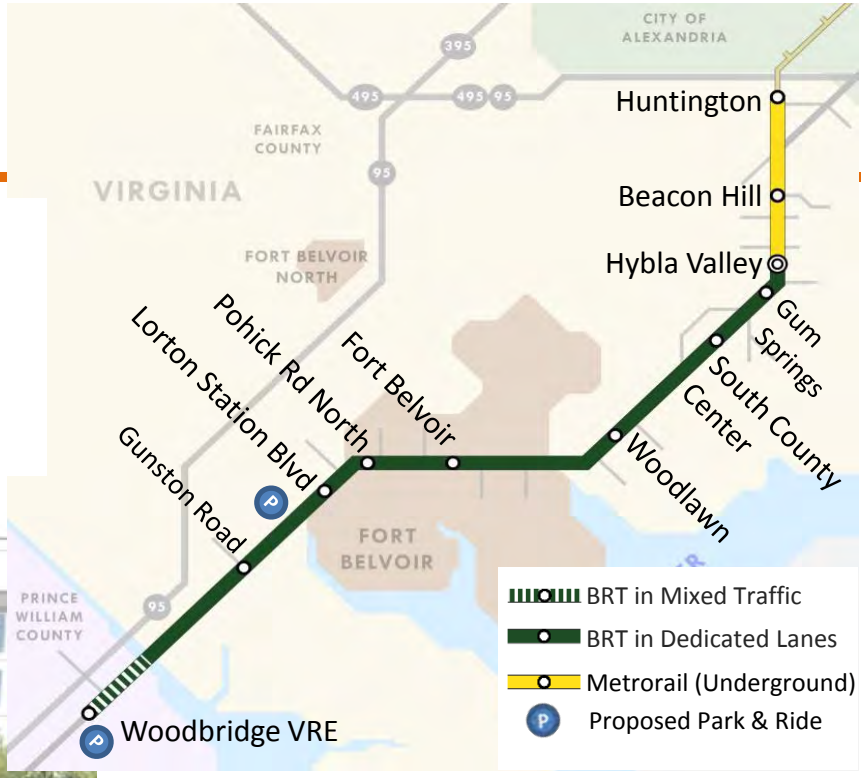
Light Rail operates in median in dedicated lanes for entire corridor





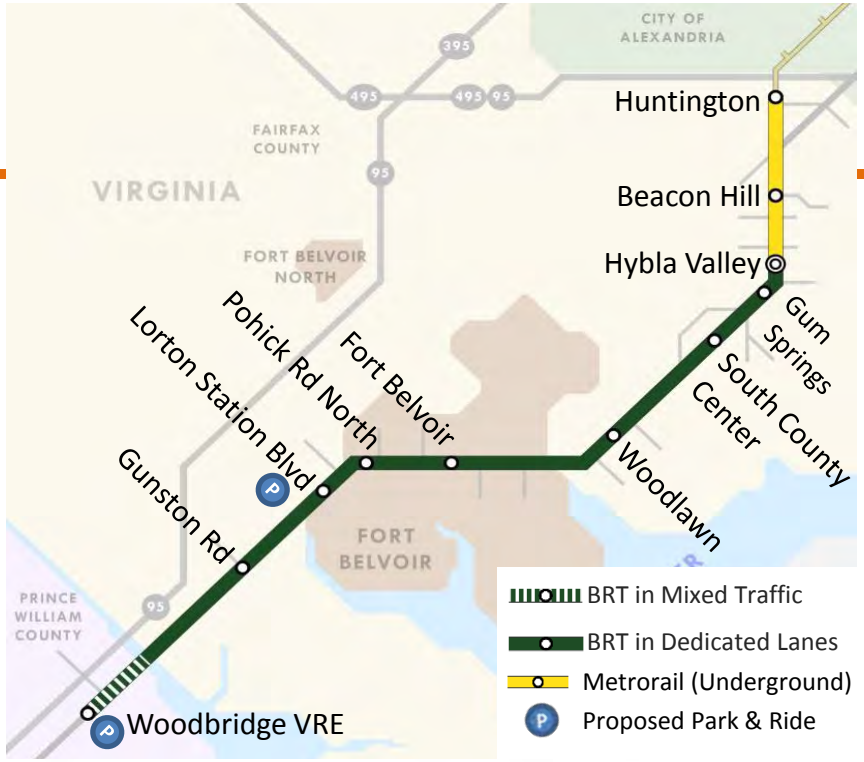
Alternative 4: Metrorail- BRT Hybrid

Metrorail operates underground from Huntington to Hybla Valley;
Transfer to BRT service at Hybla Valley to Woodbridge



Alternative 4: Metrorail- BRT Hybrid

BRT operates in dedicated lanes from Hybla Valley, and transitions to mixed traffic in Prince William County



Key Indicators: Refined Transit Alternatives

	Bus Rapid Transit 1-Curbside	Bus Rapid Transit 2-Median	Light Rail Transit-Median	Metrorail/BRT Hybrid
Average Weekday Ridership (2035)	15,200	16,600	18,400	26,500* (BRT 10,600; Metro 22,900)
Conceptual Capital Cost	$500 M	$780 M	$1.20 B	$1.57 B
Annual O&M Cost	$18 M	$17 M	$24 M	$31 M
Cost Per Rider**	$12	$15	$21	$18

* Corridor ridership, excluding transfers between Metrorail and BRT portions

**Assumes Annualized Capital Cost + Operating Costs divided by total boardings (2035)
Note: FTA Cost Effectiveness measure averages current (2015) and horizon year (2035) costs and boardings

Arriving at a Preferred Alternative

Evaluate the Alternatives based on:

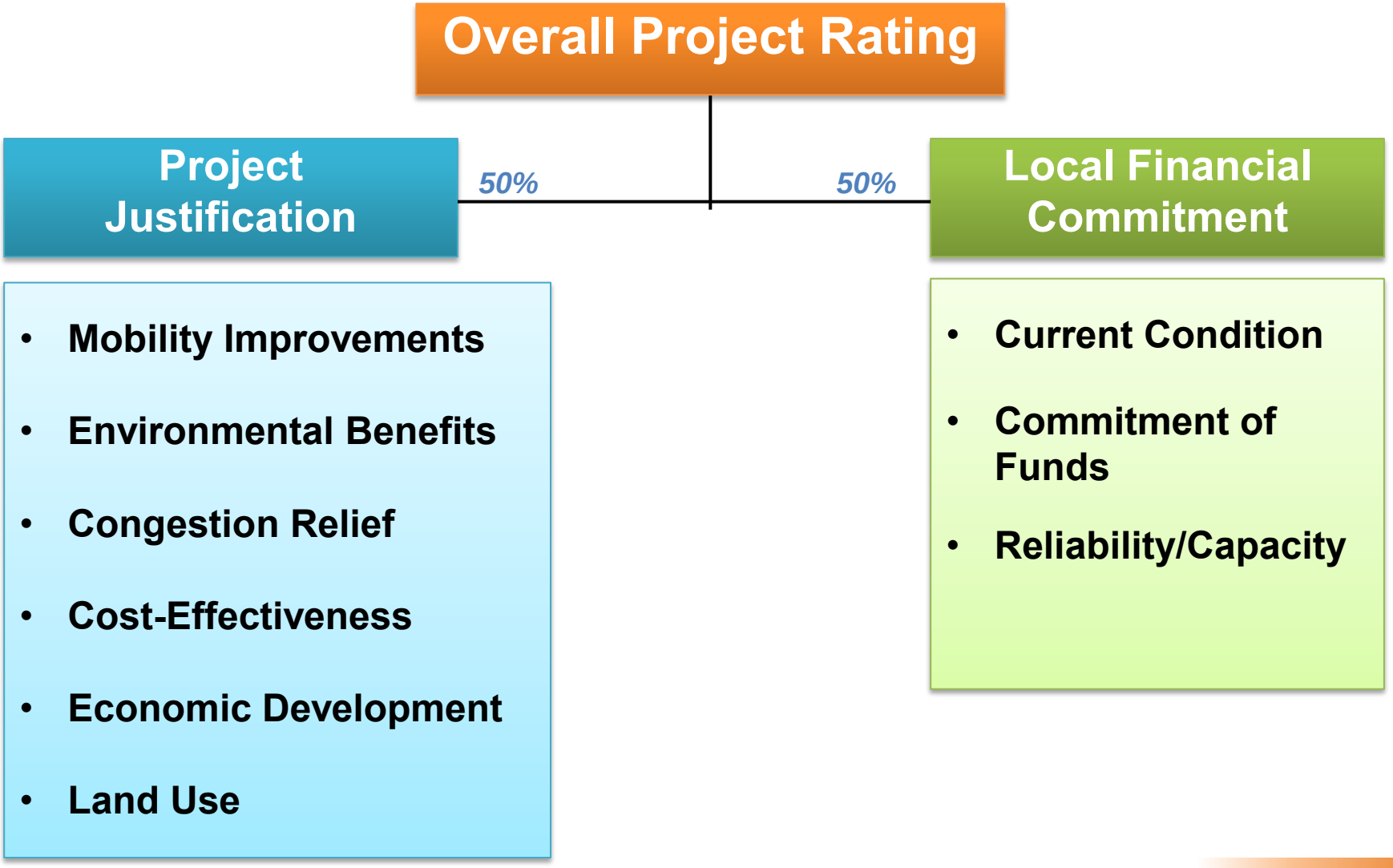
- How well does each alternative address the **Project Goals and Objectives**?

- Which alternatives are most competitive for **Federal funding**?

Example Measures: Goals and Objectives

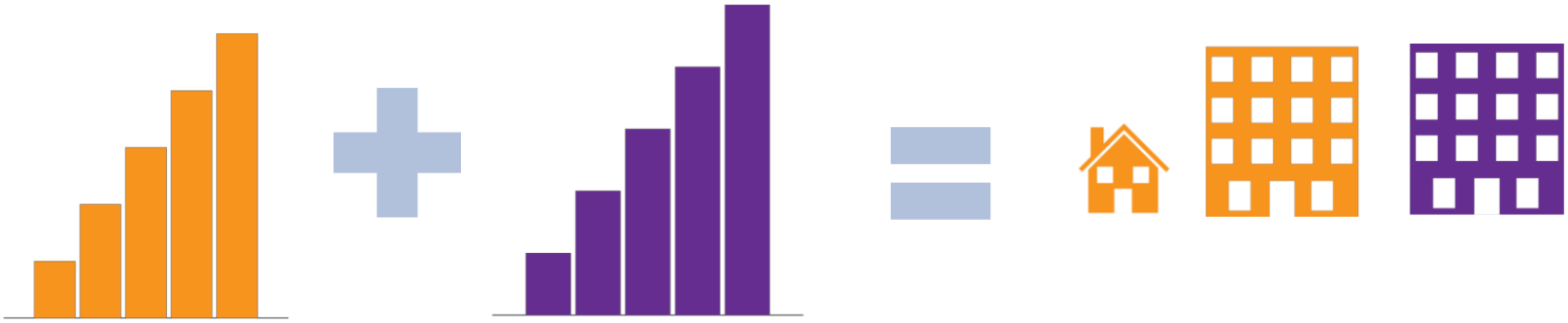
- Ridership
- Travel time
- Safe bike/ped facilities
- Traffic
- Capital and operating costs
- Cost effectiveness
- Ability to spur economic development
- Impacts on Right of Way and environmental resources
- Decrease in Vehicle Miles Traveled

Federal Transit Administration: New Starts Small Starts Funding Evaluation Criteria



5. How does land use relate to the alternatives?

Transportation Investment helps to increase economic viability and vitality of the corridor



Population growth

Employment growth

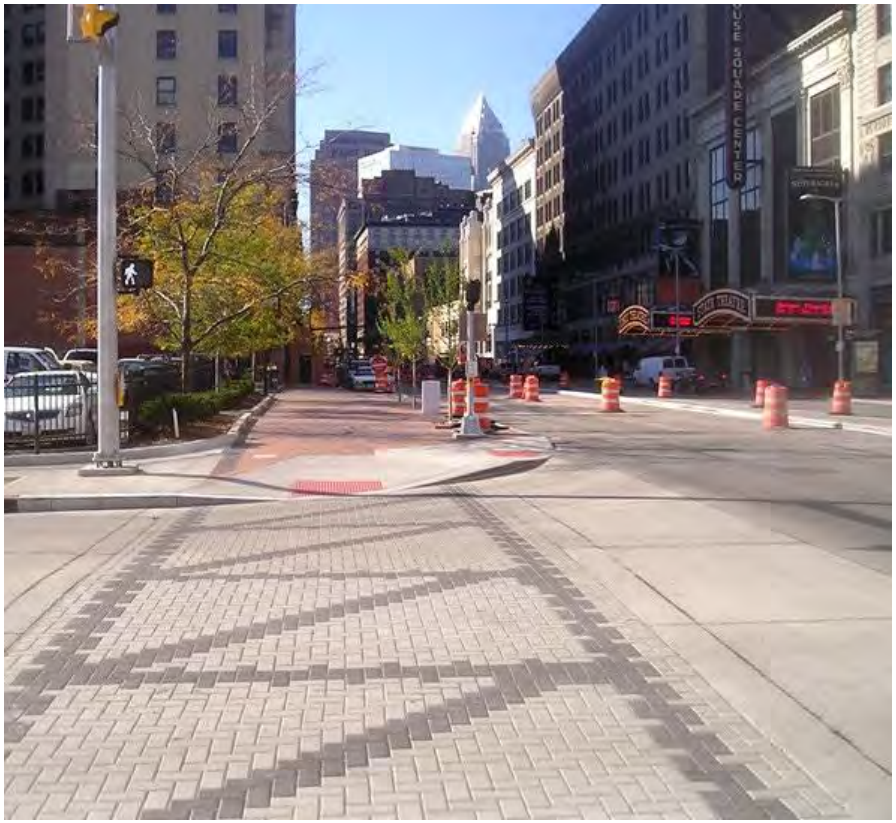
Demand for new residential units and commercial space

Land use planning

Transportation investment

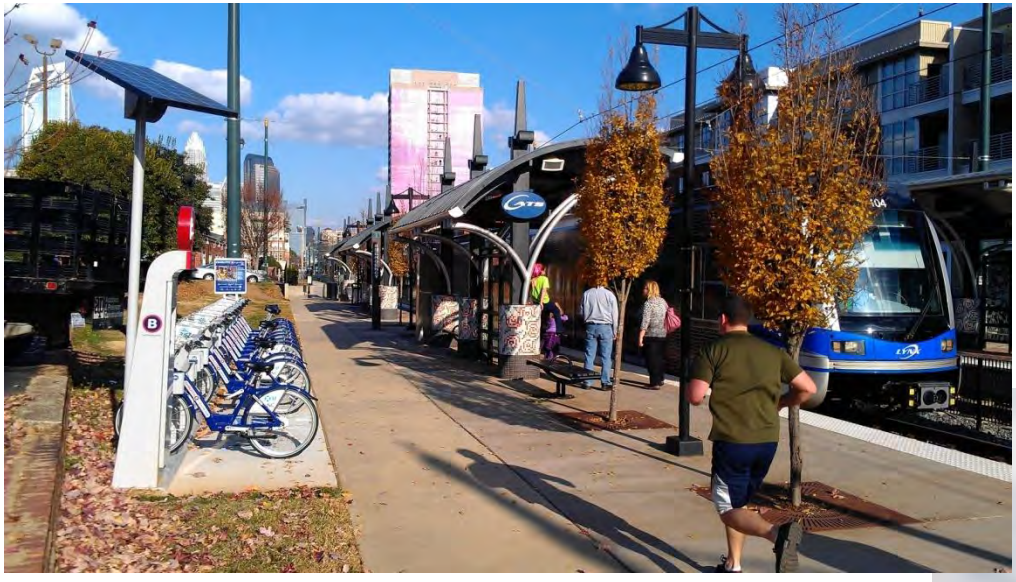
Support high quality community development

Example: Cleveland, OH (Bus Rapid Transit)



- Pedestrian-oriented, higher concentration development
- Larger tax base
- Increased travel demand

Example: Charlotte, NC (Light Rail)



- Pedestrian-oriented, higher concentration development
- Larger tax base
- Increased travel demand

Example: Arlington, VA (Metrorail)

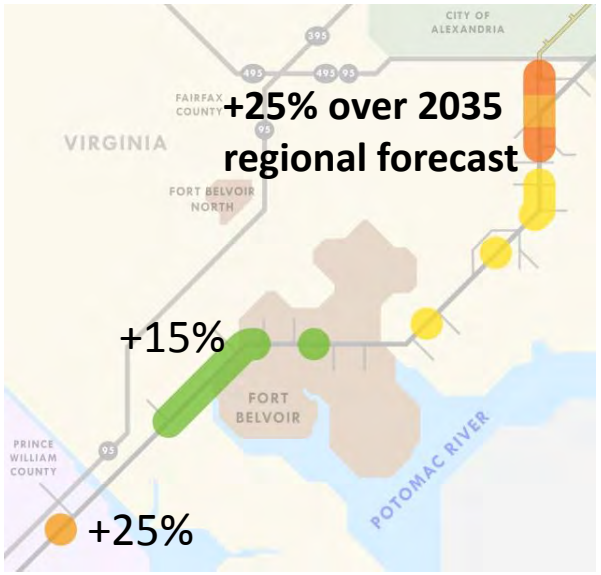
- Pedestrian-oriented, higher concentration development
- Larger tax base
- Increased travel demand

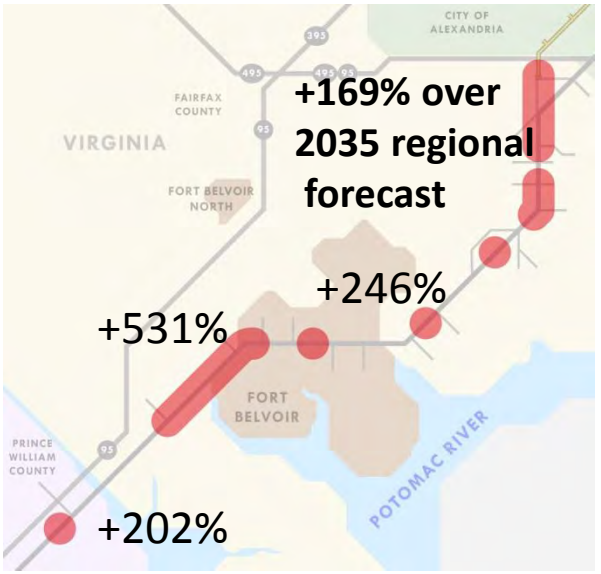
Land Use: Three Growth Scenarios

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?





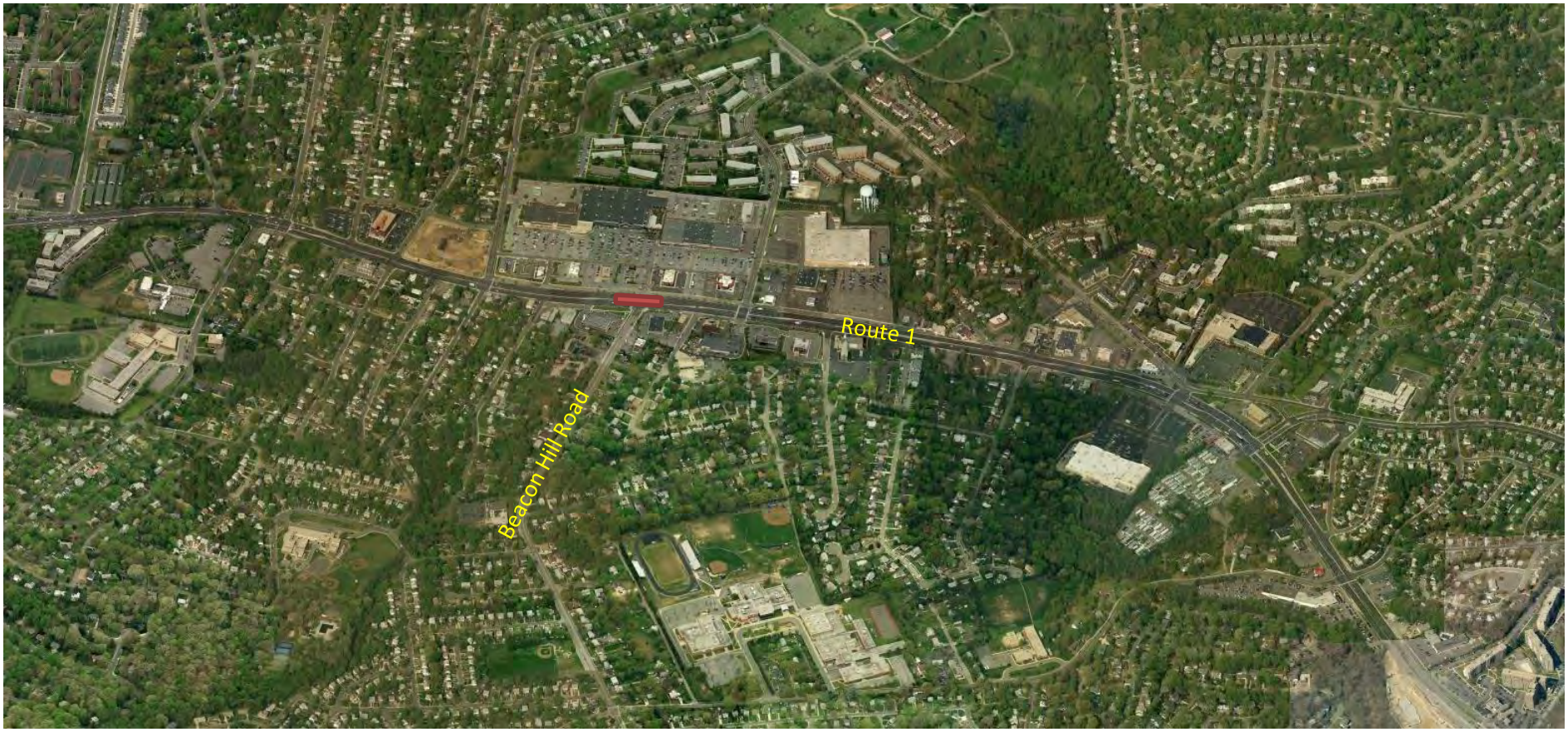
- Urban Core (Rail)
- Urban Center (BRT/ LRT)
- Large Town/Suburban Center (Express Bus)
- Medium Town/Suburban Center (Fixed Route Bus)

Source: DRPT Multimodal Design Guidelines (2013)

Office of INTERMODAL Planning and Investment

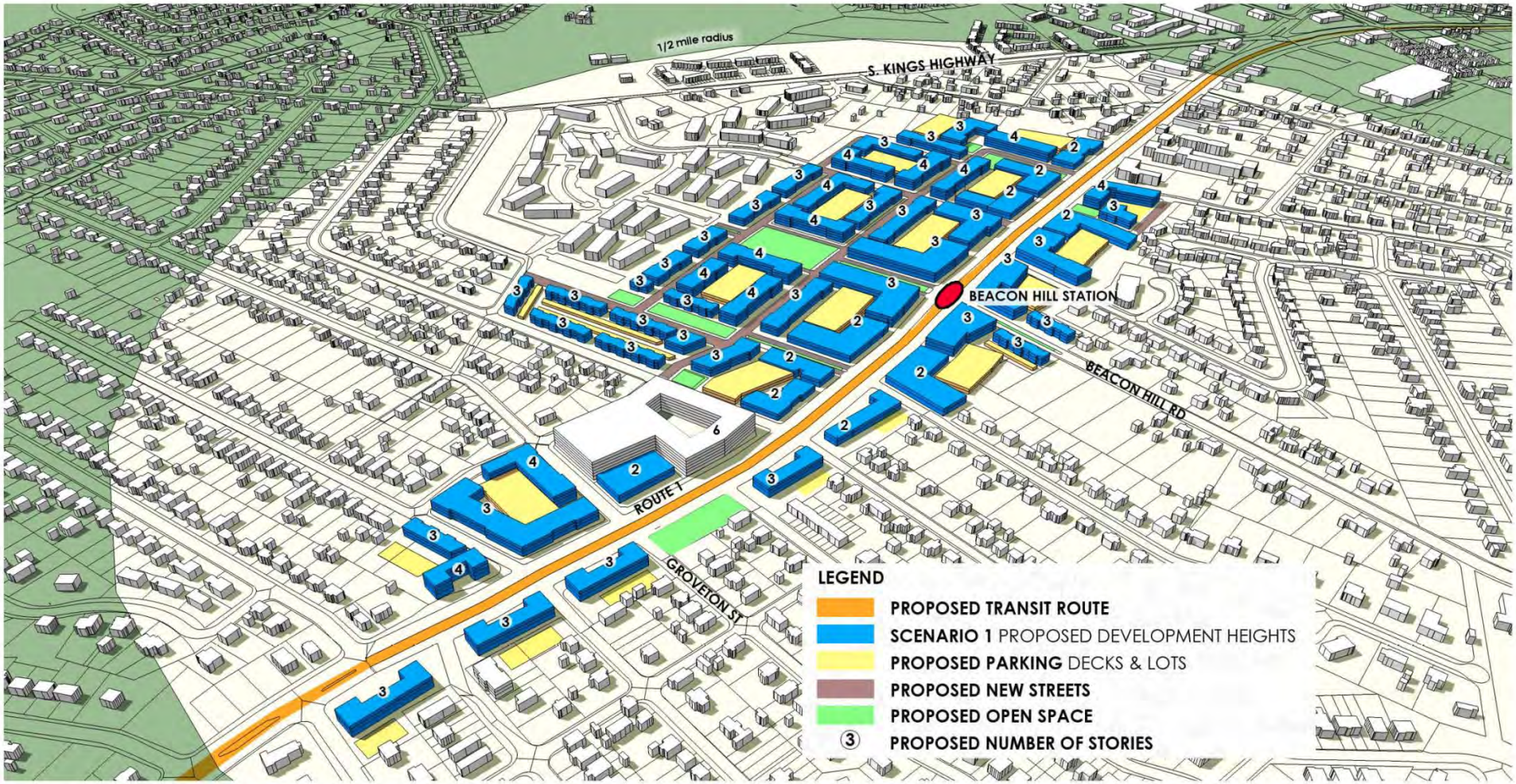
VDOT

Beacon Hill: Bird's Eye View Today



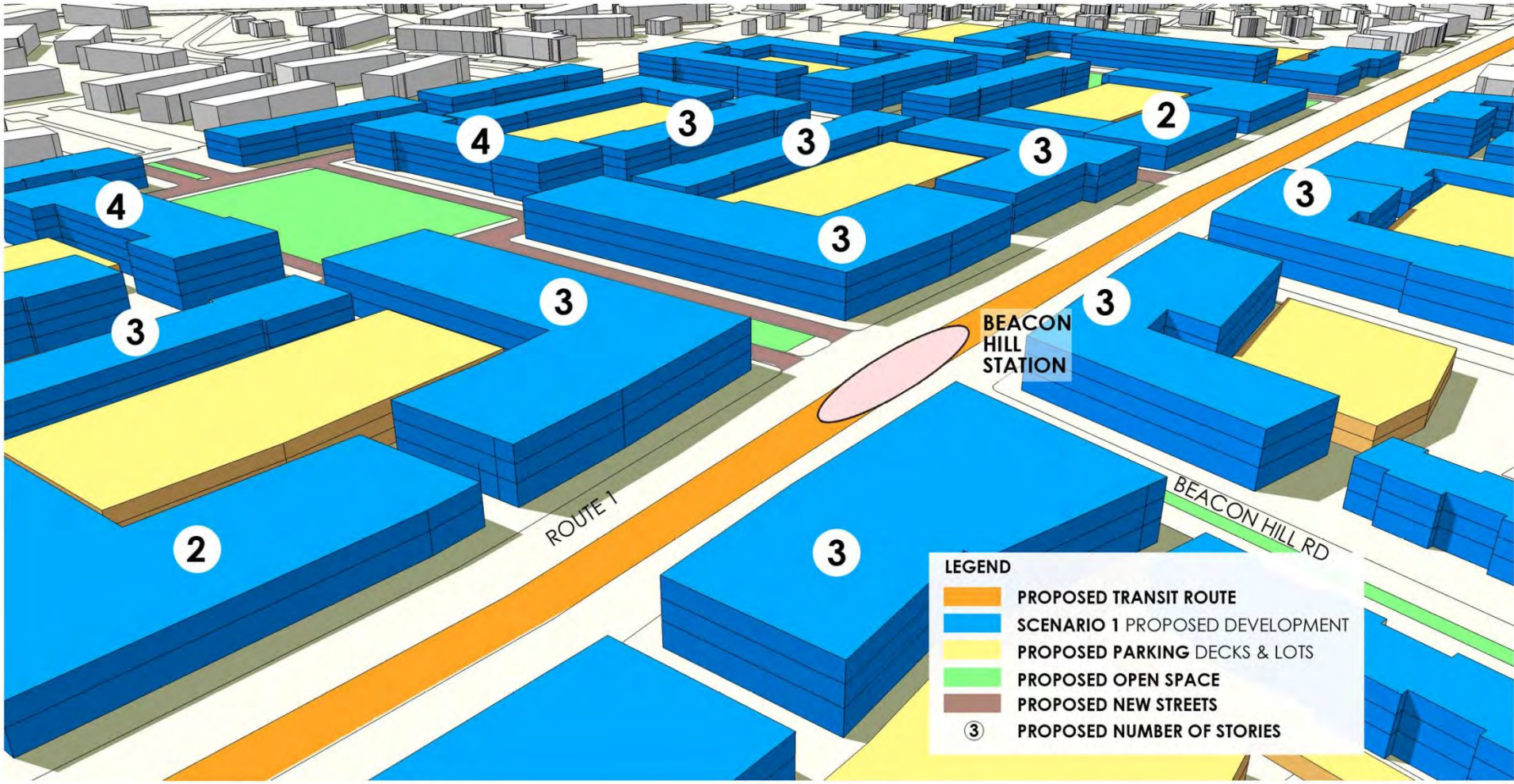
Source: Bing Maps

Beacon Hill: Land Use Scenario One (2035 COG Projection)



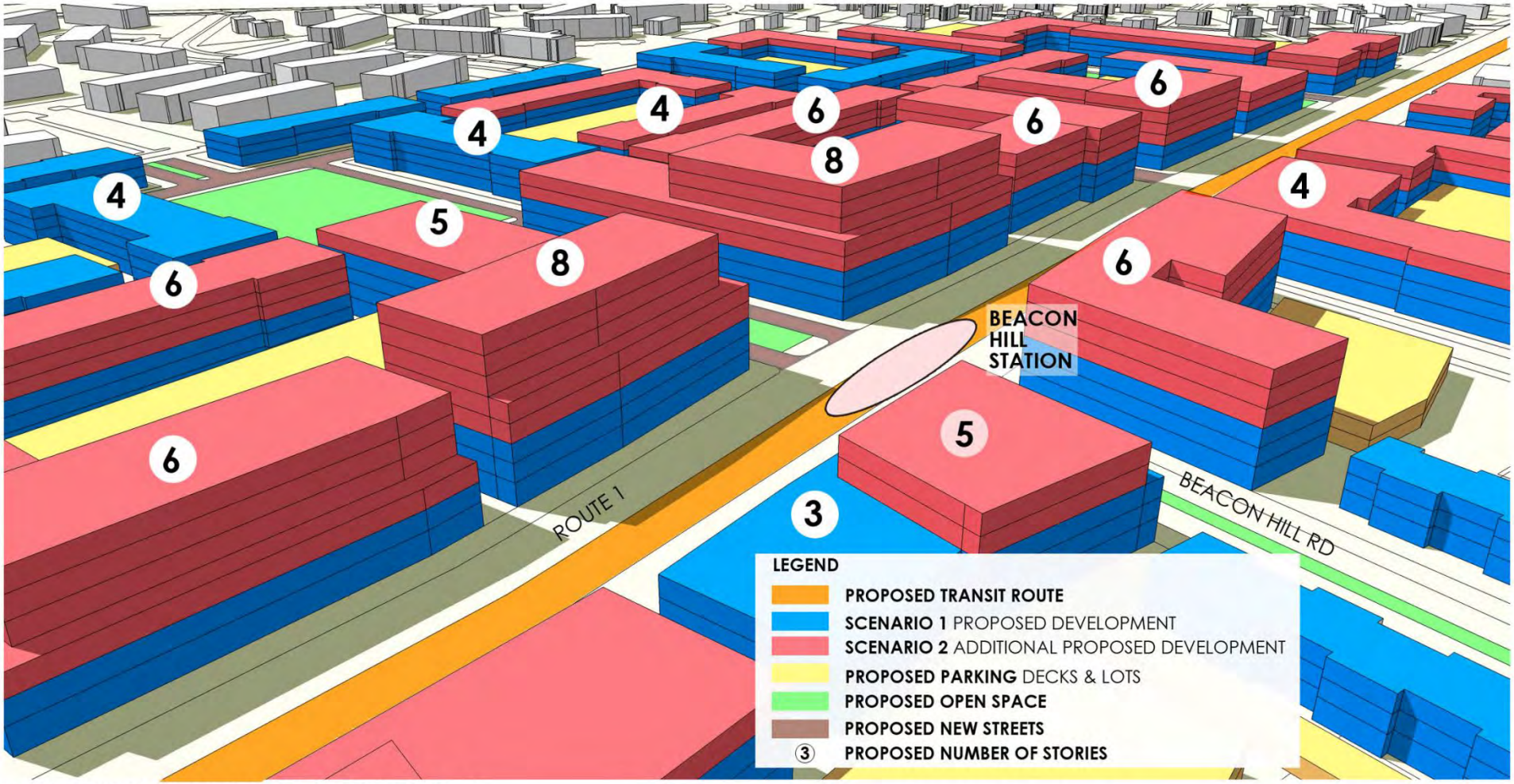
BEACON HILL STATION SCENARIO 1

Beacon Hill: Land Use Scenario One (2035 COG Projection)



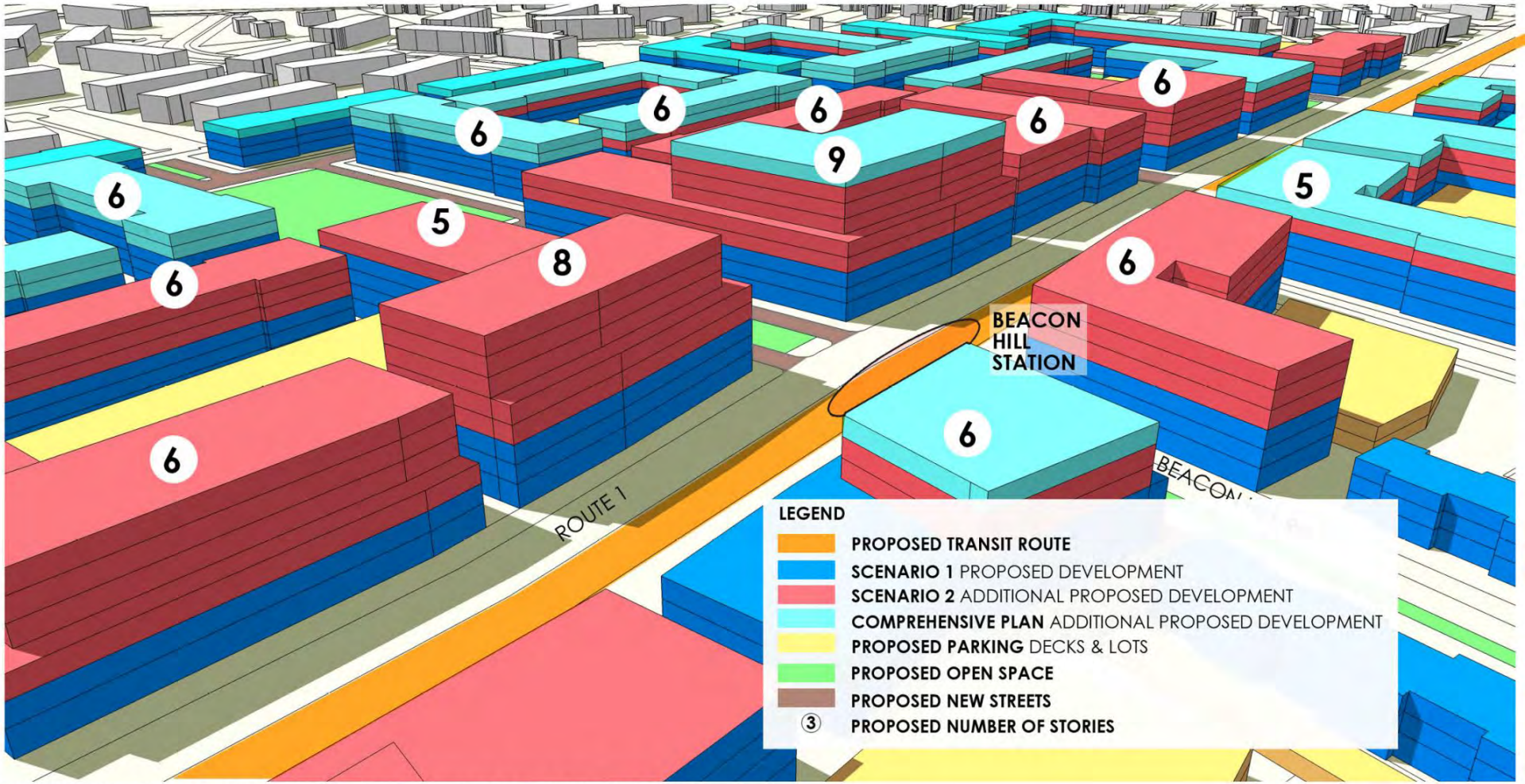
BEACON HILL STATION SCENARIO 1

Beacon Hill: Land Use Scenario Two
(Transit investment and additional growth)



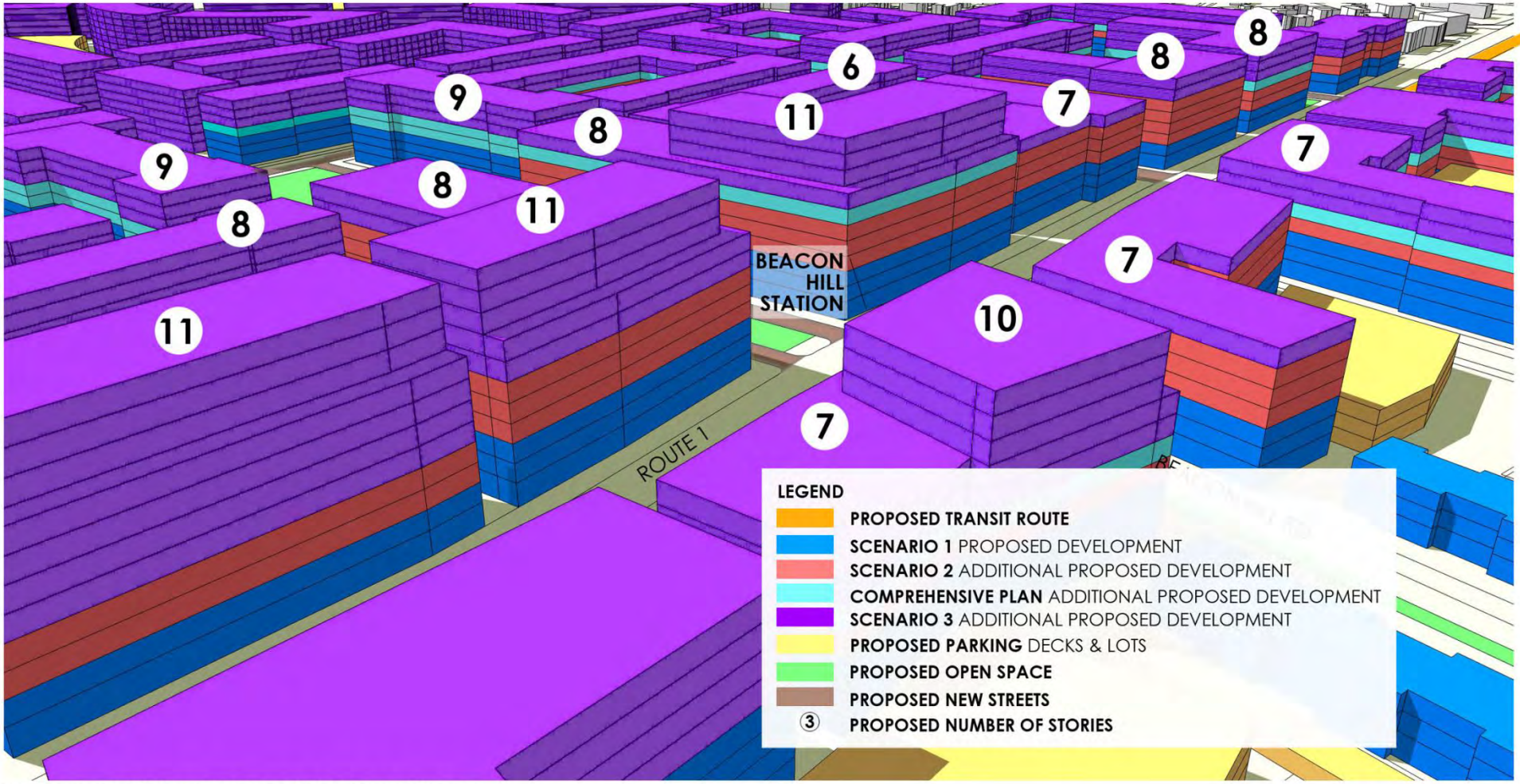
BEACON HILL STATION SCENARIO 2

Beacon Hill: County Comprehensive Plan
(Envisioned “ build-out” level of development)



BEACON HILL STATION SCENARIO COMPREHENSIVE PLAN

Beacon Hill Station: Scenario Three
(Growth and development that would support Metrorail)



BEACON HILL STATION SCENARIO 3

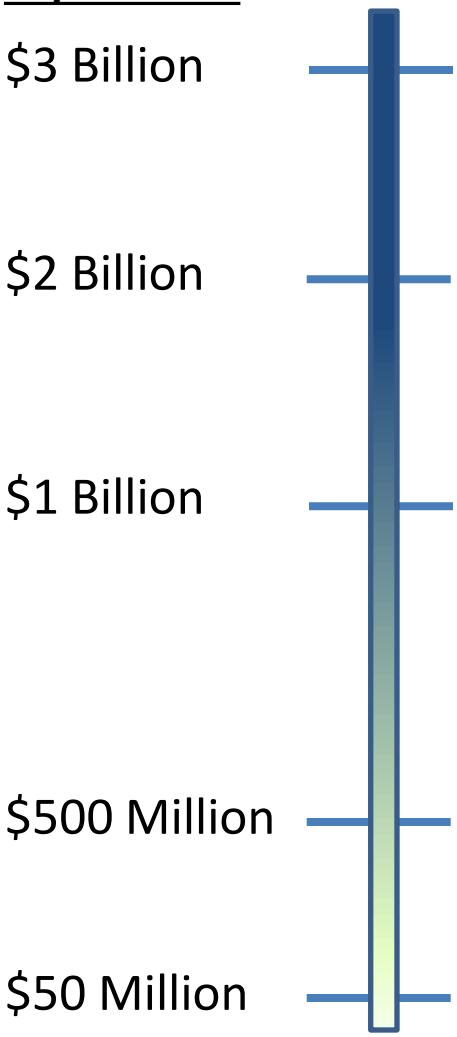
Beacon Hill: Bird's Eye View Today

Beacon Hill: Scenario Two Bird's Eye View

6. How do communities fund major transportation investments?

Comparison of Route 1 Alternatives with Other Regional Transit Projects

Capital Cost

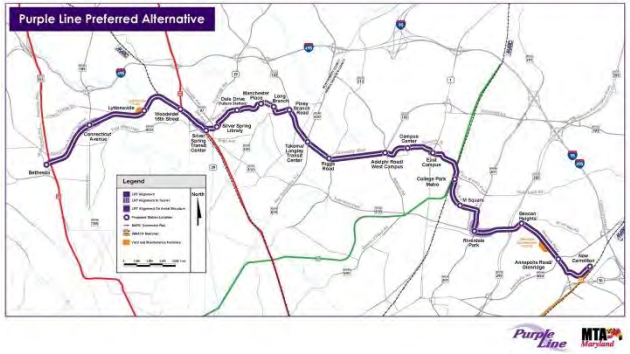


Silver Line Phase 1 (Metro)	**$2.9 B**
MDOT Purple Line (LRT)	**$2.4 B**
Alternative 4- Metro/BRT Hybrid	***($1.6 B)***
Alternative 3- LRT	***($1.2 B)***
Alternative 2 BRT - Median	***($750 M)***
Alternative 1 BRT - Curbside	***($500 M)***
Norfolk Tide (LRT)	**$316 M**
Broad Street (BRT)	**$50 M**

Project Funding Examples: MDOT Purple Line

16-mile / 21-station LRT line along exclusive and shared ROW
Operation expected to begin late 2020
$2.4 billion

Funding Source	Type	Share (YOE)
Federal	New Starts	$0.9 B (38%)
Regional	n/a	
State	MD Transportation Trust Fund (TTF)	$0.7 B (28%)
Other	-Federal TIFIA with financing by private sector -Private equity & borrowed funds	$0.7 B (31%) $0.1 B (3%)
Total Cost		*$2.4 B*



Project Funding Examples: MWAA Silver Line Phase 1 & Phase 2

Phase 1: 11.7 miles/5 stations … Phase 2: 11.4 miles/6 stations + yard
Phase operation expected to begin in 2014; Phase 2 in 2018
$5.5 Billion

Funding Source	Type	Phase I (YOE)	Phase II (YOE)	Total Share (YOE)
Federal	New Starts	$900 M		$900 M (16%)
State	DRPT	$252 M	$323 M	$575 M (11%)
Local	Fairfax County	$400 M	$484 M	$884 M (16%)
	Loudoun County		$264 M	$264 M (5%)
Other	MWAA (Aviation)		$225 M	$225 M (4%)
	MWAA (Dulles Toll Road)	$1.4 B	$1.3 B	$2.6 B (48%)
Total Cost		*$2.9 B*	*$2.6 B*	*$5.5 B*

Project Funding Examples: Richmond Broad Street Rapid Transit

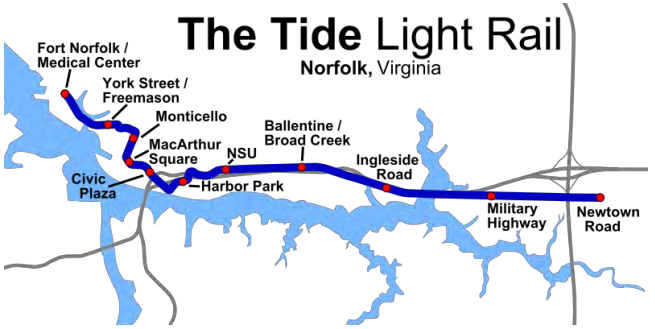
7.6-mile / 13-station BRT line on existing streets
Operation expected to begin 2017
$50 Million

Funding Source	Type	Share (YOE)
Federal	Small Starts	$25 M (50%)
State	DRPT	$17 M (34%)
Local	City County	$8 M (15%) $0.4 M (1%)
Total Cost		*$50 M*

Project Funding Examples: Norfolk TIDE Light Rail

7.4-mile / 13-station LRT line on rail right of way and existing streets
Operation initiated 2011
$316 Million

Funding Source	Type	Share (YOE)
Federal	FTA New Starts Other Federal Total Federal	$129 M (41%) $74 M (23%) $200M (64%)
Regional	n/a	
State	Commonwealth of Virginia	$62 M (20%)
Local	City of Norfolk	$54 M (17%)
Total Cost		*$316 M*



7. What are the next steps?

Stepping back – Purpose of the study:

- Recommend a program of road, bike and pedestrian improvements, and a high-quality transit alternative to be carried forward for implementation

- Consider project funding options

- Determine the appropriate level of environmental documentation

Continued Solutions: This study will serve as a tool to…

- Identify short-term and long-range improvements along Route 1
- Plan infrastructure that supports future growth in the corridor
- Define an ultimate Route 1 concept configuration
- Better define how Route 1 fits in to the regional transportation plan
- Define multi-modal approach for Route 1 and seek out funding and implementation opportunities

8. We need your feedback!

APPENDIX

Vehicular Lane Evaluation

Alternative		Intersection Performance	Right of Way Impacts
Expanded		No intersections with LOS E or worse	Significant ROW impacts
Consistent		3 intersections with LOS E or worse	Moderate ROW impacts
Converted		10 intersections with LOS E or worse	Few ROW impacts

Compares less favorably

Compares more favorably

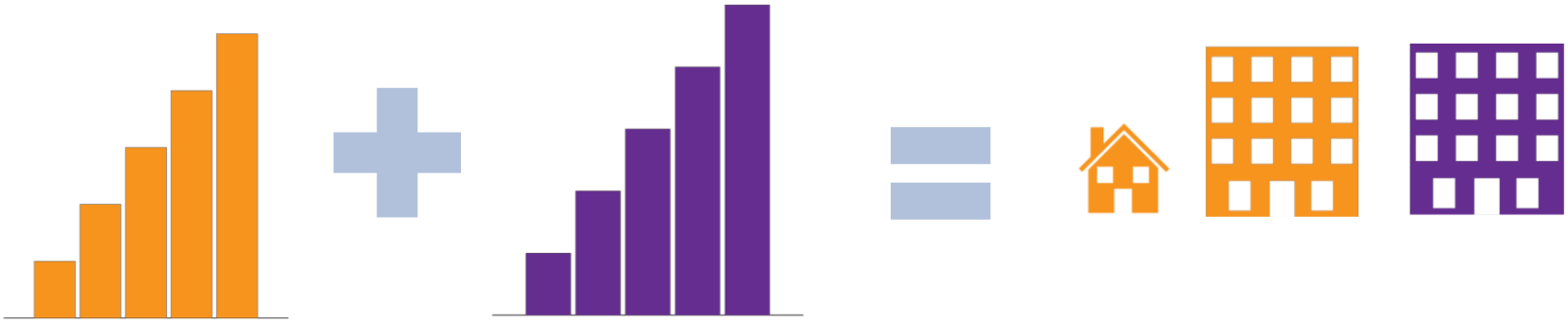
Other, qualitative factors:

- Desire to maintain existing speeds (45 mph)
- Minimize lane transitions that contribute to travel delays
- Minimize pedestrian crossing distance/time

Bicycle and Pedestrian Evaluation

	In-street bike lane and sidewalk	Shared bus/bike lane and sidewalk	Buffered bike lane and sidewalk	Multiuse path
Legend for ratings: ↑ Compares more favorably ↓ Compares less favorably				
Provides access along full corridor	Improves walk & bike access to destinations ↑	Improves walk & bike access to destinations ↑	Improves walk & bike access to destinations ↑	Improves walk & bike access to destinations ↑
Provides safety and comfort given high auto speeds and volumes	In-street bike lane not recommended for 45 mph+ ↓	Shared bike/travel lane not recommended for 45 mph+ ↓	Bike lane buffered from 45 mph traffic ↑	Bike lane buffered from 45 mph traffic with curb and landscape strip ↑
Requires additional right-of-way	Requires some new ROW ↓	Requires little new ROW ↑	Requires significant new ROW ↓	Requires some new ROW ↓

Transportation Investment helps to increase economic viability and vitality of the corridor



Population growth

Employment growth

Demand for new residential units and commercial space

Land use planning

Transportation investment

Support high quality community development

Summary of Land Use Scenarios

- **Scenario One** (2035 COG projections)

  Compare transportation alternatives in light of projected growth levels

- **Scenario Two** (growth above 2035 projections)

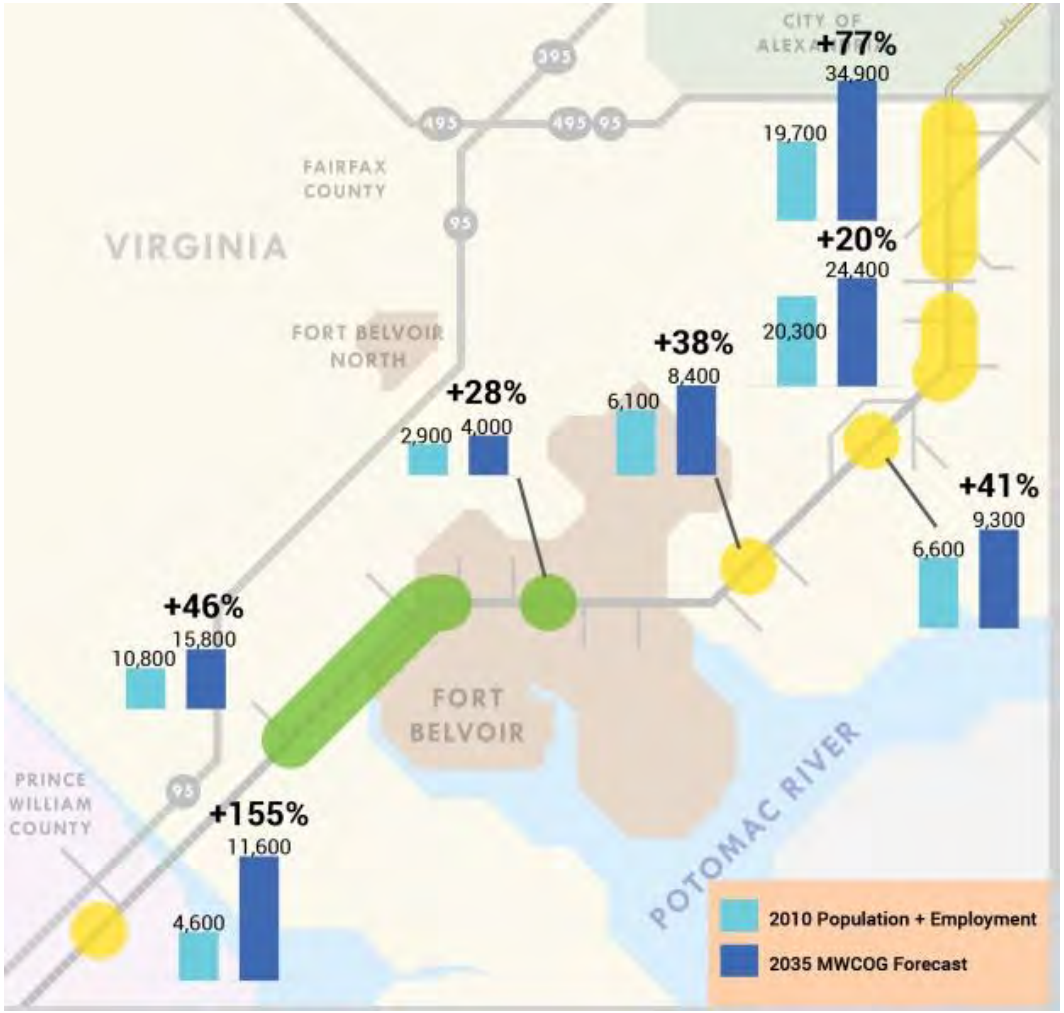
  What is a reasonable growth expectation for a corridor that invests in high-quality transit (BRT or LRT)?

- **Scenario Three** (Metrorail supportive)

  How much do population and employment need to increase to achieve density levels typically supportive of Metrorail?

Scenario 1

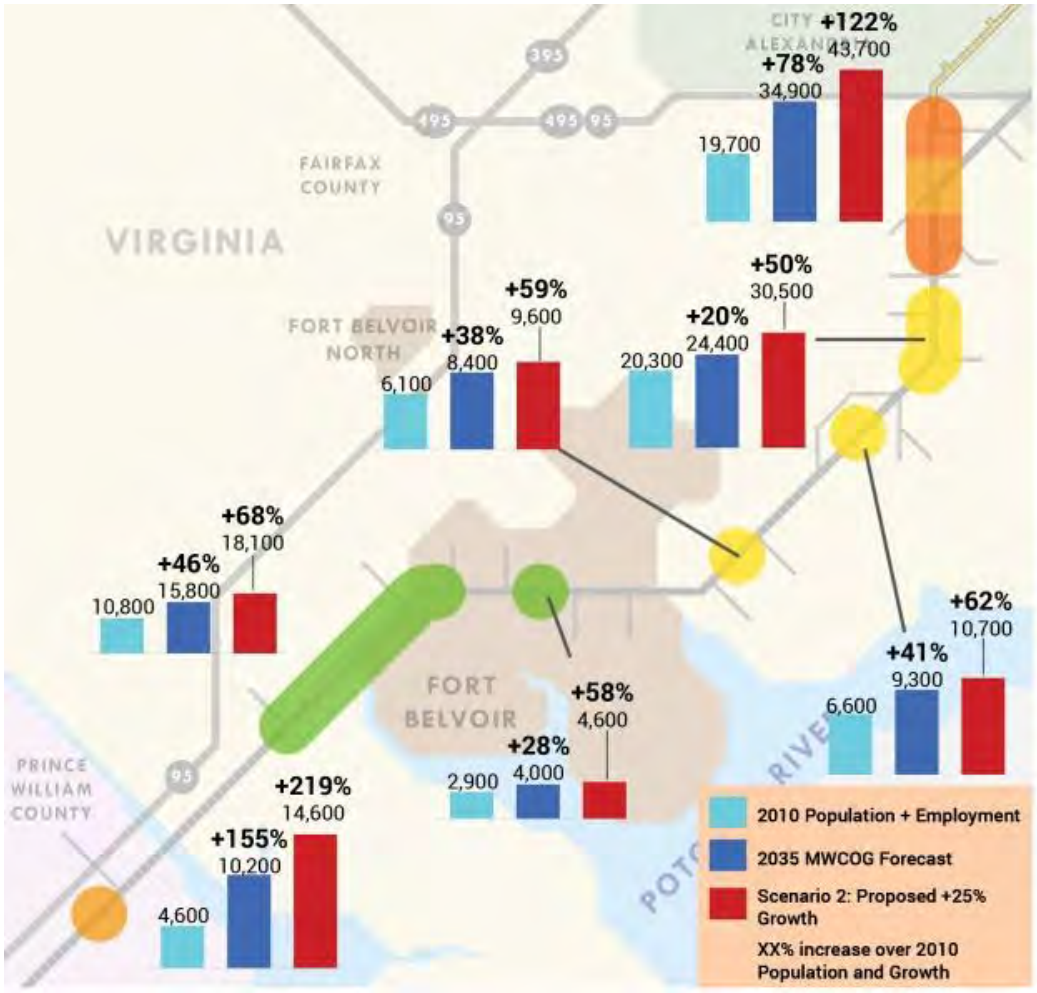
- **Scenario One** (2035 COG projections)
  Compare transportation alternatives in light of projected growth levels



Scenario 2

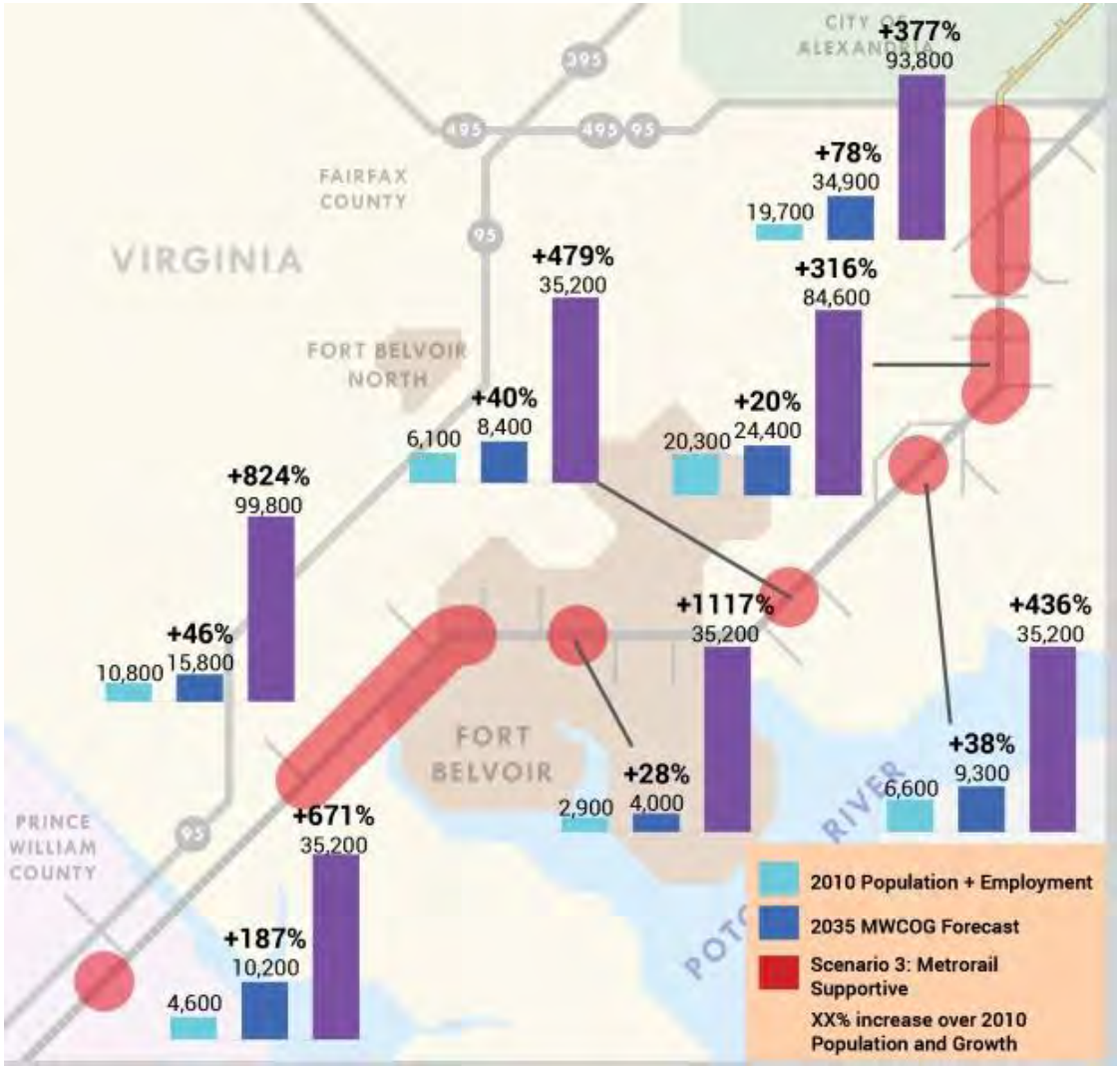
- **Scenario Two** (growth above 2035 projections)

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

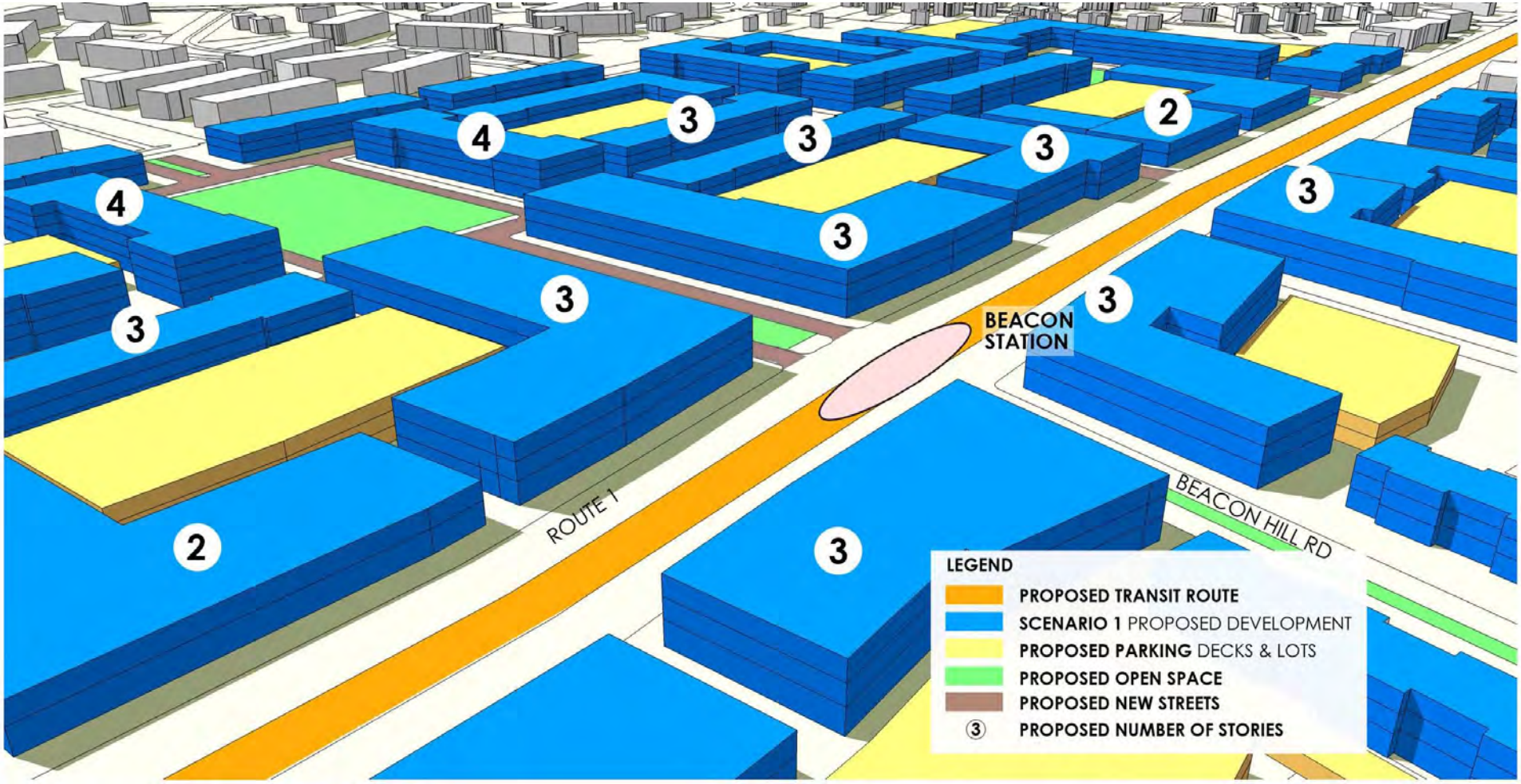


Scenario 3

- **Scenario Three** (Metrorail supportive)
  - **How much do population and employment need to increase to achieve density levels typically supportive of Metrorail?**

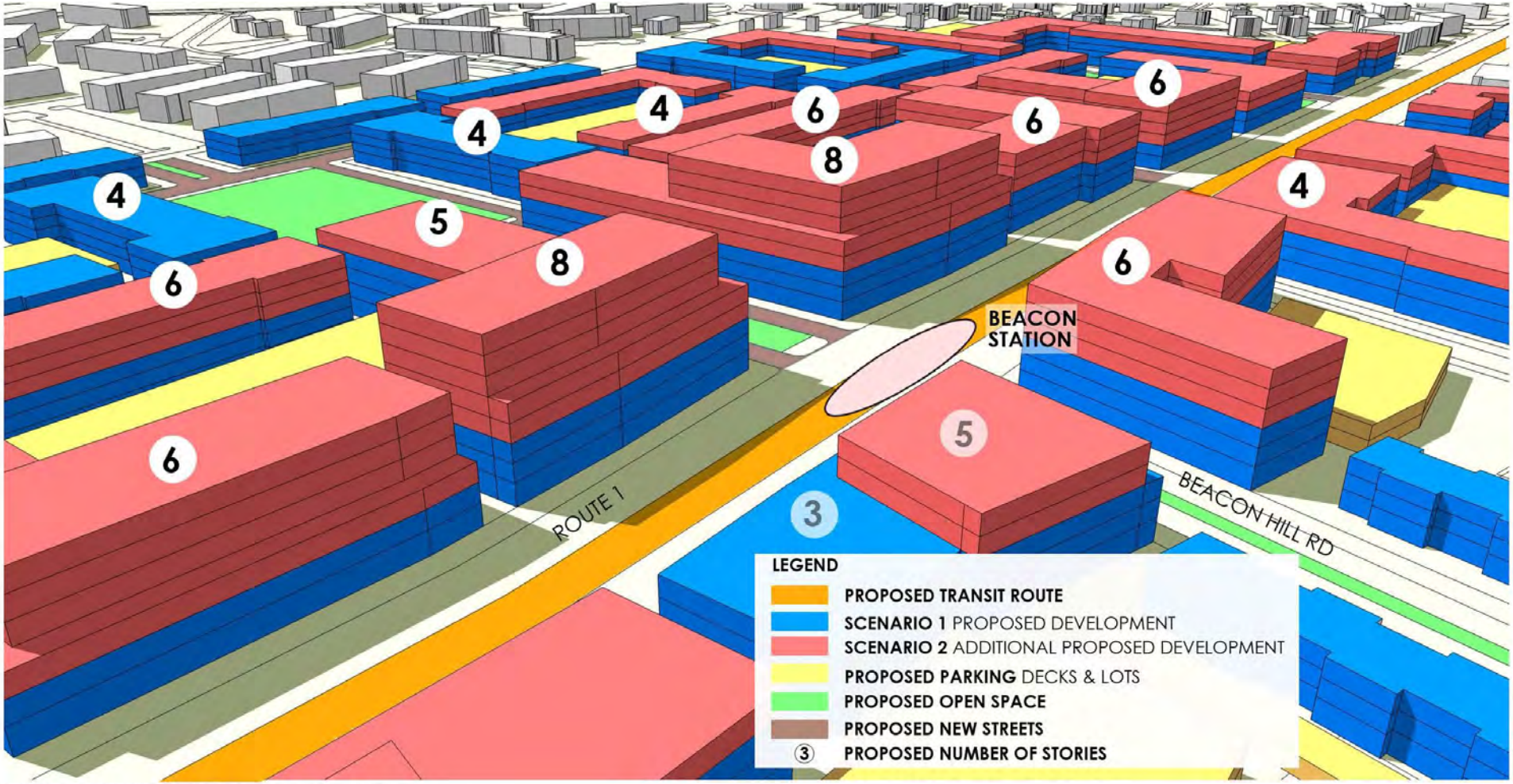


Beacon Hill: Land Use Scenario One (2035 COG Projection)



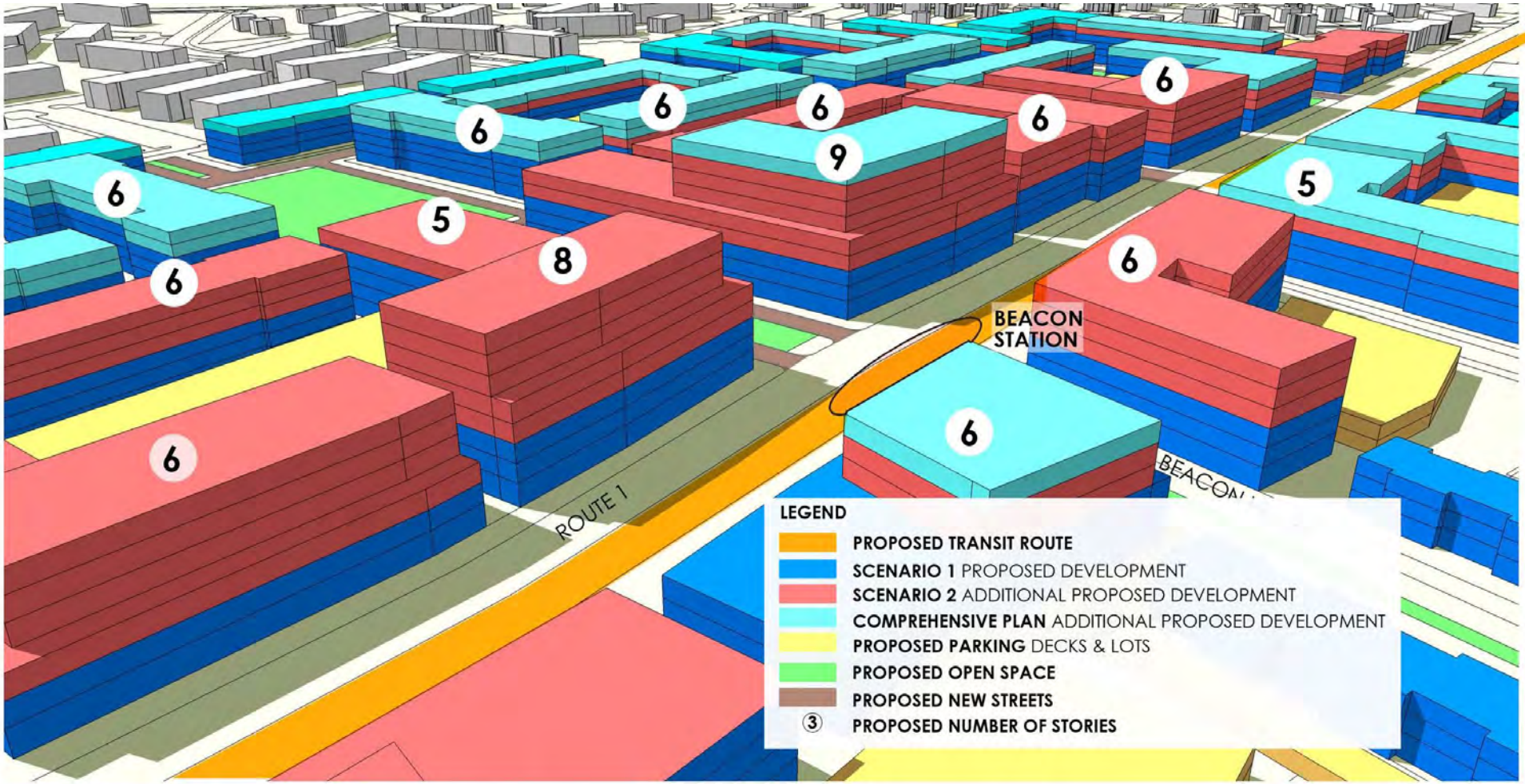
BEACON STATION SCENARIO 1

Beacon: Land Use Scenario Two (additional growth increment)



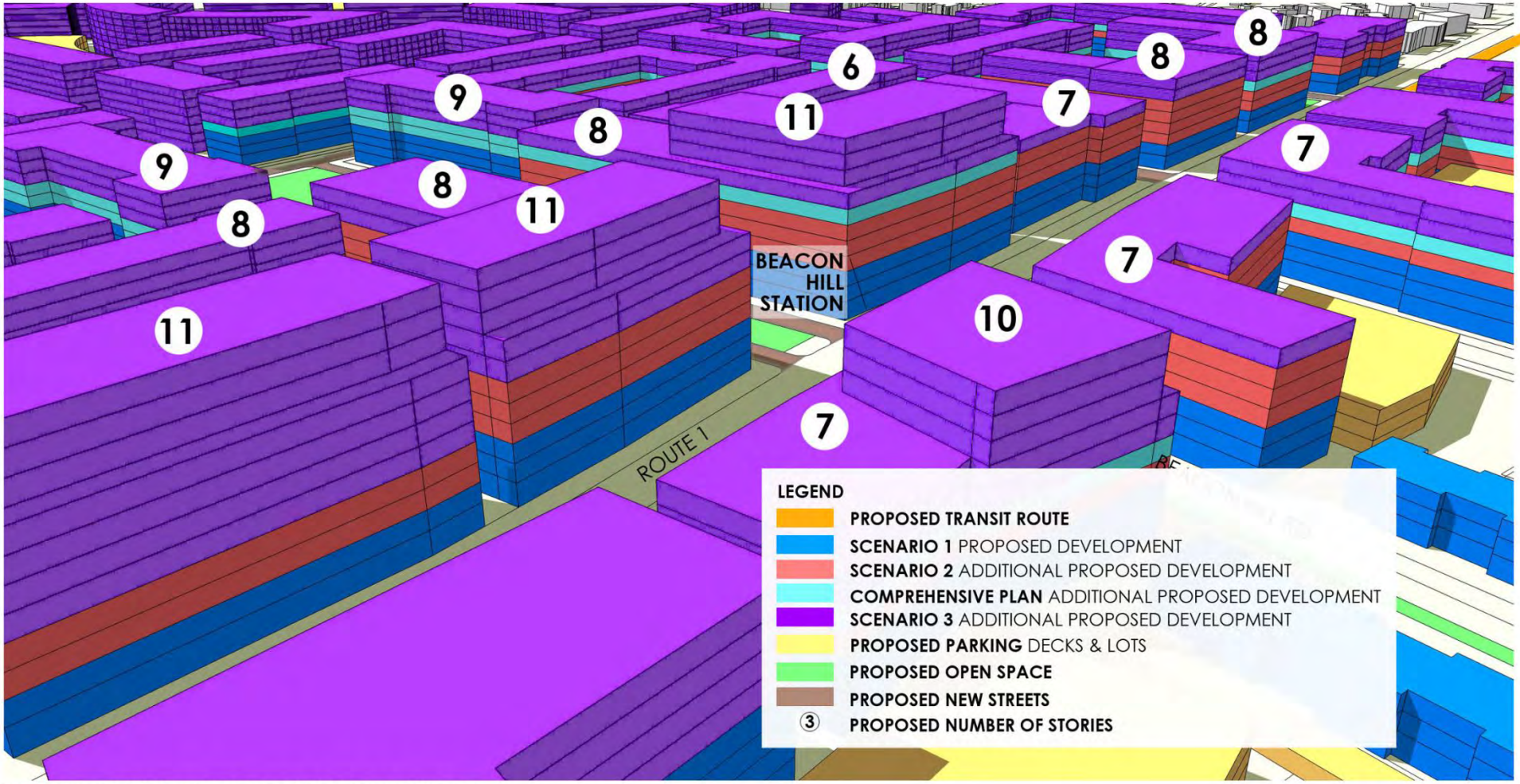
BEACON STATION SCENARIO 2

Beacon Hill: County Comprehensive Plan



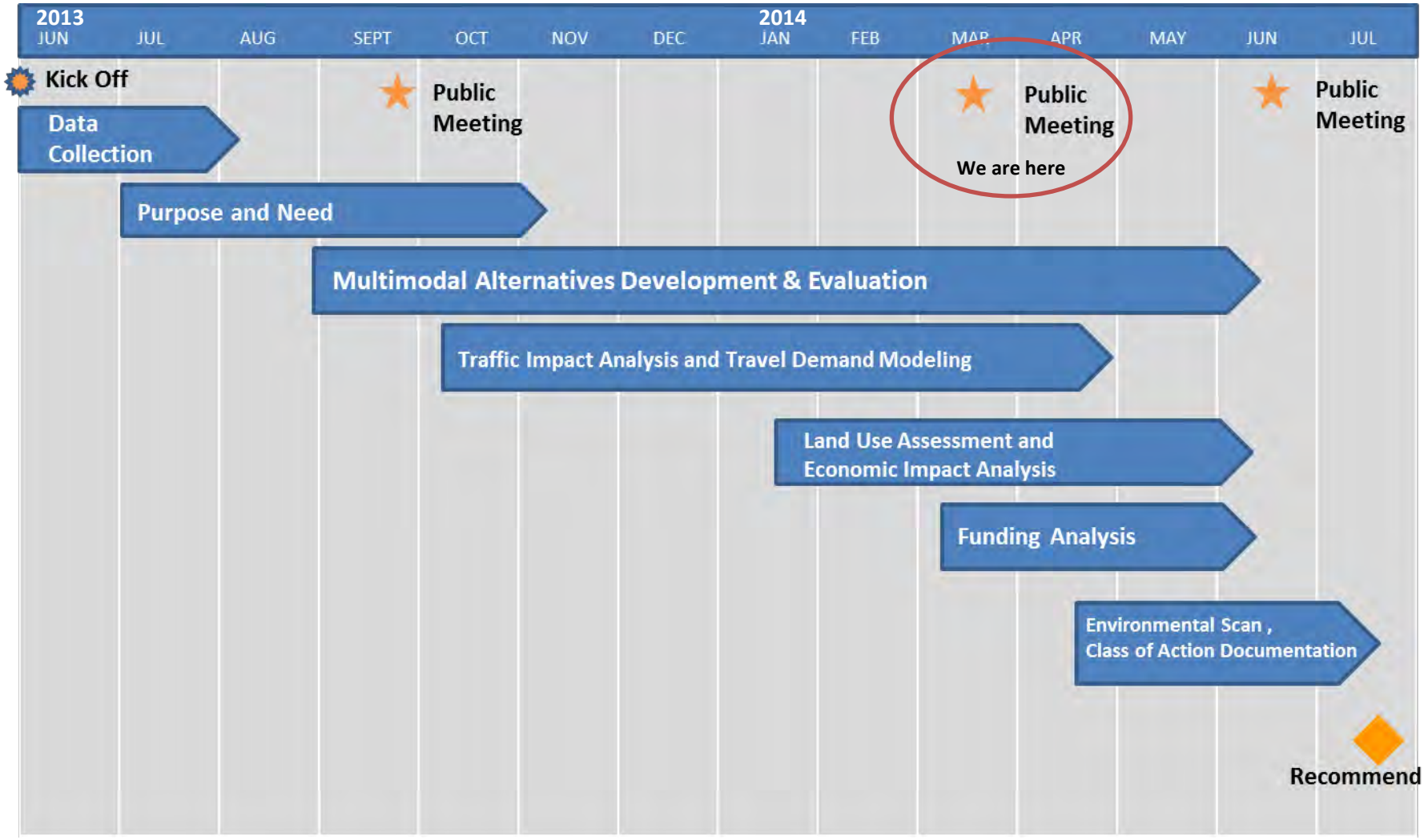
BEACON STATION SCENARIO COMPREHENSIVE PLAN

Scenario 3: Beacon Hill Station



BEACON HILL STATION SCENARIO 3

Study Schedule



Evaluation Criteria: FTA New Starts/Small Starts

Project Justification Criteria
Economic Development: Transit supportive plans and policies; plans to preserve affordable housing
Mobility Improvements: Total project boardings; transit-dependent ridership is weighted 2x
Cost Effectiveness: Annualized cost per annual linked trip on the project
Land Use: Quantitative analysis of station area development, proportion of legally binding affordability
Environmental Benefits: Environmental benefits are monetized and compared to the annualized costs
Congestion Relief: Project sponsors will receive a medium rating until further guidance is released

Financial Commitment Criteria
Current Condition (capital and operating)
Commitment of Funds (capital and operating)
Reasonableness of Assumptions and Financial Capacity (capital and operating)

Evaluation Criteria: Project Goals and Objectives

Goals and Objectives	Multimodal Measures
GOAL 1: Expand attractive multimodal travel options to improve local and regional mobility	
Increase transit ridership	Transit ridership
Improve transit to reduce travel times	Transit travel time, Automobile travel time
Increase transportation system productivity	Total person throughput
Improve bicycle and pedestrian networks	Continuous sidewalk and bike pathway
Integrate with other transit service	Connections to existing and planned transit
GOAL 2: Improve safety; increase accessibility	
Provide accessible pathways	Continuous sidewalk and bike pathway
Reduce modal conflicts	Separate facilities for separate modes
Improve pedestrian crossings	Average pedestrian delay to cross, Adequate pedestrian refuges
Maintain traffic operations	Traffic LOS
GOAL 3: Increase economic viability and vitality of the corridor	
Support higher activity levels	Accommodate 2035 density (growth scenarios)
Investments are financially feasible to construct and operate	Project costs, cost effectiveness, Allows incremental implementation
High-capacity transit facilities at appropriate locations	Serves low-income residents, value added to adjacent properties
GOAL 4: Support community health and minimize impacts on community resources	
Minimize negative impacts to the natural environment	ROW impacts on environmental and historic resources
Contribute to improvements in regional air quality	Change in VMT
Increase opportunities for bicycling and walking	Continuous sidewalk and bike pathway

Project Funding Examples:
Lynx Blue Line Extension Charlotte, NC

9.3-mile / 11-station LRT line along exclusive ROW
Operation expected to begin 2017
$1.16 billion

Funding Source	Type	Share (YOE)
Federal	New Starts	$580 M (50%)
Regional	Charlotte Area Transit System	$250 M (26%)
State	NC DOT	$299 M (26%)
Local	City of Charlotte City/In-kind ROW	$18 M (2%) $13 M (1%)
Total Cost		*$1.16 Billion*