



**Finance and Capital Committee**

**Information Item IV-A**

**July 13, 2023**

**Blue/Orange/Silver Capacity & Reliability Study**

Washington Metropolitan Area Transit Authority

## Board Action/Information Summary

<input type="radio"/> Action <input checked="" type="radio"/> Information	MEAD Number: 203433	Resolution: <input type="radio"/> Yes <input checked="" type="radio"/> No
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### TITLE:

Blue/Orange/Silver Capacity & Reliability Study

### PRESENTATION SUMMARY:

This information item will brief the Board on the Blue/Orange/Silver Corridor Capacity & Reliability Study (BOS Study).

This briefing describes the study's purpose; the challenges and opportunities; how potential solutions were identified; the range of alternatives currently under consideration; and next steps towards the identification and selection of a "locally-preferred alternative" (LPA).

### PURPOSE:

To brief the Board about planning work completed to date and the status of the BOS Study, the process and next steps in advance of additional public engagement and outreach to stakeholders and elected officials.

### DESCRIPTION:

In 2019, Metro launched the BOS Study to identify a project or package of projects to address needs and opportunities related to the Blue, Orange, and Silver lines, including capacity constraints and crowding, reliability and resiliency concerns, equity, development opportunities, a lack of operational flexibility, and long-term sustainability.

The BOS Study's approach aligns with federal process requirements and guidelines for planning large infrastructure projects, such as the National Environmental Policy Act (NEPA) and Planning and Environmental Linkages (PEL) studies.

The BOS Study advances most of the goals and objectives set by the Your Metro Strategic Transformation Plan, and the Board's selection of an LPA is specifically listed as one of the plan's near-term initiatives.

More information about the BOS Study including previous studies related to the BOS corridor can be found at <https://www.wmata.com/BOSstudy>.

Contractors and Interested Parties involved in the BOS Study: **HNTB** (prime consultant), **Cambridge Systematics**, **Fehr and Peers**, **Foursquare Integrated Transportation Planning** (FITP), **GeoConcepts Engineering**, **KGP Design**

**Studio, Kimley-Horn and Associates, Mercado Consultants, Rhodeside & Harwell, VHB**

**Key Highlights:**

- Metro launched the BOS Study in 2019 on behalf of the region to develop and evaluate multiple needs and opportunities within the corridor, including reliability, crowding, regional growth, equity, operational flexibility and cost-efficiency, and sustainability.
- An extensive engagement process featured 27 meetings with stakeholders, including jurisdictional partners, 13 pop-ups at BOS stations, four public workshops, and an online survey. Elected officials from across the region have been briefed three times to date.
- A cost-benefit analysis (CBA) for six alternatives has been completed. The six alternatives and the CBA results will be presented to elected officials, stakeholders, and the public this spring to gather feedback to inform and support the selection of an LPA.
- The BOS Study process was designed according to federal requirements and guidelines, to ensure Metro and the region can pursue federal funding if desired.
- The jurisdictions forecast that the BOS corridor will add 37% more people and 30% more jobs by 2040, which is likely to increase ridership. They also identified priority areas and corridors for growth and significant infrastructure investments that informed the alternatives.
- The pandemic has changed ridership patterns making it much more challenging to forecast future transportation demand. However, because an effective solution to the challenges in the corridor could take 10 to 20 years or more to deliver, project development work will continue on the LPA unless and until it becomes clear improvements will not be necessary.

**Background and History:**

The BOS Study is an important step to address challenges that have impacted service on the Blue, Orange, and Silver lines for over a decade. Running three lines through one tunnel and set of tracks (“interlining”) creates challenges for Metro and our customers, including crowding during peak periods, service reliability issues, a lack of operational flexibility, and threats to long-term sustainability.

This study is intended to identify a project or package of projects capable of mitigating

those problems. At the completion of the BOS Study, a proposed project or package of projects (“locally-preferred alternative” or LPA) will be presented to the Board for consideration and approval. The BOS Study will provide the Board with a range of options, goals, data analyses, and feedback from the public and regional audiences to support their decision. As project sponsor, Metro will continue to advance the LPA through project development and environmental review processes, but selection of the LPA will be guided by the region.

## **Discussion:**

### **BOS Study Purpose and Need**

The LPA will need to address multiple challenges in the BOS corridor:

Capacity and connectivity: Metrorail’s current systems and technology supports a maximum throughput of 26 trains per hour (TPH) per track. The three lines share one tunnel and set of tracks (called interlining) between the Rosslyn and Stadium-Armory stations, which means Metro can operate a maximum of 26 TPH in the system’s primary east-west corridor between Rosslyn and Stadium-Armory. However, Metro cannot operate that maximum throughput and provide equal service on all three lines at the same time. Metro can only balance service between the three lines under seven- to eight-minute headways, eight trains per hour (TPH) on each line or 24 TPH total. Metro cannot operate six-minute or better frequencies without reducing service on at least one line. For example, when Metro last deployed a six-minute peak schedule in 2016, that operating plan scheduled 10-11 Orange and Silver trains per hour (six-minute service on each), but only five Blue trains per hour (12-minute service).

This capacity constraint means Metro cannot improve headways to meet ridership demand on all three lines as long as they are interlined. The BOS lines exceeded crowding standards on trains and platforms during peak hours for over a decade before the pandemic, regardless of service levels or systemwide ridership fluctuations. The jurisdictions are forecasting that the areas around the BOS lines will add 37% more people and 30% more jobs by 2040. This anticipated growth is expected to increase BOS ridership and result in customer crowding well above service standards by 2040. Though full eight-car trains will help, all eight-car train sets are not sufficient to solve the projected crowding problems.

Metro also has an opportunity to expand the reach of the transit system by serving new places, creating new stations, and enhancing transfers and quick connections within the system. For example, developing new service options for the Blue, Orange, and Silver lines presents an opportunity to create direct, easy transfers at a unified Farragut Station, or to create new connections at major transit hubs like Union Station.

Reliability and resilience: Due to interlining, delays on one line impact the other two. Severe delays can also impact the Green and Yellow lines, because the Blue Line is interlined with the Yellow Line in Virginia. Metro’s focus on reducing the State of Good Repair backlog, funded in part by dedicated capital funding, has substantially improved BOS reliability, especially delays caused by mechanical failure and track problems. However, nearly half of delays over one minute can be attributed to customer activity, scheduling issues, and/or police and fire events. Reliability also means maintaining quality service during construction activities and single-tracking events. The LPA should



offer the potential to minimize the geographic extent and customer impacts of work zones and any other disruptions. However, the corridor has a limited supply of infrastructure that can reduce the size of work zones and single-tracking events, such as pocket tracks and crossovers. The LPA should also make the Metro System more resilient by offering customers multiple path choices for their trips in case of disruption. This is particularly important given the BOS lines are the Metrorail System's primary east-west corridor.

Growth and Development: As noted above, the National Capital Region's jurisdictions have forecasted substantial growth along the Blue, Orange, and Silver lines. The BOS corridor is projected to add 37% more people and 30% more jobs by 2040, and the Metro System must have sufficient capacity to serve that growth. The jurisdictions have also identified areas and corridors prioritized for growth and development over the next 20 years, such as Maryland's Blue Line Corridor, the Purple Line Corridor, and National Harbor; National Landing, Tysons, and the Silver Line Phase 2 in Virginia; and Ivy City/New York Avenue, the waterfront, and St. Elizabeth's redevelopment in the District of Columbia. The region is also making major transportation investments such as the Purple Line and the Union Station redevelopment and multimodal transportation hub. The LPA should increase transit-oriented development, support the region's priorities for growth and development, and leverage planned infrastructure.

Equity: The Metropolitan Washington Council of Government (MWCOC) has identified 364 Equity Emphasis Areas (EEAs) across the National Capital Region. Those EEAs host 30% of the region's population, but only 26% of them have access to high-capacity transit. Equity Emphasis Areas exist in every jurisdiction but are geographically concentrated on the eastern side of the region. Many of those Equity Emphasis Areas lack access to high frequency transit or can access fewer jobs within a reasonable travel time on transit compared to non-equity areas. The LPA should prioritize expanding access to high-capacity transit in equity communities, and improving access from those areas to critical needs, jobs, and other economic opportunities.

Sustainability: The LPA should help Metro attain its sustainability goals and targets, as established in the Your Metro Strategic Transformation Plan and Metro's Energy Action Plan. The LPA should also help the region advance its stated and adopted climate and sustainability goals, such as providing a competitive travel choice and encouraging mode shift from cars to transit, biking, and walking; supporting transit-oriented development and car-optional lifestyles; and helping the region reduce emissions and meet greenhouse gas reduction targets.

Cost-effectiveness and operational efficiencies: Metro and the region have an interest in making transit service more cost-effective by growing ridership, better matching service levels to ridership demand, or both. Increasing transit-oriented development and providing quality service that can compete with other modes will help grow ridership and reduce Metro's operating cost per rider. However, the BOS corridor has a limited supply of the infrastructure necessary for matching service levels to ridership levels, such as pocket tracks for storing and turning trains. The alternatives and LPA should include opportunities for additional operational flexibility and track infrastructure. Additionally, any Metrorail alternative should connect to an existing railyard in order to avoid the costs and land use impacts of siting and building a new railyard and maintenance

facility. Addressing this set of issues will likely need a large-scale solution that requires regional resources, coordination, and commitment. Such projects can take a long time to plan, design, fund, and build.

## **BOS Study Process**

The region may decide to pursue federal funding for the LPA, so the BOS Study was designed according to federal requirements and guidance. It was structured to be consistent with Metro's Development and Evaluation (D&E) program as well as federal guidance on the National Environmental Policy Act (NEPA) requirements and pre-NEPA planning. It is modeled after the alternatives analysis process as described in federal guidance documents for NEPA and Planning and Environmental Linkages (PEL) studies. The BOS Study steps include, in order:

1. Identify the transit problems and set corridor goals (Complete)
2. Develop a full range of options to meet those goals (Complete)
3. Narrow the initial set of options to a final set of alternatives (Complete)
4. Evaluate the alternatives using a comparative cost-benefit analysis (CBA) methodology (Complete)
5. Select a locally preferred alternative (LPA)

Consistent with federal NEPA and PEL requirements, each of these study stages has engaged regional stakeholders, including Metro's jurisdictional partners, community and business partners, and the public. For more detail, see the section on public and stakeholder engagement below.

Steps One through Four are complete and are presented in this briefing. The selection of an LPA will be brought for the Board's consideration after public engagement and outreach to elected officials this summer.

## **Placing the BOS Study in Context of Delivering Capital Projects**

Depending on the LPA, it may take 10-20 years or more to plan, fund, and build. It may require a large capital investment that could be funded through the Federal Transit Administration (FTA)'s Capital Investment Grant (CIG) program. If the selected LPA is a major capital project and the region decides to compete for federal funding, project delivery would have to follow a required federal process that includes the following phases:

1. Pre-NEPA Planning (BOS Study)
2. NEPA/Project Development: 2-5 years
3. Engineering: 5-10 years
4. Full Funding Agreement (federal or otherwise)
5. Construction: 5-10 years

Major capital projects require substantial planning, environmental review, and design prior to funding decisions/agreements. However, until there is a funding agreement, there is no commitment to build or deliver the LPA. Depending on the scale of the recommended LPA, this could be five, 10, or more years after the BOS Study concludes. Metro can stop or pause work at any time prior to that agreement. But Metro will not be able officially start the process required to compete for federal funding until the Board of Directors selects an LPA.

Given the history of the corridor's capacity and reliability challenges, continuing to advance this study and subsequent project development will prepare the region to address those longstanding problems. While long-term ridership impacts of the pandemic are not known, crowding in BOS trains and stations always exceeded service standards during peak hours. Continuing to advance this work will ensure that the LPA is positioned to compete for federal funding.

## **Public and Stakeholder Engagement**

The BOS Study has been guided by intensive stakeholder and public input. Meetings were held with four technical advisory committees to set goals the LPA should achieve, develop initial options and alternatives, and define the measures for evaluating and scoring those alternatives. The advisory committees and public input meetings to date include:

- Executive Committee of elected officials – three briefings
- Jurisdictional leadership committee – six meetings
- Jurisdictional technical committee – six meetings
- Metro leadership committee – six meetings
- Metro technical committee – six meetings
- Business and Community Stakeholder Committee – two workshops

The work of the advisory committees informed, and was informed by, substantial public input. Three rounds of public engagement activity were identified to align with key decision points in the study. The table below summarizes the public engagement timeline and activities to date.

BOS Study Public Engagement Efforts to Date			
Phase	Timeline	Activities	Purpose/Outcome
1	Summer 2019	Street teams and pop-ups at 13 stations; handouts; website	Creating awareness of study, BOS transit needs/goals
2	Winter 2019-2020	Four public workshops; online survey; presentations; handouts; station signs; press releases and social media blasts	Soliciting feedback on preliminary options, prioritizing outcomes, and gathering new ideas/options. Over 2,000 responses added 275 ideas/project concepts.
3	Summer 2023 (tentative)	To be finalized, but planned to include hybrid in-person meetings; outreach at 8-10 locations; an online survey; handouts; station signs; press releases and social media	To communicate the final alternatives and results of the cost-benefit analysis, and gather feedback on selecting an LPA and potential names

## BOS Transit Goals

The identification and analysis of corridor needs, and opportunities was presented and discussed at multiple meetings with stakeholders. The analysis and input were translated into four project goal statements developed in close coordination with the stakeholder advisory committees. The LPA should attain these four goals:

- Capacity: Provide sufficient capacity to meet ridership demand;
- Reliability: Improve reliability and on-time performance;
- Flexibility: Improve operational flexibility and cost-efficiency; and
- Sustainability: Support sustainable development and expand access to economic opportunities.

These goals and their associated objectives guided the identification of preliminary options, the winnowing of those options into a set of refined alternatives, and the performance measures used to assess the relative costs and benefits of those alternatives.

## Identifying Potential Options

Once the goals were established, an initial set of options, or “project concepts,” was developed with the stakeholder committees. These were informed by analysis of multiple datasets including current and projected BOS ridership levels; major trip patterns and origin- destination pairs; current and future population and job densities; areas that might offer land development opportunities; and the location of vulnerable populations and equity emphasis areas. Additional requirements were that concepts had to serve major BOS origin/destination trip-patterns, explore options that would meet the four goals while limiting costs, and any rail concepts had to connect to an existing railyard.

Public input on the concepts followed. The public indicated their level of support for each project concept and prioritized their top three transportation outcomes. They also were able to draw or describe their own project concept, which resulted in over 2,000 responses and 275 new ideas/project concepts. These were narrowed to a set of 16 preliminary alternatives and further screened on the basis of whether and how each alternative would:

1. Serve BOS travel patterns and relieve projected Metrorail passenger crowding
2. Help attain the four identified goals
3. Serve areas with projected population and employment densities suitable for Metrorail service
4. Align with stakeholder and public comments and expressed preferences

Only alternatives that passed all four screening criteria were advanced, resulting in the six alternatives described below.

### **The Current Alternatives**

The six alternatives vary significantly in terms of cost, benefits, and potential impacts. They include a No-Build Alternative, a Rail Optimization and Bus Service (Lower Capital Cost) Alternative, and four Metrorail realignments/extensions.

Alternative 1: No-Build: Includes the existing transportation system plus all new projects the region has already planned and funded, as listed in the Visualize 2045 Regional Long-Range Transportation Plan and Metro's FY 2021-2026 Capital Improvement Program (CIP). It includes the existing rail and bus network and all of Metro's planned State of Good Repair and modernization projects. It also includes jurisdictional projects such as the State of Maryland's Purple Line light rail and various bus rapid transit (BRT) lines.

#### Alternative 2: The Rail Optimization and Bus Service (Lower Capital Cost)

Alternative: Includes a network of enhanced commuter bus and bus rapid transit (BRT) service, dynamic rail scheduling, exploring options to increase passenger capacity in railcars, expanding capacity in several core stations, and building infrastructure at West Falls Church and the D&G Junction that can support train turnbacks. The enhanced bus network was designed to reduce crowding on the BOS rail lines. It could do so by providing adequate capacity for the number of peak-hour customers that would need to be diverted from the BOS lines, and by offering an attractive travel option through direct, prioritized bus service. This alternative would create no new rail capacity.

Alternative 3: Blue Line to Greenbelt: This alternative would realign the existing Blue Line from the Arlington Cemetery Station to a new, second Rosslyn station, which would offer a direct pedestrian connection to the existing Rosslyn Station. From there it would run through a new, separate tunnel into Georgetown, along M Street, through the District's downtown to Union Station, then northeast through Ivy City, Port Towns, Hyattsville, and College Park to Greenbelt. It would operate on separate tracks from the

existing Green and Yellow lines in order to avoid re-interlining. This alternative would create net new rail capacity of 16 trains per hour (TPH) per direction.

Alternative 4: Blue Line to National Harbor: This alternative would also realign the existing Blue Line from Arlington Cemetery Station to a new second Rosslyn station, continuing through Georgetown and along M Street to Union Station. From Union Station it would turn south, providing new north-south service in Waterfront and Navy Yard and creating new rail access in areas targeted for development, such as Buzzard Point, St. Elizabeths, and National Harbor, before crossing over the Woodrow Wilson Bridge to Alexandria. This alternative would create net new rail capacity of 16 TPH per direction.

Alternative 5: Silver Line Express in Northern Virginia: This alternative would create a separate tunnel and tracks for the Silver Line, starting at West Falls Church Station. From WFC to a new second Rosslyn station, the new tunnel could support express service, local service, or a mix of express and local service. From the second Rosslyn station, the Silver Line would travel through Georgetown along M Street to Union Station, then through Ivy City, Port Towns, Hyattsville, and College Park to Greenbelt. This alternative would create net new rail capacity of 26 TPH per direction.

Alternative 6: Silver Line to New Carrollton: This alternative would separate the Silver Line from the Orange Line at Clarendon Station, creating a new connection at a second Rosslyn station before continuing through Georgetown to Union Station. From Union Station, the new tunnel would turn north and east to serve Ivy City and Port Towns, then run along the Annapolis Road/MD 450 corridor to New Carrollton Station. This alternative would create net new rail capacity of 16 TPH per direction.

## **Evaluating the Alternatives**

The six alternatives were evaluated in terms of costs, benefits, and their relative performance in meeting the four goals. This performance assessment was designed according to FTA guidance on the methodology for alternatives analyses.

The performance assessment and cost-benefit analysis (CBA) for all these alternatives is based on a 20-year planning horizon (2040). The rail service assumptions for 2040 follow the framework of the Metrorail Fleet Management Plan of six-minute peak headways, 100% eight- car trains, and systemwide capacity constraint of 26 TPH per direction in 2040. This is a conservative assumption in terms of assessing the need for new capacity, as it estimates ridership and passenger crowding under maximum utilization of the existing system. For the No-Build Alternative, this means a service plan of six-minute headways on the Orange and Silver lines and 12-minute headways on the Blue Line (10-11 TPH OR/SV, 5 TPH BL).

The CBA has three components:

1. Performance Assessment: Each alternative was scored on its performance across over 14 metrics, each directly related to the study goals and objectives. The alternatives were scored against future conditions as defined by the No-Build Scenario.
2. Benefits Score: The sum of the performance scores.

3. Cost-Effectiveness Score: Results from dividing the benefits score by the total annualized cost for each alternative.

The benefits score and the cost-effectiveness score were comparatively ranked from high to low, indicating how well each alternative performed relative to the others and to the No-Build Scenario. This ranking indicates the scale of positive impacts and changes each alternative would deliver compared to each other and the base-case future (benefits rank) and relative value each alternative provides for the dollars spent (cost-effectiveness rank). A high-level summary of the CBA is presented below along with some selected metrics.

BOS Study CBA Results – Performance Rankings		
Alternative	Benefits Rank	Cost-Effectiveness Rank <sup>[1]</sup>
Alternative 4: Blue Line to National Harbor	Highest	Medium-High
Alternative 5: Silver Line Express in Virginia	Medium-High	Lowest
Alternative 6: Silver Line to New Carrollton	Medium	Medium-Low
Alternative 3: Blue Line to Greenbelt	Medium-Low	Medium
Alternative 2: Rail Optimization & Bus Service	Lowest	Highest

BOS Study CBA Results – Selected Metrics (2023 dollars)				
Alternative	New weekday trips	New annual fare revenue	Construction cost estimate	Annual O&M cost
Alt 4: Blue Line to National Harbor	180,000	\$154.2 M	\$30-35 B	\$175-200 M
Alt 5: Silver Line Express in Virginia	139,000	\$119.4 M	\$35-40 B	\$175-200 M
Alt 6: Silver Line to New Carrollton	94,000	\$80.4 M	\$25-30 B	\$125-150 M
Alt 3: Blue Line to Greenbelt	92,000	\$79.1 M	\$25-30 B	\$125-150 M
Alt 2: Rail Optimization & Bus Service	16,000	\$33.9 M	\$3-5 B	\$75-100 M

## Summary of CBA Results

As evaluated, Alternative 4: Blue Line to National Harbor would deliver the highest level of benefits relative to the other options. When cost is factored in, it performs second-best. It scores well because it provides new throughput capacity across the Potomac, would include new rail stations in areas targeted for growth and development, has the greatest impact in terms of expanding access to jobs and high-capacity transit in Equity Emphasis Areas, and creates new north-south to east-west transfer opportunities.

Alternative 2: Rail Optimization and Bus Service scored lowest in terms of benefits, but highest in terms of cost-effectiveness. This is to be expected given its significantly lower construction costs relative to the rail alternatives. However, for this alternative to actually meet the four established goals and the purpose of the LPA, over 3,000 peak-hour Metrorail riders would need to voluntarily shift from rail to bus; a substantial jurisdictional investment in bus priority would be needed, such as dedicated lanes and traffic signal priority; and adequate bus circulation and layover space would be needed in the District's downtown.

## Next Steps

Public engagement activities will follow this briefing, to gather feedback on the CBA results and input on preferred alternatives and potential project names. Additional stakeholder meetings and elected official briefings will follow the public outreach campaign.

<sup>[1]</sup> For both rankings, including cost-effectiveness, “highest” and “lowest” refer to their comparative performance rather than costs.

## FUNDING IMPACT:

There is no funding impact as this is an information item.

## TIMELINE:

<b>Previous Actions</b>	September 2021 – Board status update, Finance and Capital Committee
<b>Anticipated actions after presentation</b>	Summer 2023 – Public outreach and engagement activities.  Summer-Fall 2023 – Additional stakeholder meetings and briefings to elected officials and boards. TBD – Board selection of BOS corridor LPA.

## RECOMMENDATION:



# Blue/Orange/Silver Capacity & Reliability Study

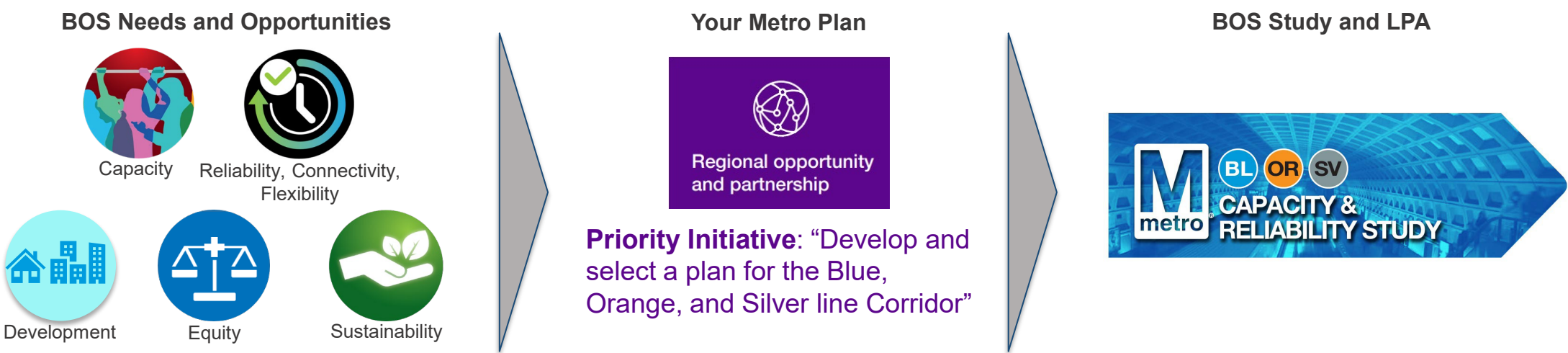
Status Update

Finance & Capital Committee  
July 13, 2023



# BOS Study Summary

- **Purpose:** Address multiple challenges and opportunities on the Blue, Orange, and Silver lines
- **Status:** Sought public input, identified several alternatives for meeting those needs, and analyzed costs and benefits
- **Outcome:** Concludes with Board’s selection of a locally-preferred alternative (LPA)



# BOS Study Advances the Your Metro Plan

Your Metro Goals		Your Metro Objectives
 Service excellence	Deliver safe, reliable, convenient, equitable, accessible, and enjoyable service for customers	<ul style="list-style-type: none"><li>• Safety and security</li><li>• Reliability</li><li>• Convenience</li></ul>
 Regional opportunity and partnership	Design transit service to move more people and equitably connect a growing region	<ul style="list-style-type: none"><li>• Regional network and partner empowerment and transit equity</li><li>• Community partnership and engagement</li></ul>
 Sustainability	Manage resources responsibly to achieve a sustainable operating, capital, and environmental model	<ul style="list-style-type: none"><li>• Financial sustainability</li><li>• Environmental sustainability</li></ul>

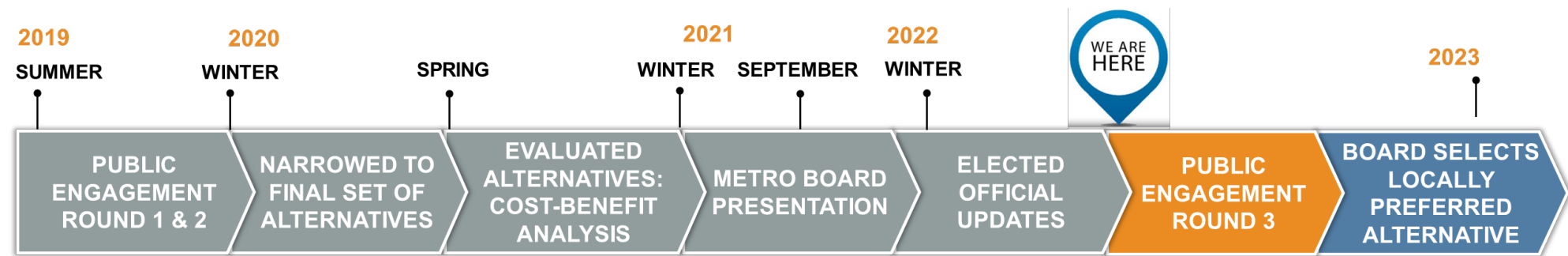
## Selecting the LPA is a Your Metro Plan initiative

  
Regional opportunity and partnership

Develop and select a plan for the Blue, Orange, and Silver Line Corridor

# BOS Study Status

- Completed two rounds of public engagement
- Engaged community partners and elected officials
- Finalized six alternatives and cost-benefit analysis results
- Ready for final round of public engagement



## A Locally-Preferred Alternative

- Follows analysis and public feedback on a range of alternatives
- The LPA is the alternative decision-makers select for further development

# Competing for Federal Funding

- Major capital projects can take 20+ years to deliver
- BOS Study and LPA only first step
- Project Development/NEPA and Engineering required to compete for federal grants
- Will continue to miss grant opportunities if projects don't advance through Project Development
- No commitment to build unless/until there's a funding agreement

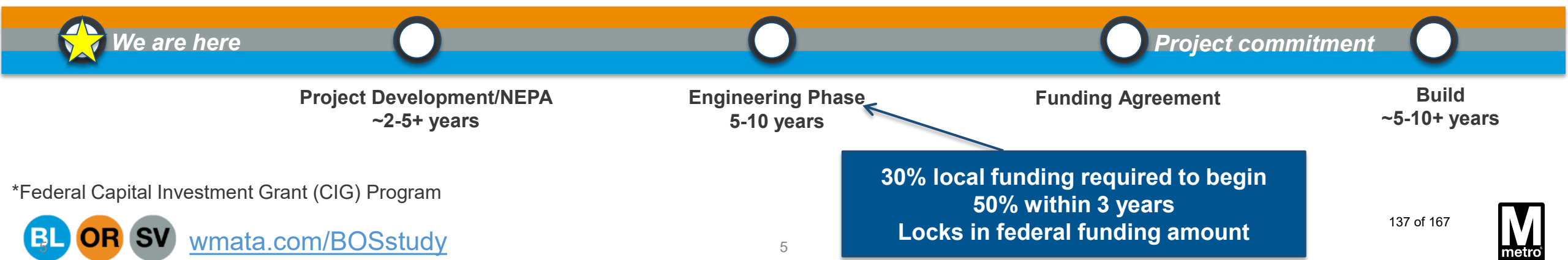
Federal Funding Milestones

Transportation bills: Generally, every five years

Grant award cycles: Annual to biannual

CIG application and evaluation deadlines: Generally, one year before target federal fiscal year starts (October)

Illustrative CIG\* Major Project Delivery Timeline



\*Federal Capital Investment Grant (CIG) Program

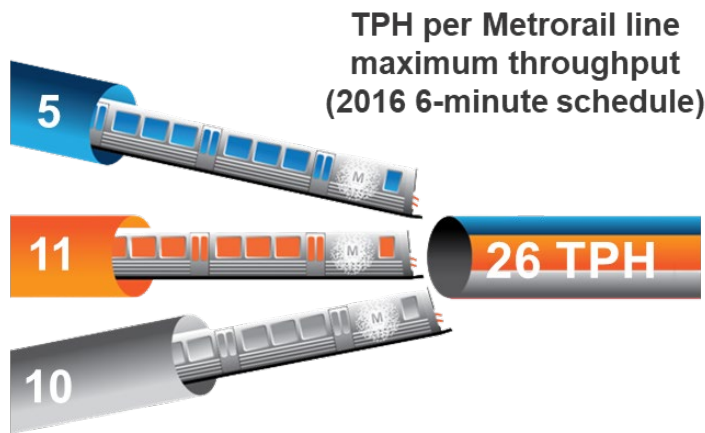
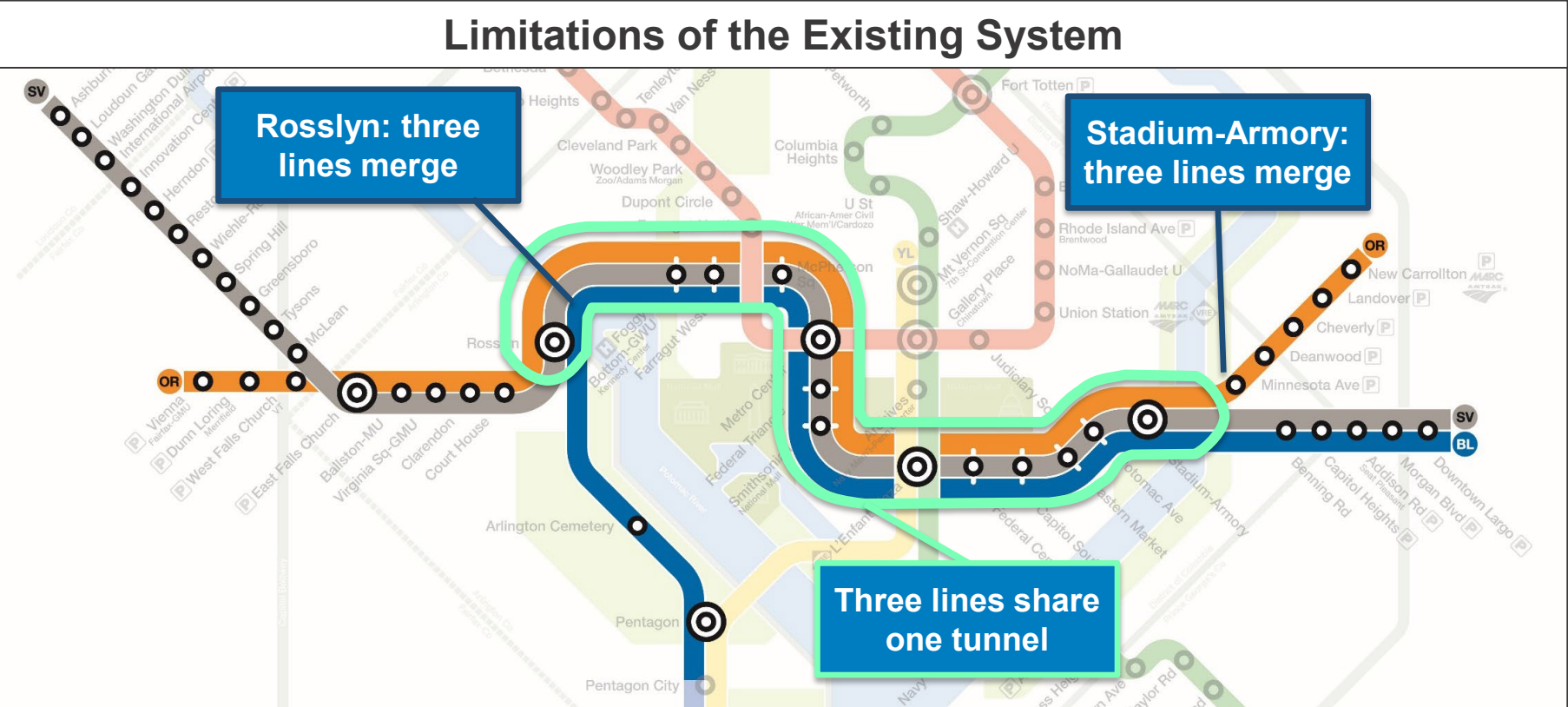




# How the Alternatives Were Developed

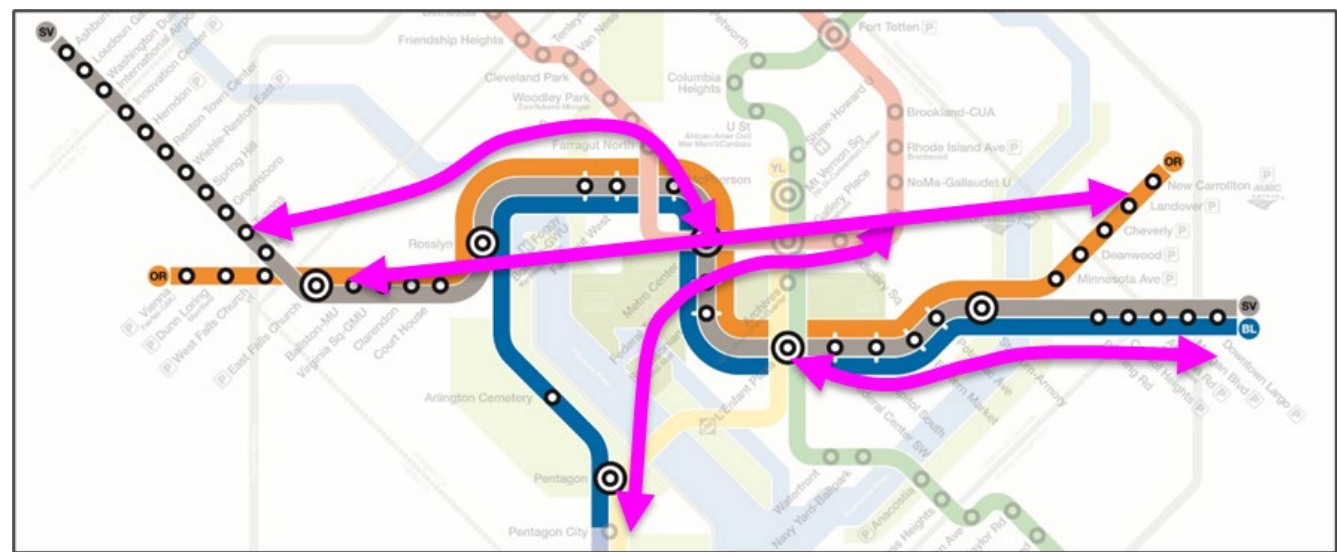
# Capacity

- Three lines operate on one set of tracks between Rosslyn and Stadium-Armory
- Capacity of 26 trains per hour (TPH) with existing systems / technology
- Region forecasts 37% more people and 30% more jobs around BOS lines by 2040

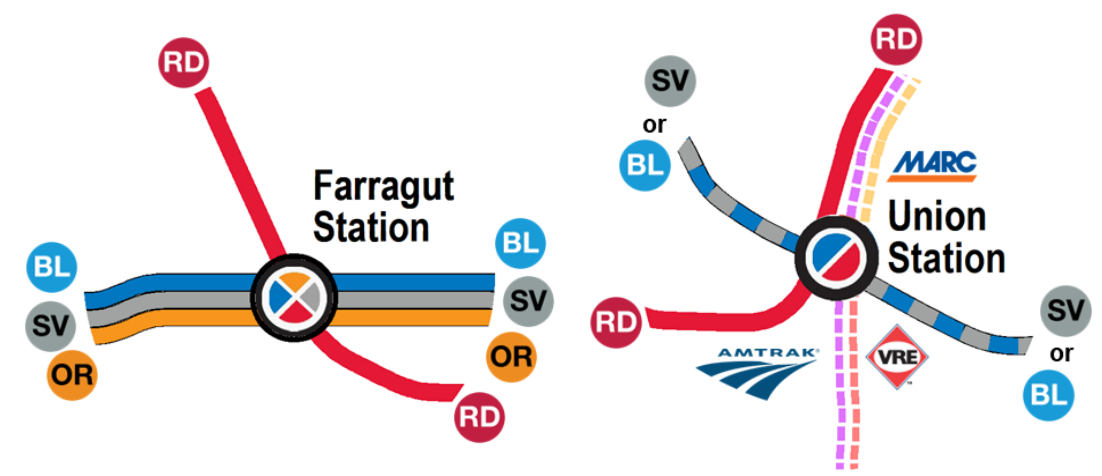


# Reliability, Connectivity, and Flexibility

- Interlining compounds delays and makes it hard to manage service disruptions
- Opportunity to fix limitations of existing system (interlining and difficult transfers)
- New connections and customer path-choices would avoid similar problems in future



Opportunity to un-interline Blue/Orange/Silver and to provide customers more ways to get where they're going



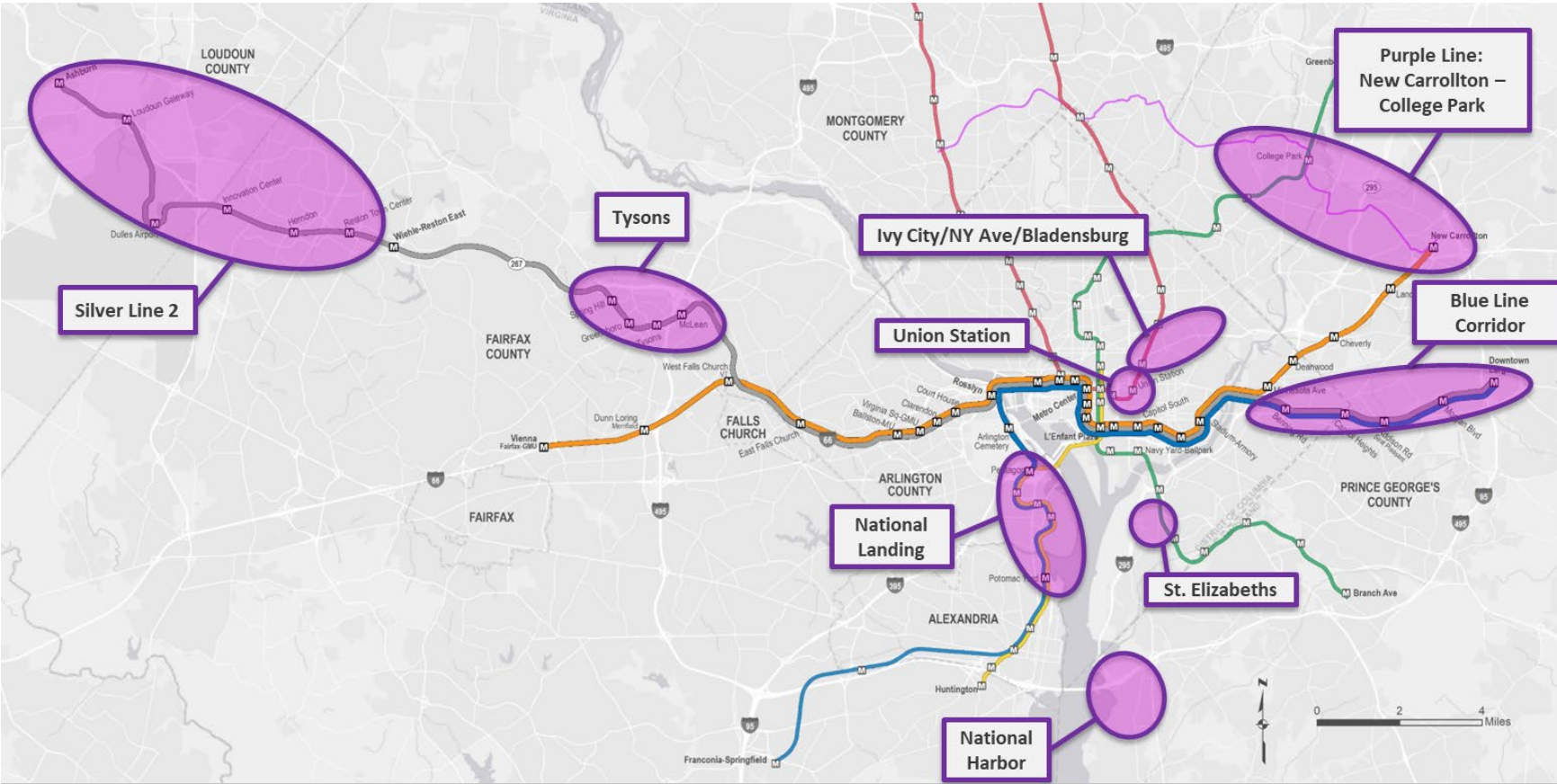
Opportunity for more and better connections, within Metro system and to regional services





# Development

- Increase transit-oriented development
- Support areas prioritized for growth
- Increase use and value of existing infrastructure

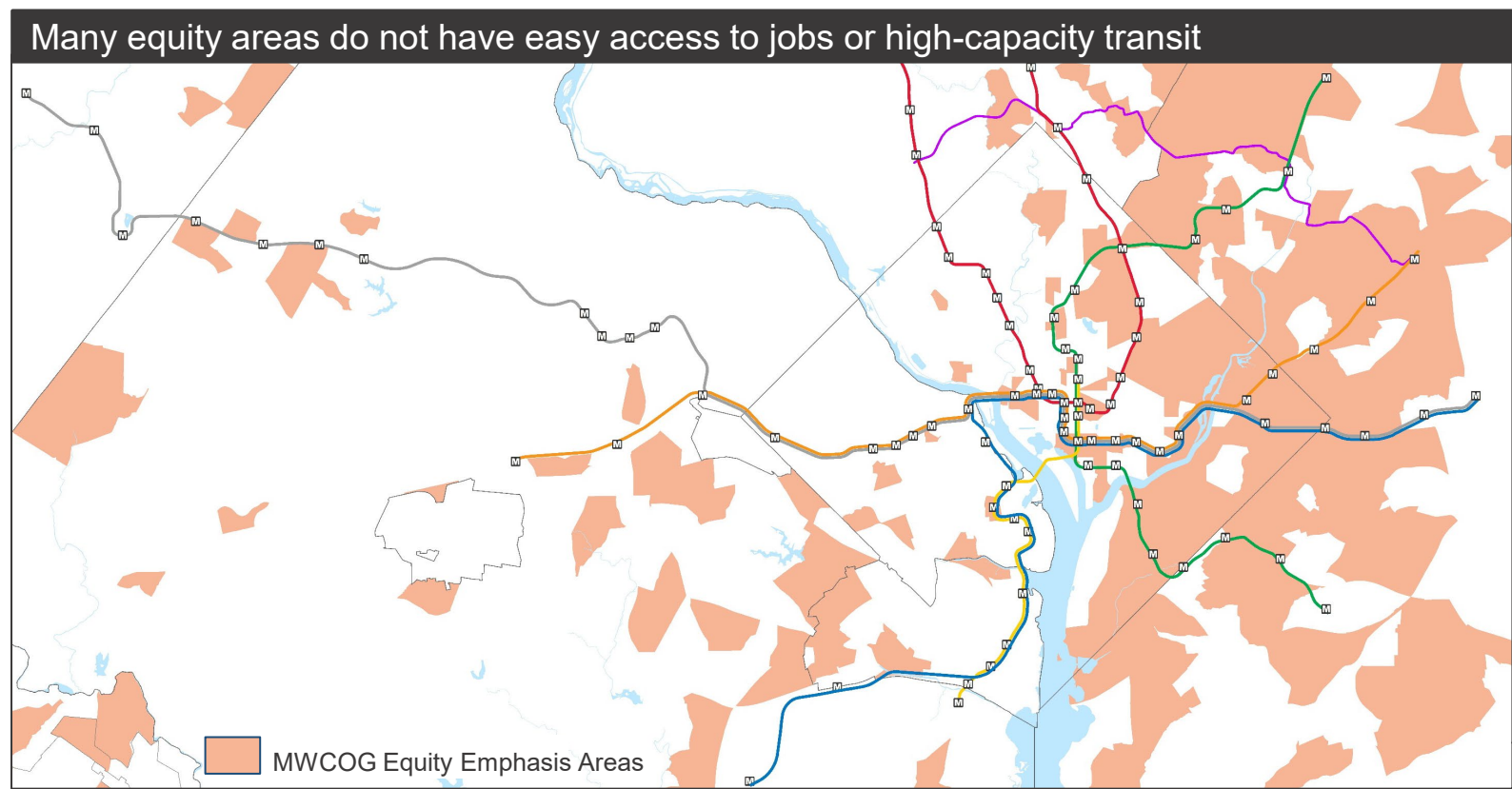


# Equity

- Expand access to high-frequency transit and economic opportunities
- Particularly in equity-focus communities that lack fast transit to jobs, other activities

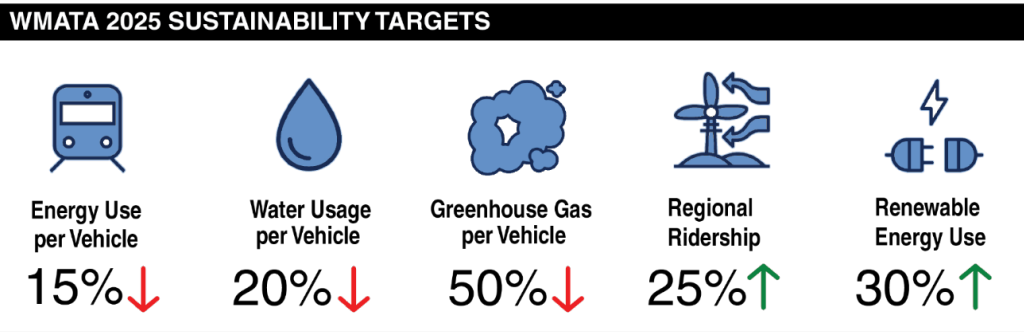


MWCOG's Region United Framework

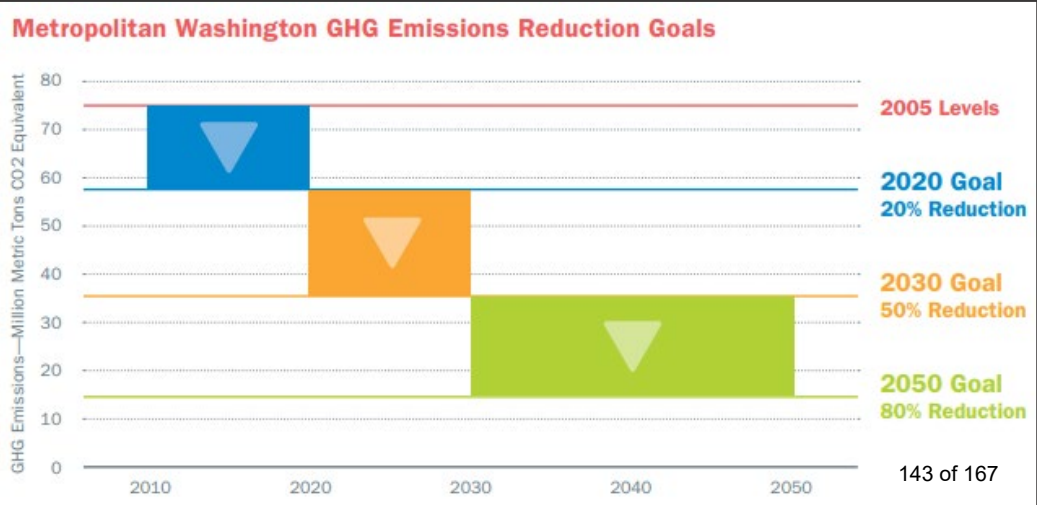


# Sustainability

- Advance the region’s sustainability goals and targets
  - Be primary mode of choice for most people
  - Encourage shifts from driving to transit, biking, and walking
  - Help reduce emissions and greenhouse gases



MWCOG’s Region United Framework



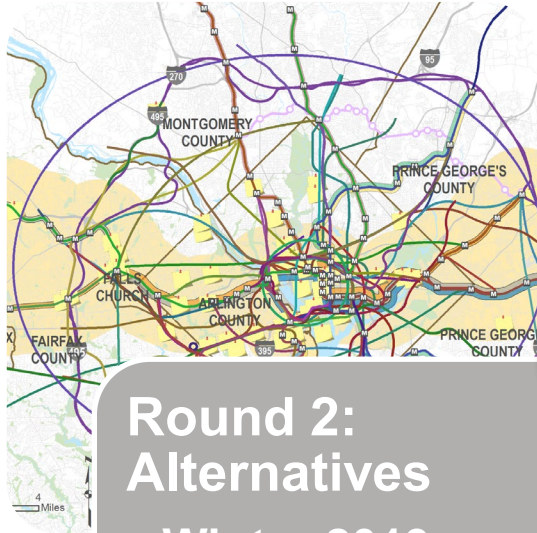


# Alternatives Were Shaped by Public and Stakeholders



## Round 1: Awareness/Goals

- Summer 2019
- Complete
- Website
- Pop-ups
- Handouts
- Stakeholder meetings



## Round 2: Alternatives

- Winter 2019
- Complete
- Public open houses
- Online survey
- Updated website
- Stakeholder meetings



## Round 3: Solution

- Summer 2023
- Public meetings
- In-person outreach at stations
- Online survey
- Stakeholder meetings
- Input on preferred alternative

The LPA should:



**Goal 1:**  
**Provide Sufficient Capacity to Serve Ridership Demand**



**Goal 2:**  
**Improve Reliability & On-Time Performance**



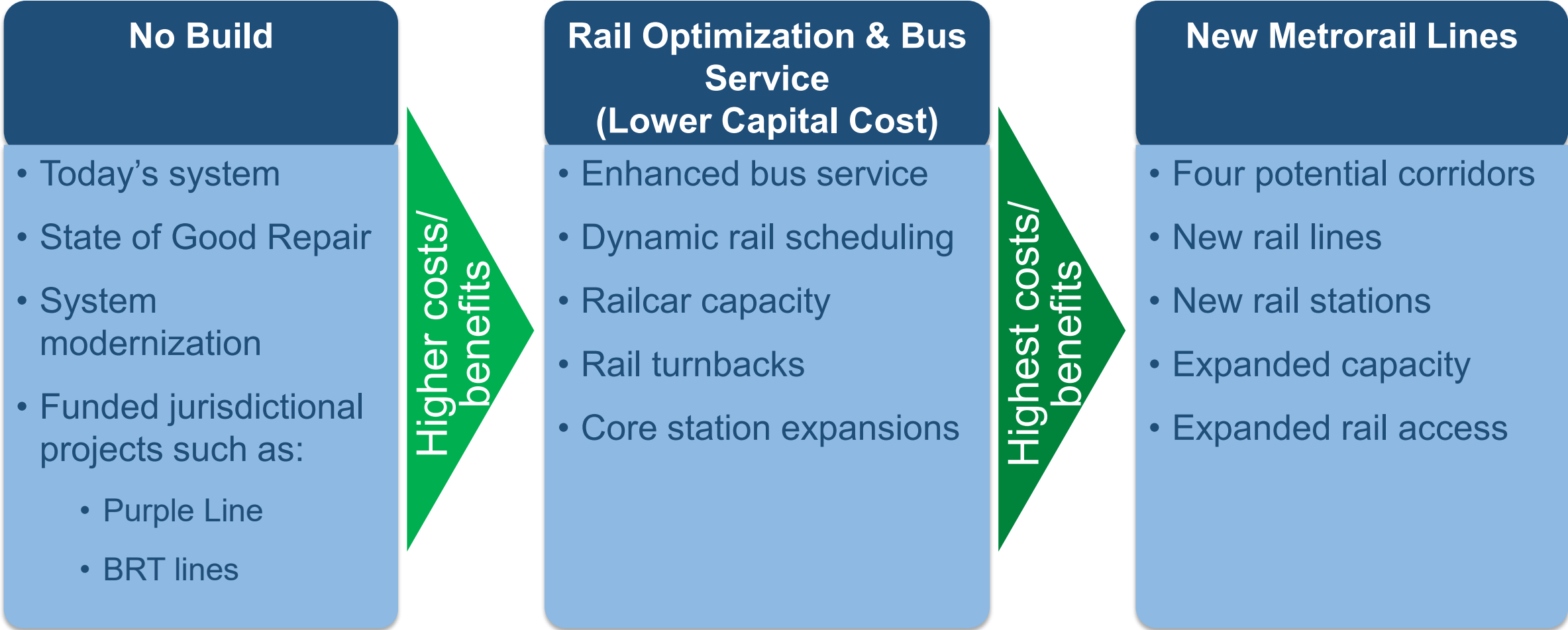
**Goal 3:**  
**Improve Operational Flexibility & Cost-Efficiency**



**Goal 4:**  
**Support Sustainable Development & Expand Access to Opportunity**

# The Alternatives

# Six Alternatives Range in Benefits, Impacts, Costs





Alternative 1: No-Build



The transportation system as it is planned (and funded) to be in 2040, including:

- Existing roads and transit
- State of good repair projects
- Modernization and optimization programs
- Planned/funded new transit services, such as:
  - Purple Line
  - US-1/Richmond Highway BRT
  - Flash BRT

This alternative will improve reliability and sustainability, but would not meet all four goals

\* Based on currently funded projects



# Alternative 2: Rail Optimization & Bus Service (Lower Capital Cost)

Attempts to meet goals without a new rail line, using:

- New bus rapid transit (BRT) and commuter bus service (approximately 60 routes)\*\*
- Dynamic rail scheduling
- New rail turnback infrastructure
- Core station capacity improvements
- Railcar capacity improvements

Benefits summary:

- Costs far less than rail options
- Could be implemented sooner
- Fewer/lower benefits than rail options
- Only achieves capacity goals if thousands of peak riders switch from rail to bus



\* Based on currently funded projects plus this alternative

\*\*See bus maps on next slide

# Alternative 2: Rail Optimization & Bus Service

## Illustrative BRT and Commuter Routes




16,000  
New weekday transit trips



0  
New stations




\$3-5 B  
Construction cost




+3%  
Trips by transit vs. other travel options




+27%  
Residents in equity areas with new access to high capacity transit



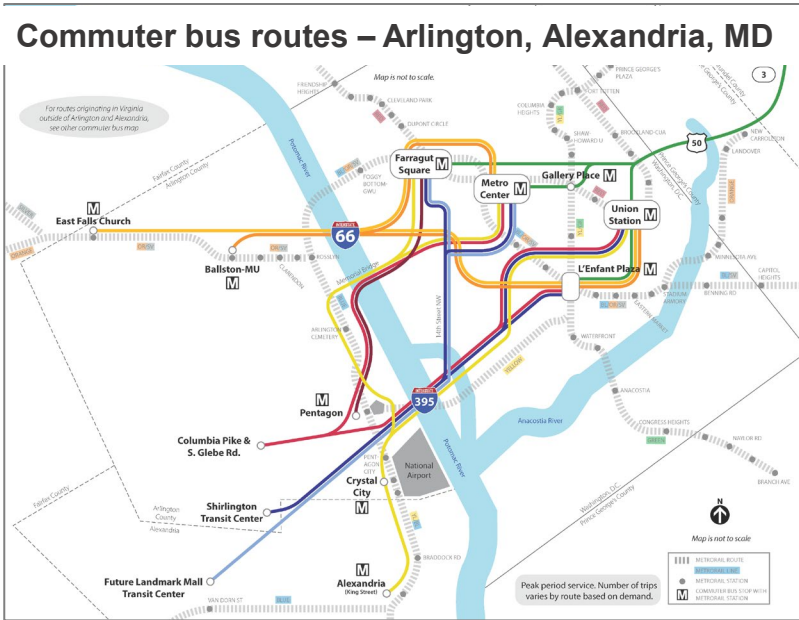
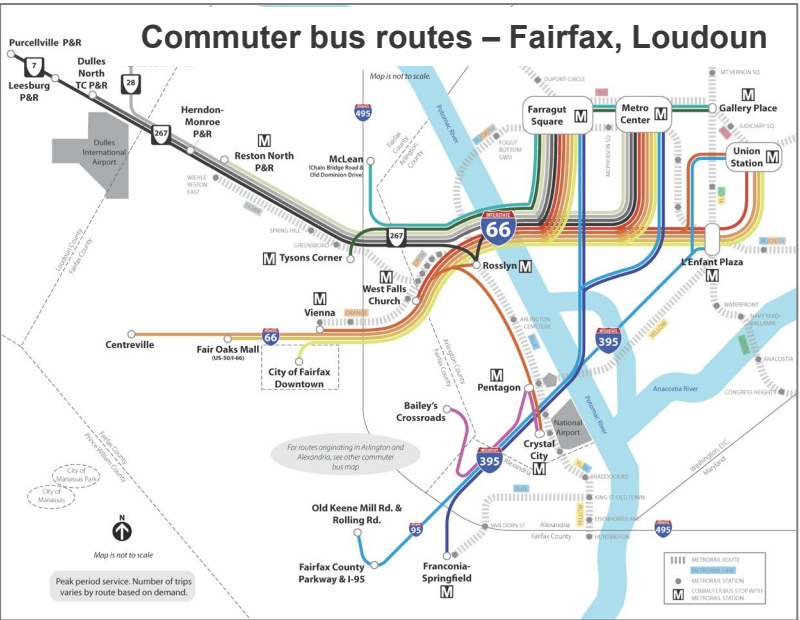
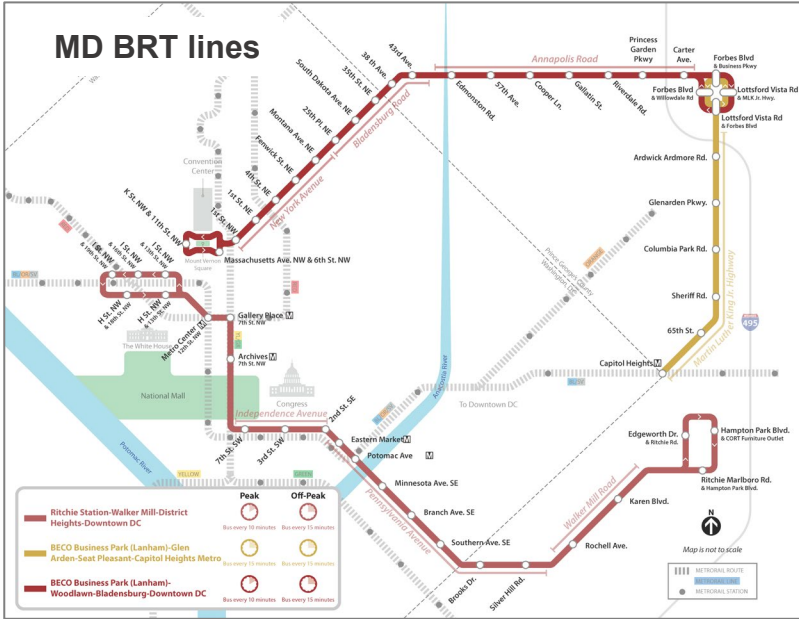
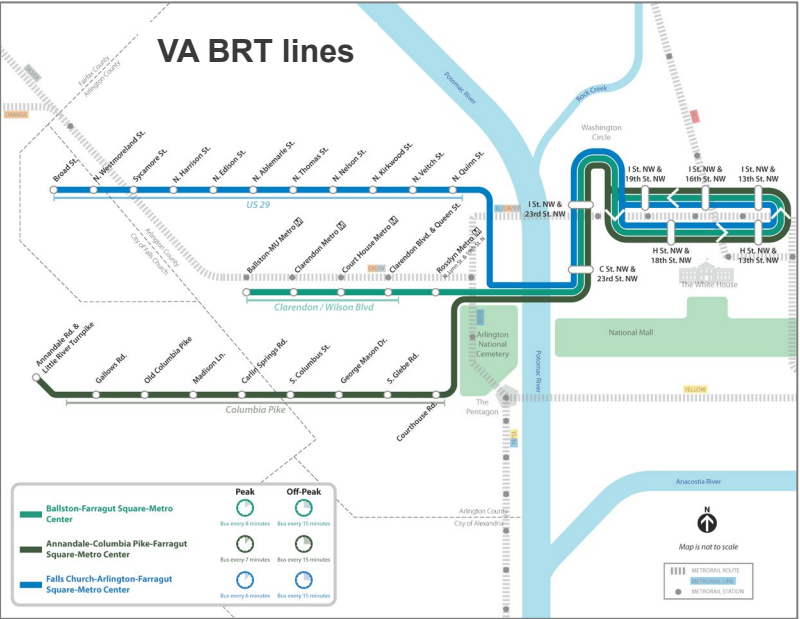
\$75-100 M  
New annual operating cost



-7%  
Customers affected by service delays



\$34 M  
New annual fare revenue





# Alternative 3: BL to Greenbelt

This alternative would serve the following areas:

- Rosslyn
- Georgetown
- Downtown DC
- Union Station
- Union Market
- Ivy City
- Fort Lincoln
- Port Towns
- Hyattsville
- College Park
- Greenbelt

Transfers would be available at the following stations:

- GR Greenbelt
- GR College Park-U of Md
- YL GR Mt Vernon Sq
- OR SV Rosslyn
- RD OR SV Farragut Station
- RD Union Station

Benefits summary: Does well with on-time performance, lowest construction cost of the rail options



92,000  
New weekday transit trips

14  
New stations

\$25-30 B  
Construction cost

+3%  
Trips by transit vs. other travel options

+20%  
Residents in equity areas with new access to high capacity transit

\$125-150 M  
New annual operating cost

-13%  
Customers affected by service delays

\$79 M  
New annual fare revenue

\* Based on currently funded projects plus this alternative

# Alternative 4: BL to National Harbor




This alternative would serve the following areas:

- Rosslyn
- Georgetown
- Downtown DC
- Union Station
- Navy Yard
- Buzzard Point
- St. Elizabeths
- Forest Heights
- Oxon Hill
- National Harbor
- Alexandria


Transfers would be available at the following stations:

- GR Navy Yard-Ballpark
- YL GR Mt Vernon Sq
- OR SV Rosslyn
- OR SV Capitol South
- RD OR SV Farragut Station
- RD Union Station


Benefits summary: Best at reducing crowding, growing ridership, increasing connectivity, and expanding access to transit and jobs in equity areas




180,000  
New weekday  
transit trips




16  
New stations




\$30-35 B  
Construction  
cost




+11%  
Trips by transit  
vs. other travel  
options




+35%  
Residents in equity  
areas with new  
access to high  
capacity transit



\$175-200 M  
New annual  
operating cost



-15%  
Customers  
affected by  
service delays



\$154 M  
New annual  
fare revenue

\* Based on currently funded projects plus this alternative



# Alternative 5: sv Express in VA



- This alternative would serve the following areas:
- West Falls Church
  - Ballston
  - Rosslyn
  - Georgetown
  - Downtown DC
  - Union Station
  - Capitol Hill
  - Ivy City
  - Port Towns
  - Hyattsville
  - College Park
  - Greenbelt

- Transfers would be available at the following stations:
- GR Greenbelt
  - GR College Park-U of Md
  - YL GR Mt Vernon Sq
  - OR West Falls Church
  - BL OR Rosslyn
  - RD BL OR Farragut Station
  - RD Union Station

Benefits summary: Would maximize train throughput, increase operational flexibility and resilience, and provide customers with multiple path choices



139,000  
New weekday  
transit trips



18  
New stations




\$35-40 B  
Construction  
cost



+3%  
Trips by transit  
vs. other travel  
options



+27%  
Residents in equity  
areas with new  
access to high  
capacity transit



\$175-200 M  
New annual  
operating cost



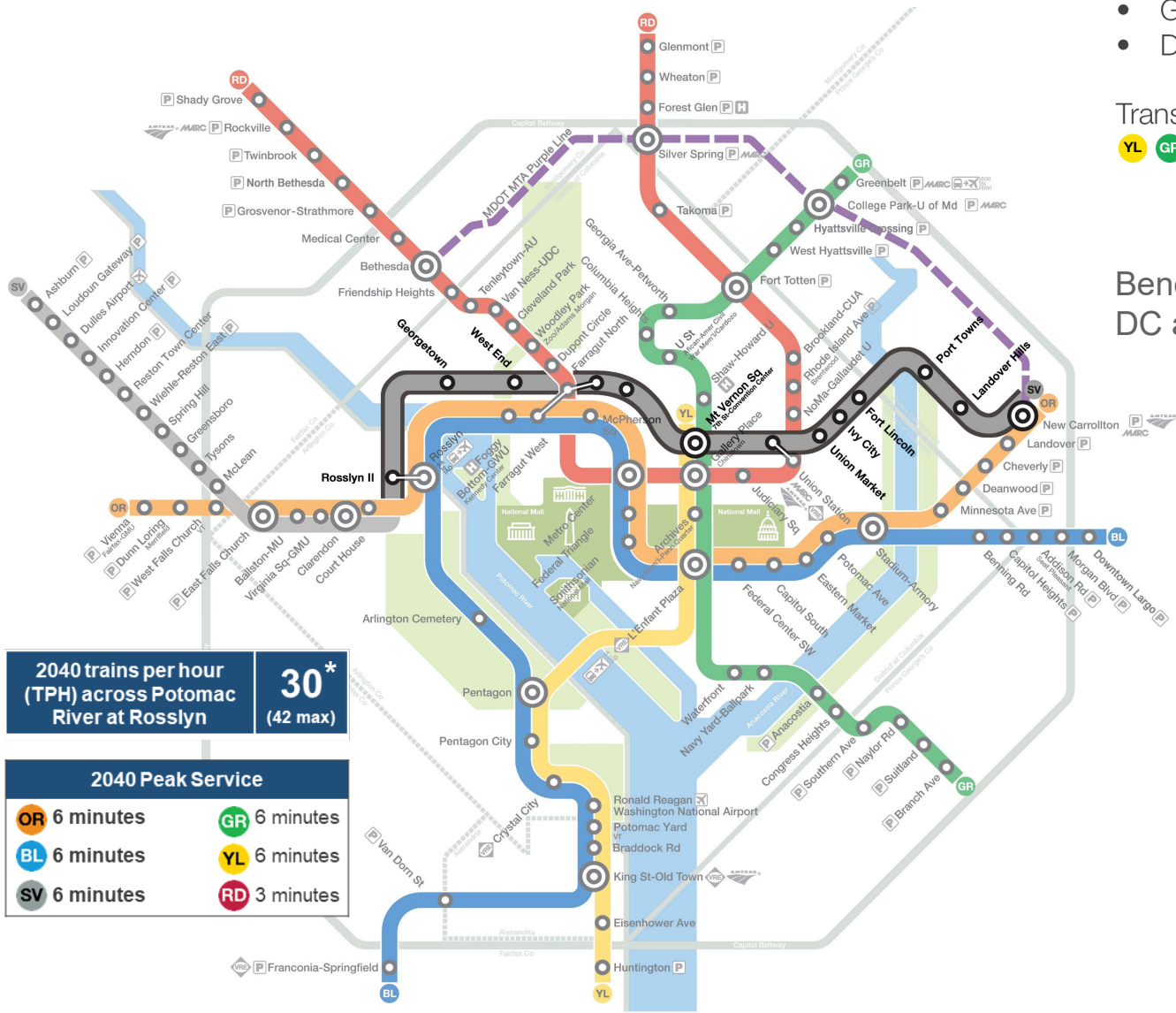
-32%  
Customers  
affected by  
service delays



\$119 M  
New annual  
fare revenue

\* Based on currently funded projects plus this alternative

# Alternative 6: sv to New Carrollton



- This alternative would serve the following areas:
- Rosslyn
  - Georgetown
  - Downtown DC
  - Union Station
  - Union Market
  - Ivy City
  - Fort Lincoln
  - Port Towns
  - Landover Hills
  - New Carrollton

Transfers would be available at the following stations:

- YL GR Mt Vernon Sq
- OR New Carrollton
- BL OR Rosslyn
- RD BL OR Farragut Station
- RD Union Station

Benefits summary: Does best at reducing travel times between Downtown DC and areas near the eastern Orange Line

94,000  
New weekday  
transit trips

12  
New stations

\$25-30 B  
Construction  
cost

+3%  
Trips by transit  
vs. other travel  
options

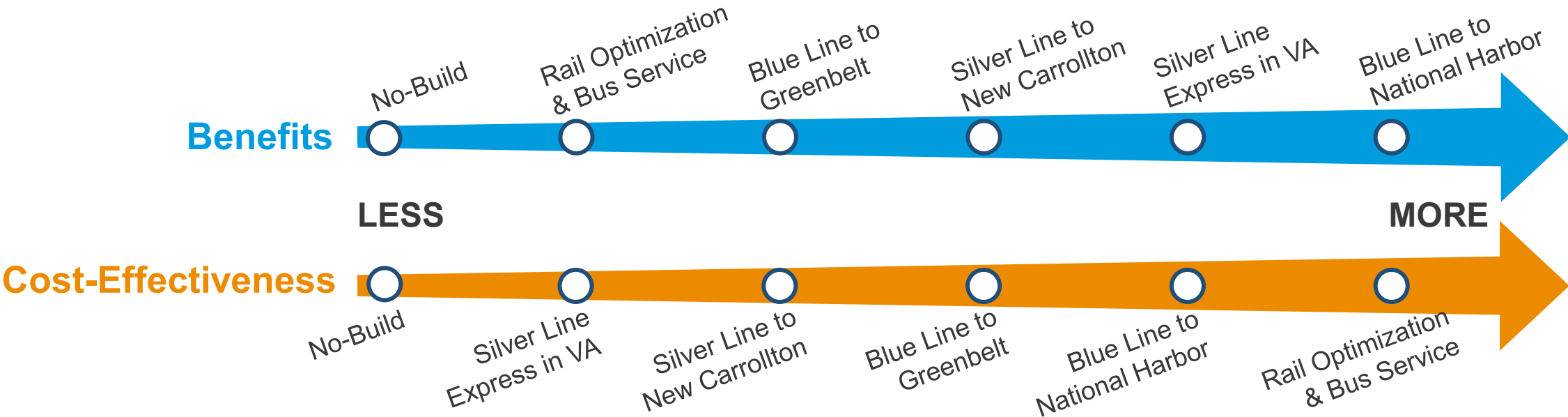
+17%  
Residents in equity  
areas with new  
access to high  
capacity transit

\$125-150 M  
New annual  
operating cost

-34%  
Customers  
affected by  
service delays

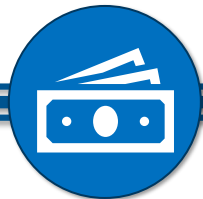
\$80 M  
New annual  
fare revenue

# Comparing Costs, Benefits, and Impacts



Estimated New Ridership, Fare Revenue, and Costs, 2023 Dollars (in addition to the No-Build Alternative)					
Alternative	How well it meets goals	New weekday rail trips	New annual fare revenue (\$M)	Construction costs (\$B)	Annual operating/ maintenance costs (\$M)
Alt 4: Blue Line to National Harbor	<div></div>	180K	\$154.2	\$30-35	\$175-200
Alt 5: Silver Line Express in VA	<div></div>	139K	\$119.4	\$35-40	\$175-200
Alt 6: Silver Line to New Carrollton	<div></div>	94K	\$80.4	\$25-30	\$125-150
Alt 3: Blue Line to Greenbelt	<div></div>	92K	\$79.1	\$25-30	\$125-150
Alt 2: Rail Optimization & Bus	<div></div>	16K	\$33.9	\$3-5	\$75-100
Alt 1: No-Build	<div></div>	0	\$0	\$0	\$0

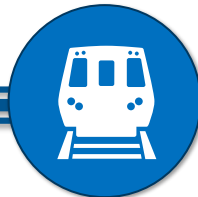
# BOS Project Costs and Impacts in Context



Region’s total economic output through 2045\*:  
**\$25 trillion**  
BOS alternative = 0.12% of GRP



Region’s planned spending on highway expansion:  
**\$33 billion** for 893 new road miles



BOS rail alternative average cost:  
**\$31 billion**

Impacts of current plans

- More driving (+2 million car trips)
- More traffic (+45% congestion)
- More land needed for parking
- Unhealthy air (1.72 million metric tons of CO2 per year)

Impacts of a BOS alternative\*\*\*

- More travel by transit
- More connections / transfers
- Access to thousands more jobs
- Better transit in equity communities
- More opportunities for TOD
- Healthier region and cleaner air

\*Economic output in terms of Gross Regional Product (GRP), or the total market value of goods and services produced in the region. 2021 GRP of \$607B (most data recent available) was projected to 2045 by the average annual growth rate 2001-2021.

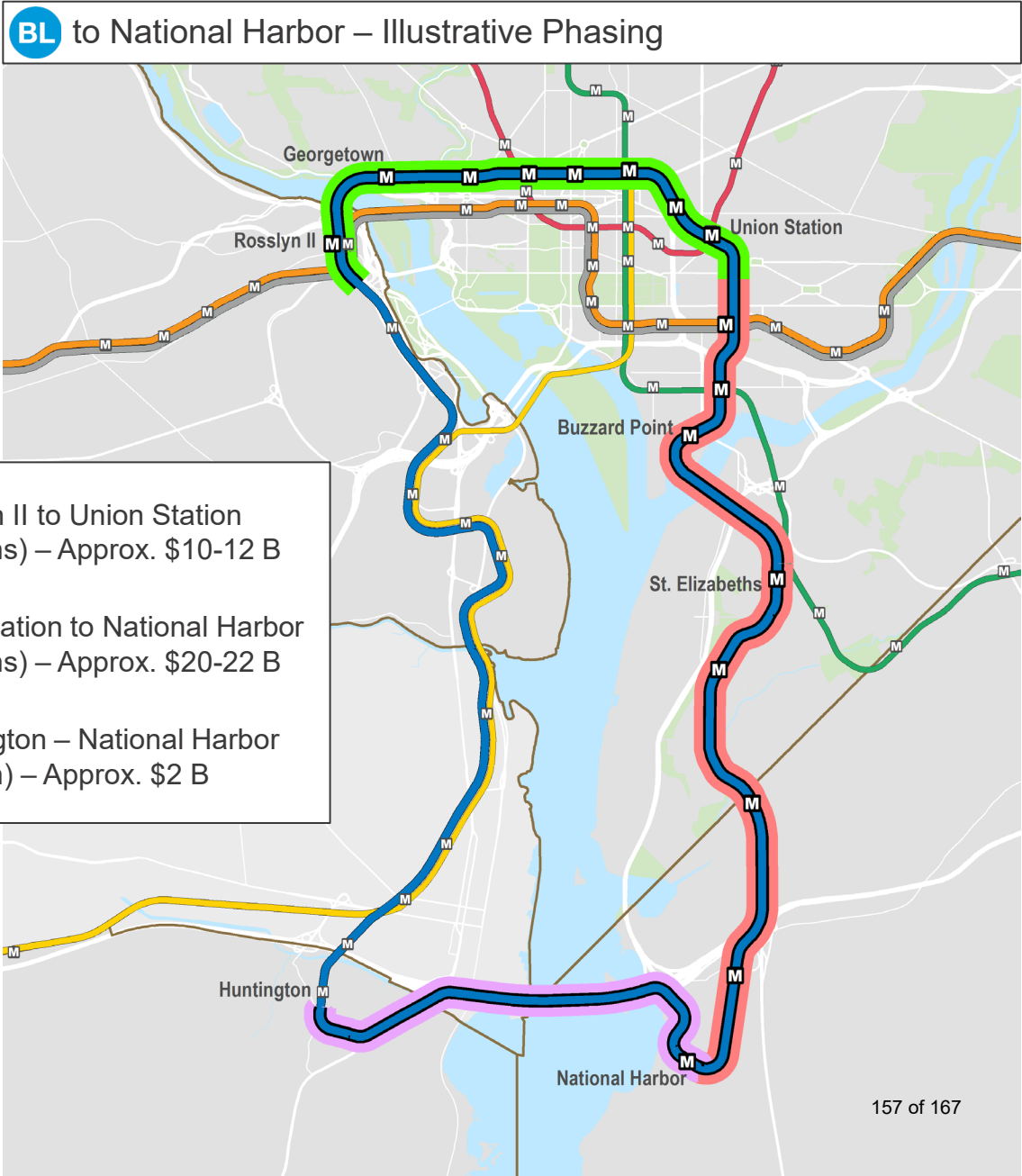
\*\*From the region’s Visualize2045 long-range transportation plan, adjusted for inflation to \$2023. May not include all locally funded spending to build and maintain roads.

\*\*\*BOS alternatives range in type and scale of impact. See preceding slides for more detail



# Illustrative Project Phasing

Similar to how the Silver Line was constructed, **any alternative could be delivered in phases**



# Round 3 Public Engagement and Next Steps

# Purpose of Round 3 Public Engagement

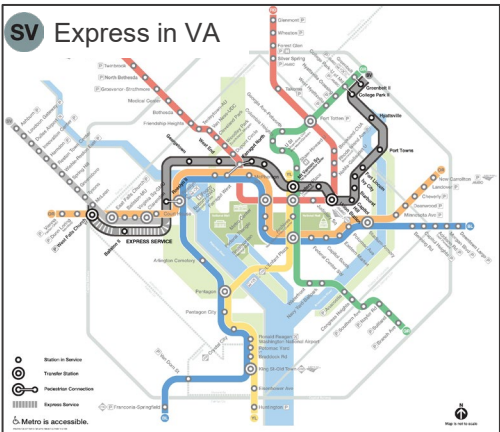
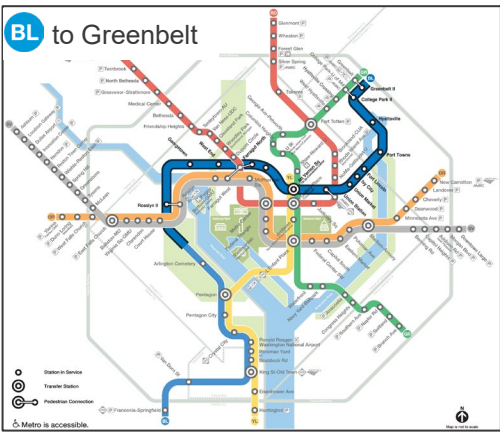
- Present the six alternatives and cost-benefit analysis
- Gather public feedback on:
  - preferred alternative & potential names
  - priority outcomes/benefits
- Inform Board’s selection of locally-preferred alternative (LPA)
- Not revisiting goals, alternatives, or cost-benefit analysis

No-Build Alternative

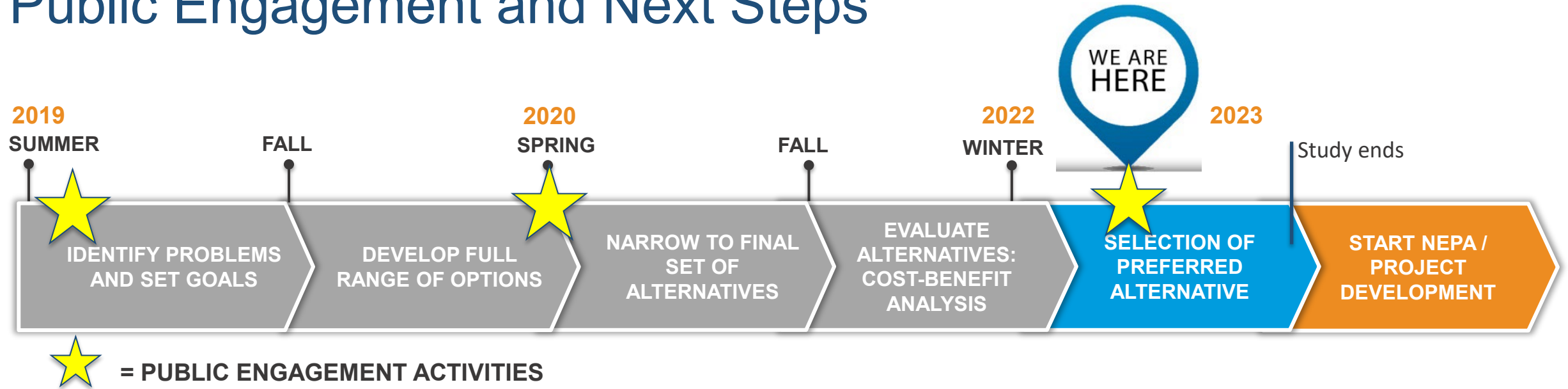
- Existing Services
- State of Good Repair
- Silver Line Phase 2
- Potomac Yard
- Funded Partner Projects (e.g. Purple Line)

Lower Capital Cost Alternative

- Enhanced bus service
- Dynamic rail scheduling
- Railcar capacity
- Rail turnbacks
- Core station expansions



# Public Engagement and Next Steps



- Briefings to elected officials and TPB: Continuous throughout study
- Public engagement: July 17 - September 30
- Discuss results/findings with stakeholder committees: October-November 2023
- Support Board of Directors in selecting an LPA: TBD

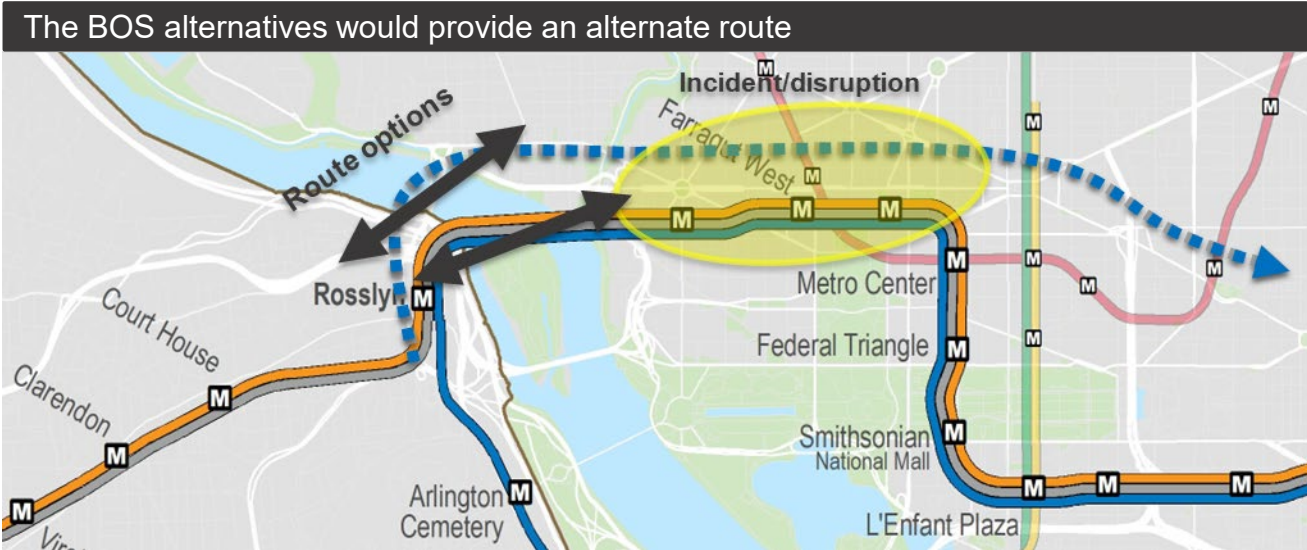
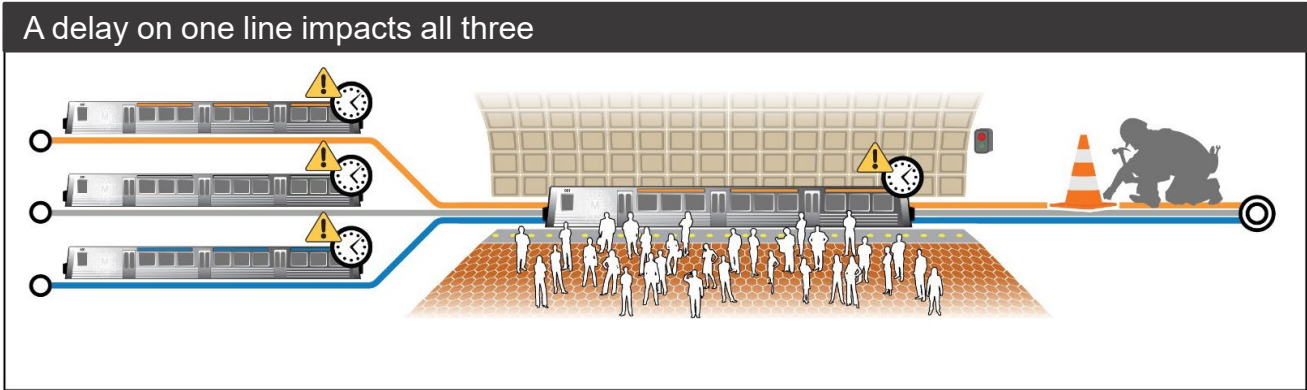


# Appendix



# Customer Benefits Example 1: Reliability and Resilience

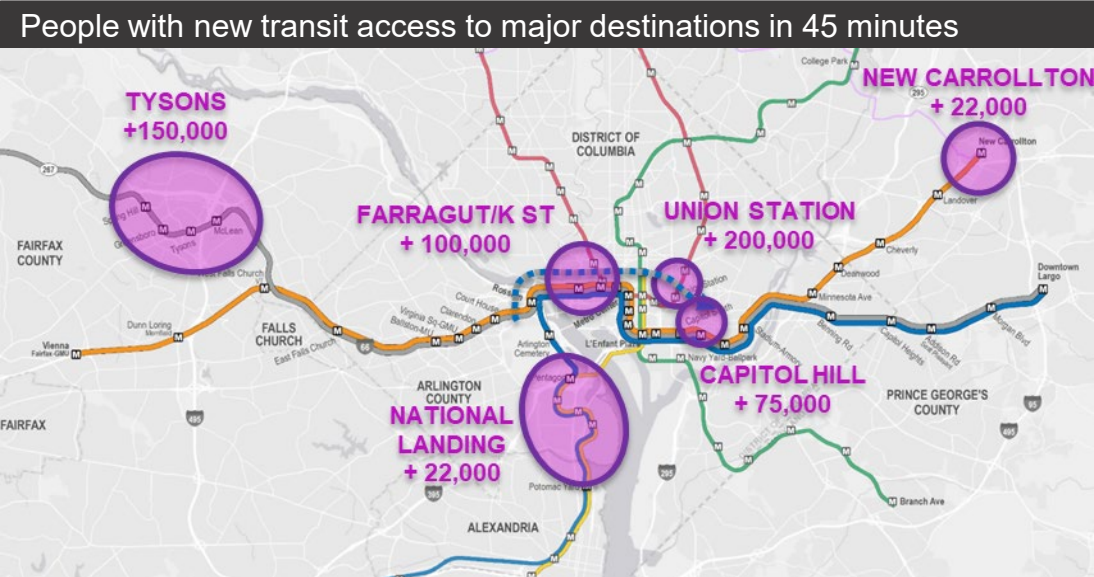
- Silver Line customers who live in Ashburn and work on K Street would have a less crowded peak-hour commute
- Would also have more reliable service and an alternate route to work if there is a service disruption on one line



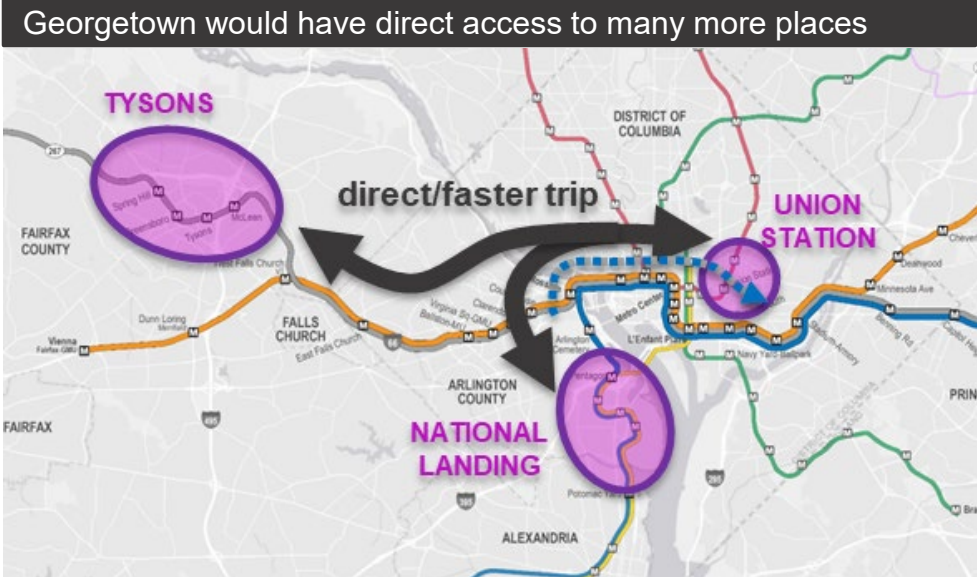
Results for all alternatives

# Customer Benefits Example 2: Connectivity and New Access

- Many more people could take transit to major destinations and activity centers in a reasonable amount of time
- People who live in Georgetown would have fast, direct connection to major activity centers



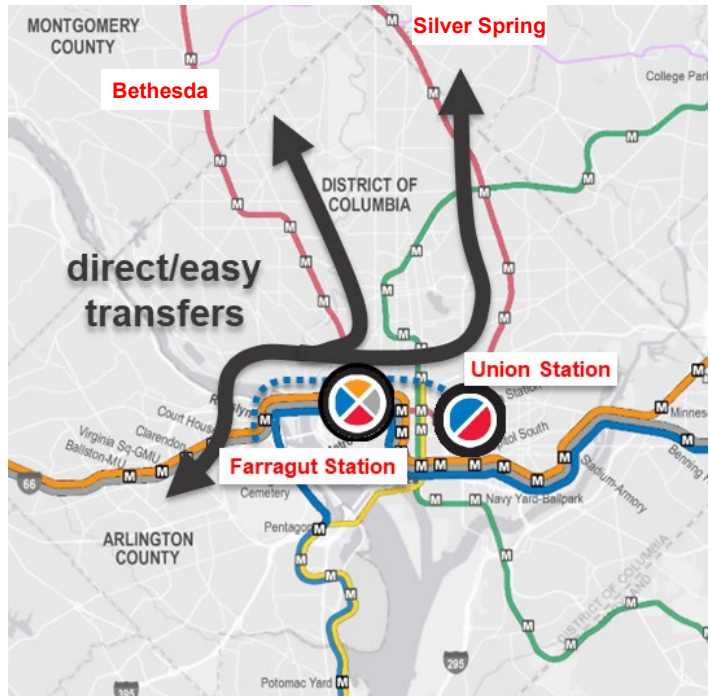
Results are average result of all rail alternatives.  
Exception: Tysons result is only for Alternative 5: SV Express in VA



 **– 20-25**  
minutes transit travel time  
Results for all rail alternatives

# Customer Benefits Example 3: Faster Trips to More Places

- Red Line riders in Montgomery County would have multiple ways to get to jobs in Ballston
- Would also save up to 10-15 minutes per trip
- A resident of Manassas Park who rides VRE and Metrobus to Ivy City could transfer to Metrorail
- They would save up to 20 minutes per trip



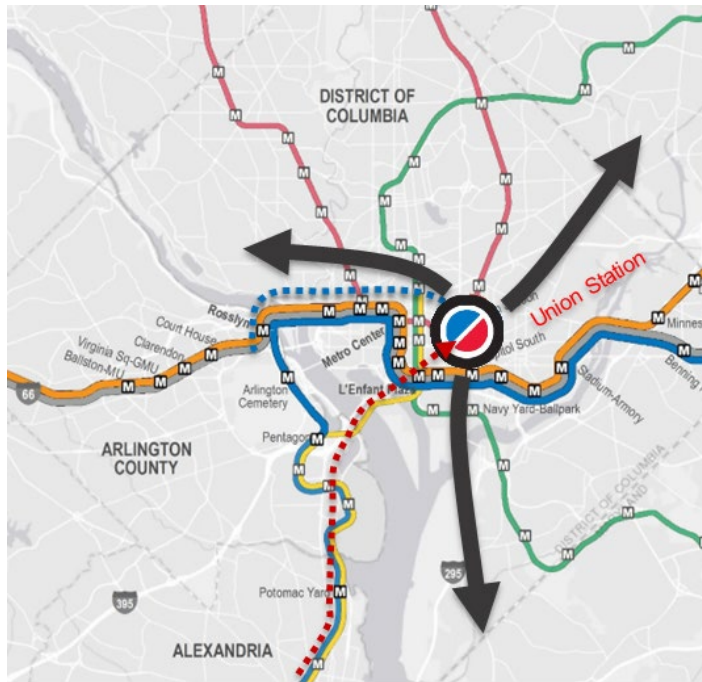
Results for Alternative 5: SV Express in VA



**+1**  
transit path  
option



**-10-15**  
minutes  
travel time



Results for all rail alternatives serving Ivy City (all but Alternative 4: BL to National Harbor)



**-20**  
minutes  
travel time

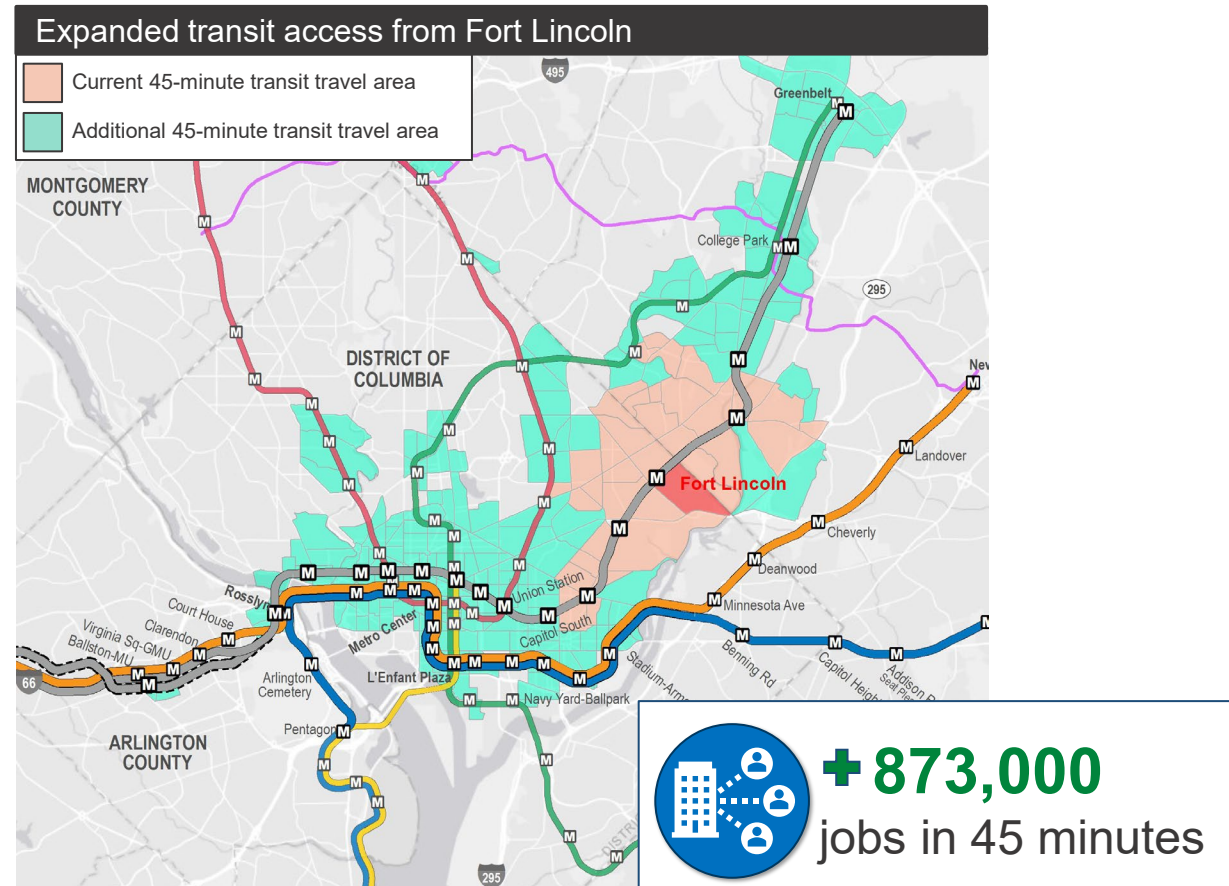


**Many more  
destinations**  
from VRE,  
MARC,  
Amtrak

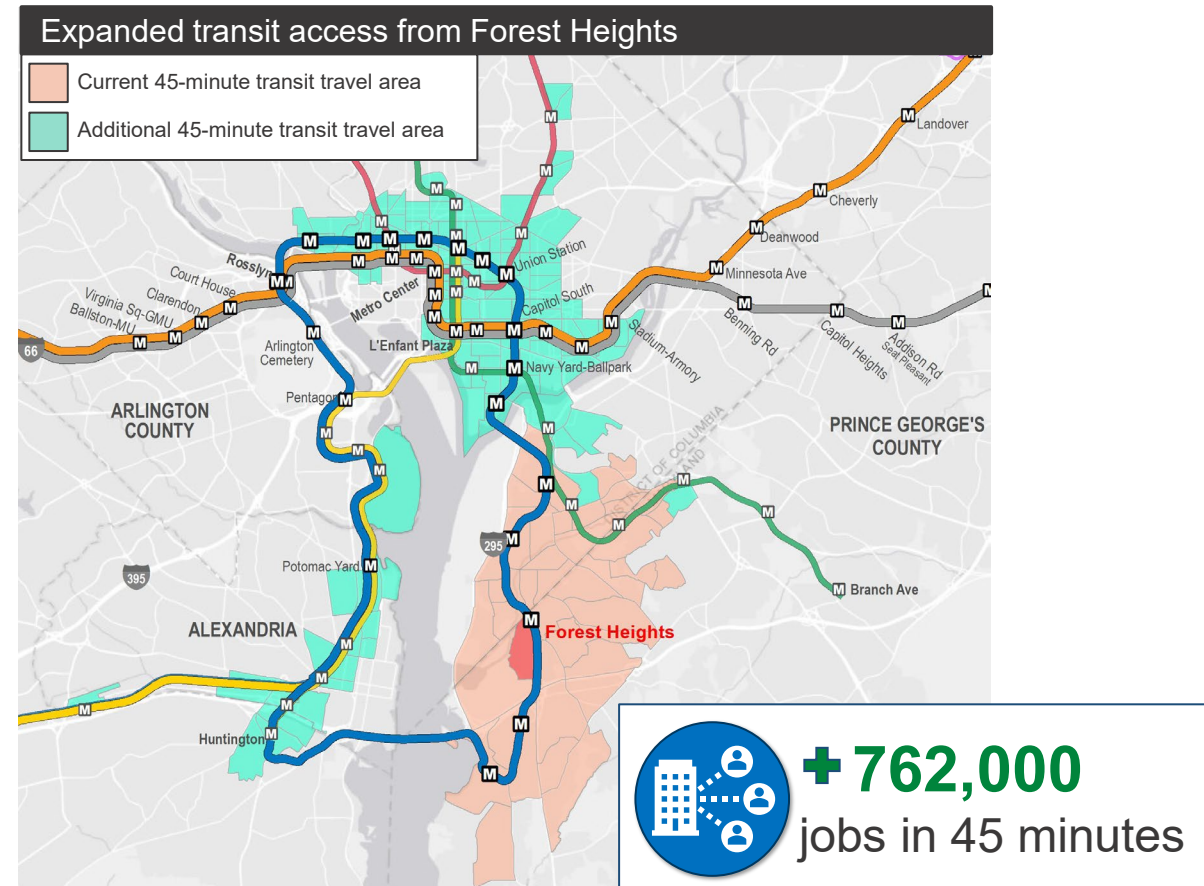


# Customer Benefits Example 4: Equity and Access to Opportunity

Customers living in equity emphasis communities like Fort Lincoln or Forest Heights would have greatly expanded access to jobs, shopping, school, and other vital needs



Results for Alternative 5: SV Express in VA



Results for Alternative 4: BL to National Harbor

# Community & Business Partners Committee

Regional and Business Partners		Community Organizations
Greater Washington Partnership	Northern Virginia Transportation Alliance	Jewish Council for the Aging
Greater Washington Board of Trade	Rosslyn BID	TPB Access for All Committee
Greater Washington Hispanic Chamber of Commerce	Tysons Partnership	TPB Citizens Advisory Committee
Arlington County Chamber of Commerce	DoD Washington Headquarters Services	Washington Area Bicyclists Association
Arlington Economic Development	DC Sustainable Transportation	Metro Riders Advisory Council
Ballston BID	Downtown DC BID	Metro Accessibility Advisory Committee
City of Fairfax Chamber of Commerce	Georgetown BID	Northern Virginia Resource Center for Deaf and Hard of Hearing Persons
Crystal City BID	Golden Triangle BID	DC Center for Independent Living
Falls Church Chamber of Commerce	Southwest DC BID	House of Ruth
Loudoun County Chamber of Commerce	Prince George's County Chamber of Commerce	EMPLOY Prince George's
Loudoun County Dept of Economic Development	Prince George's County Economic Development Corporation	
Northern Virginia Chamber of Commerce		



# Leadership and Technical Advisory Committees

Regional Agencies	State and Local Agencies	
Transportation Planning Board staff	Arlington County Department of Environmental Services	DC Dept of Transportation
Metropolitan Washington Airports Authority	City of Alexandria Transportation & Environmental Services	DC Office of Planning
National Capital Planning Commission	City of Fairfax Dept. of Public Works	Maryland Dept of Transportation, Office of Planning & Capital Programming
	City of Falls Church Department of Planning	MNCPPC – Planning Department
	Fairfax County Department of Transportation	Prince George’s County Dept of Transportation
	Loudoun County Dept of Transportation and Capital Infrastructure	Washington Suburban Transit Commission
	Northern Virginia Transportation Commission	
	Northern Virginia Transportation Authority	
	Virginia Department of Rail and Public Transportation	
	Virginia Department of Transportation	

