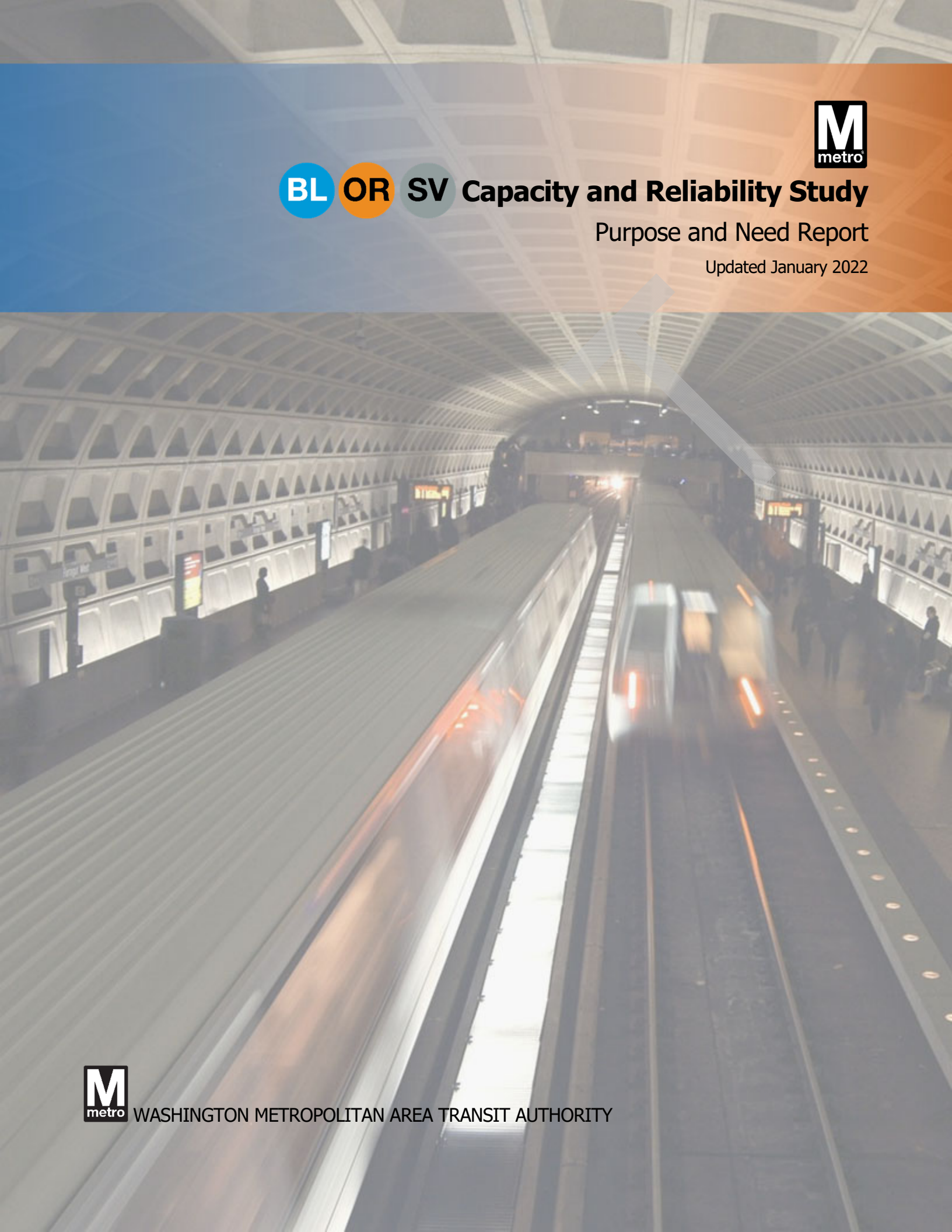
BL OR SV Capacity and Reliability Study

Purpose and Need Report

Updated January 2022



WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

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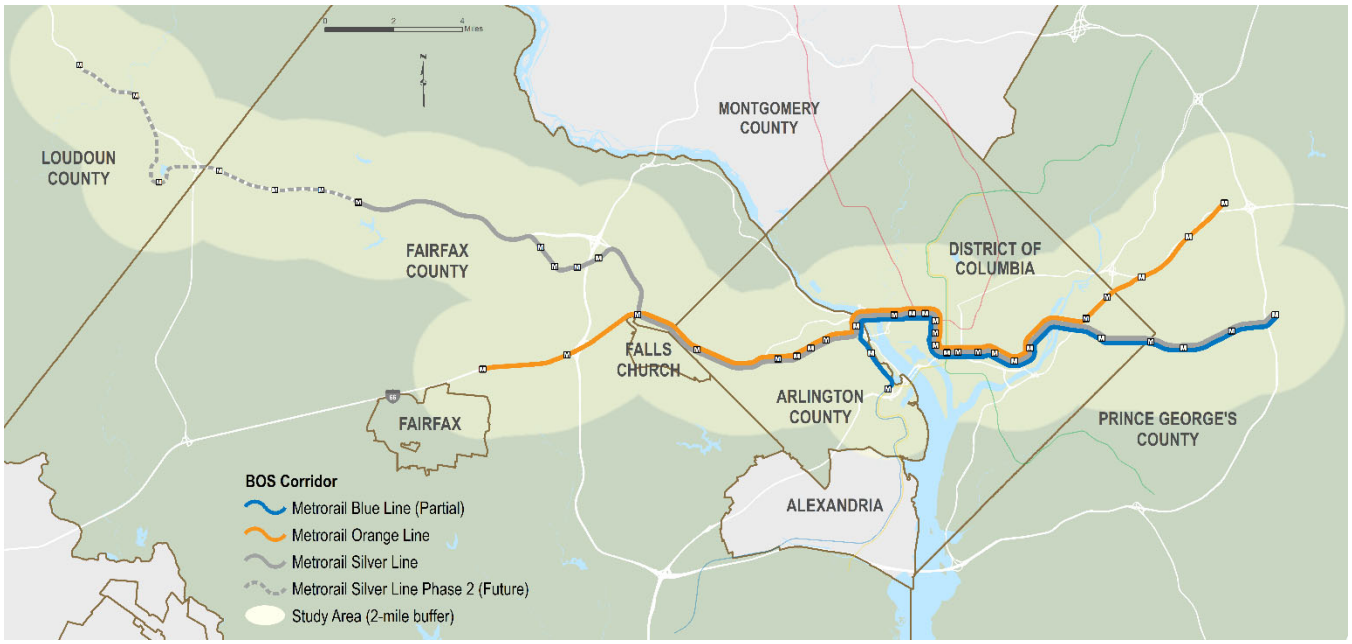
SUMMARY

The Washington Metropolitan Area Transit Authority (WMATA or Metro) has initiated the Blue, Orange, Silver Corridor Capacity and Reliability Study (BOS Study) to develop and evaluate options for addressing projected Metrorail needs for the corridor shared by the Blue, Orange, and Silver lines. The study will actively engage stakeholders and the public to identify the project purpose and need, develop and evaluate alternatives to improve transit services in the corridor, and recommend a preferred alternative for review and approval by the WMATA Board of Directors. As shown in the chart below, the first step in the process is to identify the project purpose, including Metrorail needs and problems in the corridor both now and in the future. The Purpose and Need Report summarizes the results of this assessment and provides the basis for the development of goals and objectives to guide the development and evaluation of alternatives to improve Metrorail service in the corridor.

Figure S-1: BOS Study Process

The project study area includes the area within 2 miles of the Orange and Silver Metrorail Lines plus the portion of the Blue Line between Pentagon and Largo Metrorail stations, as shown in the figure below.

Figure S-2: BOS Corridor Study Area

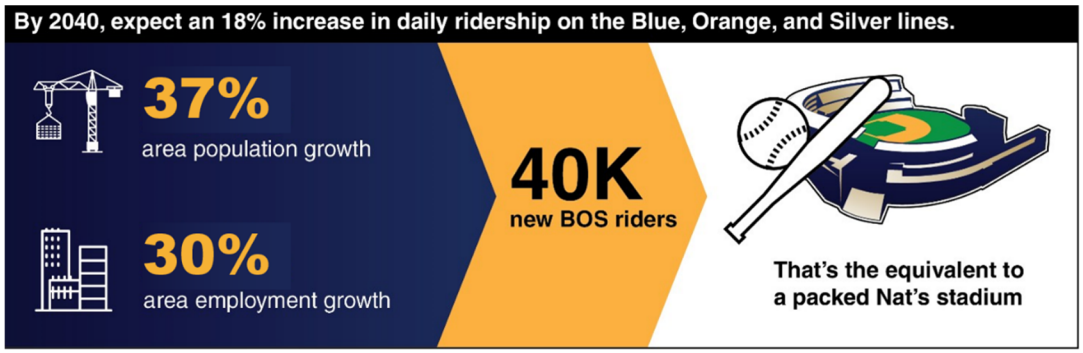


Why are Metrorail Improvements Needed?

Several previous studies, including the *Momentum and Core Capacity Constraints*, *ConnectGreaterWashington 2040 Plan*, *Silver Line Junction Study*, and the *Northern Virginia Core Capacity Report*, identified the most important problems facing the BOS corridor over the next 20 years. These studies were based on a review of existing and projected corridor conditions as well as previous studies of corridor transit issues and operations. Major capital investments, like those that will be considered in this study, must accommodate future demand because of the cost and time involved in designing and constructing such projects. However, in many instances, the issues identified for this corridor have been occurring for years andprevious studies dating back to 2013 have recommended solutions to crowding, operational inflexibility, and reliability. As a result, there is strong evidence for the following key corridor needs identified through review of prior studies.

Meet Ridership Demand

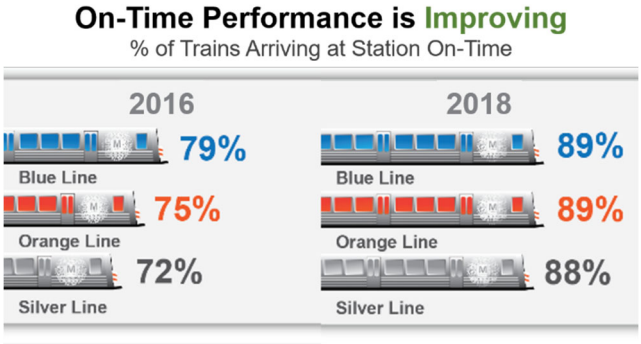
The BOS corridor study area population is projected to grow by 37% and employment projected to grow by 30% by 2040, which is expected to boost Metrorail ridership by 18% over the next 20 years. The increase in ridership will exacerbate the passenger crowding that is already evident in the corridor between West Falls Church and Farragut West Metrorail stations. Even if all eight car trains are used in the corridor during peak hours, train cars will still experience extreme peak period crowding with more than 100 passengers per car for the portion of the corridor between the Court House, Pentagon, and Foggy Bottom Metrorail stations, exceeding WMATA maximum standards for vehicle crowding.



According to Metro's Momentum strategic plan, the Rosslyn, Metro Center, and L'Enfant Plaza Metrorail stations are projected to hit maximum volume/capacity ratios in the near future and will experience crush loads and unsafe conditions. Additional circulation and platform capacity at these stations will be needed to safely and comfortably accommodate the increases in passengers.

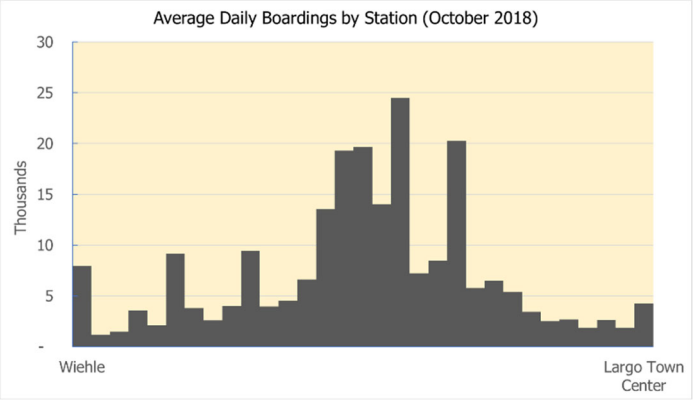
Preserve On-time Performance

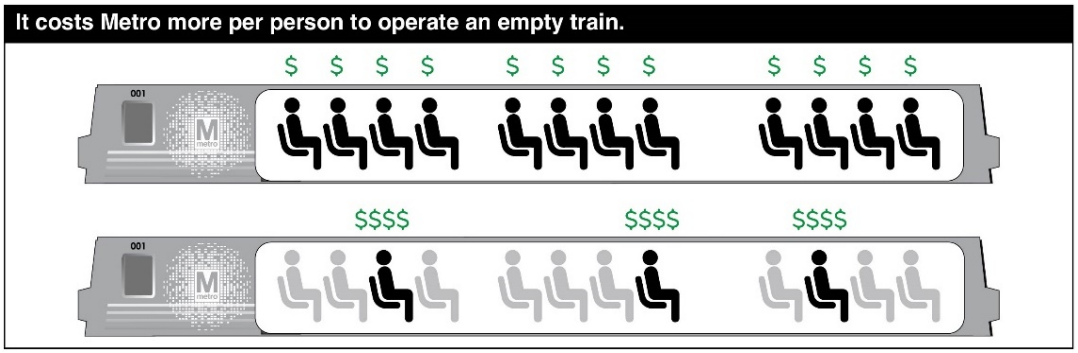
The Blue, Orange, and Silver Lines have significantly improved their on-time performance since 2016 and now operate on time more than 88% of the time, which is about the overall system average. As ridership continues to grow, and if station crowding continues to worsen in the future, the time it takes for passengers to board/alight the vehicles will increase and have a negative effect on reliability and on-time performance. Train delays typically spread quickly across the corridor and even negatively affect operations on other lines outside the corridor since, with the exception of the Red Line, they all interline with each other at different points in the system.



Improve Operational Flexibility

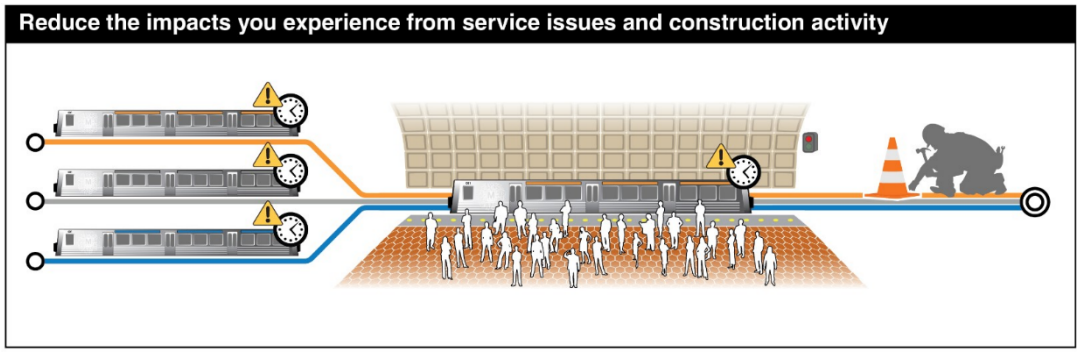
The existing Metrorail infrastructure in the corridor limits the ability to establish more flexible service patterns. This is particularly problematic for the BOS corridor since the demand levels vary widely along the corridor both now and in the future. This results in having to provide very high frequencies of service throughout the corridor to accommodate the very high level of demand that is confined to the portion of the corridor in the core area, generally between Rosslyn and L'Enfant Plaza Metrorail stations. The mismatch between service levels and demand in the eastern and western ends of the corridor drives up the corridor (and overall system) operating costs.





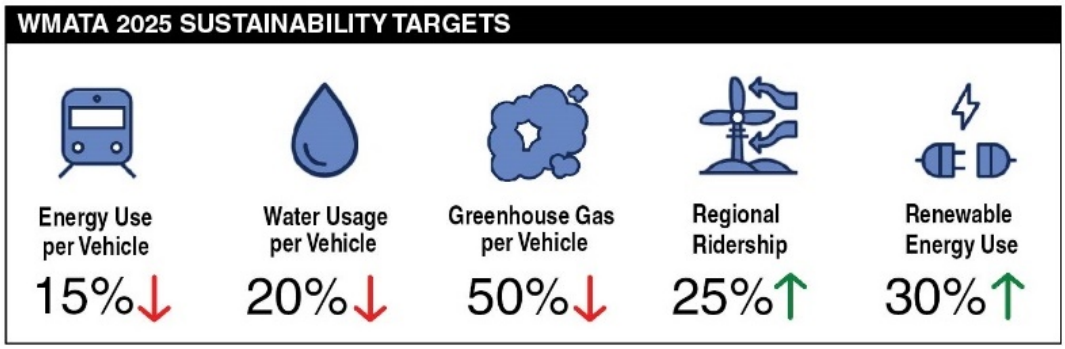
Manage Construction and Disruptions

As a two-track system with a limited number of pocket tracks, storage tracks, and cross-overs, responding to unexpected train and station-related incidents can be a difficult and time-consuming process. This can result in substantial service delays that can quickly spread across the corridor as well as the other system lines. Given the minimal amount of track time available to complete necessary and on-going preventative maintenance during the overnight period when the system is closed, some of these work activities may need to be completed during daytime hours and weekends, requiring single tracking or even occasional shutdowns of some parts of the corridor. The existing infrastructure constraints limit the ability to execute customer-friendly rail service while accommodating planned construction work.



Meeting WMATA and Regional Sustainability Commitments

As part of WMATA's Sustainability Initiative, the Authority has established both regional and internal system efficiency objectives to achieve its financial and environmental goals while improving safety and reliability. These include supporting projects that promote more cost-effective, energy-efficient, safe, and environmentally friendly transit services in the BOS corridor and throughout the metropolitan area. These factors must be considered in the development and evaluation of Metrorail improvement options for the BOS corridor.



What is the Purpose of the Project?

Based on the corridor needs assessment, a problem statement has been developed to guide the project. The BOS Study will identify a preferred alternative and a phased implementation plan that best addresses Metrorail needs in the corridor and responds to the following problem statement.

PROBLEM STATEMENT

Current Metrorail infrastructure and operational constraints in the BOS corridor limit the ability to:

- **accommodate forecasted growth in population, employment, and Metrorail ridership over the next twenty years, resulting in passenger crowding at corridor stations and on trains that exceed acceptable WMATA standards;**
- **match service levels to variable demand across the corridor, driving up operating costs;**
- **respond quickly and efficiently to incidents and service disruptions, resulting in delays that rapidly spread across the corridor and to other lines in the system; and**
- **maximize service reliability for Metrorail riders.**

The general purpose of the project is to address this problem statement and the serious challenges to operations and customers resulting from the interlining of the Blue, Orange, and Silver lines.

What are the Project Goals and How Will They Be Used?

Four project goals and twelve related objectives have been identified based on the project problem statement and needs assessment. In the next steps of the BOS Study, several corridor improvement alternatives will be developed to address the project purpose and corridor needs. These improvement options will then be evaluated, in part based on how each meets the project goals and objectives. Specific measures of effectiveness will be identified for each of the objectives and used to compare the performance of the alternatives. The evaluation results, as well as comparisons of the potential benefits and estimated costs of each of the alternatives, will be used to identify a preferred alternative for review and adoption by the WMATA Board of Directors.

The project goals and objectives are as follows:

Goal 1: Provide Sufficient Rail Capacity to Serve Ridership Demand.

Objectives:

- Deliver optimal railcar passenger loads at 100 passengers per car (PPC).
- Safely and efficiently accommodate passenger and transfer demand.
- Increase capacity, flexibility, and resiliency to serve ridership demand and east-west travel.

Goal 2: Improve Reliability and On-Time Performance.

Objectives:

- Maintain or increase percentage of trains arriving on-time.
- Maintain or increase percentage of customers completing their trips on time.
- Minimize the number significant trip delays.

Goal 3: Improve Operational Flexibility and Cost-Efficiency.

Objectives:

- Minimize the travel-time impacts of work zones and disruptions.
- Meet ridership demand cost-effectively.
- Provide flexibility to match service levels to changes in ridership.

Goal 4: Provide Transportation Options That Support Sustainable Development and Expand Access to Opportunity.

Objectives:

- Increase corridor transit mode share.
- Enhance passenger safety and convenience.
- Support Transit-Oriented Development (TOD) and improved transit access.

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1.0 INTRODUCTION

1.1 Study Process Overview

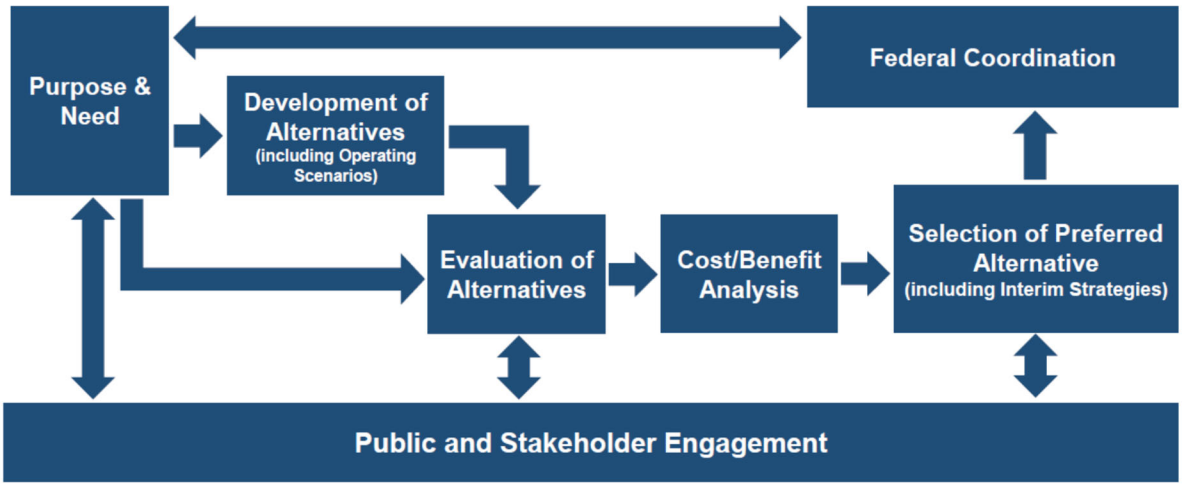
The WMATA Blue, Orange, Silver Corridor Capacity and Reliability Study (BOS Study) will develop and evaluate options for addressing the projected needs and deficiencies of the Metrorail corridor shared by the Blue, Orange, and Silver lines. The study will actively engage corridor stakeholders and the public to identify corridor problems and deficiencies, develop and evaluate corridor improvement alternatives, and recommend a phased corridor improvement program that best addresses projected transit needs in the corridor.

The study process is illustrated in **Figure 1-1** and includes the following:

- Assess key issues and trends in the corridor;
- Identify the purpose and need for improvements in the corridor;
- Develop a set of evaluation criteria to screen and evaluate alternatives to address the identified purpose and need;
- Identify a set of alternatives that address the identified purpose and need and develop those alternatives to a conceptual level of design;
- Perform a comparison of the alternatives using the evaluation criteria, including a thorough analysis of costs, benefits, and other impacts, to assist the authority leadership and community stakeholders to recommend a preferred option for approval by the WMATA Board; and
- Coordinate with the Federal Transit Administration (FTA) to explore the possibility of utilizing the BOS Study as planning to be incorporated into and support any required National Environmental Policy Act (NEPA) compliance and the potential for federal funding, such as the Capital Investment Grant (CIG) program, for the project.

At the end of the study, the preferred option will be identified and positioned for entry into FTA Project Development, NEPA review, and further phases of design.

Figure 1-1: Study Process



As noted above, the critical first stage of this study is the development of a clear and concise statement of purpose and need. The purpose and need statement justifies why an investment in corridor improvements is needed and establishes goals and objectives for those improvements. For the BOS Study, the Purpose and Need is based on key trends and issues identified in extensive previous analysis of the corridor combined with needs identified by the public, stakeholders, and WMATA staff and leadership.

The project purpose and need has been developed in coordination with the general public and the following technical and advisory committees:

- ***Internal Leadership Advisory Committee***, including WMATA upper-level managers and policy-makers;
- ***Internal Technical Advisory Committee***, comprised of WMATA interdepartmental experts in transit planning engineering, design, and operations;
- ***External Stakeholders Advisory Committee***, consisting of leaders and upper-level managers from the public and private sectors and community organizations with an interest in corridor transportation issues;
- ***External Stakeholder Technical Committee***, comprised of regional and jurisdictional transportation and land-use planning staff;
- ***Business and Community Stakeholder Committee,*** comprised of representatives from area business groups, such as chambers and business improvement districts, and major regional Community-Based Organizations (CBOs); and the
- ***Executive Steering Committee,*** including elected officials from all jurisdictions in the corridor study area.

The final goals and objectives developed as part of the project purpose and need were developed to align with WMATA's mission while reflecting the public and stakeholders' needs and desires.

The development of the purpose and need was based on:

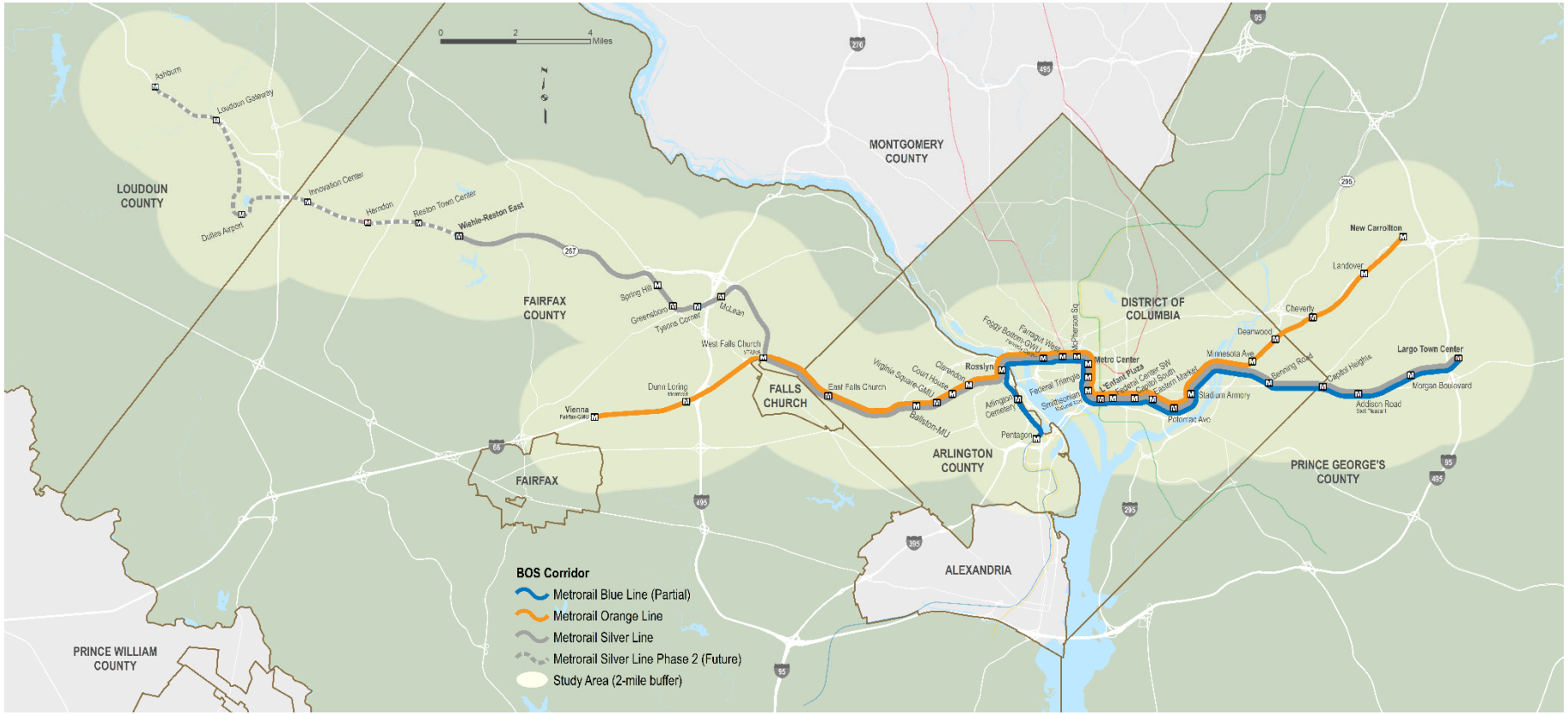
- Work sessions or briefings with the committees per committee-specific meeting schedules to review the draft and final goals and input regarding the Purpose and Need statement;
- The use innovative methods to effectively engage all committee members and gather candid feedback, including the use of interactive polling and facilitated group breakout sessions; and
- Follow-up meetings and conversations, as necessary, to gather input and feedback from FTA and other potential cooperating agencies in the NEPA process.

1.2 Study Area

As shown in **Figure 1-2**, the project study area includes the east-west Orange and Silver Line corridor, which extends from Loudoun and Fairfax counties in Virginia to Prince George's County in Maryland, plus the portion of the Blue line between the Pentagon and Largo Metrorail stations. This study area includes existing and future stations and the surrounding area within two miles of the stations and corridor track. Geographically, the corridor study area includes portions of the following jurisdictions:

- Loudon County, Virginia
- Fairfax County, Virginia
- City of Falls Church, Virginia
- City of Fairfax, Virginia
- Arlington County, Virginia
- District of Columbia
- Prince George's County, Maryland

Figure 1-2: Study Area



As shown in **Table 1-1** on the following page, the corridor study area includes 44 existing and future Metrorail stations, 13 of which form the shared three-line BOS corridor from Rosslyn in Virginia to Stadium-Armory in the District of Columbia. The study area includes just over 56 miles of rail track. Metrorail's Blue, Orange, and Silver Line rail lines operate on five unique Metrorail system segments identified by letters. The lettered segments of the Metrorail system included in the project study area are shown in **Figure 1-3** and include:

- C-Line (partial): Metro Center to Pentagon[1];
- D-Line: Metro Center to New Carrollton;
- G-Line: Stadium-Armory to Largo Town Center;
- K-Line: Rosslyn to Vienna; and
- N-Line: West Falls Church to Wiehle-Reston East (eventually to Ashburn).

These segments meet at junctions. The junctions included in the project study area are:

- C&K junction (south of Rosslyn) where the Blue line joins the Orange and Silver lines;
- D&G junction (east of Stadium-Armory) where the Blue and Silver lines join the Orange line; and
- K&N junction (east of West Falls Church) where the Silver line joins the Orange line.

Like the other lines in the Metrorail system, the Blue, Orange, and Silver lines generally feature two tracks – one in each direction. Several supporting facilities and track features were included in the original system design to enhance operational flexibility given a two-track constraint. These facilities and features include pocket tracks, track cross-overs, and rail maintenance and storage yard facilities as shown in **Figure 1-4**. As shown in the figure, the Metrorail alignment includes a combination of elevated, surface, and underground track and stations.

While the study area is principally focused on the area within one mile on either side of the rail alignment in this corridor, the project will also consider operational impacts of corridor improvements on lines outside of the study area resulting from the interconnected nature of the Metrorail system. For example, the project may investigate operational impacts further south along the Blue Line, impacts along the Yellow Line between Pentagon L'Enfant Plaza Metrorail stations, and cascading operational impacts on the Green Line resulting from changes to the Blue, Orange, and Silver Line operations.

[1] Note: The C-Line runs from Metro Center to Huntington via Arlington Cemetery, but the project study area truncates at Pentagon.

Table 1-1: BOS Corridor Metrorail Stations

Station	Track Segment	Service
Ashburn		SV
Loudoun Gateway	N	SV
Dulles Airport		SV
Innovation Center	N	SV
Herndon		SV
Reston Town Center	N	SV
Wiehle-Reston East		SV
Spring Hill	N	SV
Greensboro		SV
Tysons Corner	N	SV
McLean		SV
Vienna	K	OR
Dunn Loring		OR
West Falls Church	K	OR
East Falls Church		OR SV
Ballston-MU	K	OR SV
Virginia Square-GMU		OR SV
Clarendon	K	OR SV
Court House		OR SV
Pentagon	K	BL
Arlington Cemetery		BL
Rosslyn	C/K	BL OR SV

Station	Track Segment	Service
Foggy Bottom-GWU	C	BL OR SV
Farragut West	C	BL OR SV
McPherson Square	C	BL OR SV
Metro Center	C/D	BL OR SV
Federal Triangle	D	BL OR SV
Smithsonian	D	BL OR SV
L'Enfant Plaza	D	BL OR SV
Federal Center SW	D	BL OR SV
Capitol South	D	BL OR SV
Eastern Market	D	BL OR SV
Potomac Avenue	D	BL OR SV
Stadium-Armory	D	BL OR SV
Benning Road	G	BL SV
Capitol Heights	G	BL SV
Addison Road	G	BL SV
Morgan Boulevard	G	BL SV
Largo Town Center	G	BL SV
Minnesota Avenue	D	OR
Deanwood	D	OR
Cheverly	D	OR
Landover	D	OR
New Carrollton	D	OR

Figure 1-3: BOS Corridor Track Segments

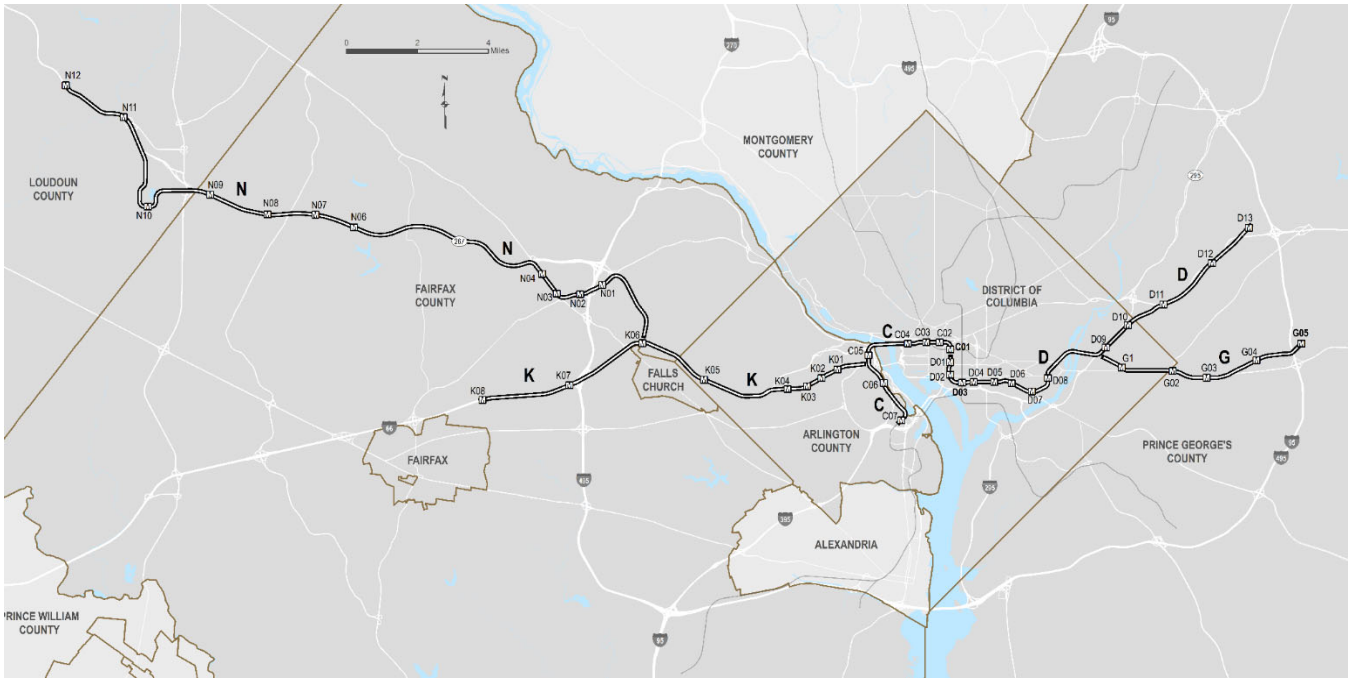
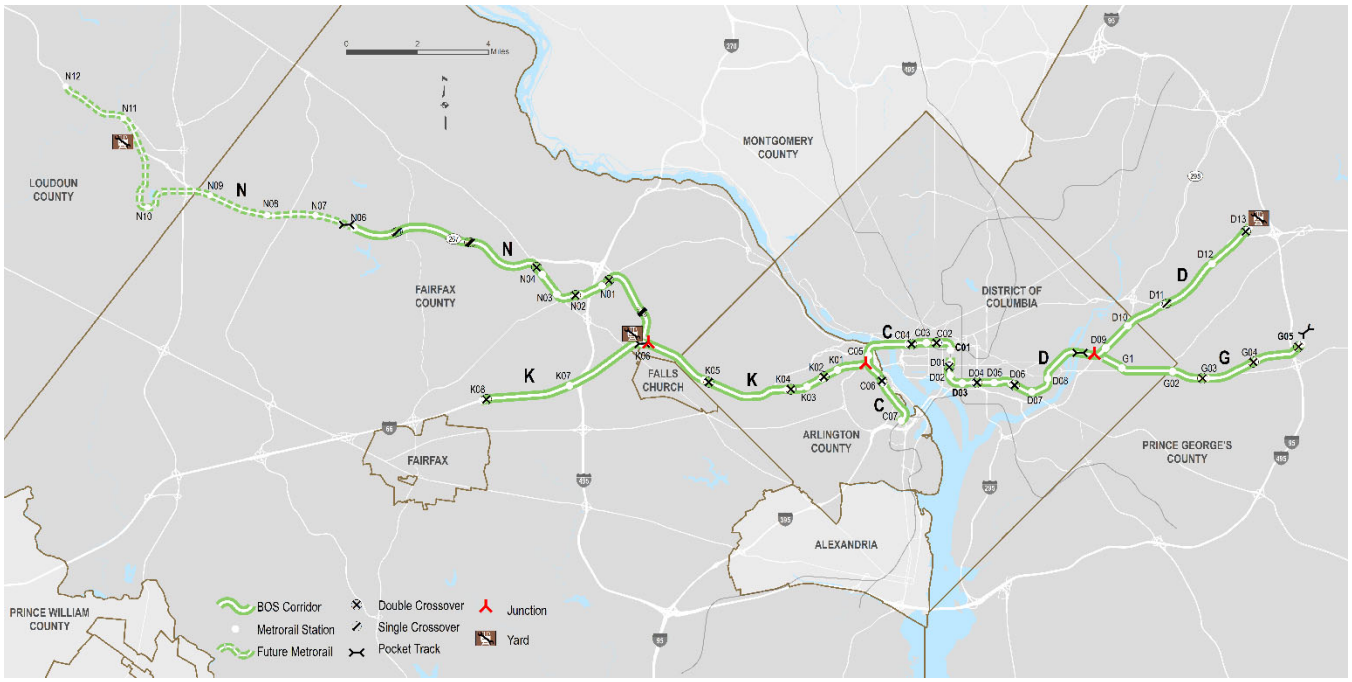


Figure 1-4: BOS Corridor Pocket Tracks, Crossovers, Junctions, and Rail Yards



1.3 Report Organization

The remainder of the report is organized in the following sections:

2.0 Key Trends in the Corridor Study Area describes the current and future trends in the corridor study area that may affect service and operations for the Blue, Orange, Silver Metrorail lines.

3.0 Summary of the Previous Studies briefly summarizes the results of past studies of potential capital and operational improvements in the corridor for consideration in the BO Study. This chapter includes a matrix that summarizes the study name, sponsor, date, description, alternatives studied, and relevance to the BOS Study project Purpose and Need.

4.0 Purpose and Need for the Project presents the project problem statement and summarizes the information supporting the identified corridor needs to be addressed by the BOS Study.

5.0 Project Goals and Objectives presents draft project-specific goals and objectives related to specific project needs identified in the corridor. This includes a description of how the project goals and objectives will be used to determine measures of effectiveness to evaluate alternatives and ultimately identify a preferred alternative.

6.0 Stakeholder and Public Involvement summarizes comments received from the internal and external stakeholders and the public on the draft purpose and need and how this information was addressed and/or incorporated in the final project purpose and need statement.

2.0 KEY TRENDS AND ISSUES IN THE CORRIDOR

2.1 Corridor Trends

Table 2.1 shows key information by corridor segment for the BOS corridor study area, including current and future Metrorail ridership, service levels, capacity, operating and maintenance costs, and population and employment within one mile of the Metrorail alignment.

Table 2-1: Corridor Information and Future Trends by Segment

Measure		Track Segment					Total
		C (partial)	D	G	K	N	
Avg. Weekday Ridership[1]	2018	97,831	72,266	13,504	43,107	15,528	242,235
	2040	106,177	79,033	15,892	50,668	33,312	285,083
	% Change	9%	9%	18%	18%	115%	18%
Peak Capacity (assuming 100 ppc)[2]	2018	32,200	32,200	21,000	32,200	11,200	
	2040	36,800	36,800	24,000	36,800	12,800	
	% Change			14%			
Service Levels (per direction)[3]	2018 & 2040			*23 Peak* *5 Off-Peak* *3 Late*			
Population (within 2 mile)[4]	2015	242,900	258,400	126,900	297,700	206,600	1,132,500
	2040	327,900	370,200	147,700	363,100	340,500	1,549,400
	% Change	35%	43%	16%	22%	65%	37%
Employment (within 2 Mile)[4]	2015	539,500	297,800	36,500	186,800	272,500	1,333,100
	2040	647,300	403,600	49,000	222,000	412,000	1,733,900
	% Change	20%	36%	34%	19%	51%	30%

Sources: [1]2018 Integrated Metrorail Ridership Forecast (WMATA Office of Planning); [2]Capacity estimate based on railcar size mix, service frequency, and passenger crowding threshold; [3]WMATA Rail Service Timetables; [4]MWCOG Population & Employment Round 9.1 Cooperative Forecasts

Comparing average weekday ridership in 2018 to peak capacity in 2018 (assuming 100 PPC), ridership already exceeded capacity on all but one track segment (segment G). Segment C carried three times the ideal capacity, segment D carried twice the ideal capacity, and segments K and N exceed capacity.

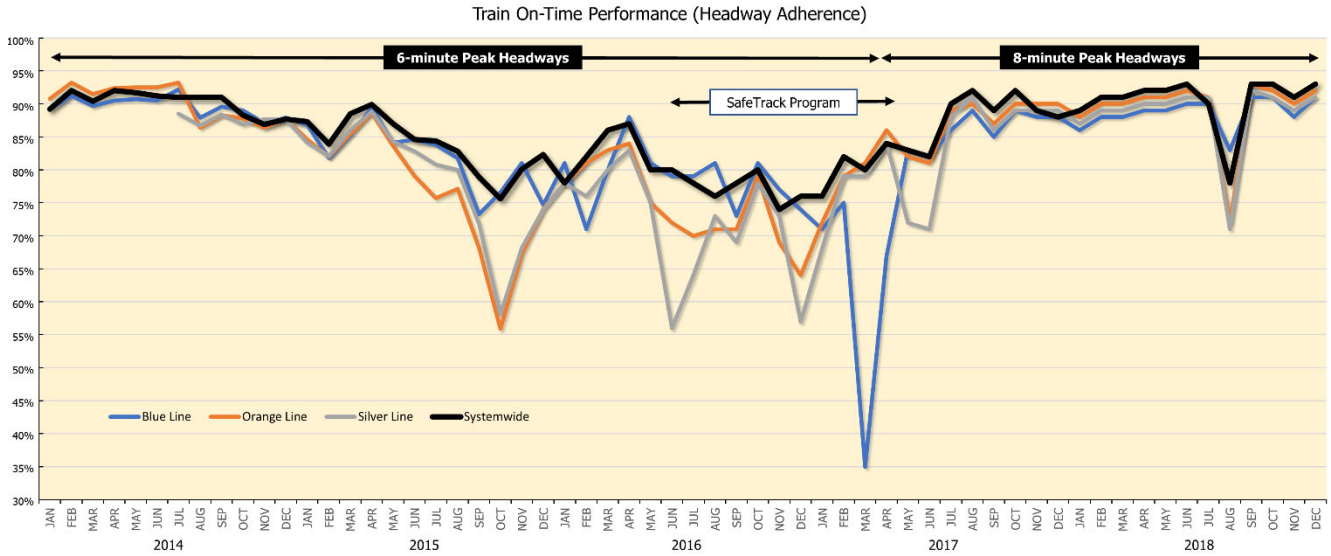
As population and employment is expected to rise substantially throughout the corridor, sizeable gains in ridership are expected as well, exacerbating the crowding already demonstrated in 2018. The corridor is expected to experience strong ridership growth on both sides of the corridor, with 18% growth expected both between Benning Road and Largo Town Center and between Vienna and East Falls Church. The particularly strong growth numbers on the Silver Line are mostly explained by the opening of Silver Line Phase 2 stations. Peak capacity is assumed to increase slightly as Metrorail shifts to all eight-car trains with accompanying traction power upgrades.

2.2 On-Time Performance

Figure 2-1 shows recent trends in on-time performance for the Blue, Orange, and Silver Lines. Between July 2014 (when Silver Line Phase I opened) and October 2015, all three BOS lines saw steady decreases in on-time performance. In 2016, the SafeTrack program further interrupted service on the corridor, with on-time performance

on the Silver Line dipping to 56 percent in December 2016 and on-time performance on the Blue Line dropping below 50 percent in March 2017. When headways along the corridor were changed to 8 minutes on all three BOS lines in June 2017, on-time performance began to improve. As of June of 2018, all three lines were generally operating above 85% on-time, very close the Metrorail system average.

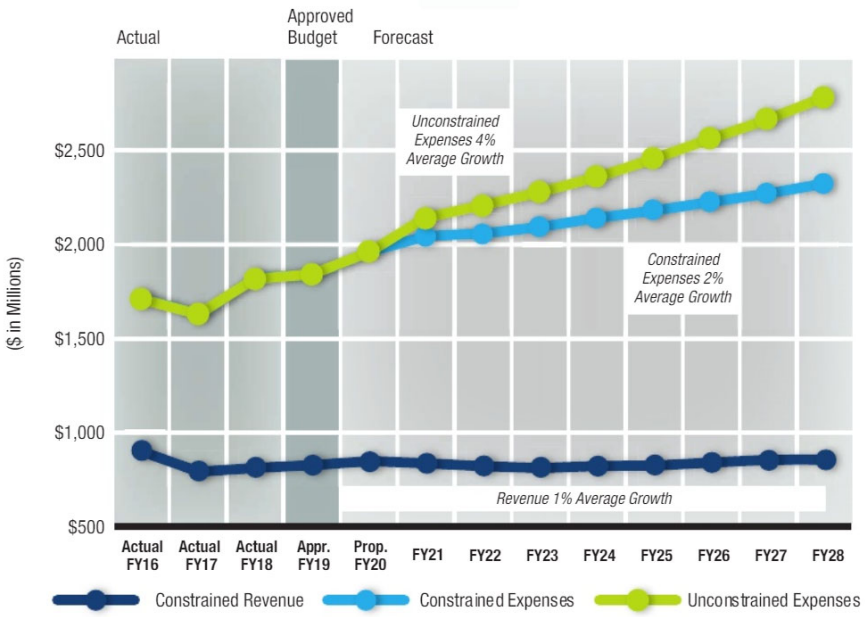
Figure 2-1: On Time Performance



2.3 Operating Costs

According to WMATA, a key agency-wide goal over the next 10 years is to eliminate the four billion-dollar backlog of deferred maintenance and move towards implementing a sustainable maintenance program. Combined with personnel costs that exceed 70 percent of the agency's budget, WMATA believes that it is possible to limit annual operations subsidy growth for existing services to three percent or less per year. As shown in **Figure 2-2**, constrained expense growth is necessary, as rising operating costs are projected to outpace future revenue from passenger fares. WMATA expects revenue from passenger fares to grow by one percent annually; however, even in a constrained scenario, operating costs are expected to grow by two percent annually. Containing operating costs needs to be a key consideration in developing and evaluating improvements for the BOS corridor and the system as a whole.

Figure 2-2: Unconstrained Expense Growth Compared to Constrained Expense Growth1



1 Excludes Potomac Yard revenue and expenses.

3.0 PREVIOUS STUDIES

Table 3-1 describes the previous studies that have been conducted in the corridor and their relevance to the BOS Study. WMATA has conducted a series of studies and analyses to address specific capacity and operational constraints along the Blue, Orange, and Silver Lines**.** Because of existing infrastructure limitations and interdependence along the BOS corridor, seemingly localized issues related to crowding, equipment problems, and maintenance closures may magnify and quickly spread to the other lines in the system. These pressures negatively impact operations and reliability throughout the corridor, and cascade across adjacent Metrorail lines since all lines, except the Red Line, interline with at least one other line at points across the system. Studies dating back to 2008 have recommended solutions to crowding, operational inflexibility, and reliability.

Previous studies considered the feasibility of some alternatives to alleviate pressure along the BOS corridor through options such as additional interlining and track configurations near Rosslyn, placing additional trains into service, and expanding the D&G junction pocket track. Some of these studies were designed to address specific deficiencies in the system, while others were designed as more long-term, visionary documents addressing future system ridership projections, capacity, and needs. These studies often highlighted existing design deficiencies that limit the flexibility of services provided by Metrorail, such as traction power constraints and the limited number of pocket tracks, crossovers, and junctions that accommodate all movements. Several studies also reached similar conclusions regarding the impact of Silver Line implementation on system performance, finding that the Silver Line presents significant challenges to maintaining service frequency and on-time performance for other lines.

Table 3-1: Summary of Previous Studies

Sponsor/Study	Date	Description	Alternatives Studied	Key Relevance to Purpose and Need
WMATA/ WMATA Station Access and Capacity Study		The purpose of the study was to identify and prioritize the needs of the existing 86 stations and identify stations where more detailed analysis is needed.	Capacity Study to meet growing ridership demand and to maximize capacity of the existing system. The study addressed three basic questions: How will ridership grow over the next 25 years? Is there sufficient capacity to handle the growth? How will customers access the system?	Detailed information on ridership trends, high-ridership stations, growth inside and outside the core, peaking, transfers, line capacity, and station capacity.
WMATA/ Silver Line Operating Plan and Presentation	2012	An update to the Silver Line Operating Plan (2004) which included plans to extend the Silver Line route from Stadium-Armory to Largo Town Center.	An extension of the Silver Line from Stadium-Armory to Largo Town Center.	D&G Junction cannot handle the needed train storage: it does not have capacity for eight-car trains, and as an aerial structure, it would require high levels of maintenance. Extending the Silver Line to Largo Town Center would not negatively impact frequency on any line.
WMATA/ Momentum Strategic Plan 2013-2025	2013	Metro details short-term investments that should be made to improve service.	New Blue Line Connections: The Plan explores two alternatives around Rosslyn station to restore peak Blue Line service to levels from before Rush Plus service, which decreased the number of peak Blue Line trains.	Identifies major improvements for 2025, relevant to the BOS corridor including eight-car trains during peak periods, core station improvements, new Blue Line connections and pocket tracks.
WMATA/ Eight-Car Train Implementation Plan	2014	An extension of the Momentum Strategic Plan 2013-2025 (2013), the report identifies system improvements that will be needed to run eight-car trains on all lines.	Improvements that would be necessary for all lines to run only eight-car trains	Primary improvements investigated include: the purchasing of rail cars, improvements to traction power including enhanced traction power substations (TPSS), DC Gear, and tie breaker stations (TBS), facilities to store and maintain rail cars, train control systems, and staffing.
WMATA/ Additional Metrorail Store & Maintenance Study (aka "Eight-Car Train Yard Study")	2014	An extension of the Momentum Strategic Plan 2013-2025 (2013), the report identifies improvements that will be needed at train yards to run only eight-car trains. The study commenced in November 2011 and was extended to June 2013.	Determines the most cost-effective assignment of rail cars for storage and maintenance, balancing the capital costs (namely the additional yard facilities) and operating costs (namely the movement of railcars). The study also addresses storage and maintenance of track maintenance equipment.	Detailed information on rail storage and maintenance needs and options that will be useful in developing alternatives for the BOS corridor.
Transportation Planning Board/ ConnectGreaterWashington Long Range Plan	2014	Metro looks forward to 2040 detailing their vision regarding the region's high-capacity transit network.	A new core Metrorail loop and an Orange/Silver Express Line in Virginia.	Recommended projects would potentially affect the BOS corridor, including Metrorail 100% eight-car trains and a new Yellow Line along 2nd St SE/NE.

Sponsor/Study	Date	Description	Alternatives Studied	Key Relevance to Purpose and Need
WMATA/ New Blue Line Connections and Northern Virginia Core Capacity Feasibility Study	2014	Investigated two alternative scenarios for changes at Rosslyn station to improve service for Blue Line passengers who have been negatively impacted by Rush Plus	Alternative 1 proposed interlining between Arlington Cemetery and Court House. Alternative 2 proposed creating a new Blue Line tail track at Rosslyn.	an engineering perspective. could be part of a larger reconfiguration that reroutes the Blue Line through Georgetown
WMATA Metrorail Capacity White Paper	2015	Examined whether more trains could be added to the existing system without a rail expansion. The paper concludes that there is limited possibility to increase capacity without building new lines but suggests some improvements that would have limited benefit.	Report investigates why more trains cannot simply be added to the system.	Greatest opportunities for expanding capacity are conversion of peak trains from 6-car trains to 8-car trains, as well as Automatic Train Operation (ATO), which would allow more trains per hour to be deployed.
WMATA/ Metrorail Silver Line Corridor Junction Feasibility Study and Conceptual Design	2016	Analyzed alternative junctions and pocket tracks on the BOS corridor that would allow for more operational flexibility.	Improvements to BOS junctions (alternative junctions and pocket tracks).	The addition of Silver Line service has negatively impacted service frequency and on-time performance for the BOS corridor. The new line added riders to stations; at times this created dangerous crowding conditions on platforms, escalators, stairs and elevators.
WMATA/ Flexible Metrorail Operational Analysis Scope of Work	2018	Mismatch between service supply and anticipated demand, as well as new work zones have been growing areas of concern. The report identifies operational and capital improvements that could improve system flexibility and maximize service despite these issues.	*Not Applicable*	There are a limited number of junctions and pocket tracks where trains can turn around or cross tracks to avoid work zones. Work zones can impact large sections of the system.
WMATA/ The Case for Upgrading D&G Junction	2018	Presents the business case for upgrading D&G Junction. Recommends construction options be included in the Development and Evaluation (D&E) program for major capital projects.	Upgrade D&G Junction to allow for termination of trains at Stadium-Armory.	Service between Stadium-Armory and Largo Town Center is over-supplied: at Benning Road, trains are only 25% full. An upgraded D&G Junction could allow some trains to turn at Stadium-Armory as was originally planned for Silver Line service
WMATA/ Capital Options for a Separate Silver Line	2018	Presents several options for where the Silver Line should terminate following the implementation of Silver Line Phase Two.	Options for Silver Line termination.	Advances a Recommendation to Advance Construction Options into the Development and Evaluation (D&E) program for major capital projects.

4.0 PROJECT PURPOSE AND NEED

This chapter defines the corridor needs based on past corridor trends, previous studies of transit service in the corridor, forecasts of future corridor conditions, and review and comment by internal WMATA stakeholders, external stakeholders, and the public.

4.1 Corridor Needs

The following four key corridor needs have been identified for the BOS corridor:

- Manage construction and disruptions;
- Preserve on-time performance;
- Meet ridership demand; and
- Improve operational flexibility.

The remainder of this section describes the rationale for each of these key corridor needs.

Manage Construction and Disruptions

The Metrorail system, like many rail transit systems, was constructed as a two-track system. A limited number of pocket tracks, storage tracks, and crossovers has long been identified as a deficiency for the system. These limitations make it more difficult and time consuming to bypass train and station platform related incidents and on-going preventative maintenance activities. This can result in service delays that can quickly spread across the corridor as well as the other system lines given that all lines (except the Red Line) are interlined with each other for part of their alignments.

Currently, the two-track system with a limited number of pocket tracks and crossovers also reduces the amount of time that WMATA maintenance workers can effectively make system repairs. It takes one hour for all last trains to be moved to their final destination, between 30 minutes and one hour to turn off power and establish a work zone, 30 minutes to restore power, and 30 minutes to move trains to begin service. Therefore, the actual work period is up to three hours shorter than the overnight period of time that the system is closed.

The Metrorail Silver Line Corridor Feasibility Study and Conceptual Design (2016) began to address these deficiencies by exploring potential track junctions for enhanced operational flexibility throughout the BOS corridor. The study identified various options for additional junction infrastructure and assessed the feasibility, physical requirements, service impacts, capital costs, and operating costs associated with each. The options analyzed were:

- New station platform at West Falls Church, allowing for Silver Line train turnbacks;
- East Falls Church east crossover and pocket track, aerial platform, or tunnel; allowing for Silver Line turnbacks;
- RFK Stadium north turnout and new station, allowing for Blue Line train turnbacks north of Stadium-Armory; and
- D&G junction modification, allowing for Blue Line turnbacks at the D&G pocket track.

The study found that only the D&G junction modification provided a net cost benefit, but would not improve reliability of 24-26 trains per hour at Rosslyn. The first two options (new station platform at West Falls Church or a modification at the East Falls Church Metrorail station) would improve reliability there.

Preserve On-time Performance

On-time performance for the Blue, Orange, and Silver Lines has significantly improved since 2017 and now operate on-time more than 88% of the time which is about the overall system average. However, WMATA will need to continue to pro-actively maintain or even further improve on-time performance in future. The BOS lines still have a greater share of major delays than other lines. Systemwide these lines are responsible for 42% of incidents, 49% of delays greater than 5 minutes, and 43% of delays greater than 10 minutes. The lines carry 40% of the system ridership today, but produce 60% of trips qualifying for Rush Hour Promise refunds. The Rush Hour Promise is a

WMATA program that refunds trip fares to a Metrorail passenger if their trip is delayed by 10 minutes or more. As shown in **Figure 4-1**, railcar and infrastructure related incidents have accounted for 46.5 percent of BOS corridor delays. This category of issues includes railcar malfunctions as well as station and track maintenance related issues. About 15.5% of delays are caused by customer and police related incidents and almost 38% are caused by schedule and operations related delays.

Figure 4-1: Causes of Delay (Greater Than 1 Minute)

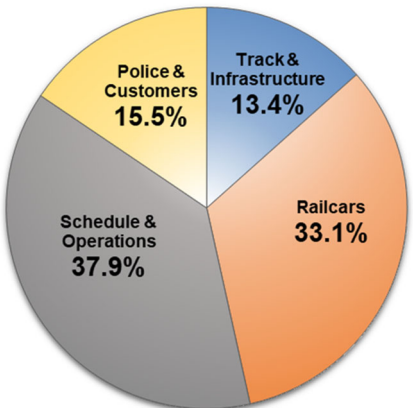
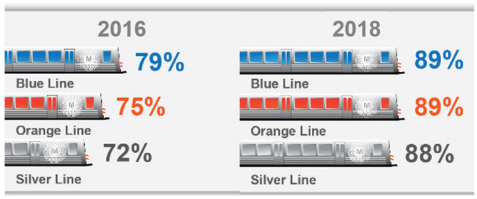


Figure 4-2: Percent of Trains Arriving at Station On-Time



Continued vehicle and infrastructure upgrades and preventative maintenance will be critically important to maintaining and enhancing on-time performance in the future. As ridership continues to grow and station crowding worsens, the time it takes to for passengers to board/alight the vehicles will likely increase and have a negative effect on reliability and on-time performance. A WMATA 2015 Capacity Analysis found that the most prominent sources of delays in the Metrorail system included:

- Long dwell times at transfer stations due to crowding and delay on other lines;

- Junction points near Rosslyn Metrorail station (Junction of Segments C and K) and east of the Stadium/Armory Metrorail station (Junction of Segments D and G) where lines come together and diverge. At the junctions, trains often must wait their turn to enter the shared track, causing delay; and

- Close station spacing and "slot swapping" operations (i.e. where Blue Line trains must time their movements when leaving a slot between Yellow Line trains at Pentagon and entering a slot between Orange and Silver Line trains at Rosslyn, and vice versa).

While on-time performance has improved since 2016, as shown in **Figure 4-2**, the opening of Silver Phase II will likely place additional burdens on train scheduling due to the longer distances traveled by Silver Line trains. Because of the longer distance traveled, there are increased opportunities for schedule disruptions.

Meet Ridership Demand

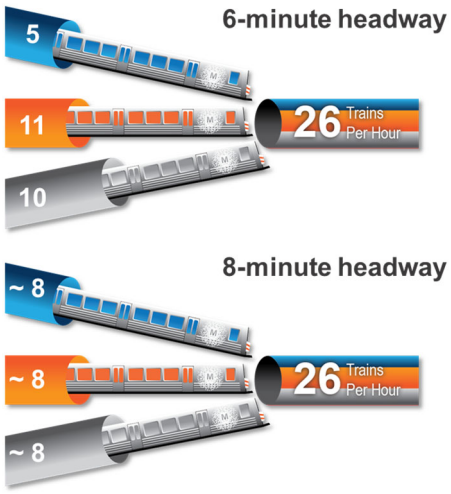
Prior to the opening of the Silver Line in 2014, peak service on the BOS corridor included sixteen Orange Line trains and ten Blue Line trains. Because of the limited capacity of the signal system, implementing the Silver Line service plan required changing the mix of service in the corridor. This resulted in increasing the headways on the Blue Line from 8 minutes to 12 minutes during peak periods to accommodate 6-minute headways on both the Silver and Orange lines. This resulted in 25 trains per hour scheduled through Rosslyn which was close to the theoretical maximum of 26 trains per hour that can be accommodated by the tunnel connecting the Rosslyn and Foggy Bottom Metrorail stations. The maximum number of trains passing through the tunnel is based on the ability to maintain the minimum spacing between trains to meet safety standards.

In mid-2017, the schedule was adjusted increasing the headways between trains on all Metrorail lines (except for the Red Line) to 8 minutes. This resulted in a significant improvement in on-time performance across the system including the Blue, Orange, and Silver Lines. **Figure 4-3** illustrates the mix of service before and after changes. This change reduced the effective capacity of the corridor to approximately 23 trains per hour, but improved system reliability. For example, at Rosslyn, in April 2016, Metro did not meet its throughput targets any day that month. In 2019, in the same month, Metro met its throughput targets 59% of days. The current service levels for all three lines in the BOS corridor is as follows:

- AM Rush (5:00 am to 9:30 am) every 8 minutes
- Midday (9:30 am to 3:00 pm) every 12 minutes

- PM Rush (3:00 pm to 7:00 pm) every 8 minutes
- Evening (7:00 pm to 9:30 pm) every 12 minutes
- Late Night (9:30 pm to close) every 20 minutes

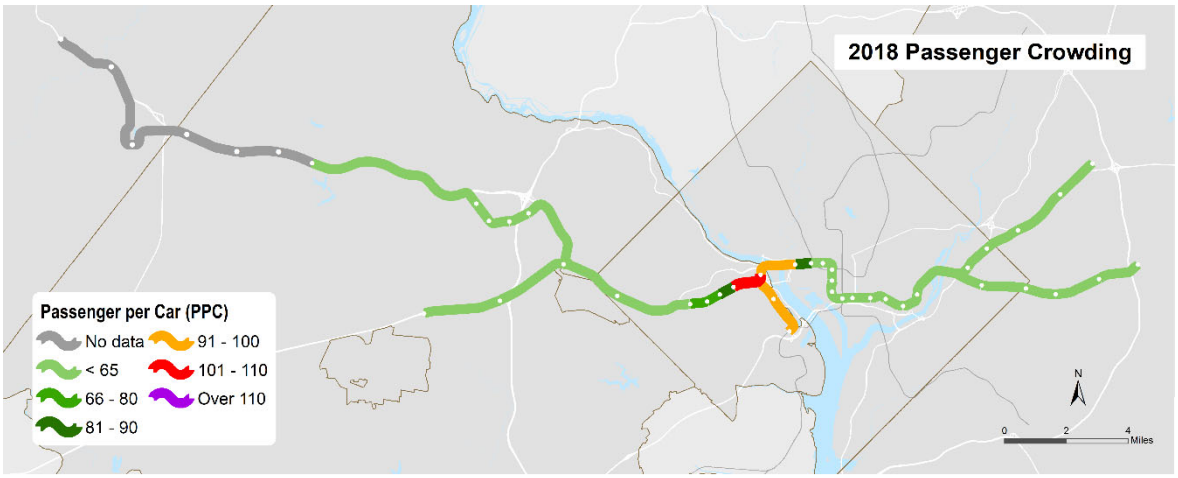
Figure 4-3: Effect of 6 vs. 8 Minute Headway on Service Mix



These new headways have compounded existing crowding and delay issues across the Metrorail system including the BOS corridor, resulting in significant crowding on station platforms and trains. This crowding has created safety concerns for passengers on platforms, escalators, stairs, and elevators.

Station and vehicle crowding is projected to become an increasing problem in the corridor. Population is projected to grow by 37% and employment projected to grow by 30% in the corridor study area by 2040. This is estimated to result in Metrorail ridership in the BOS corridor to increase by 18% by 2040. The increase in ridership will exacerbate passenger crowding that is already evident in the corridor between West Falls Church and Farragut West Metrorail stations (see first map in **Figure 4-4**). WMATA ridership projections show that regardless of whether 8-minute headways are maintained, or 6-minute headways are restored for the BOS corridor lines, several segments of the BOS corridor would be required to accommodate more than 100 passengers per car (the maximum desirable train car capacity) by 2040. Under either scenario many segments of the BOS corridor will experience crowded conditions, and in some segments crowding so severe as to be deemed unsafe for passengers. The Blue Line between Pentagon and Rosslyn would see the most significant overcrowding, followed by the Orange/Silver lines between Courthouse and Farragut West Metrorail stations. **Figure 4-4** shows the portions of the BOS corridor that are projected to exceed the maximum train car capacity by 2040 for both 6-minute and 8-minute headways, even when all eight car trains are used during the peak period. **Figure 4-5** shows the BOS corridor station V/C ratios, showing critical ratios at Foggy Bottom-GWU, Farragut West, Ballston, McPherson Square, L'Enfant Plaza, and Metro Center Metrorail stations by 2040.

Figure 4-4: BOS Corridor Passenger Crowding



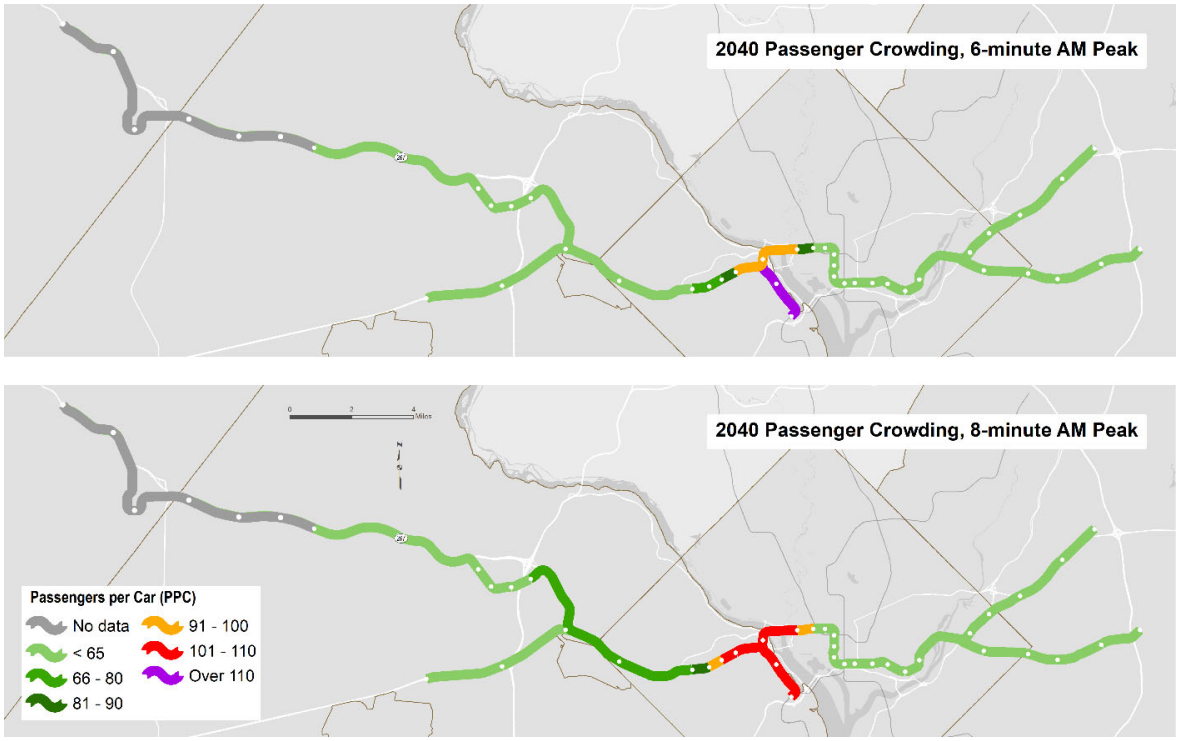
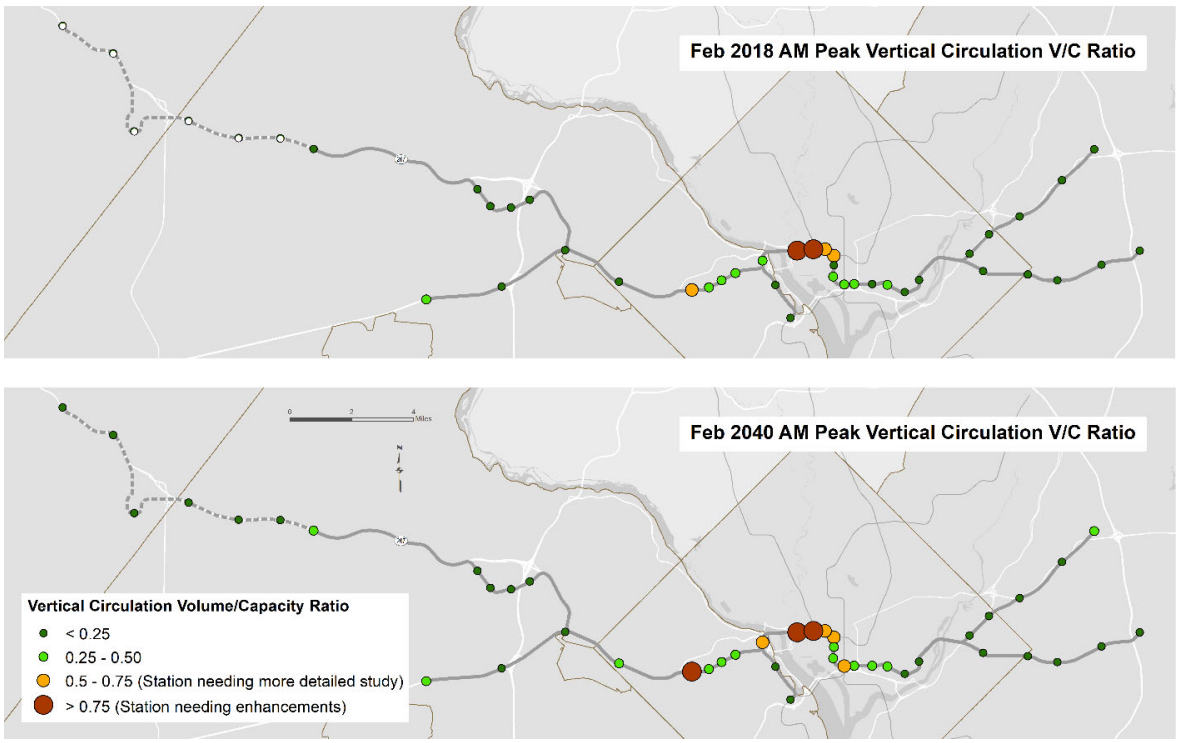


Figure 4-5: BOS Corridor Station Crowding



Improve Operational Flexibility

Metrorail improvement options considered in the BOS Study need to consider the ability to accommodate more flexible service patterns to match the variable levels of demand throughout the corridor. Metrorail is an extensive system, but its radial nature and regional job distribution patterns means the downtown DC core still attracts the largest share of work-trips. The high-density Rosslyn-Ballston corridor in Arlington County already generated great demand on the Orange Line, and implementation of Silver Line service added thousands of riders through that

corridor. Every weekday, approximately 16,000 weekday customers board at a Silver Line station. Approximately 15-20% of those trips travel to a station in the Rosslyn-Ballston corridor, while over 50% travel to a station in the system's core.

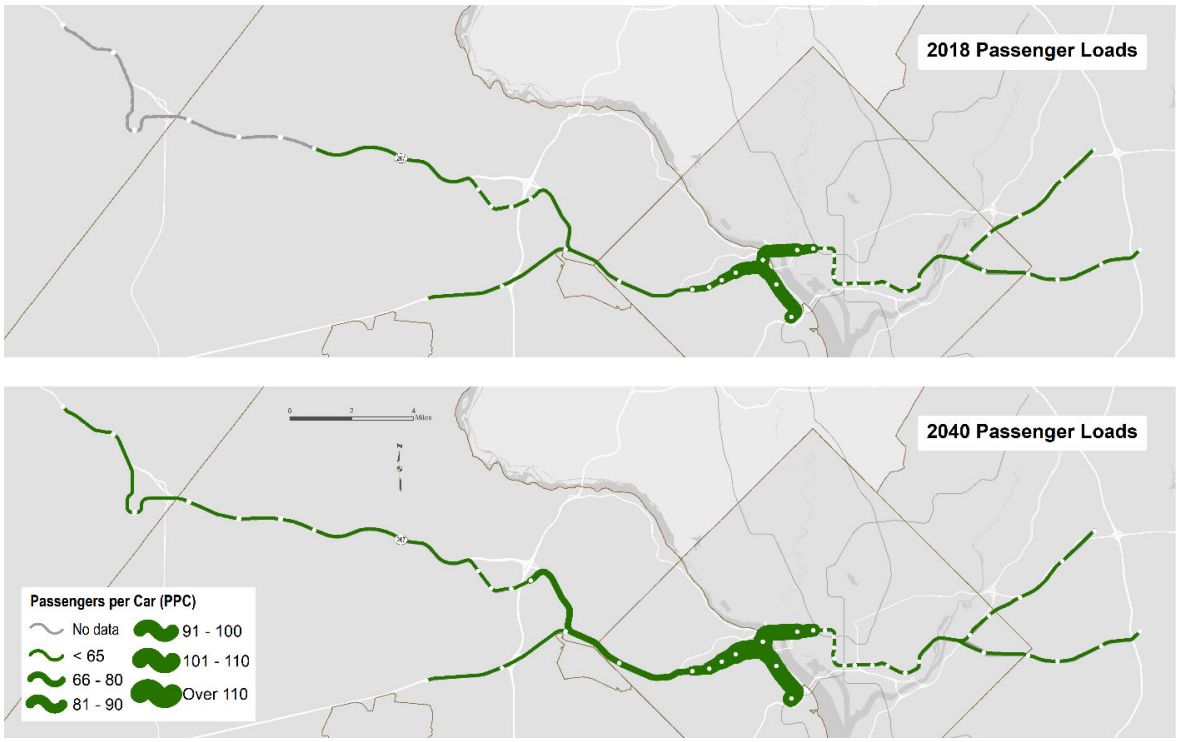
While the portions of the BOS corridor through the region's core experience very high levels of demand and vehicle loads, other segments east and west of the core experience lower, more moderate levels of demand. This variable pattern of demand across the corridor is forecast to continue in the future. In order to provide the high frequency of service that is necessary to accommodate demand through the core area, the service levels in areas east and west of the core are often higher than they need to be to accommodate demand in those areas. **Figure 4-6** shows the significant differences in vehicle loads through the corridor by 2040. The segments from Ballston and Pentagon Metrorail stations to Farragut West Metrorail station are projected to experience very crowded peak period conditions even with 6-minute headways and all eight car trains while the portions of the corridor east and west of this area will experience low vehicle loads as shown in Figure.

The existing Metrorail infrastructure with its limited number of pocket tracks, crossovers, and junctions that can accommodate a full range of movements, constrains the ability to implement more flexible operations to better match the service levels provided to the passenger travel demand. Previous studies including the Silver Line Junction Study have attributed rising operating costs for this corridor and the overall system to a lack of flexibility in the Metrorail service patterns.

In the summer of 2018, Metro launched a new study on maximizing the rail system's flexibility to maintain service levels during ongoing maintenance efforts. The 2018 Flexible Metrorail Operational Analysis is tasked with identifying system wide operational and capital improvements that provide additional flexibility in schedules, service patterns, and route termini, in order to provide better and more cost-efficient service. It is also intended to help Metro better match service levels to ridership demand, and to respond more efficiently to maintenance projects and service disruptions. This project will be completed in parallel with the early part of the BOS Study and information and alternatives developed for the Flexible Metrorail Operational Analysis will be integrated into the BOS Study as they become available.

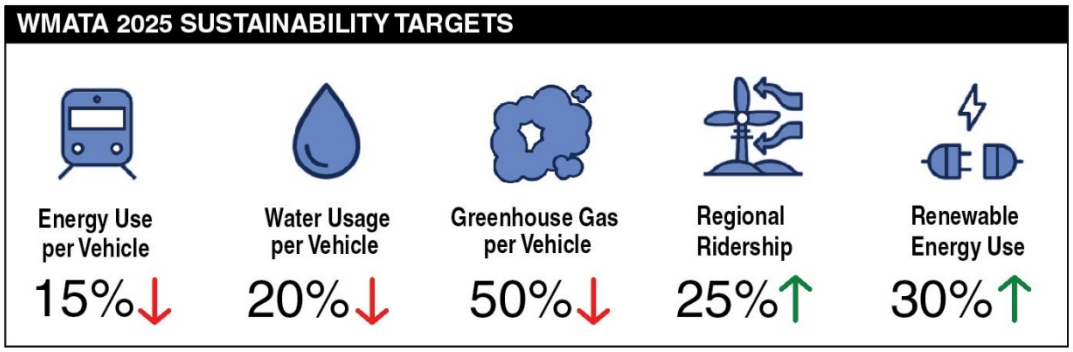
The BOS corridor currently does not have the operational flexibility needed to be able respond to these challenges. Infrastructure improvements, such as additional pocket tracks, crossovers, and junctions that maximize access between Metrorail segments, can provide additional choices to services planners to better match levels of service with demand and reduce overall system operating expenses.

Figure 4-6: BOS Corridor Passenger Loads



Meeting WMATA and Regional Sustainability Commitments

As part of WMATA's Sustainability Initiative, the authority has established both regional and internal system efficiency objectives to achieve its financial and environmental goals while improving safety and reliability. This includes supporting projects that promote more cost-effective, energy-efficient, safe, and environmentally friendly transit services in the BOS corridor and throughout the metropolitan area. The authority has made a long-term commitment to fully integrate sustainable practices into its infrastructure rebuilding program to promote a cleaner and healthier environment and to help generate long-term cost savings that give the region the best return on its investment.



Metro's economic sustainability depends on stabilizing and growing ridership and mode share. To this end, Metro is working on many fronts to improve the system's safety and reliability while keeping the system affordable and getting riders to their destinations quickly and on-time. This includes supporting Metrorail improvement projects that have the potential to attract more riders to the system. In addition to the cost-efficiency benefits of additional riders, each new trip taken on Metrorail instead of by car reduces regional greenhouse gas emissions and the release of other pollutant emissions into the environment.

The identification and evaluation Metrorail improvements in the BOS corridor need to consider sustainability-related factors including increasing ridership and mode share, minimizing long-term negative impacts to the environment,

supporting transit supportive development patterns, and facilitating the development of a safe and energy-efficient transit system.

4.2 Problem Statement and Project Purpose

The following corridor problem statement has been developed based on the review of corridor trends, past studies of corridor service and operations, forecasts of future population, employment, and ridership growth, and the corridor needs described in Section 4.1.

Current Metrorail infrastructure and operational constraints in the BOS corridor limit the ability to:

- ***accommodate forecasted growth in population, employment, and Metrorail ridership over the next twenty years, resulting in passenger crowding at corridor stations and on trains that exceed acceptable WMATA standards;***
- ***match service levels to variable demand across the corridor driving up operating costs;***
- ***respond quickly and efficiently to incidents and service disruptions resulting in delays that rapidly spread across the corridor and to other lines in the system; and***
- ***maximize service reliability for Metrorail riders.***

The interlining of the Blue, Orange, and Silver Lines present serious challenges to operations and customers, including capacity, managing construction and disruption, and lack of operational flexibility. These issues were studied in the past—beginning in 2013—and potential solutions were identified, but WMATA hasn't yet made a decision.

The BOS Study will identify and evaluate infrastructure and operational improvements that best address the project problem statement, consider the benefits and costs of the alternative improvement options, and prepare a phased implementation plan for a recommended solution.

5.0 CORRIDOR GOALS AND OBJECTIVES

The BOS Study problem statement and corridor needs were used to develop corridor goals and associated objectives to alleviate Metrorail infrastructure and operational constraints. The corridor goals and objectives have been developed to facilitate measuring how well each of the alternatives meets the purpose and need of the study and presents a solution to the project problem statement. For each objective, one or more quantitative measure of effectiveness will be developed. The summary of these measures, together with public and agency input, will form the recommended outcome of this study.

Goal 1: Provide sufficient Rail capacity to serve ridership demand.

Objective 1.1: *Deliver optimal railcar passenger loads at 100 passengers per car (PPC).*

Objective 1.2: *Safely and efficiently accommodate passenger and transfer demand.*

Objective 1.3: *Increase capacity, flexibility, and resiliency to serve ridership demand and east-west travel.*

Goal 2: Improve reliability and on-time performance.

Objective 2.1: *Maintain or increase percentage of trains arriving on-time.*

Objective 2.2: *Maintain or increase percentage of customers completing their trips on time.*

Objective 2.3: *Minimize the number of significant trip delays .*

Goal 3: Improve operational flexibility and cost-efficiency.

Objective 3.1: *Minimize the travel-time impacts of work zones and disruptions.*

Objective 3.2: *Minimize the number of railcars with very high (>120 PPC) or very low (<50 PPC) loads.*

Objective 3.3: *Provide flexibility to match service levels to changes in ridership.*

Goal 4: Provide transportation options that reduce environmental impacts and strengthen Metro's finances.

Objective 4.1: *Increase corridor transit mode share.*

Objective 4.2: *Enhance passenger safety and convenience.*

Objective 4.3: *Support Transit-Oriented Development (TOD) and improved transit access.*

Through the process of measure development, minor wording changes were made to the goals and objectives as highlighted below with underlining. The first change—to Objective 3.2—was to make it easier to understand for non-technical audiences. Passengers per car (PPC) is a technical term that does not have intuitive meaning to the general public; the new objective wording more clearly and plainly states the objective in lay terms. The second change—to Goal 4—was to more accurately encompass the objectives which are not restricted to reducing environmental impacts and improving Metro's finances, but rather include broader goals of sustainability (environmental, social, and financial) as well as improved transit access.

Goal 1: Provide sufficient Rail capacity to serve ridership demand.

Objective 1.1: *Deliver optimal railcar passenger loads at 100 passengers per car (PPC).*

Objective 1.2: *Safely and efficiently accommodate passenger and transfer demand.*

Objective 1.3: *Increase capacity, flexibility, and resiliency to serve ridership demand and east-west travel.*

Goal 2: Improve reliability and on-time performance.

Objective 2.1: Maintain or increase percentage of trains arriving on-time.

Objective 2.2: Maintain or increase percentage of customers completing their trips on time.

Objective 2.3: Minimize the number of significant trip delays .

Goal 3: Improve operational flexibility and cost-efficiency.

Objective 3.1: Minimize the travel-time impacts of work zones and disruptions.

Objective 3.2: Meet ridership demand cost-effectively.

Objective 3.3: Provide flexibility to match service levels to changes in ridership.

Goal 4: Provide transportation options that support sustainable development and expand access to opportunity.

Objective 4.1: Increase corridor transit mode share.

Objective 4.2: Enhance passenger safety and convenience.

Objective 4.3: Support Transit-Oriented Development (TOD) and improved transit access.

6.0 STAKEHOLDER AND PUBLIC FEEDBACK

This chapter summarizes comments received from the internal and external stakeholders and the public on the draft purpose and need and how this information was addressed and/or incorporated in the final project purpose and need.

6.1 Stakeholder Review

The draft project purpose and need was presented to the internal and external stakeholders at the following meetings in 2019 for their review and comment.

- *Internal Technical Advisory Committee Meeting* on April 24, 2019
- *Internal Leadership Advisory Committee Meeting* on May 2, 2019
- *External Stakeholder Technical Committee Meeting* on May 28, 2019;
- *External Stakeholders Advisory Committee Meeting* on May 30, 2019;
- *Executive Steering Committee* on July 18, 2019; and
- *Business and Community Stakeholder Committee Meeting* on October 30, 2019.

Appendix A shows the presentation slides used for these events. Appendix B shows the comments received at each of the meetings. The following summarizes the key comments received on project purpose and need at these meetings.

Purpose and Need Comments

This section represents consolidated and summarized comments on the project's draft Purpose and Need from the following three committees:

- External Stakeholder Technical Committee Meeting (May 28, 2019)
- External Stakeholders Advisory Committee Meeting (May 30, 2019)
- Executive Steering Committee (July 18, 2019)

In each meeting, the project team presented slides summarizing the project's Draft Purpose & Need; this was followed by a committee discussion about the presentation. Although some participants directly addressed the project's Draft Purpose and Need, many participants proposed methods and approaches for the study itself. Discussion feedback topics included:

- **Amazon HQ:** Job growth and transportation modeling forecasts may not account for the potential mode choices of future workers at the new Amazon HQ in Crystal City.
- **Project Approach**
    - Consider possible impacts of changing the level of service on the Blue/Orange/Silver Lines, including impacts on jurisdictional subsidy formulas and whether some sections of the lines would see increases or decreases in service.
    - Turnback studies should consider the potential for new technology to identify if, and when, trains need to travel to the end of the line during peak periods.
    - Take a "stepped approach" and group projects into short, medium, and long-term. Non-rail solutions (like bus) or turnbacks could be used in the short and medium term to address capacity issues.
    - Consider using data from special events.

- **Project Communication**
    - Maintain good customer service – customers need to know what is happening, and why. Create a plan to communicate about the project and consider the use of smart technologies to communicate with customers.
    - Create graphics to help visualize "choke points" in the system and show Blue/Orange/Silver Line impacts on the Green and Yellow Lines.
    - Develop a clear explanation of capital improvement project timelines, the importance of starting the planning process now, and how the economic competitiveness of the region depends on these potential projects.

Goals and Objectives Comments

This section represents consolidated and summarized comments on the project's draft Goals and Objectives from the following three committees:

- External Stakeholder Technical Committee Meeting (May 28, 2019)
- External Stakeholders Advisory Committee Meeting (May 30, 2019)
- Executive Steering Committee (July 18, 2019)

In each meeting, the project team presented slides summarizing the project's Draft Goals and Objectives: this was followed by a committee discussion about the presentation. Discussion feedback topics included:

- **Goal 2 – Improve Reliability and On-Time Performance:** Emphasize this goal the most, due to its short-term nature.
- **Goal 4 – Provide Transportation Options That Reduce Environmental Impacts and Strengthen Metro's Finances**
    - Consider separating this goal into two goals that focus on reducing environmental impact and strengthening WMATA's finances.
    - Objectives should include improved access to Metrorail – environmental goals are inherent to the project.
- **Potential New Goals**
    - Develop a clear statement about the long-term goal to optimize the Blue/Orange/Silver Lines, and the reason for this study.
    - Consider a goal related to enhanced connectivity and access to jobs – that's the core reason why Metrorail serves people.
        - If access is a goal, a possible objective would be to include access to riders of all income levels and Title VI populations, including on different modes.
    - Look at impacts on riders and customers to help clarify the goals and objectives.
    - A long-term goal or problem statement should address the bottleneck at the Potomac River, and the need to take people across the river.
    - Building trust and confidence in the system could be an additional goal.

6.2 Public Review

Informational Pop-up Events were conducted at thirteen Blue, Orange, and Silver Line Metrorail stations in the District of Columbia, Maryland, and Virginia during June and July 2019. During these events, a combination of WMATA staff, consultant team staff, and outreach event staff engaged Metro customers at station entrances and handed out information on the study. The events were promoted through a WMATA press release and on WMATA's website. Engagement teams for each event distributed bilingual (English-Spanish) postcards explaining the purpose of the study and directing recipients to the study website, ***wmata.com/bosstudy***. Additional fact sheet flyers with more-detailed information on the goals of, and need for, the study were also distributed to those interested. Copies of the press release, postcard, and fact sheet flyer are shown in Appendix C. In total, 25,390 postcards of these materials were distributed to the general public at these events. In general, Metro customers engaged study team members about the study's goals and timeline, as well as its potential near-term impacts on their commute.

The project website was launched concurrently with the pop-up events. The project website pages are shown in Appendix D. The website included a summary of the draft project purpose and need and the draft goals and objectives. The website provided an opportunity for website visitors to comment on the project information. Comments received are shown in Appendix E. None of the comments specifically addressed project purpose and need or goals and objectives. There was an initial spike in be traffic during the period of time that the pop-up meetings were held. Web traffic was measured in page views, of which wmata.com/bosstudy received a total of 2,934 page views or "clicks". This figure included secondary page visits; for example, one visitor navigating through three of the study's pages was recorded as three views. Of the 2,934 total views recorded, however, 2,320 (79%) were identified as unique visitors to the study's landing page.

Public open house meetings for the project occurred on December 9, 10, 12, and 17, 2019. The meetings included a public survey that was open between December 5, 2019 and January 6, 2020 and other opportunities for the public to review and comment on the draft project purpose, need, goals, and objectives. Their comments were considered as the project purpose and need was finalized. Top priorities among the public who engaged via the meetings and survey included expanding the system/increasing workforce connections via new lines and stations, increasing frequency, encouraging TOD, and shifting more trips to transit. These top priorities were incorporated into Goal 1 (greater frequency increases capacity to accommodate demand) and Goal 4 (explicitly includes objectives to shift trips to transit and encourage TOD). In addition, Goal 4 includes objective language to improve transit access, which incorporates public feedback to expand workforce connections via new lines and stations.

Appendix A:

Stakeholder Meeting Presentation slides

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Capacity and Reliability Study

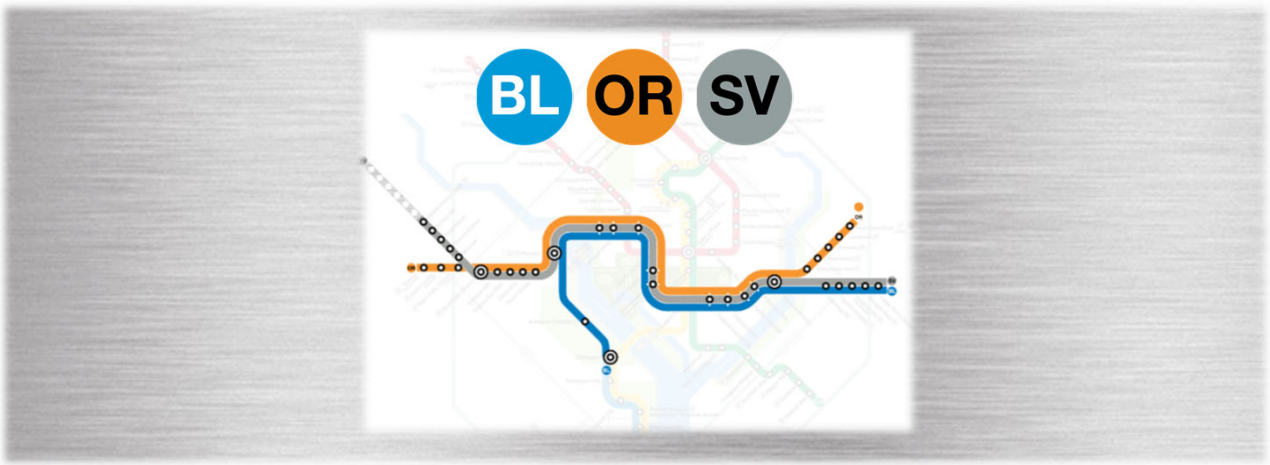
Executive Committee Meeting

July 18, 2019

CONFIDENTIAL: NOT FOR CIRCULATION

Desired meeting outcomes

1. Reactions to the Purpose & Need findings
2. Your input on goals and objectives
3. Advice on framing these issues and opportunities for your constituents



Study Overview

Study purpose

Running the Blue, Orange, and Silver lines through one tunnel creates serious challenges for Metro and customers, including capacity, managing construction and disruption, and lack of operational flexibility.

We have studied these issues and identified some potential solutions, but haven't yet made a decision.

As these problems persist, we need to agree on a fix. This study will determine that preferred solution.

Why we need to do this study

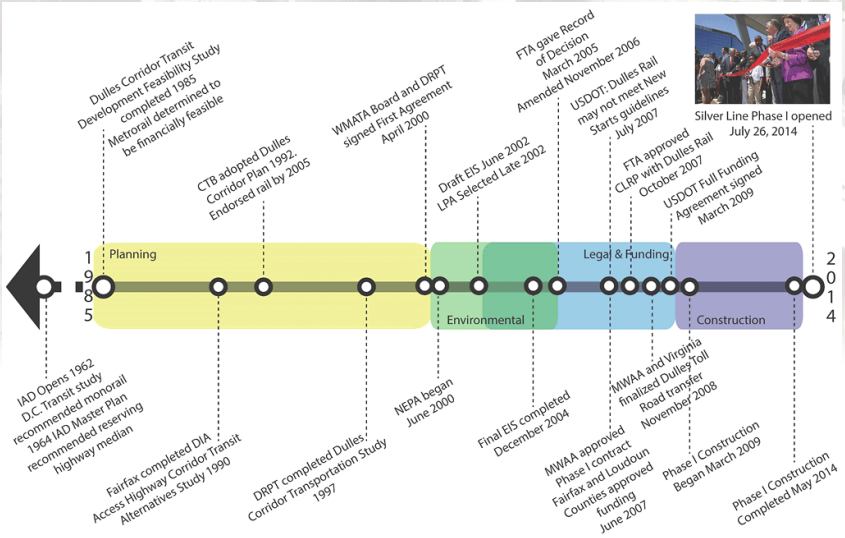
Manage construction and disruptions: need to execute customer-friendly rail service while accommodating planned construction work

Preserve on-time performance: as system prepares for Silver Line extension, potential return to increased frequencies, and 100% 8-car trains in peak periods

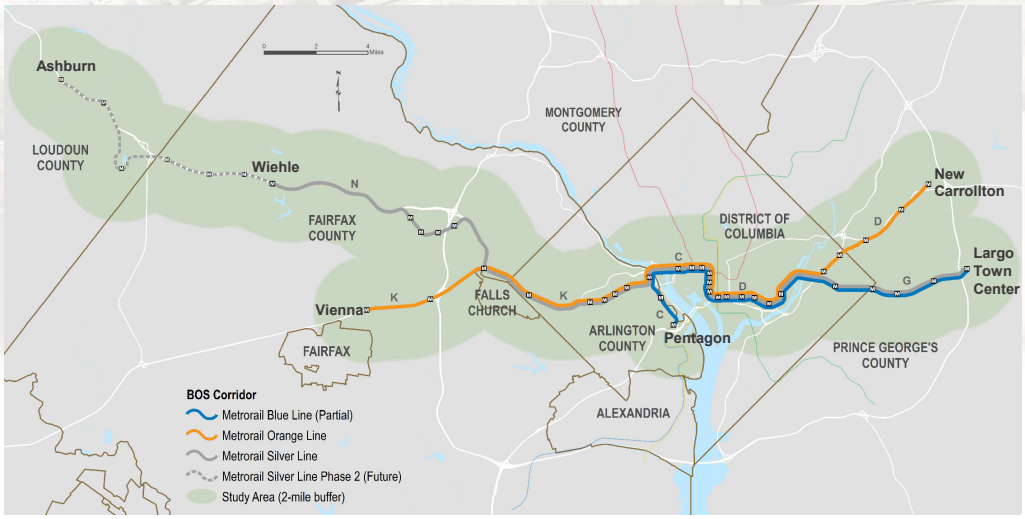
Meet ridership demand: projected ridership likely to require more frequent service by 2022, and will exceed crowding thresholds by 2040

Improve operational flexibility: provide the ability for Metro to operate variable service patterns, promoting a more flexible and cost-efficient network

Why we need to do it now – planning major projects takes a long time

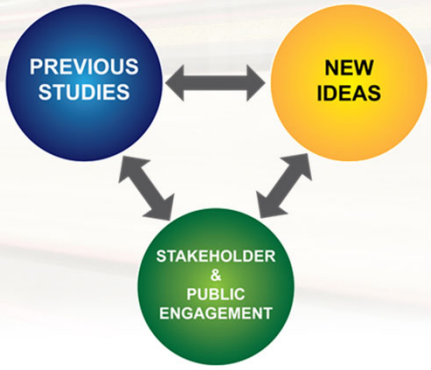


Study area



Identifying options

- Define problems and opportunities
- Establish goals and objectives
- Identify potential solutions based on previous studies, new ideas, and outreach
- Get input from leadership, stakeholders, public
- Develop alternatives to the level needed to assess benefits, impacts, and costs



Evaluating options

Comparison of benefits, impacts and costs

Increased Capacity | Improved Reliability | Increased Ridership | Reduced Travel Time | Environmental Benefits

Seeking input and advice

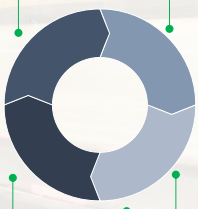
INTERNAL

Leadership Advisory Committee

Upper-level managers and policy-makers will provide guidance on key milestones, including Purpose and Need, alternatives, cost-benefit analysis, LPA, project phasing.

Technical Advisory Committee

Interdepartmental experts will review and comment on the technical work, including the AA process and methodology, design concepts, cost estimates, cost-benefit analysis, and technical memoranda.



EXTERNAL

Strategic Advisory Committee

Leaders and upper-level managers from the public and nonprofit sectors, as well as community representatives, who will provide insight and feedback on the project's goals.

Stakeholder Technical Committee

Regional and jurisdictional planning and land use staff who will review and provide comments on technical memoranda.

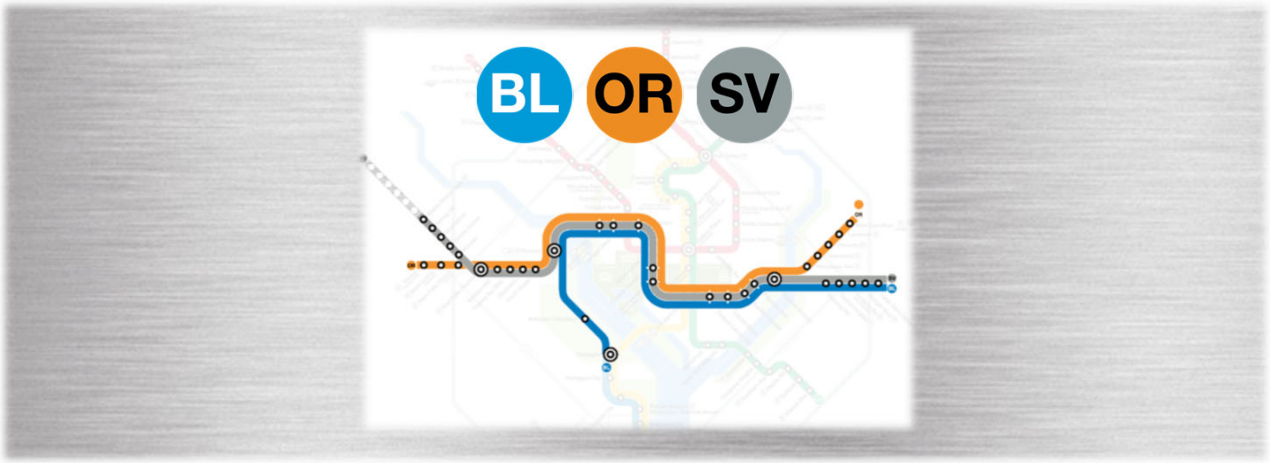
Executive Committee

Elected Officials from all jurisdictions, who will provide input on project goals, feasible alternatives and LPA. Engage three times during study, with additional briefings as needed.

Defining the solution

Target outcomes

- Regional input and consensus on a preferred solution
- GM recommendation of a “locally-preferred alternative” (LPA)
- Funding and implementation strategy for the LPA



Draft Findings / Purpose & Need

The problem with running three lines through one tunnel (interlining)

- Maximum of 26 trains per hour (TPH) for any tunnel/set of tracks
- Under 8-min headways Metro can deliver equal service, but not enough to meet demand
- Under 6-min peak schedule, Blue Line had to be reduced to 5 TPH
- Cannot improve peak headways *and* meet demand on all 3 lines

Rush-hour trains are already crowded – and it will get worse

Study Area: Population
↑ 25%

Study Area: Metrorail Ridership
↑ 18%

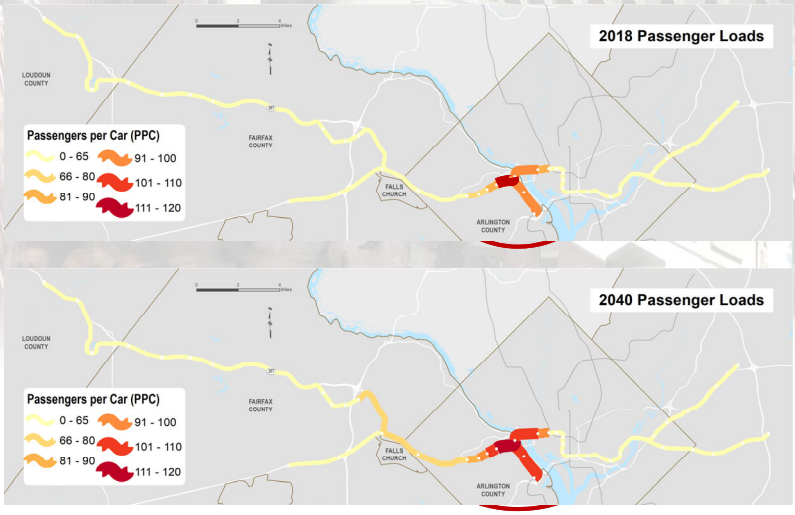
Study Area: Employment
↑ 21%

Metrorail Crowding on Core Segments
>110
Passengers per Car* (PPC)

* 100 PPC is optimal

Metro lacks the capacity to meet current and future demand

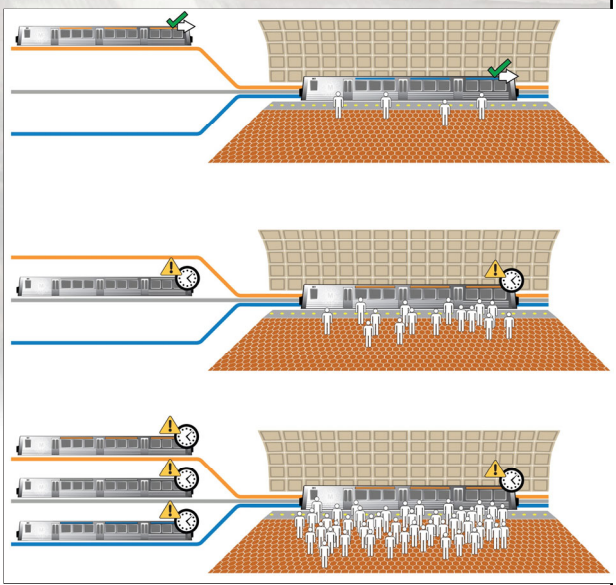
- Core segments already at or over peak carrying capacity
- Peak service in the core will be severely crowded by 2040
- Need both 100% 8-car trains and higher frequencies
- 100% 8-car trains won't solve the problem, can't increase frequencies while interlined



** 100 PPC is optimal*

Interlining creates (and compounds) delays and crowding

- Delays on one line cascade to the others
- Surges of delayed passengers at transfer stations affect all lines
- Crowding on trains, platforms, escalators creates significant safety issues
- Major disruptions can impact Yellow and Green service

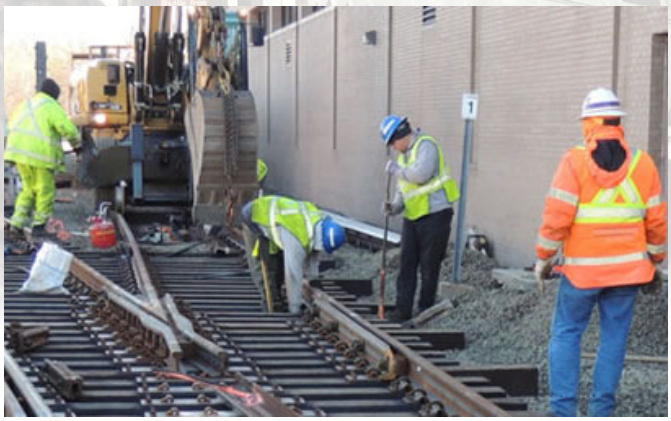


Note: Only one direction of travel shown for simplicity

Metro needs to maintain customer-focused service while rebuilding

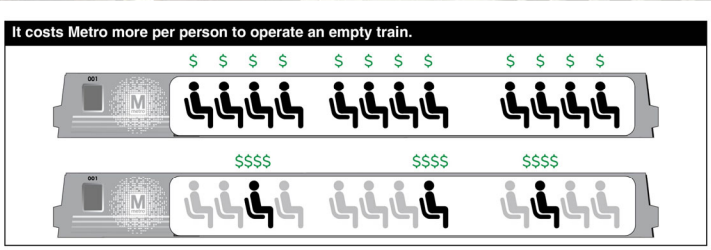
But lacks the infrastructure to:

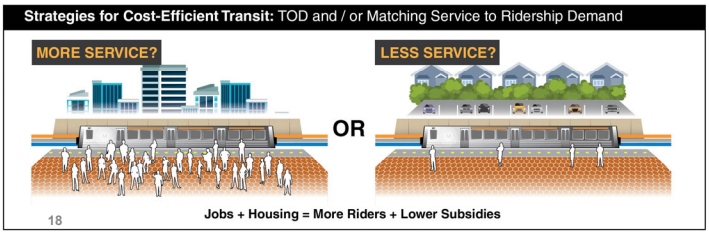
- Maneuver around work zones
- Minimize travel-time impacts of single tracking
- Store and dispatch relief trains
- Utilize special service patterns



Metro also lacks the flexibility to match service to demand, efficiently use scarce resources

- Very limited ability to turn trains, deploy varied service patterns
- High demand between Arlington and Downtown DC
- Lower demand elsewhere, but same level of service
- The demand/supply mismatch continues through 2040





Metro needs to comply with National Environmental Policy Act (NEPA) and implement its Energy Action Plan

- Corridor study as early scoping for NEPA process
- NEPA required to compete for federal funding
- Help WMATA implement its Energy Action Plan to reduce energy use and costs

WMATA 2025 SUSTAINABILITY TARGETS

Energy Use per Vehicle	Water Usage per Vehicle	Greenhouse Gas per Vehicle	Regional Ridership	Renewable Energy Use
15% ↓	20% ↓	50% ↓	25% ↑	30% ↑

Reduce impacts of construction, disruption

Address urgent ridership and capacity needs

Maintain or improve reliability, customer-focused service

Build capacity for flexibility, lower costs

Better leverage transit's environmental benefits

Discussion

- Was anything surprising? Are we missing anything?
- Do these findings reflect the needs and experiences of your constituents?

FEEDBACK

COMMENTS

THOUGHTS

SUGGESTIONS

Goals and Objectives

Goal 1:
Provide Sufficient Rail Capacity to Serve Ridership Demand

Objectives:

- Deliver optimal railcar passenger loads at 100 passengers per car (PPC)
- Safely and efficiently accommodate passenger and transfer demand
- Increase capacity, flexibility, and resiliency to serve ridership demand and east-west travel

BOS Capacity and Reliability Study | Goals & Objectives

Goal 2:
Improve Reliability and On-Time Performance

Objectives:

- Maintain or increase percentage of trains arriving on-time
- Maintain or increase percentage of customers completing trips on time
- Minimize the number of significant trip delays

Goal 3:
Improve Operational Flexibility and Cost-Efficiency

Objectives:

- Minimize the travel-time impacts of work zones and disruptions
- Minimize the number of rail cars with very high (>120 PPC) or very low (< 50 PPC) loads
- Provide flexibility to match service levels to changes in ridership

BOS Capacity and Reliability Study | Goals & Objectives

Goal 4:
Provide Transportation Options That Reduce Environmental Impacts and Strengthen Metro's Finances

Objectives:

- Increase corridor transit mode share
- Enhance passenger safety and convenience
- Support Transit-Oriented Development (TOD) and improved transit access

Discussion

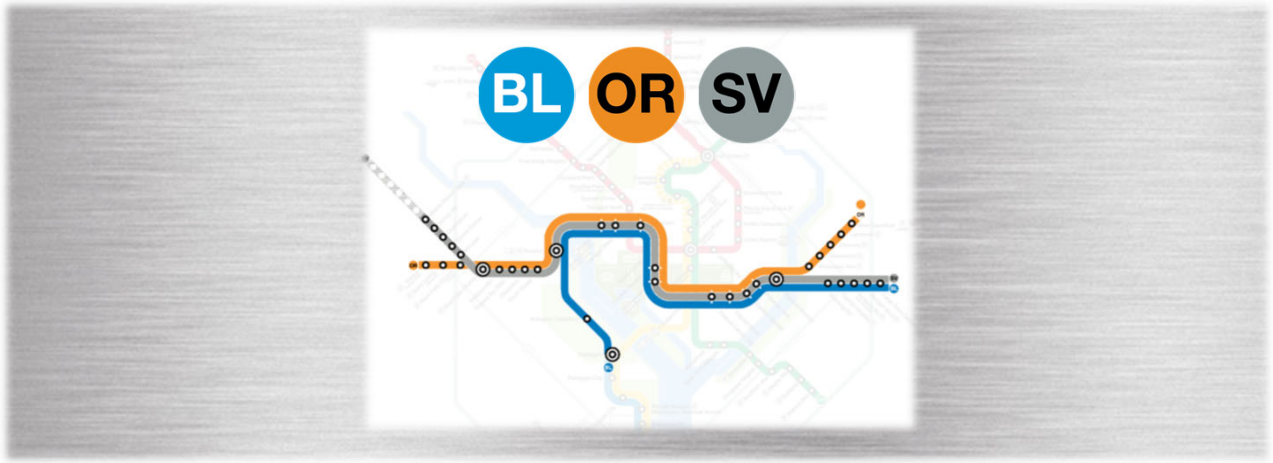
- Do you have any reactions to the draft set of goals and objectives? Do you disagree with any?
- Are any of these goals particularly important to you, your constituents?
- Do you have suggestions for making this list resonate with the public?

FEEDBACK

COMMENTS

THOUGHTS

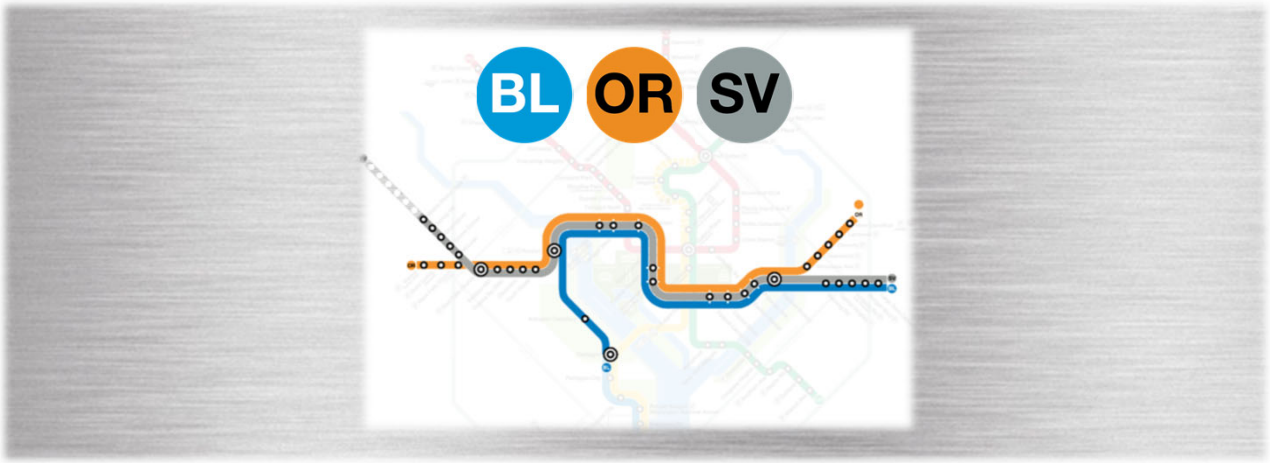
SUGGESTIONS



Public Engagement Strategy

Public engagement

- Public Announcement: Early June
  - Website launched with project announcement: wmata.com/BOSstudy
- Pop-Up Events: June-July
  - Events at 13 Metrorail stations, beginning week of June 10th
  - 25,000 project postcards distributed by engagement staff
- Discussion Group Sessions: August-September
  - Business communities, CBO group reps
- Public Sessions – Alternatives Discussions: Fall 2019



Next Steps

Upcoming

- Check out the website!: wmata.com/BOSstudy
- Email the project team: BOSstudy@wmata.com
- Initial set of alternatives: August 2019
- Technical and Strategic Advisory Committees: September 2019
- Public engagement: October – November 2019
  - Workshops
  - Survey, online mapping/planning tool
  - Pop-up events
- Next Executive Committee Meeting: Winter 2019

Appendix B:

Stakeholder Meeting Notes

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STAKEHOLDER TECHNICAL COMMITTEE MEETING – BOS CAPACITY AND RELIABILITY STUDY

MAY 28, 2019
1:00 PM
Meeting Notes

In Attendance:

- WMATA/Consultant Staff: Mark Phillips, Katie List, David Miller, Lori Zeller, Mark Niles, Deana Rhodeside
- STC Members (both in person and by phone):

Bob Brown	Loudoun County Department of Transportation and Capital Infrastructure
Kristin Calkins	DC Office of Planning
Matt Cheng	NVTC
Anthony Foster	Prince George's County DPWT
Matthew Gaskins	MWCOG Department of Transportation Planning
Tom Masog	MNCPPC – Prince George's County
Sree Nampoothiri	NVTA
Haley Peckett	DDOT Policy, Planning, and Sustainability Administration
Chloe Ritter	City of Fairfax
Tim Roseboom	Arlington County Department of Environmental Services
Amir Shahpar	VDOT
Jennifer Slesinger	City of Alexandria Long Range and Transportation Planning
Kari Snyder	MDOT
Todd Wigglesworth	Fairfax County DOT

Introduction/Overview

Mark Phillips welcomed the committee and provided a brief overview of the study.

David Miller of Foursquare ITP provided an overview of the Stakeholder Technical Committee framework and meeting frequency. He then asked STC members to introduce themselves, and to answer the following questions:

- What do you see as the most important issues and opportunities in the BOS corridor?
- What are your ideal outcomes from this study? What does this process need to produce?

Most Important Issues/Opportunities

As part of their introductions, STC members addressed the following topics when asked to identify the most important issues/opportunities in the BOS corridor:

- **Reliability**
  - Maintain and increase transit reliability along the I-66 corridor so residents can commute using transit now and into the future.
  - Crush loads and major choke points (Rosslyn and Stadium Armory were mentioned as two of the worst) could be relieved with more capacity.
  - Station in Rosslyn are the biggest issue for reliability.
- **Impact and Involvement of Jurisdictions**
  - When Silver Line Phase II comes online, Loudoun County expects to receive the same amount of rail service they expected when they entered into the Metrorail expansion agreement.
  - Regarding any type of improvements along the corridor, there was concern and questions about what the financial implications would be for jurisdictions if major capital investments will be needed in the future.
- **Employment Access**
  - Crush loads on the BOS lines impact the ability for people to reach employment areas along the corridor; this issue was raised by DC and Virginia representatives, but also impacts the economic competitiveness of the whole region.
  - Metro is critical to economic growth and development.
- **Land Use/Other Planning**
  - The region is growing – more jobs and population are coming – and analysis shows that the Rosslyn bottleneck is the most critical portion of the Metro system, which will continue to be overloaded by the region's growth if there is no effective intervention.
  - The service needs to be adapted and expanded to match the growing demand.
  - Areas around Metro stations remain underdeveloped in Prince George's County. With increased Metro reliability, more station areas would be able to be developed.
  - Alexandria is doing a lot of TOD, which could be best supported by increased service and reliability on Metro to accommodate the growing demand for transit.

- **Maintaining Service**
    - To maintain levels of service, one idea is for the Silver Line to remain within Virginia.
    - System redundancy is important to establish, to be prepared for disruptions in service due to construction or emergencies.
- **Other**
    - The study should be conducted assuming that Phase II of the Silver Line is already built, since it will be open soon after the study is complete.
    - Other critical points in the Metro system are not included in the study, like Potomac Yards, Crystal City, and future Amazon HQ.

Ideal Outcomes

As part of their introductions, STC members addressed the following topics when asked to identify ideal outcomes from this study, and what the study needs to produce:

- **Ideal Outcomes**
    - Produce a plan that is feasible, transparent, and defensible and easy to communicate to elected officials and the public. The plan should determine a reasonable path in terms of timing and funding to get the improvements implemented.
    - Enhance WMATA rail capacity and optimize throughput on the BOS.
    - Encourage mode shift to transit.
- **Other**
    - The project team should provide materials in advance of meetings so that committee members have time to absorb the material, shop the material around to the appropriate parties, and come to meetings with meaningful input.
    - Moving forward, the project team should make a clearer case as to why this project is being done now, when there have been many similar studies and public outreach on the topic before.

Purpose & Need

Mark Niles of HNTB provided an overview of the project's Purpose & Need findings and noted that the full report will be emailed to STC members in the next month or so.

Goals & Objectives
Mark Niles of HNTB provided an overview of the project's draft Goals & Objectives.

Purpose & Need/Goals & Objectives Feedback
STC members asked the following questions and addressed the following topics when asked to provide feedback on the project's Purpose and Needs findings, as well as the draft Goals & Objectives.

- **Purpose & Need Questions and Feedback**
    - An STC member asked about the land use data used for the modeling on slide 21. Mark Phillips replied that the project team used Cooperative Forecast 9.1 and WMATA applied their growth model on top of it.
    - Committee members discussed whether the land use forecasts include forecasted job growth for the new Amazon HQ. One STC member noted that while the forecasts were set before the Amazon HQ plan was announced, they already include the number of jobs that Amazon HQ would incrementally bring over the years. Another committee member expressed concern that the transportation modeling may not be accounting for the mode preferences of new Amazon workers, who will be more inclined to use transit than drive. Mark Niles responded that this issue could be examined as part of the study.
    - An STC member suggested that maps on slide 21, capacity and crowding issues could be better illustrated using different colors rather than different line weights.
    - An STC member asked if Red Line stations are part of the project as well. Mark Niles replied that transfers are considered, and that vertical circulation within stations on the BOS is being considered in the study.
    - An STC member inquired as to what the original level of service for Silver Line Phase II was intended to be, if there have been any changes since then, and whether the crowding problem was expected when Loudoun County signed on for Phase II. Mark Phillips emphasized that the purpose of this project is to build the capacity needed along the BOS and not to determine the exact scheduling of trains. He added that this project will help determine the path forward for the BOS to be in a state of good repair, which will help prepare the system for service disruptions.
    - An STC member asked if the project will result in a NEPA document. Mark Niles noted that the outcome will not be an official NEPA document at this time because it is not yet required, but that this project is being considered part of the early scoping for a future NEPA document because this will involve examining all the previous studies and soliciting public involvement. Mark

Phillips added that the federal government sets a two-year limit for project work, so by doing some of the work in advance it will help any future project progress more smoothly.

- An STC member asked if the WMATA sustainability targets on slide 25 are just for rail or for the entire agency. Mark Phillips replied that they apply to the entire agency.
- An STC member asked if the idea of matching service to ridership demand could result in any recommendations for reducing service. Mark Phillips replied that matching service to demand could potentially mean increasing service in the core and reducing on the ends of the lines, for example, but that overall the system will need to remain balanced in terms of operating costs while still providing service where it is needed.
- An STC member asked if the formulas for subsidies would change if levels of service were to change for a jurisdiction. Mark Phillips replied that this should be part of the conversation. Another STC member replied that the rail formula does include ridership, and that they do not want to see any reductions of service in their jurisdiction. Another STC member added that these comments could be addressed by tweaking the Purpose and Need to show that the solution must be financially sustainable – there are operating caps but everyone wants service – it should be made more clear that this study is working within what is financially feasible. Mark Phillips replied that financial sustainability is part of the conversation, but that these problems may not be solved by remaining financially constrained (this project is not financially constrained).
- An STC member commented that even if an alternative is not favorable by an agency or jurisdiction, the full set of alternatives needs to be considered in order to see what the potential impact of each would be.
- The project team asked committee members how to best frame the project for the public and elected officials. Committee member responses included:
    - Develop one clear statement about the goal to optimize BOS in the long term. Less is more.
    - Visualizing where choke points are is helpful. Graphics showing BOS impacts to and on the Green and Yellow lines would also be helpful.
    - Explain clearly how long it would take to make capital improvements and the importance of starting this process now.
    - One STC member expressed the desire to have more time to think this through, having not seen this presentation in advance. Mark Phillips replied that additional feedback could be sent to him over email.

        - One STC member said that they were trying to understand what senior leadership will need to respond to throughout this project. Mark Phillips replied that the project team is looking for their feedback on the Purpose and Need and the goals and objectives, as well as providing a heads up about public outreach.
    - An STC member said they were curious as to what the impetus for this study is and whether they should be asking these questions of the public at this time, as the timing seems strange. The committee member noted that in the past, the discussion of opening Silver Line Phase I opened up a lot of Blue Line arguments between jurisdictions and the public who were not happy they were losing service. The committee member said that in the past year or so, they have not heard a lot of complaints about the mixture of BOS service – but now, the Blue and Yellow lines are going to be shut down for the summer, and this BOS project is beginning. The committee member added that there is not a lot of operating flexibility to do things because of the subsidy cap.
        - Mark Phillips said that this study has been in the works for years and it is now finally happening. He acknowledged that there are capacity constraints now, and in the future, the BOS lines will not be able to serve peak hour demand if the planning is not done now for the longer-term capacity issues. He said that WMATA leadership is talking about long-range planning and capacity issues, so the timing is right. If this project ends up recommending a large-scale capital project, and one that would involve NEPA project design, the planning needs to be started now instead of waiting to hit a crisis.
        - An STC member added that it would be helpful to tell public about how long it would take to make capital improvements and the importance of starting this process now. Another STC member added that the economic competitiveness of the region depends on this.
        - Mark Phillips added that this study came from an outgrowth of Momentum and ConnectGreaterWashington, and that all background documents will be on website once it is launched.
    - An STC member asked if there was a financial constraint to the project and if board members been notified. Mark Phillips replied that the study is financially unconstrained and that the impact analysis will include a cost/benefit analysis. He added that the board members have been notified.

- **Goals & Objectives Feedback**
    - An STC member suggested that Goal 4 should be separated into two goals: reduce environmental impact and strengthen Metro's finances. Mark Phillips

replied that the financial aspect of Goal 4 can be combined with Goal 3.

- An STC member expressed that Goal 2 should be emphasized the most because it's a shorter-term goal.

- **Other**
  - An STC member said that they did not understand what the compelling reason was for their participation in the study. Mark Phillips replied that it is important to discuss the planning for future capacity needs now. The committee member replied that Maryland jurisdictions rely on the state for funding, so even if they participate in this study and support an alternative, they do not provide any direct capital dollars. Mark Phillips replied that Maryland leadership is participating in this project, and that it is important for the jurisdictions to participate so that the recommendations that come out of the project are favorable to the jurisdictions as a result of them providing their input.

Public Engagement Strategy

Deana Rhodeside provided an overview of the project's upcoming public engagement strategy, including the upcoming project announcement, pop-up events and focus group sessions.

- An STC member asked about the plan for getting people interested in the project from the beginning. Deana Rhodeside responded that the team is working with PIOs and other stakeholder committees to spread the word. Mark Phillips added that the team is developing a brief hand-out that will highlight customer-focused issues to encourage public interest in the project.
- An STC member asked if the Wiehle-Reston East Metro station is included in the project outreach. Deana Rhodeside confirmed that it is.

Next Steps

Mark Phillips noted the project's next steps, including public engagement, Executive Committee meeting, and next Stakeholder Technical Committee Meeting (date TBD, but potentially August/September 2019).

STRATEGIC ADVISORY COMMITTEE MEETING – BOS CAPACITY AND RELIABILITY STUDY

MAY 30, 2019
1:30 PM
Meeting Notes

In Attendance:

- WMATA/Consultant Staff: Allison Davis, Shyam Kannan, Katie List, David Miller, Mark Niles, Joshua Penn, Mark Phillips
- SAC Members (both in person and by phone):

David Alpert	DCST
Bryan Barnett-Woods	Maryland National Capital Parks and Planning Commission
Jeff Bennett	District Department of Transportation (DDOT)
Tom Biesiadny	Fairfax County Department of Transportation
Jennifer DeBruhl	Virginia Department of Rail and Public Transportation (DRPT)
Kristen Calkins (attended on behalf of Sakina Khan)	DC Office of Planning
Joe Kroboth	Loudoun County Department of Transportation & Capital Infrastructure
Kate Mattice	Northern Virginia Transportation Commission (NVTC)
Jeff Parnes	TPB Citizens Advisory Committee
Tino Calabia (attended on behalf of Phil Posner)	WMATA Accessibility Advisory Committee
Doris Ray	TPB Access for All Committee
Lynn Rivers	Arlington County Department of Environmental Services (DES)
Kanti Srikanth	MWCOG Department of Transportation Planning
Norman Whitaker	Virginia Department of Transportation

Introduction/Overview

Mark Phillips welcomed the committee and provided a brief overview of the study.

David Miller of Foursquare ITP provided and overview of the stakeholder committee framework and meeting frequency. He noted that SAC members could provide feedback on stakeholder committee assignments via email to Mark Phillips, and the consultant team. He then asked SAC members to introduce themselves, and to answer the following questions:

- What do you see as the most important issues and opportunities in the BOS corridor?
- What are your ideal outcomes from this study? What does this process need to produce?

Most Important Issues/Opportunities

As part of their introductions, SAC members addressed the following topics when asked to identify the most important issues/opportunities in the BOS corridor:

- **Bus Service**
  - This project should consider access, availability, coverage and frequency of bus service in the corridor; this project needs to fit into the Bus Transformation Project.
- **Employment Access**
  - Crush loads on the BOS lines impact employment areas along the corridor, including Dulles, Reston, and Tysons Corner; this is an issue for DC and the region as a whole, which needs to stay economically competitive.
  - The federal government interested in improving accessibility to all federal destinations.
- **Land Use/Other Planning**
  - BOS lines are critical to long-term growth in Fairfax County, where planning is focused around these lines (as well as the Yellow and Silver Lines). The BOS lines need to operate effectively within Fairfax County, as well as to DC and Maryland.
  - Loudoun County is transforming development policies to push higher density development around future Metrorail stations. The growth and economic success of the county is tied to success of operations of the Metrorail system.
  - Virginia has shifted its focus from counting cars to counting people, and Metrorail service ridership assumptions are at the core of highway and land use planning – if people revert to cars, there's a built-in conflict with the amount of travel along the corridor that's assumed to be transit. Land use is shaped around the presence of transportation.
  - There's an opportunity to improve TOD at Metrorail stations. Prince George's County land use plans focus on Metrorail, Purple Line, and activity centers, which need frequent, consistent, and reliable schedules. Need to make sure there isn't a residual delay at Prince George's County stations when something happens elsewhere – need to maintain service and connectivity.

- **Regional Perspective**:
    - Metrorail is a critical element of regional mobility and accessibility and sustaining anticipated growth over the next 25 years. From a regional perspective, the big issues are:
        - Regional mobility
        - Crowding and its impact on service reliability, ridership, and safety
        - Improved connectivity and accessibility to stations on all three BOS lines, including non-motorized access to stations
        - Safe and efficient circulation of people around stations on these lines, particularly transfer stations
- **Local Connections**
    - BOS lines were built to bring people into DC - but jobs exist in Virginia. People in Virginia need to get to Virginia without going to DC, like the G train that connects Brooklyn and Queens.
    - Metrorail service should go from Courthouse to areas in Arlington, Alexandria, and other part of Fairfax County, so people can go from Springfield to Tysons, Dulles to Reagan, and from/to Loudoun County and Western Fairfax County, without changing trains. Then not every train has to go to Rosslyn.
- **Maintaining Service**
    - There's a desperate need for system redundancy – BOS lines are only one catastrophic event at the tunnel from shutting off hundreds of thousands of people.
    - Hopeful that solutions can be found so WMATA isn't forced to diminish service to the Northern Virginia area compared to other part of system.
- **Other**
    - Include cost-effectiveness in study.
    - There's discussion of a BOS/Rosslyn river crossing – it's important to understand what we already have in that area.
    - Previous studies were interested in maximizing the amount of transit that can be provided with the current system.
    - Most important opportunities: growing ridership, growing modal split.

Ideal Outcomes

As part of their introductions, SAC members addressed the following topics when asked to identify ideal outcomes from this study, and what the study needs to produce:

- **Ideal Outcomes**
    - Identify all reasonable alternatives, then conduct a thorough evaluation of each alternative without limits or constraints at the analysis stage.
    - Consensus on preferred solution is important for moving forward.
    - Pick a small number of different scenarios to present to decision makers for selection of future projects and funding.
    - Provide specific details and implementation plans for how to improve Metrorail service in the study area.
- **Other**
    - The project team should provide materials to committee for review ahead of time – the scope of the project deserves review time.

Other Notes and Questions

During introductions, several SAC members asked questions about the project, or noted simultaneous planning efforts that could impact the corridor.

- **Decision-Making**: A SAC member asked who would make the final recommendations. Mark Phillips responded that after the cost/benefit analysis was complete, the project team would engage in more public and stakeholder outreach, then make a recommendation to the WMATA General Manager and Board, which is empowered to adopt a preferred project(s). The final report will have costing and implementation information.
- **Stakeholder Executive Committee:** A SAC member asked if the Stakeholder Executive Committee would include officials from outside the WMATA compare area. Mark Phillips noted that the elected officials would reflect constituents within a two-mile radius of the corridor, but that the project team may engage with a larger group at some point during the study. The SAC member noted that some residents outside the compact area use Metrorail and reaching out to their elected officials might help to broaden the scope of project support.
- **Train Capacity:** A SAC member noted that open gangway trains could increase capacity by 10 percent, which could help Metrorail accommodate some of the anticipated ridership growth over the next decades.
- **Other Current Studies**: SAC members noted the following simultaneous studies, which could have impacts on the corridor:

- The National Capital Planning Commission (NCPC) is currently updated the transportation policy in their comprehensive plan.
- The Virginia Department of Rail and Public Transportation (DRPT) is updating their I-66 Transit/TDM study, which is anticipated to provide increase commuter transit service in coordination with the opening of new I-66 Express Lanes in 2022.

Purpose & Need

Mark Niles of HNTB provided an overview of the project's Purpose & Need findings and noted that the full report will be emailed to SAC members in the next month or so.

Goals & Objectives

Mark Niles of HNTB provided an overview of the project's draft Goals & Objectives.

Purpose & Need/Goals & Objectives Feedback

SAC members asked the following questions and addressed the following topics when asked to provide feedback on the project's Purpose and Needs findings, as well as the draft Goals & Objectives.

- **Purpose & Need Questions**
  - A SAC member asked when the Silver Line Phase II will open. Mark Phillips noted that the construction is not being managed by WMATA, but that it is planned to open in 2020.
  - A SAC member asked if the tunnel capacity of trains – based on the differences between eight-minute versus six-minute headways – was based on automated or manual train control. Mark Phillips noted that it is based on current (manual) operations, but that enhanced communication-based train control (CBTC) would only increase the number of trains per hour through the tunnel by one or two, resulting in a total of 27-28 trains per hour.
- **Goals & Objectives Feedback**
  - The project goals relate to how Metrorail service runs – but not why we want it to run well. The project could build in a goal related to enhanced connectivity and access to jobs, emphasizing that Metrorail connects people where they live to jobs, opportunities, and recreation throughout the region – that's the core reason why it serves people.
  - Looking at impacts on riders and customers could help clarify the goals and objectives.
  - A long-term goal could include creating a rail spur connecting the Orange and Silver Lines, taking people directly across the Potomac, similar to Purple Line connections.

  - If access is a goal, a possible objective under that goal is to include access to riders of all income levels and Title VI populations. Metro has a toolbox that's not limited to rail; some trips could be served by Metrobus or other modes.
  - In Goal 4 (Provide Transportation Options That Reduce Environmental Impacts and Strengthen Metro's Finances), the objectives should be about improving access to Metrorail – environmental goals are inherent to the project.

- **Other**
  - A SAC member noted that there will soon be more express buses along I-66, but that they will require commuters to drive to park and rides. Jennifer DeBruhle asked SAC members to email her feedback on the I-66 Transit & TDM study.
  - A SAC member noted that the project needs to coordinate with bus service, and questioned whether riders should be forced to take the Metro, in lieu of a one-seat bus ride within Fairfax County.

Public Engagement Strategy

Joshua Penn provided an overview of the project's upcoming public engagement strategy, including the upcoming project announcement, pop-up events and focus group sessions.

Next Steps

Mark Phillips noted the project's next steps, including public engagement, Executive Committee meeting, and next Strategic Advisory Committee Meeting (date TBD, but potentially August/September 2019).

EXECUTIVE COMMITTEE MEETING – BOS CAPACITY AND RELIABILITY STUDY

JULY 18, 2019

2:00 PM

Meeting Notes

In Attendance:

- WMATA/Consultant Staff: Regina Sullivan, Charlie Scott, Mark Phillips, Melissa Kim, Mark Niles, Madhu Reddy, Deana Rhodeside, Katie List, Lori Zeller
- Executive Committee Members (both in person and by phone):

Director Terry Bellamy	Prince George's County Department of Public Works & Transportation
Member Katie Cristol	Arlington County Board
Councilor Dannielle Glaros	Prince George's County Council
Mayor Eugene Grant	City of Seat Pleasant
Shawn Hilgendorf - Office of Councilor Robert White	District of Columbia City Council
Mtokufa Ngenya - Chief of Staff to Councilor Robert White	District of Columbia City Council
Chair Phyllis Randall	Loudoun County Board of Supervisors
Councilor David Snyder	City of Falls Church City Council
Mayor Justin Wilson	City of Alexandria

Introduction

Regina Sullivan welcomed the committee and noted that Executive Committee members were identified based on the study area alignment. Committee members introduced themselves, both in person and on the phone.

Project Overview

Mark Phillips provided a brief overview of the study, including timeline, previous studies, alternatives analysis process, committee involvement, and the process for developing study outcomes.

Purpose & Need

Mark Niles of HNTB provided a summary of the project's Purpose & Need findings, including incidents, delays, disruptions, system constraints, carrying capacity, and station crowding.

Chair Randall noted the importance of getting Metrorail tracks back to a state of good repair while maintaining good customer service. She emphasized the need for high quality communication from Metro, so customers know what is happening, and why.

Member Cristol said the bottleneck at the Potomac River is a critical problem, and that public engagement and conversation should reflect a clear problem statement identifying this issue, and the potential for a tunnel. She asked if the current problem statement should be narrowed to clarify this problem.

Mark Phillips agreed that the bottleneck is the most important issue the study will grapple with. He said that there are other potential solutions to address issues like service reliability during construction – and that the project's solutions may be a phased series of projects with differing scales. Mark Niles said that other strategies could work together, along with fixing the tunnel, to increase overall reliability.

Councilor Snyder asked how the study will respond to different levels of demand during peak period versus non-peak periods (when the system has adequate capacity). He also asked about a timeline for considering costs of potential solutions.

Mark Phillips said that costs will be identified during the cost/benefit analysis portion of the project, likely in Summer 2020. These costs will include information about jurisdictional subsidies and costs. He noted that Metrorail service guidelines include a person per car metric, and that WMATA needs to make investments to reach those service standards – but that underused capacity in off-peak hours and directions could be balanced by land use development, which could improve the overall cost profile.

Mayor Wilson said the WMATA should take a stepped approach and consider short, medium, and long-term projects. He noted that a new river crossing is a big ask and would take a generation to develop. He said that WMATA should be explicit about grouping options, i.e. using non-rail solutions (bus) in the short and medium term or targeting capacity issues by turning trains around to match service levels to demand.

Mark Phillips said that the project's alternatives analysis will include a no-build scenario with bus options, and that the Bus Transformation Project is still ongoing. He noted that bus service cannot fully address the bottleneck.

Mayor Wilson said that using bus service wouldn't be a no-build alternative – it's more of an interim step that acknowledges that different use cases will have different transit needs.

Mark Niles noted that a transportation systems management alternative could look at better use of existing transit service.

Mayor Grant asked if other cities in the U.S. have undergone similar transitions that the project could review. He noted the need for a comprehensive strategic plan to communicate about the project, so the committee could speak with one voice going forward. He also asked about the impacts of mobile network transitions from 4G to 5G on the project and noted that smart technologies could be used to communicate with riders.

Director Bellamy said the discussion about turnback opportunities has been happening for a long time, and noted the potential for technology to identify when/if trains needed to go to the end of the line during peak periods.

A staff member for DC Councilor Robert White said that building trust and confidence in the system should be an additional goal. He asked if it was possible for the project to use data from special events (such as inauguration days) to do data analysis, similar to Homeland Security planning processes.

Mark Niles said that WMATA is doing a study on special event impacts, including a high-end service day scenario to identify overwhelmed stations. These results could be incorporated into this project.

Goals and Objectives

Regina Sullivan asked committee members to call or email her with further input regarding project goals and objectives.

Public Outreach

Deana Rhodeside provided an overview of the project's public outreach plan and activities, and asked for committee input regarding community-based organization and business groups the team should reach out to.

Mark Phillips said the project will include examples from other public agencies in community outreach. He said the project team will come back to the Executive Committee this winter to get feedback.

Chair Randall asked if the project team had reached out to NVTC and NVTA. Mark Phillips noted that they are in the project's Strategic Advisory Committee.

Appendix C:

Press release, Postcard, and Fact Sheet

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Washington Metropolitan Area Transit Authority

For immediate release: June 17, 2019

Metro study of Blue, Orange and Silver lines will identify options to address region's future needs

Metro today announced the launch of a two-year study of the Blue, Orange and Silver lines with the goal of identifying long-term options to improve reliability, meet future ridership demand, and better serve customers.

Today, the Blue, Orange and Silver (BOS) lines all share a single set of tracks between the Rosslyn tunnel and the Anacostia River, creating a bottleneck that limits the number of trains that can cross between Virginia, Maryland, and the District of Columbia. The limited capacity means that Metro cannot easily add more trains and has limited ability to work around service disruptions. With the current configuration, a disruption on one line can have a ripple effect on all three lines.

The BOS Study will identify potential infrastructure improvements and service alternatives to resolve these issues.

"Our rebuilding efforts and ongoing preventive maintenance have improved Metro's reliability to the highest levels in eight years, but it's time to start thinking about the Blue, Orange and Silver lines' infrastructure constraints so that Metro is well positioned to serve future generations," said Metro General Manager Paul J. Wiedefeld.

The first phase of the study will assess key issues and trends and document why improvements to the Blue, Orange, and Silver lines are necessary. Subsequent phases will include the development and evaluation of alternatives, as well as a thorough analysis of costs and benefits, with recommendation of a preferred alternative expected to occur by the fall of 2020.

Ultimately, the study will identify and analyze a range of potential alternatives before recommending a "locally preferred alternative" to move forward with federal environmental review, full design, and competition for federal funding. Over the next two years, Metro plans extensive outreach to engage the community, stakeholders, and transit experts to gather feedback and make recommendations.

To learn more about the project and opportunities to get involved, and to track the status of the project, visit the project website at www.wmata.com/BOSstudy.

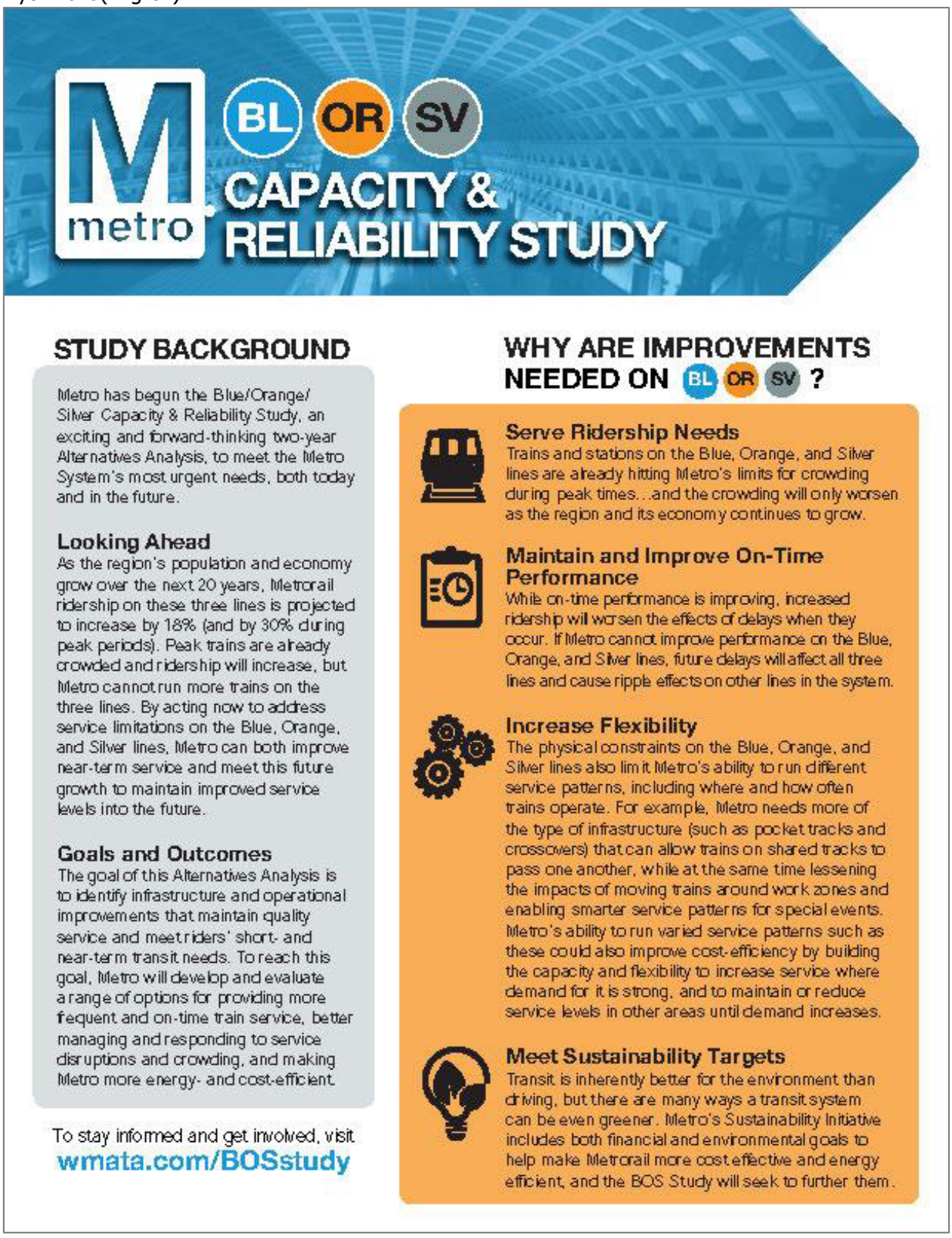
BOS Capacity and Reliability Study
Event Postcard

English Version

Spanish Version

BOS Capacity and Reliability Study
Event Fact Sheet

Flyer front (English)



BOS Capacity and Reliability Study
Event Fact Sheet

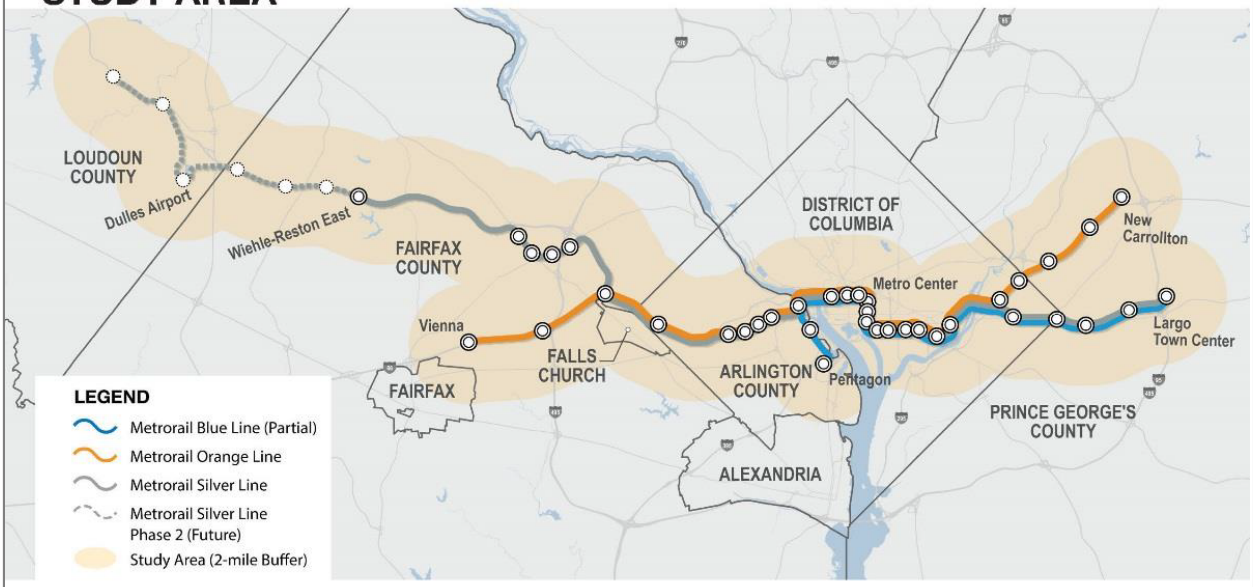
Flyer back (English)

BL OR SV STUDY PROCESS & TIMELINE

Stakeholders and the public will be actively engaged in helping to identify and evaluate potential alternatives, as well as in selecting a Locally Preferred Alternative. The process will be guided by input from both internal and external advisory committees.

2019 SPRING	SUMMER	FALL	2020 WINTER	SPRING / SUMMER	FALL
PURPOSE & NEED	**ALTERNATIVES DEVELOPMENT**	**ALTERNATIVES EVALUATION**	**COST / BENEFIT ANALYSIS**	**SELECTION OF PREFERRED ALTERNATIVE**	
Purpose and Need statement defined, based on key issues and trends assessment in the study area.	Conceptual design for a set of options that address the Purpose and Need.	Comparison of alternatives based on a set of evaluation criteria.	Assessment of total construction and operating costs for each alternative against all the benefits it would produce.	Selection of preferred solution based on the comparative analysis of alternatives and public/ stakeholder input.	

STUDY AREA



WHAT IS AN ALTERNATIVES ANALYSIS?

An Alternatives Analysis is a process for evaluating the costs, benefits, and impacts of transportation improvements along a transit corridor. This process accomplishes the following:

- A thorough evaluation of Metro's needs and opportunities;
- A range of options for addressing those needs;
- A high level of stakeholder and public engagement;
- The selection of a locally-preferred alternative (LPA); and
- The necessary documentation to apply for federal transportation funds.

FOR MORE INFORMATION

E-mail the Office of Planning at BOSstudy@wmata.com with general questions about the study.

Visit our project webpage at wmata.com/BOSstudy for ongoing updates, feedback opportunities, and to sign up to receive updates on the project.

BOS Capacity and Reliability Study
Event Fact Sheet

Flyer front (Spanish)

BOS Capacity and Reliability Study
Event Fact Sheet

Flyer back (Spanish)

BL OR SV PROCESO Y CRONOGRAMA DEL ESTUDIO

Las partes interesadas y el público participarán activamente para ayudar a identificar y evaluar posibles alternativas, así como a seleccionar una alternativa preferida a nivel local. La participación de los comités de asesoramiento internos y externos permitirá guiar el proceso.

Definición del propósito y la necesidad del proyecto con base en una evaluación de los aspectos y las tendencias clave en el área de estudio.

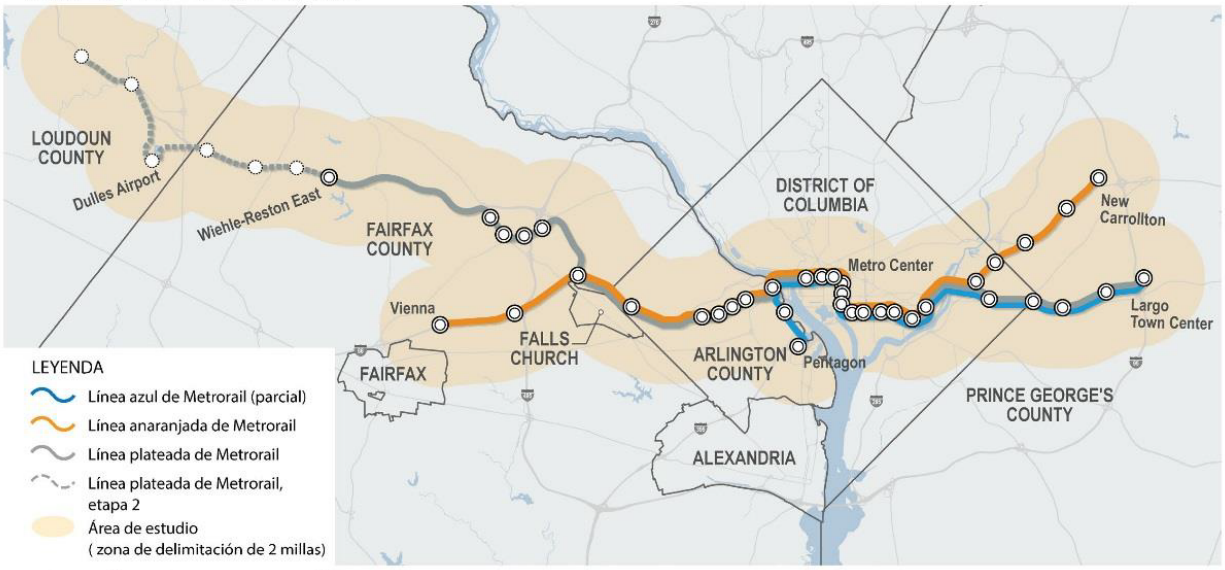
Diseño conceptual de un conjunto de opciones que aborden el propósito y la necesidad del proyecto.

Comparación de alternativas con base en un conjunto de criterios de evaluación.

Evaluación de los costos totales de construcción y operación para cada alternativa en contraste con todos los beneficios que cada una produciría.

Selección de la solución preferida con base en el análisis comparativo de las alternativas y la participación de las partes interesadas y el público.

ÁREA DE ESTUDIO



¿QUÉ ES UN ANÁLISIS DE ALTERNATIVAS?

Un análisis de alternativas es un proceso para evaluar los costos, los beneficios y los impactos de las mejoras de transporte a lo largo de un corredor de tránsito. Este proceso permite lograr lo siguiente:

- una evaluación a fondo de las necesidades y oportunidades del Metro;
- un rango de opciones para abordar esas necesidades;
- un alto nivel de participación de las partes interesadas y el público;
- la selección de una alternativa preferida a nivel local (LPA, por sus siglas en inglés); y
- la documentación necesaria para solicitar fondos federales de transporte.

PARA OBTENER MÁS INFORMACIÓN

Envíe un correo electrónico a la Oficina de Planeación a BOSstudy@wmata.com con cualquier pregunta general sobre el estudio.

Visite el sitio web de nuestro proyecto en wmata.com/BOSstudy para recibir actualizaciones constantes, tener la oportunidad de enviar comentarios y para registrarse con el fin de recibir actualizaciones sobre el proyecto.

Appendix D:

Project Website

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Skip to main content

Washington Metropolitan Area Transit Authority

Metro
Home

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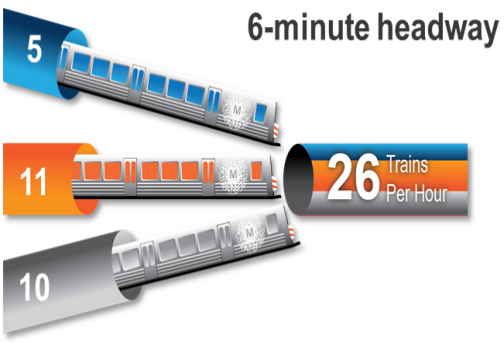
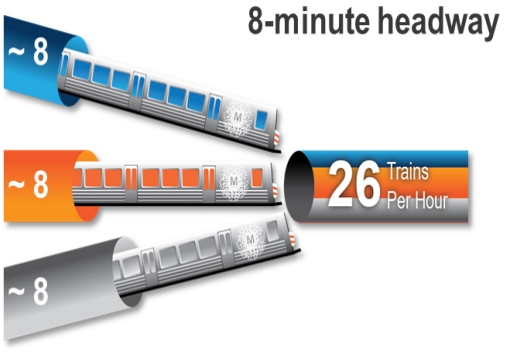
Metro Needs to Improve Service on the Blue, Orange, and Silver Lines

Customers on Metro's Blue, Orange, and Silver lines often experience delays, crowding, and congestion due to limitations in the system's design. All three lines merge at the Rosslyn tunnel onto one set of tracks, creating a bottleneck that limits the number of trains per hour that can pass through. Coordinating the movement of all three lines through the tunnel requires precision. Any service disruption on one line can create a ripple effect leading to delays across all three lines. Metro's infrastructure poses additional challenges managing the impacts of scheduled track work or unanticipated disruptions. These constraints can cause crowding, reduce reliability, and restrict the ability to meet higher ridership demand.





The Blue/Orange/Silver Capacity & Reliability Study (BOS Study) will build on past studies, working with the public, to identify solutions that will address today's urgent needs and position Metro for the future.

BL OR SV CAPACITY & RELIABILITY STUDY

To meet the demands of a growing region, Metro is studying ways to improve service on the Blue, Orange, and Silver lines.

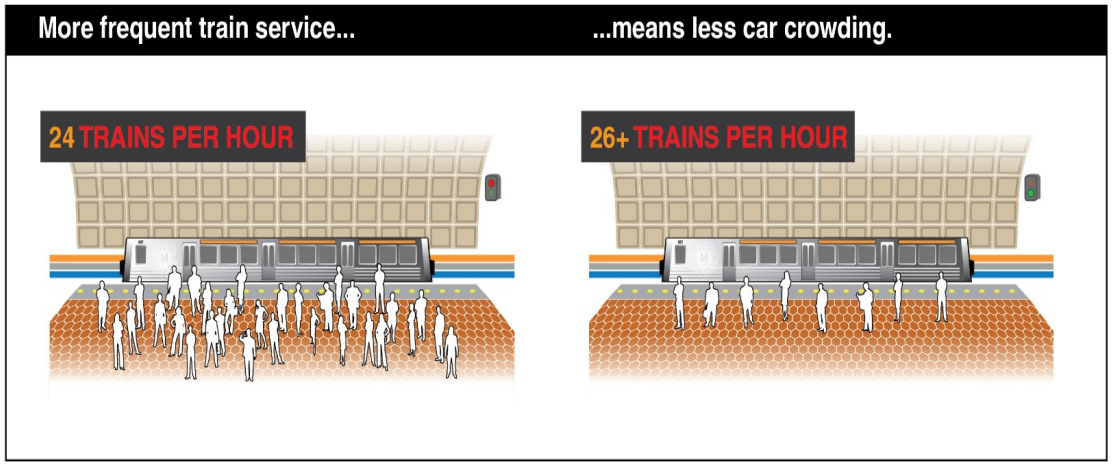
Project team members will be visiting Blue, Orange, and Silver Line Metrorail stations in June and July to share information about the study (look for staff in yellow Metro aprons). Take the opportunity to learn more about the study, discuss your ideas, and sign up to receive future updates.

TO LEARN MORE AND SIGN UP TO RECEIVE UPDATES, VISIT:
wmata.com/BOSstudy

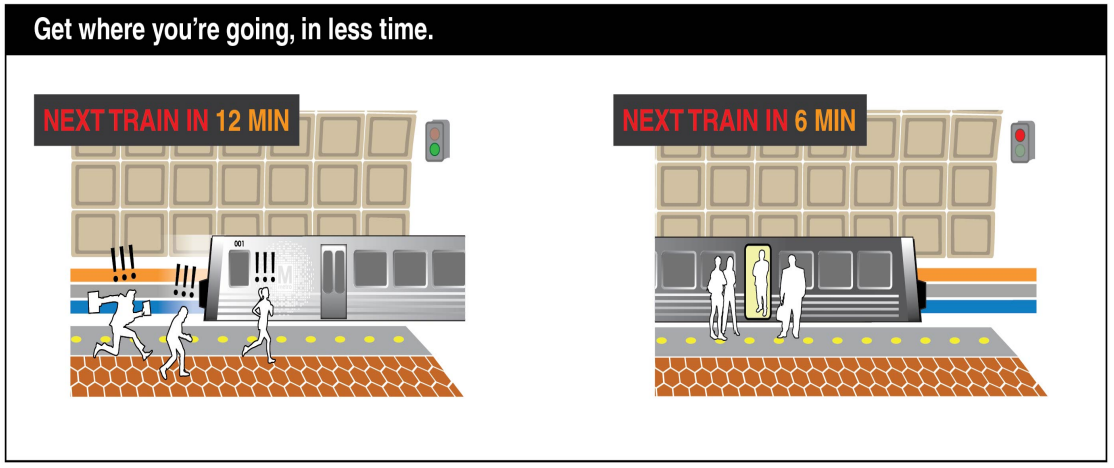
How This Benefits You

Through this study, Metro will look for a solution or solutions that will aim to:

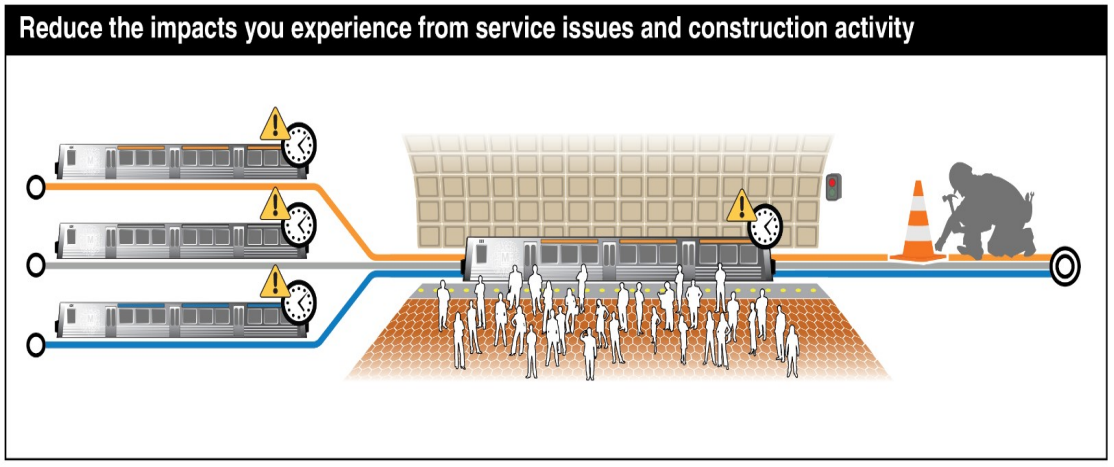
Improve service with more trains and less crowding. Trains are already crowded through Rosslyn during rush hours and will continue to get worse.



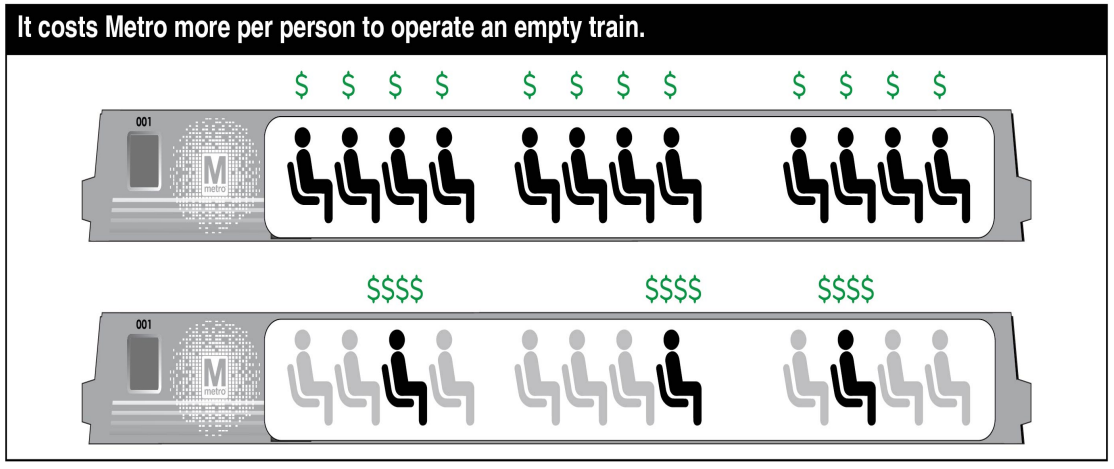
Get you where you're going, in less time.



Reduce delays due to service issues and track and maintenance work.



Optimize ridership to provide more cost-efficient rail service.



See About the Study (/initiatives/plans/About-BOS-Study.cfm) for more information on the study goals, process, and timeline.

See Get Involved! (/initiatives/plans/BOS-Get-Involved.cfm) to engage and share your input on the study.

See Documents and FAQs (/initiatives/plans/BOS-Documents-and-Resources.cfm) for project documents, news highlights, and further reading.

Keep in Touch!

To receive information and updates about the project, enter your email address here.

* Required Fields

Contact Us!

For more information about the Blue/Orange/Silver Capacity & Reliability Study, please send an email to: BOSstudy@wmata.com (mailto:BOSstudy@wmata.com)

Or you may contact Metro's Office of Customer Information at 202-637-7000 (TTY 202-638-3780). Press 88 and then press 5.

About This Study

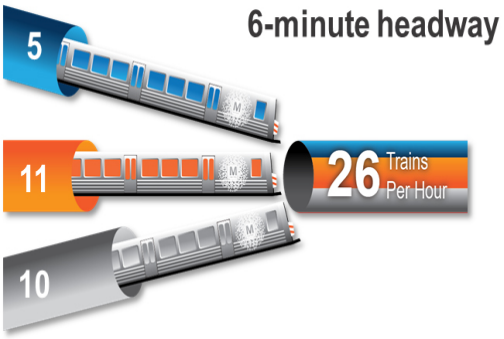
Home (/initiatives/plans/BOS-Study.cfm) | About This Study | Get Involved! (/initiatives/plans/BOS-Get-Involved.cfm) | Documents and FAQs (/initiatives/plans/BOS-Documents-and-Resources.cfm) | En Español (/initiatives/plans/Informacion-sobre-el-estudio.cfm)

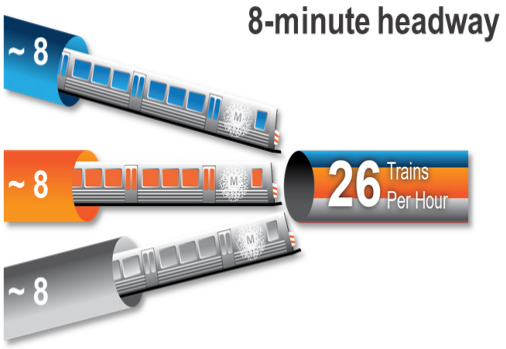
Study Purpose

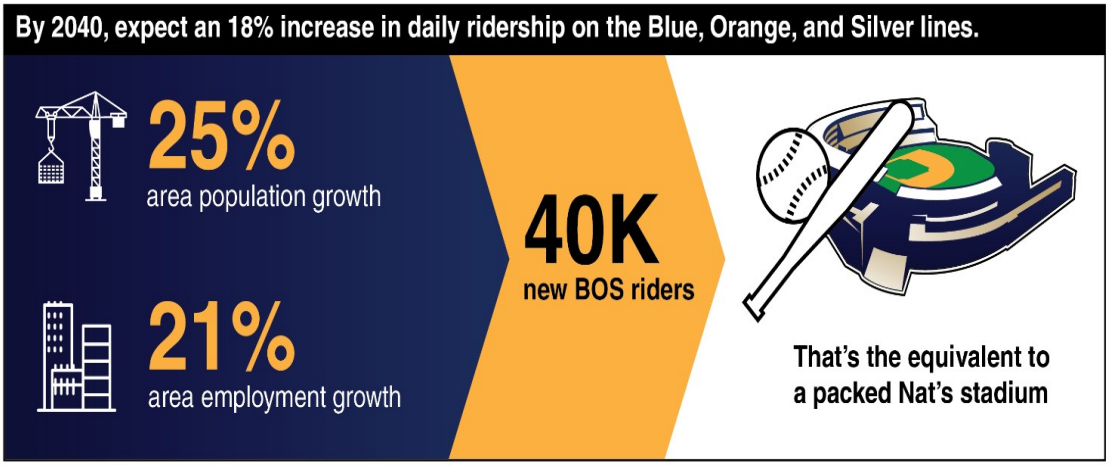
Metro has started a two-year study to identify ways to address the current and future needs on the Blue, Orange and Silver Lines. The study will identify strategies to meet four key goals:

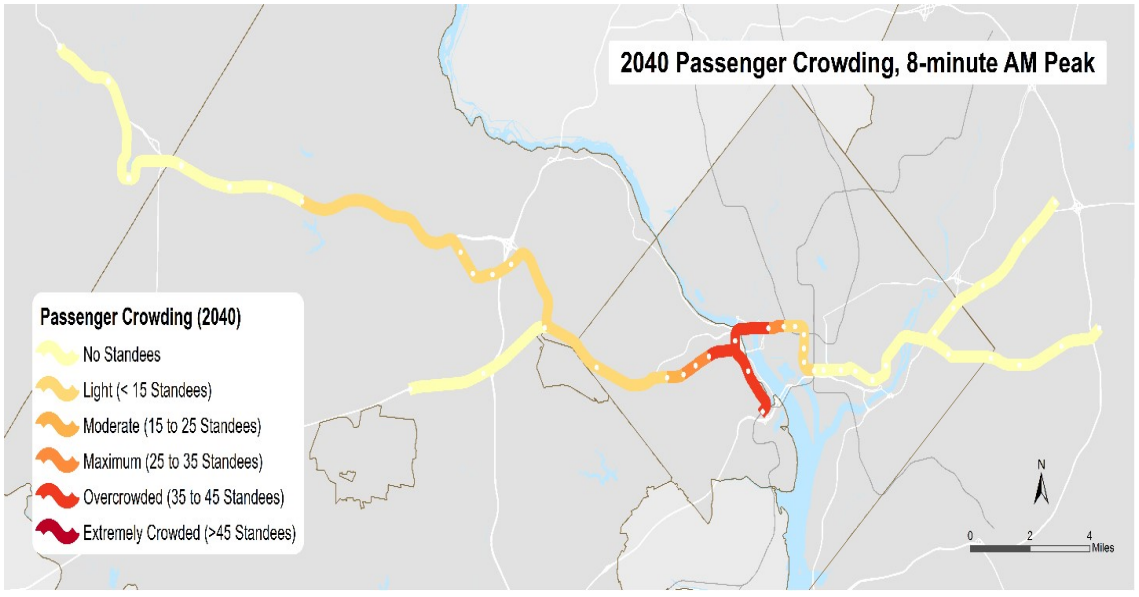
- Serve current and future ridership
- Improve on time performance
- Increase operational flexibility
- Meet sustainability targets

Serve current and future ridership needs
The maximum number of trains that can run through the shared lines using existing techonogy is 26 trains per hour (TPH) in each direction, and that 26 TPH is divided between the three lines. Today, trains on the Blue, Orange, and Silver lines are already crowded during rush hours, when some Orange Line trains between Court House and Foggy Bottom are at maximum capacity. By 2040, both population and jobs along the three lines are forcast to grow by more than 20%, which will increase Metrorail ridership by 18%. The use of all 8-car trains alone is not enough to relieve the crowding and absorb future ridership growth.



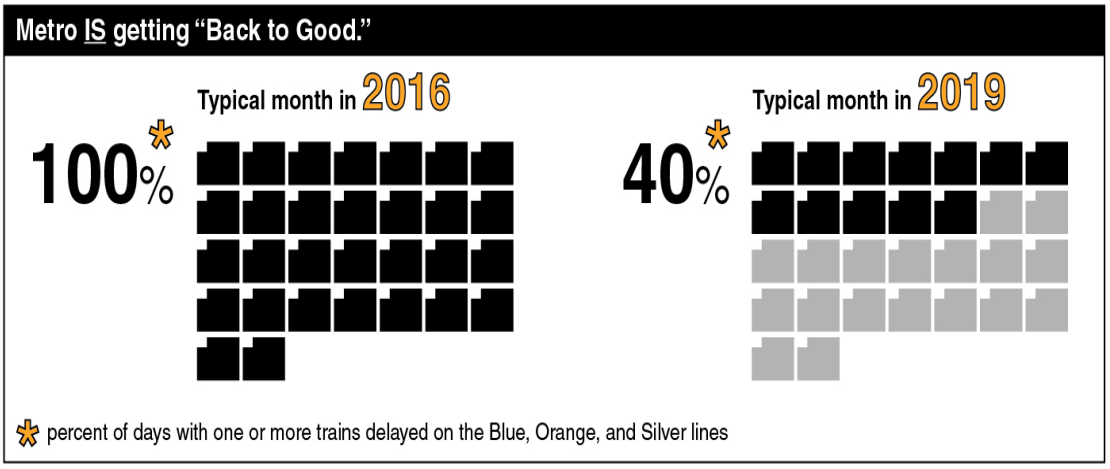


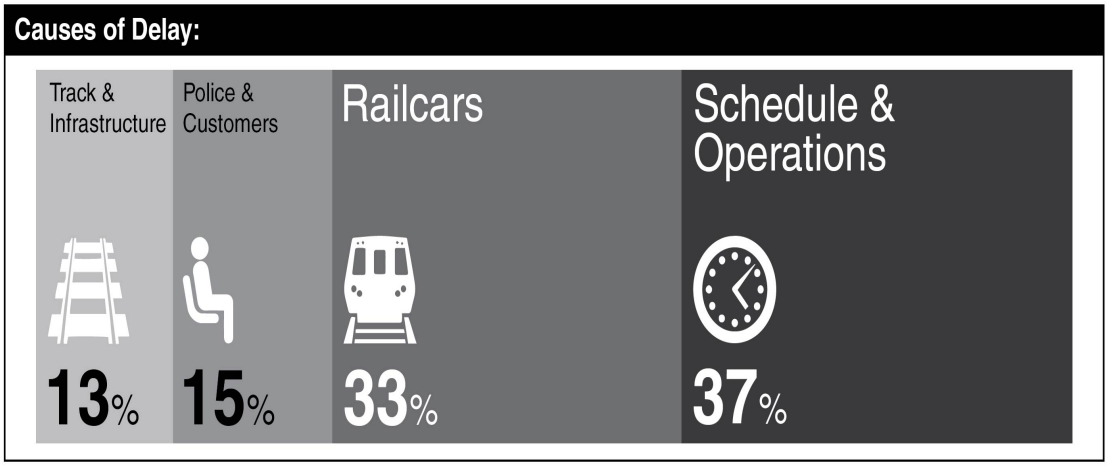




Maintain and improve on-time performance

As a result of Metro's emergency repair program, SafeTrack, a robust preventive maintenance program, and schedule adjustments, on-time performance has significantly improved on the Orange, Blue and Silver lines, but is still far below target. In April 2019 Metro reached its target only 60% of mornings due to unanticipated delays and service disruptions, compared to April 2016 when Metro missed the target every morning.

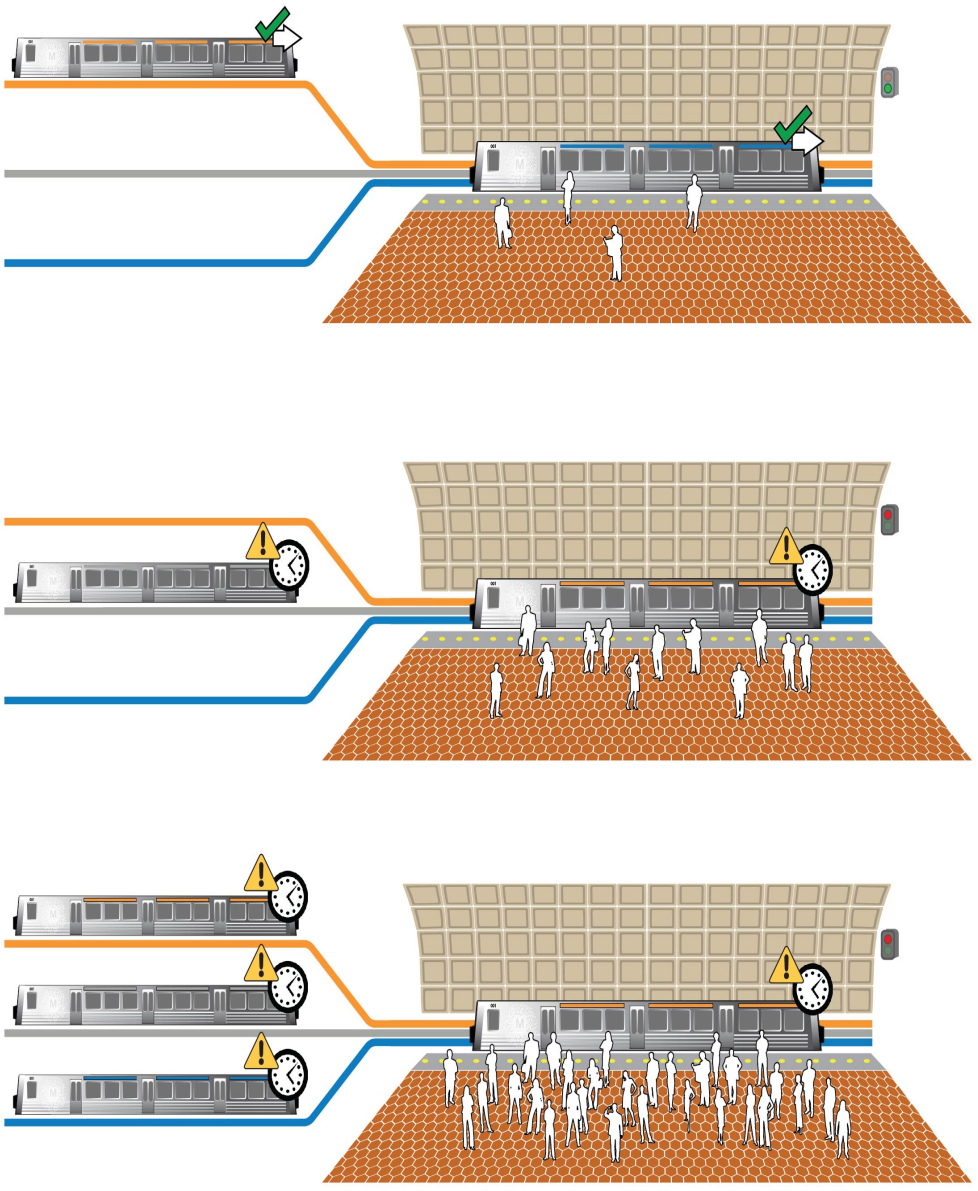




A delay on one line can create a domino effect, impacting all three lines and, in severe cases, impacting Yellow and Green line service. Half of delays are caused by mechanical failures and infrastructure issues and can be addressed with ongoing maintenance. The other half of delays are caused by unanticipated problems such as sick passengers, police activity, customers holding doors, and other factors.

When unanticipated disruptions like this occur, Metro's ability to minimize the impact of single tracking or to quickly deploy relief trains is limited due to the two-track system and available infrastructure. Addressing these limitations requires solutions that will allow Metro to manage disruptions more efficiently.

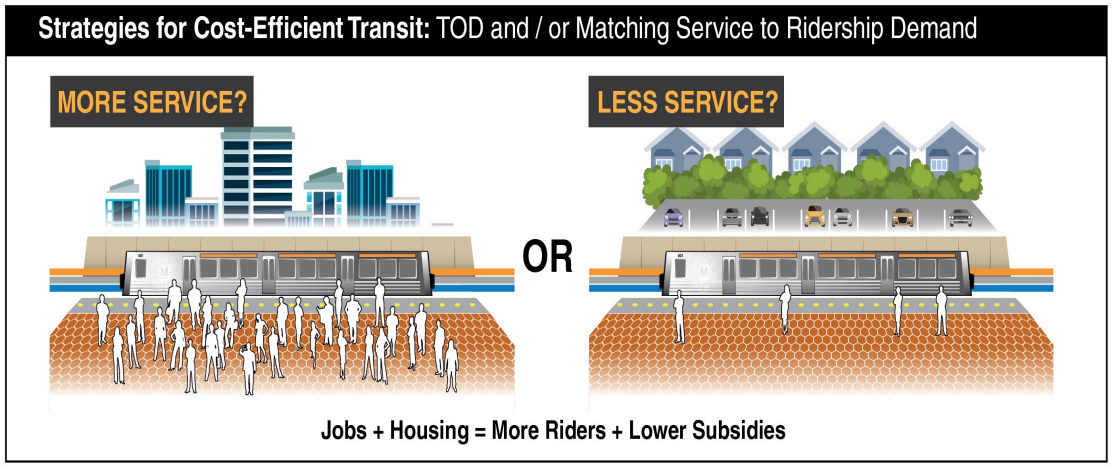
A delay on one line can create a domino effect, impacting all three lines.



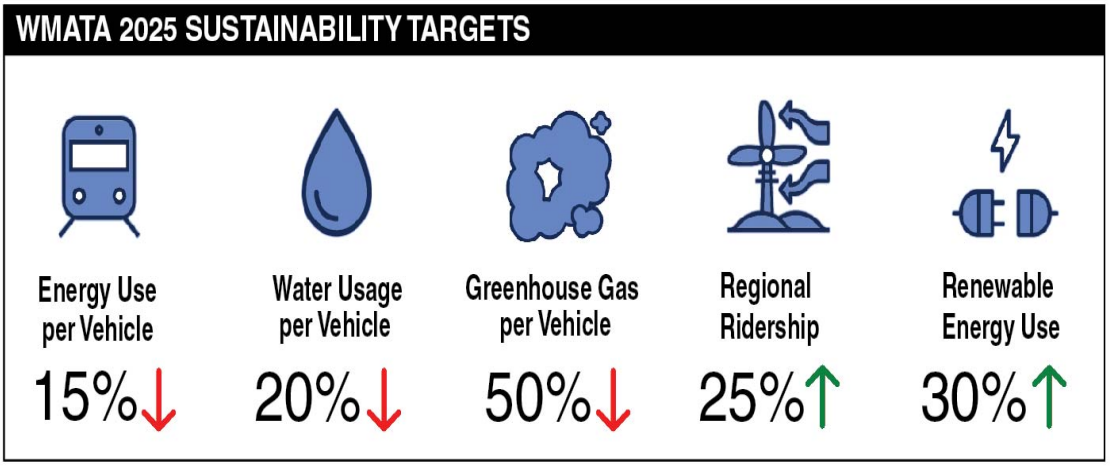
Increase operational flexibility

The physical constraints on the Blue, Orange, and Silver lines limit Metro's service patterns, meaning where and how often trains operate. At the same time, Metro's robust preventive maintenance program is necessary to the long-term health of the system. To accommodate track work and minimize the inconvenience to customers, Metro needs more areas where trains can switch tracks or turn around, allowing Metro to reduce lengthy single-tracking and to deploy better service patterns during disruptions or special events.

The ability to run varied service patterns may also provide cost-savings to Metro, while staying within the 3% operating cap. In some areas, underutilized trains run nearly empty all the way to the end, while other parts of the system that are already crowded need more service. This end-to-end service on all lines at all times comes at a real cost to taxpayers. Metro could better serve taxpayers by building the infrastructure for added flexibility to increase service where demand is strong, and to maintain or reduce service levels in other areas. Taxpayer subsidies would also be reduced if station areas are more intensely developed (transit-oriented development). TOD would generate higher ridership and revenue, which in turn would reduce the taxpayer subsidy.



Meet sustainability targets
Metro has established an Energy Action Plan - a detailed roadmap to reduce energy usage, cut greenhouse gas emissions, and generate cost savings. Transit already plays a vital role in providing sustainable transportation that keeps cars off the road. The BOS Study will support this initiative to make Metrorail more cost effective and energy efficient.

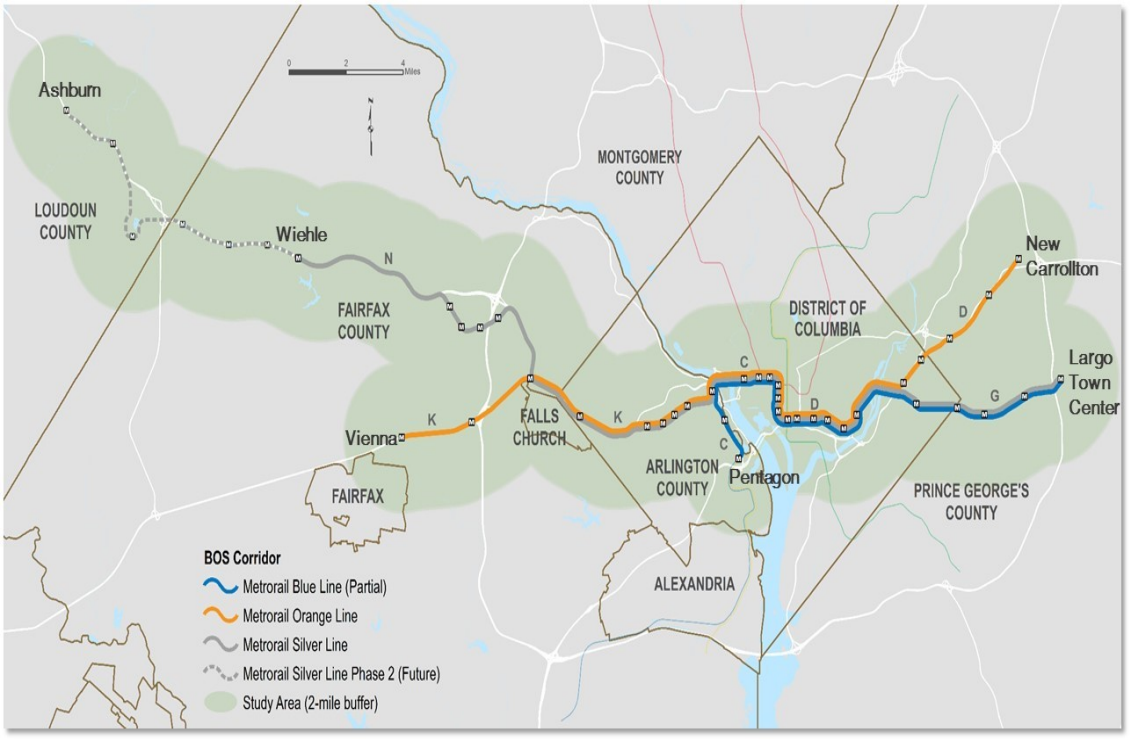


Visit the Documents and FAQs (/initiatives/plans/BOS-Documents-and-Resources.cfm) page for more information on this study.

Study Area

The project area includes the east-west Orange and Silver line corridor, from Vienna and the future Ashburn Station to the New Carrollton and Largo Town Center stations, as well as the Blue Line between the Pentagon and Largo stations. Once Silver Line Phase 2 opens, the total area includes seven jurisdictions, 44 Metrorail stations, and 56 miles of track.

While any improvements recommended by this study will focus on the Blue, Orange, and Silver lines, the analysis will also consider potential operational impacts on other lines in the Metrorail system.



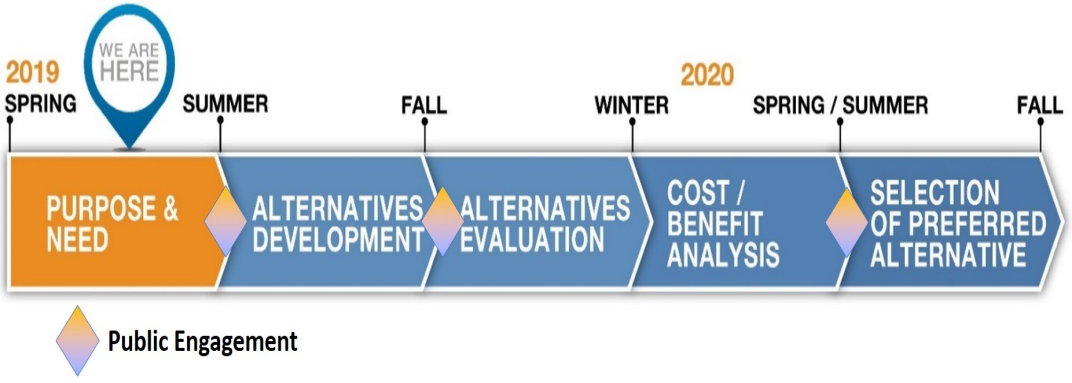
Study Process - Finding the Solution

The BOS Study is a type of study known as an Alternatives Analysis (AA). The AA is a two-year study that complies with best-practices guidelines from the Federal Transit Administration and the National Environmental Policy Act (NEPA) to quality as "early scoping". This will allow Metro to move forward with the study recommendation(s) and compete for federal funding, while reducing the length and cost of any future environmental review process. The study recommendations will be based on data analysis, with input from regional stakeholders and the public to define the problems and determine the preferred solution.

Metro will engage stakeholders and the public throughout the study. In June and July of 2019, project teams will distribute information and be available to answer questions at 13 Metrorail stations across the corridor. Starting in Fall of 2019, Metro will hold workshops, meetings, and surveys to get public input and ideas for potential solutions to address the needs and opportunities listed above.

Visit Get Involved (/initiatives/plans/BOS-Get-Involved.cfm) for the latest information on ways to participate and make sure your voice gets heard!

Project Phases: At a Glance



- **Purpose & Need**: This phase identifies the study's purpose and states why improvements to the Blue, Orange, and Silver lines are needed. This phase includes an assessment of key issues and trends in the study area.
- **Alternatives Development**: The project team will identify and prepare conceptual designs for a set of options that address the purpose and need defined in the previous phase.

- **Alternatives Evaluation**: The project team will then compare those options against each other using a set of evaluation criteria, including impacts on ridership, capacity, reliability, and service levels.
- **Cost/Benefit Analysis**: The project team will assess the total construction and operating costs for each alterative against all the benefits it would produce, to help Metro leadership, stakeholders, and the public identify the most cost-effective option.
- **Selection of a Preferred Alternative**: Based on the comparative analysis of alternatives and input from the public and key stakeholders, the project team will support Metro's leadership in selecting a preferred solution, described in NEPA terms as a "locally-preferred alternative" (LPA).

After this study is completed and Metro has identified an LPA, it will carry that solution forward through the federal environmental review process, full design, and competition for federal funding. That future phase of project development will also include additional opportunities for public and stakeholder input.

Stakeholder Committees

In addition to input from the public, the study will be guided by input from five technical and advisory committees:

Agencies participating in external advisory committees include:

REGIONAL ORGANIZATIONS
Transportation Planning Board (TPB)
Metropolitan Washington Council of Governments - Department of Transportation
National Capital Planning Commission
Metropolitan Washington Airports Authority (MWAA)
VIRGINIA
Virginia Department of Rail and Public Transportation (DRPT)
Virginia Department of Transportation (VDOT)
Fairfax County Department of Transportation (FCDOT)
Loudoun County Department of Transportation & Capital Infrastructure
Arlington County Department of Environmental Services (DES)
City of Alexandria, Transportation and Environmental Services (T&ES)
Northern Virginia Transportation Authority (NVTA)

Northern Virginia Transportation Commission (NVTC)
City of Fairfax Department of Public Works, Transportation Division
City of Falls Church Department of Planning
WASHINGTON, DC
DC Department of Transportation (DDOT)
DC Office of Planning (DC-OP)
DC Sustainable Transportation (DCST)
MARYLAND
Washington Suburban Transit Commission
Maryland-National Capital Park and Planning Commission (M-NCPPC) - Planning Department
Maryland Department of Transportation, Office of Planning & Capital Programming (MDOT)
Prince George's County Department of Planning, Transportation Section
COMMUNITY REPRESENTATIVES
Metro's Accessibility Advisory Committee
TPB Citizens Advisory Committee
TPB Access for All Committee

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Washington Metropolitan Area Transit Authority

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Get Involved!

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How to Get Involved

Public and stakeholder input will be essential throughout the next two years to help identify current corridor issues and provide feedback on potential alternatives.

Metro will engage stakeholders and the public throughout the study. In June and July of 2019, project teams will distribute information and be available to answer questions at 13 Metrorail stations across the corridor (map and list below). Starting in Fall of 2019, Metro will hold workshops, meetings, and surveys to seek input and ideas for potential solutions.

Check the space below for news about our upcoming events.

Upcoming Public Engagement

The next round of meetings will take place in October, with schedule to be determined.

Keep in Touch!

For project updates, join our project mailing list and follow us on social media.

* Required Fields

Contact Us!

For more information about the Blue/Orange/Silver Capacity & Reliability Study, please send an email to: BOSstudy@wmata.com (mailto:BOSstudy@wmata.com)

Or you may contact Metro's Office of Customer Information at 202-637-7000 (TTY 202-638-3780). Press 88 and then press 5.

Documents and FAQs

Project Documents

- Fact Sheet (/initiatives/plans/upload/BOS_Fact-Sheet_Final_English.pdf)
- Fact Sheet - Spanish (/initiatives/plans/upload/BOS_Fact-Sheet_Final_Spanish.pdf)

New documents will be posted here as the study progresses.

Previous Studies

Interested in learning more? See the links below to get started. The project team recommends starting with the summary document, which explains how these previous studies are related and provides direct links to each study document.

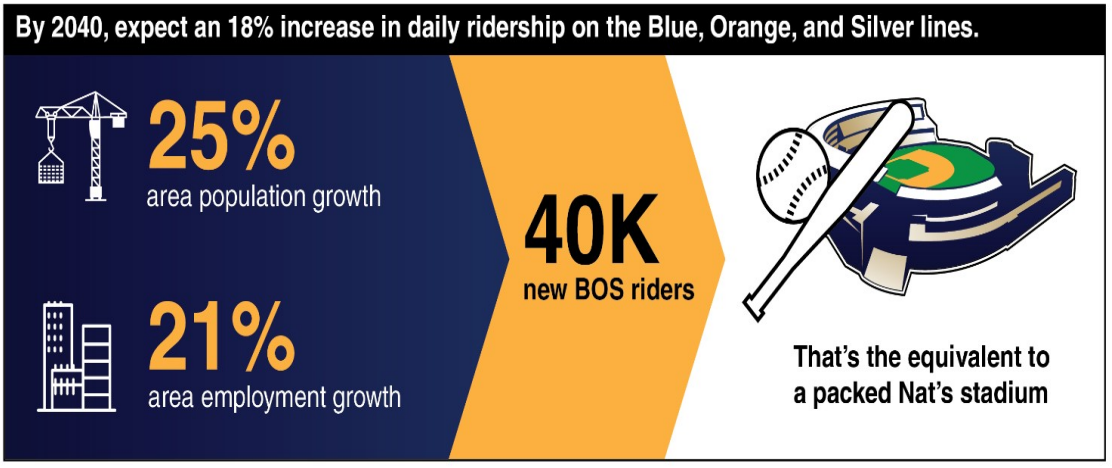
- BOS Corridor Study - Summary of Previous Work (/initiatives/plans/upload/BOS-Corridor-Study_Summary-of-Previous-Work.pdf)
- 2002 Core Capacity Study Final Report (/initiatives/plans/upload/2002-Core-Capacity-Study-Final-Report.pdf)
- 2008 Station Access & Capacity Study (/initiatives/plans/upload/2008-Station-Access-Capacity-Study.pdf)
- 2013 Momentum Strategic Plan for 2025 (/initiatives/plans/upload/2013-Momentum-Strategic-Plan-for-2025.pdf)
- 2014 Connect Greater Washington Long Range Transit Plan (/initiatives/plans/upload/2014-ConnectGreaterWashington-Long-Range-Transit-Plan.pdf)
- 2014 New Blue Line Connections Report (/initiatives/plans/upload/2014-New-Blue-Line-Connections-Report.pdf)
- 2015 Metrorail Capacity White Paper (/initiatives/plans/upload/2015-Metrorail-Capacity-White-Paper.pdf)
- 2016 Silver Line Junction Feasibility Study (/initiatives/plans/upload/2016-Silver-Line-Junction-Feasibility-Study.pdf)

Frequently Asked Questions

Why should I care about the BOS Study?

Over the next 20 years, the number of riders using these three lines is expected to increase by 18% overall and 30% during rush hours. That translates into about 40,000 additional riders per day. Trains are already at maximum capacity during rush hours between the Court House and Rosslyn stations, and absent any major changes, that situation will only worsen. Another factor to consider is frequency. Metro is limited to running 26 trains per hour (TPH) through the Rosslyn tunnel. Blue, Orange, and Silver line trains operate every 8 minutes by line, alternating through the tunnel, resulting in a train every 2-3 minutes. The service - divided equally between lines - doesn't necessarily match ridership levels (e.g. Orange Line trains are crowded). Improving frequencies to pre-2017 levels - every 6 minutes - would require cutting service to one line due to the tunnel's 26 train hourly limit. For example, in 2016 Metro could operate 11 Orange and 10 Silver line trains in peak periods, but only 5 Blue trains.

This study seeks to identify a project or projects that will relieve those constraints.



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Why is Metro conducting this study now?

Orange and Silver line trains between Court House and Rosslyn are crowded in the morning and needs to be addressed today. At the same time, our regional and jurisdictional planning partners are forecasting explosive growth in people and jobs by 2040, and we have every reason to believe that will generate substantial increases in ridership. It's anticipated that regional growth will bring 40,000 new rides per day to the Blue, Orange, and Silver lines by 2040.

The BOS Study will take a comprehensive look at this critical corridor to determine what is needed and how to fix it. Planning, designing, funding, and constructing the type of project to address these needs can take 10-20 years to deliver. That's why we need to start planning **now** to meet the needs of the future.

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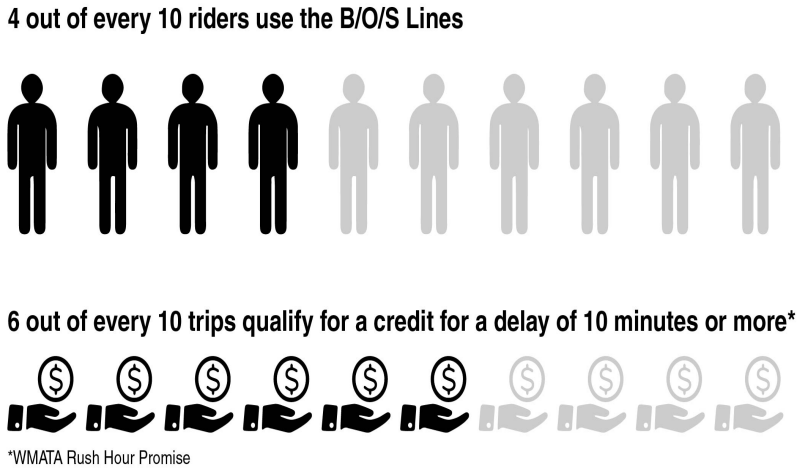
Why is Metro focusing on the Blue, Orange, and Silver lines?

The Blue, Orange, and Silver lines have urgent ridership and reliability issues today. For example, the most crowded Orange Line trains in the morning might carry well over 150 passengers per car, 25% higher than Metro's maximum threshold. As a result of the reliability issues, Blue, Orange, and Silver line riders account for 6 out of every 10 trips that quality for a Rush Hour Promise credit, but carry only 40% of riders. Without changes, there is no room for the forecasted ridership growth.



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Won't an increase in ridership also affect the other lines in the system?

Metro continually monitors and evaluates ridership, land use, travel, and economic data to help make informed decisions. Once forecasts and trends indicate potential issues within a 10- to 20-year timeframe, we need to start planning for the future. Currently, the Blue, Orange and Silver lines pose the most urgent need but similar studies may be needed at some point for other lines in the system.

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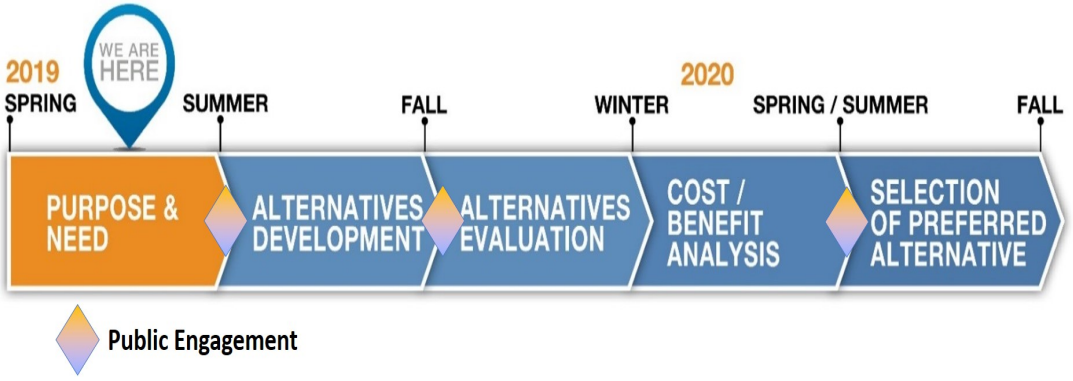
How long will this study take?

Two years.



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Why will the study take so long?

Due to the long-term impact of the study on the region, it's important the study be thorough and collaborate with the public and key stakeholders. We will identify and evaluate various options for how to improve the Blue, Orange, and Silver lines, conduct a cost-benefit analysis for each option, and recommend a locally-preferred alternative. The

locally-preferred alternative will then be presented to Metro's General Manager and Board of Directors for review and approval.

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What happens after the study is complete?

Once Metro leadership and the General Manager have identified a locally-preferred alternative (LPA), it will be presented to the Metro's Board of Directors for review and approval along with funding options and project timeline.

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What impact will my opinion have? Will it even matter?

Metro is committed to stakeholder and public engagement…and to making sure that engagement isn't used as a rubber stamp. Metro introduced a Public Participation Plan in 2014, approved by the WMATA Board of Directors and the Federal Transit Administration, which is founded on four principles: inclusivity, collaboration, responsiveness and consistency. These principles will be seen in all public engagement opportunities throughout the BOS study. All feedback collected through the study process will be analyzed, shared with the project team and management, and taken into consideration along with operation and structural assessments in order to develop a Locally Preferred Alternative. The WMATA Compact also requires public hearings for any major system changes. Multiple opportunities will be available throughout the process - be sure to sign up for the project email list to get updates and stay involved. Your opinion matters!

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What is WMATA doing today to address Metro delays?

Metro is committed to on-time performance, which has improved - nearly 9 out of 10 rail trips systemwide now arrive on time. Programs like SafeTrack have had a measurable positive impact, and will continue to do so as Metro ramps up its state of good repair program using the dedicated capital funding approved by Maryland, Virginia and DC. Metro has a full 10-year Capital Needs Inventory of repair and maintenance work that will continue to reduce delays and improve reliability. However, as noted under Study Purpose, only 50% of delays on the Blue, Orange, and Silver lines are caused by mechanical or system problems; the other 50% are medical emergencies, police activity or other unanticipated issues beyond Metro's control. Those delays are projected to increase as ridership grows, which is why it is essential to develop a plan to improve this corridor.

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What is an Alternatives Analysis (AA)?

An Alternatives Analysis is a process for evaluating the costs, benefits, and impacts of transportation improvements. This two-year process will provide:

- A thorough evaluation of Metro's needs and opportunities along the Blue, Orange, and Silver lines;
- A range of options for addressing those needs;
- A high level of stakeholder and public engagement;
- The selection of a locally-preferred alternative (LPA);
- The opportunity to adopt the LPA as part of its long-range transportation plan; and
- The necessary documentation to apply for federal transportation funds.

Once it has been approved, the LPA will advance through separate federally-guided processes for project development, environmental review, and project design.

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Past News

Appendix E:

Public Comments

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BOS Capacity and Reliability Study

Website Comments

Name	Email	Location	Comment 1	Rationale	Comment 2	Rationale	Comment 3	Rationale
Peggy Darlington	subway-buff@mindspring.com	Winchester, VA	Opposes SV turnbacks	SV Phase 2 will serve Dulles; people with luggage will opt for a different travel option if forced to transfer, especially if it's a second transfer (noted Union Station).	Supports a 2nd Rosslyn Station and New Blue Line	Will address capacity constraint without forcing turnbacks. She was a NYCT station agent and served on Amtrak citizen committee, saw similar capacity constraints. Noted her recommendations ended up being agency proposal.	Wants comment recorded in official records and urges New Blue as LPA.	N/A
Tony Dragon	anthony.dragon@juno.com	N/A	Recommends AM rush OR/SV + service to Franconia-Springfield (west to south) and PM peak Blue + F-S to Vienna (south to west)	Claims it would address 90% of congestion issue.				
Tino Calabia	fcalabia36@gmail.com	Chevy Chase, MD	Use the large advertising screens in Metro's stations to notify public about this study and other important invitiaties.					
N/A	ptourial@classic-concierge.com	N/A	Please run SV line at 6-minute headways.					
Lisa Sullivan	LisaDun4@hotmail.com	Reston, VA	Please run SV line at 6-minute headways with 8-car trains	She needs to be able to sit, especially as she ages. With SV starting at Wiehle she can usually get a seat, but worries she won't be able to when SV2 opens. She experiences severe crowding during peak travel already, especially in	Consider turning around SV line somewhere around Eastern Market rather than sending it all the way to Largo.	Believes it may allow Metro to more easily run SV at 6-min headways.		